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EDITORIAL

THE ANAESTHETIST: A PERIOPERATIVE PHYSICIAN

Perioperative medicine has been defined as "the continuum of patient care involving preoperative evaluation and preparation, pre-anaesthetic assessment, intraoperative care, and the management of systems and personnel supporting these activities" and the Anaesthetist is said to be a physician trained in anaesthesia and perioperative medicine[1-2].

The field of anaesthesia has changed over the years when the principal function of an anaesthetist was to render patients unconscious for surgery[3]. Anaesthetists' extensive knowledge of physiology and pharmacology coupled with inroads into neuraxial blocks has opened other avenues for anaesthetists to operate[4,5]. Advances in ultrasonography and x-ray technology have improved and expanded use of neuraxial blocks for management of acute and chronic pain. Anaesthetists are the pacesetters in most pain clinics/therapy units throughout the world. Development of pain medicine have been slow in Ghana and at present Komfo Anokye Teaching Hospital in Kumasi is the only centre which provides routine chronic pain therapy services.

Given their vast knowledge of biochemistry, physiology and medicine, anaesthetists are providing intensive care services in most of the tertiary and some of the regional hospitals in the country. In high income countries, *intensivists* recruited from internal medicine, paediatrics and surgery organise and manage intensive care units. These countries have fellowship programmes for intensive care medicine and qualified doctors manage intensive care units, although some of the fellows may have other roles in their original specialties. Almost all intensive care units in Ghana are currently managed by anaesthetists and their limited numbers must increase if intensive care morbidity and mortality are to reduce. Cardiopulmonary Resuscitation (CPR) is a basic core topic in every aspect of the anaesthetists training programme and CPR training is spearheaded by the Anaesthesia Faculty of the Ghana College of Physicians and Surgeons. Airway maintenance which is important in CPR and the expertise of anaesthetists is unsurprisingly featured in this current issue of the journal.

Anaesthetist-directed preoperative clinics have helped to prepare patients for surgery, reduced cancellation of cases, modified patient drug therapy, discovered other systemic disease and counselled patients when patients were confused or distressed because of scheduled surgery. This may reduce waiting lists in the hospital and help in the efficient management of theatre space and time[6]. Postoperative visits by anaesthetists have been shown to improve outcome in patients after major surgery and is said to improve on utilisation of resources in hospitals[7].

Anaesthetists with the co-operation of surgeons, transfusion specialists and laboratory technologists have also championed perioperative blood conservation. Anaesthetists have been involved in preoperative haemoglobin augmentation, promotion of preoperative blood donation, normovolaemic haemodilution and intraoperative/postoperative blood salvage. These reduce the transfusion of allogeneic blood in the perioperative period and save blood for patients in dire need of blood[8].

There are at present about 23 Fellows in anaesthesia, 10 with Membership and 10 who are Diploma holders in the country. The numbers are certainly not great. However anaesthetists have published articles in most of the last four issues of the Journal, including this issue on various topics thus, showing their versatility[3,8]. The career opportunities are upbeat and with the current training programmes from the Ghana College of Physicians and the West African College of Surgeons, more doctors are being encouraged into the specialty.

In conclusion, anaesthetists have a major role to play in the management of patients outside the theatre. This role is expected to increase as more physician anaesthetists are trained in the various subspecialties of the profession. Creation of sub-specialisation "Fellowships in Intensive care and Pain" by the Ghana College of Physicians and Surgeons will stimulate the recruitment of more physicians into the specialty.

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COMMENTARY

HIV IN GHANA

The Human Immunodeficiency Virus (HIV) kills the body's immune cells and AIDS is the most advanced form of the HIV infection. The first case of the disease was detected in Ghana in 1986 in Accra[1,2] and since then, it has spread throughout the country. Initially it was most prevalent in Eastern Region, and was linked to indigenes who had returned home after being infected in neighbouring countries notably, Cote d'Ivoire[1]. The country established AIDS Control Programme (ACP) in the Ministry of Health with support from the World Health Organization (WHO)[3]. Preparatory efforts started as the National Technical Committee on AIDS and later became National Advisory Council on HIV and AIDS in 1985. The Council evolved into the National AIDS Control Programme (NACP)[3]. The initial emphasis of the programme was on Prevention, with the flagship slogan of "Abstinence, Being faithful to partner and Condom use" (ABC). The Ghana AIDS Commission (GAG) was established in 2000 and was placed directly under the office of the President, for policy guidance[3].

The HIV/AIDS epidemic in Ghana is described as: "established low level generalized epidemic" with mostly higher prevalence among certain communities and special groups[4]. The current national HIV prevalence (2013) among the entire population is 1.5% (the lowest ever recorded)[4]. Estimates of HIV prevalence among female sex workers is just under 4.5%, while it is about 2.6% in men who have sex with men[4]. The median HIV prevalence was 3.6% in 2003 dropping to 1.8% in 2008 as per sentinel surveillance data among antenatal clinic (ANC) women[4]. The current median HIV prevalence (2013) is 1.9%[4]. The median HIV prevalence among ANC clients ranged from 0.2% in Naleringu (rural) to 10.1% in Agormanya (rural/urban)[4]. HIV prevalence at regional level ranged from 0.8% in the Northern and Upper West regions to 3.7% in the Eastern Region. With respect to age variation, the highest prevalence was recorded within the age group 45-49 years, and the lowest (0.8%) within the 15–19 year age group[4].

In the nationwide Study of Ageing and Adult Health in Ghana by WHO (SAGE Wave 1, 2008)[5] the prevalence of HIV was estimated among persons 50 years and above. The prevalence was 2.3% for the age group 50-59 years; 3.0% for the 60-69 years age group and 1.3% in those 70 years and above[5]. In this older population as well, rural-urban disparity in the prevalence of HIV was demonstrated. The rural prevalence was 1.8% and urban prevalence was 2.6% [5]. Again sex differences existed in HIV prevalence among the older population. It was 1.9% in males and 2.4% in females[5]. This shows that older adults are sexually active and also at risk of HIV infection and should be considered in national HIV prevention activities.

In Ghana, the predominant HIV sub-type is HIV type 1, and constituted 97.1% of all infections per national HIV surveillance data 2013[4]. This has implication for programmatic activities and treatment. HIV Type I (unlike the type 2) is more amenable to the current National antiretroviral therapy (ART) regimen[3]. Overall trend analysis of the HIV prevalence in the country since 2000 shows a declining epidemic[4].

The national response involved the National Strategic Framework (NSF) in three phases[3]. The NSF I was from 2001 to 2005, NSF II 2006 to 2010 and currently, the National Strategic Programme 2011 to 2015 to provide guidance for comprehensive care which involves – HIV testing and Counselling (HTC), Prevention of Mother to Child Transmission of HIV (PMTCT), Anti-Retroviral Therapy (ART), sexually transmitted infection (STI) management, Blood safety, Behavioural change communication and targeted risk reduction programmes[3]. The national response has enhanced the scale-up of HTC and ART in hospitals and health centres in several districts in the ten regions of the country. This involved the training of health personnel, development of national guidelines and establishment of supporting data capturing systems[3]. This has been supported by international partners and engagement of private health sector in care and support services for persons living with HIV (PLHAs)[3].

The programme has achieved some successes and services have improved consistently over the years in terms of quality, including availability of anti-retroviral drugs (ARV) at an affordable cost. Testing and counselling sites have increased in number. From three ART centres in 2003 when the ART programme began, there are now over 160 sites providing ART in the country[6]. In 1996, 166 (59.7%) of 278 HIV/AIDS patients admitted to the Korle Bu Teaching Hospital died, compared to 155 (30.4%) of 510 HIV/AIDS cases admitted to the same hospital in 2011[7]. Since May 2003 when ART was introduced into Ghana, a cumulative total of 65,342 people have been initiated on therapy as at the end of 2011[6]; this number has been increasing since. The Ghana Health Service through the NACP and the Ghana AIDS Commission have increased awareness in the community, decreased stigma surrounding HIV infection, increased motivation of health workers, decreased expenditure on opportunistic infections and have provided palliative care. HIV and AIDS in Ghana is recognized as a threat to the country's development. There is a need to strengthen the prevention component of the comprehensive package in the continuum of care

and the national response, and to improve data management and information generation to guide priorities[3]. A comprehensive and truly integrated national response at all levels is essential in the light of funding gap being experienced in the country[3]. Increased national commitment in the face of dwindling donor support for HIV activities is critical.

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ORIGINAL ARTICLES

A REVIEW OF NATIONAL PROGRAMME DATA ON THE HIV EPIDEMIC IN GHANA: 2005-2010

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Abstract

Introduction: Enormous national efforts have gone into combating the HIV epidemic in Ghana. This study reviewed data from the National AIDS/STI Control Programme over the period 2005-2010, in terms of time, place and person characteristics of the epidemic. It focused on past and current efforts at combating the epidemic and what future efforts are required.

Methods: It was a descriptive review of data from HIV sentinel surveys (HSS) and annual reports of the National AIDS/STI Control Programme (NACP) from 2005 to 2010. The review was conducted in 2011. The analysis described reported HIV and AIDS cases in the general population, median prevalence of HIV among pregnant women (15-49years), and AIDS related mortalities. Also, number of clients on ART, and those lost to follow up was analyzed. These characteristics were disaggregated by sex, age groupings, location and by administrative regions.

Results: The review demonstrated an increasing trend in the annual new HIV+ cases. However, the median HIV prevalence amongst pregnant women over the period was declining. There were clear age and regional or urban/rural differences in HIV prevalence in the country. National coverage for ART was 26% in 2009 and 35.2% in 2010. Number of clients on ART lost to follow up increased over the period, especially from 2008 onwards; it was 4.9% in 2008 and 9.2% in 2009. Over the entire review period (2005-2010), number of patients lost to follow up was over a hundred fold.

Conclusion: Ghana has made good progress in combating the HIV and AIDS epidemic, however there are challenges. National coverage of ART was low, and patients lost to follow up were high. The unmet need for ART though comparable to that of other African countries, poses major challenges to Ghana's quest to reverse the HIV epidemic. Policy measures to increase ART coverage and limit loss-to-follow up are still paramount.

Keywords: Antiretroviral therapy, HIV and AIDS, HIV sentinel survey, Ghana, Median HIV prevalence.

Introduction

HIV was first confirmed in Ghana at the Noguchi Memorial Institute for Medical Research in 1986[1,2]. The infection has since spread to all parts of the country and is established within the whole society. In 2010, HIV prevalence was 1.5% in the adult population and 2.0% among pregnant women aged 15-49 years[3]. Although the national prevalence is relatively low compared to other African countries[4-8], there are pockets of high prevalence in select geographic areas and among select risk groups[3]. There is a higher prevalence in urban sites compared to rural sites, as is true worldwide; HIV prevalence in Ghana is consistently higher among at-risk groups such as commercial sex workers, clients at STI clinics and long distance truck drivers[3,9]. These sub-populations with higher prevalence and risk of transmission constitute a reservoir for sustaining an epidemic[10,11] .

Since the first case of HIV was diagnosed, enormous national and international efforts and resources have been expended through the National HIV and AIDS response to contain the epidemic[9,12,13]. The National response started as the National Technical Committee on AIDS and later became National Advisory Council on HIV and AIDS in 1985. The Council evolved into National AIDS/STI Control Programme (NACP) in 1987. The NACP has since been the lead agency in the health sector response to HIV and AIDS in Ghana[1]. The NACP in combating the epidemic, has been involved in behaviour change communication programmes, HIV testing and counselling, provision of antiretroviral therapy, prevention of mother-to-child transmission of HIV, early infant diagnosis of HIV, prevention and

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management of STIs including condom use, safety in blood and blood products, advocacy and research[1,3].
The NACP has since 1992, been conducting HIV Sentinel Survey (HSS) annually to provide data on the epidemic. In the last six years (using 2011 as base year), HSS data have been used as the primary data source for National HIV and AIDS estimates in Ghana. Over the 19 years, huge efforts have gone into the process of generating high quality data for HIV estimates and projections in the country[14] because the data is critical for planning and implementation of programmes within the National Response[15]. It is useful for understanding the magnitude of HIV and AIDS epidemic and for monitoring impact of interventions.

Generation of HIV prevalence data in Ghana is done using UNAIDS/WHO recommended methods[14]. The method used to calibrate the HSS data is based on the Estimation and Projection Package (EPP) software of the UNAIDS[14,16]. In Ghana, HIV prevalence is primarily based on sentinel surveillance among pregnant women attending Antenatal Care (ANC) clinics and a national population based survey that includes HIV testing[17]. Analysis of combined data from sentinel surveillance and population-based surveys provide a clear picture of both overall trends and geographical distribution of HIV. The HSS Report therefore represents prevalence among pregnant women while the National HIV Prevalence Estimates (derived from HSS data calibrated with Demographic and Health Survey (DHS+) data) indicates the national HIV prevalence rate for Ghana[14,18] .

The goal of this analysis is to describe the HIV epidemic in Ghana over the last six years (2005-2010) in terms of time, place and person characteristics based on HSS data and annual reports of the NACP. It aims at determining who is affected and where in the country, as well as direction of the epidemic in the general population, among high risk groups and in different geographical areas of the country. In addition treatment efforts in combating the epidemic is described in terms of who is getting treatment and from which part of the country. This analysis has potential value for the Ministry of Health/Ghana Health Service and the NACP in their quest to provide universal access to HIV testing and counselling (HTC), PMTCT and Antiretroviral Therapy (ART) for all who need the services and also inform policies on the national response to HIV and AIDS epidemic.

Methods:

Data Source

The NACP under the Ghana Health Service provides comprehensive HIV and AIDS services to all persons living with HIV and AIDS in Ghana. As of the end of 2010, over 1,000 Testing and Counselling and PMTCT Centres, and over 140 ART Centres were available in the country for HIV and AIDS services[2,8]. HIV testing and counselling (HTC) is done by well trained counsellors in all health facilities and the HTC services are free. In this study we reviewed HIV sentinel survey (HSS) reports and annual reports of the NACP from 2005-2010. The HSS report is produced annually from sentinel surveys across all sentinel sites in the country and the annual reports provide a summary of all activities and service provision data by the NACP.

The annual reports contain data on reported HIV and AIDS cases. Data on reported AIDS cases is collected using the universal case reporting system i.e. Integrated Disease Surveillance Response (IDSR)[1]. AIDS case reporting has been used by the Ministry of Health to assess the magnitude of the HIV and AIDS problem in all the ten regions and provide an approximate picture of the distribution of AIDS cases and changes over time in the country[1] .

HIV sentinel survey in Ghana

The HIV Sentinel Survey (HSS) is a cross sectional survey targeting women attending antenatal clinics in selected ANC sites in Ghana. The annual HIV sentinel surveillance system was initiated in 1992. It is based on the premise that prevalence of HIV among pregnant women is a good proxy indicator of the spread of infection among the populace. In the last six years, the HSS data have been the primary data source for National HIV and AIDS estimates in Ghana. Currently forty sentinel sites have been established in all ten regions of Ghana; each region has at least three sites. There are twenty three urban and seventeen rural sites. The number of sites has increased over the years from 24 in 2002, to 35 in 2004 and to 40 since 2005. The increase ensures a balanced representation of rural/urban areas in the determination of HIV prevalence in Ghana. The number of sites has remained same since 2005.

Quality improvement measures in HIV sentinel survey in Ghana

Measures employed to improve quality of data obtained from the HSS are described below:
Selection of sentinel sites follow strict predetermined criteria and aims at ensuring sites are located in different geographic areas and represent each geographical region in the country. Each of the ten regions has at least three sites including a minimum of one rural site. All selected sites provide antenatal care and sexually transmitted infection (STI) services. A standard sampling scheme is used in the selection of the survey population. The populations for HIV sentinel surveillance are adults aged 15 to 49 years including, pregnant women attending antenatal clinics (ANC) and male and female clients seeking treatment for Sexually Transmitted Infections (STIs) at STI Clinics during the survey period.

All first time ANC clients within the survey period are eligible for inclusion and those reporting for repeated visits are excluded. Samples are collected through unlinked anonymous methods (i.e samples have code numbers not names). Basic data including

age, sex, date of collection, name of site; district and region are recorded on site. The World Health Organization's HIV Testing Strategy II for surveillance[14] is used to screen the samples. The laboratories at the peripheral sentinel sites and regional level use Rapid Tests (First Response I and II) and confirmation for HIV is done at the National Public Health Reference Laboratory (PHRL) in Accra using Immunoblot (INNOLIA). Sample screening at the sentinel site is done soon after collection or sera stored at 2-8 degrees centigrade for not more than 3 days. All samples at urban sites are screened at the site and samples from rural sites are stored (not more than 3 days) and transferred to an urban testing site for immediate testing. The Public Health Reference Laboratory currently holds all samples submitted for confirmation for a period not less than three years.

In addition to the above measures, early selection and evaluation of test kits and training of laboratory staff are done prior to each annual survey. All reactive samples are re-tested at the PHRL for confirmation and 10% of all non reactive samples are also randomly selected from each sentinel site and tested at PHRL. External Quality Assurance Testing is also employed; two reactive samples and three non-reactive samples from each site are sent to the Noguchi Memorial Institute for Medical Research (NMIMR) in Accra, for testing. NMIMR is the external quality assurance institution[14].

Data Analysis

Data on outcome measures of interest for this analysis were pooled from Annual HSS reports and NACP Annual reports from 2005 to 2010. Outcome measures analyzed included; annual reported HIV and AIDS cases in the general population, median prevalence of HIV among pregnant women (15-49years) and annual AIDS related deaths in the country (AIDS related deaths are deaths in clients living with HIV and AIDS attributable to opportunistic infections or causes directly attributable to HIV infection). Current number of clients on ART, annual proportions of clients who stopped treatment, and clients on ART lost to follow up or lost due to AIDS related mortalities were analyzed. Outcome measures were disaggregated by sex, age groupings, location (urban/rural) and by administrative regions for the period 2005-2010.

Missing data from HSS and annual reports were minimal accounting for less than 1% of data source, and therefore data from all regions and sentinel sites were included in the analysis. Data were entered into Excel files (Microsoft Excel 2007) and imported into SPSS (version 19) for analysis. Descriptive statistics (e.g. frequencies, ratios, proportions, percentages and median) were used for the analysis. Clearance on use of data was given by authorities of the NACP of the Ghana Health Service.

Results

1. *Pattern of HIV and AIDS epidemic among all age groups in Ghana*

i. Pattern of reported HIV cases from 2005-2010

As demonstrated in Figure 1, there has been a progressive increase each year, in the annual HIV and AIDS cases reported from health institutions from 2005-2010. In the year 2005, 104,995 HIV cases were reported compared to 2010, where 199,384 HIV cases were reported; a percentage change in the number of HIV+ persons of 90.0%.

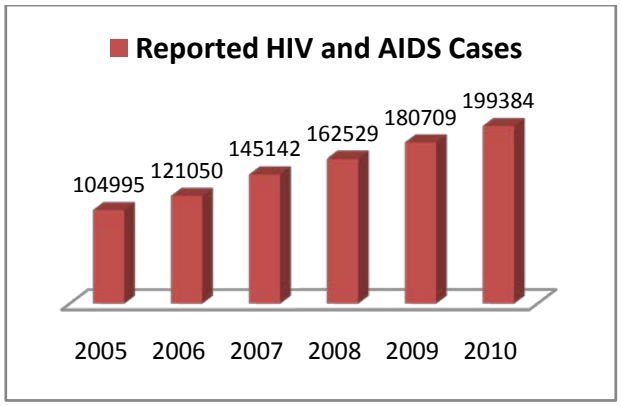

Figure 1: Overall annual reported HIV and AIDS cases from health institutions in Ghana (2005-2010). Source: Annual Report, National AIDS/STI Control Programme, Ghana Health Service, 2010

ii. *Reported HIV cases across the regions, 2005-2010*

The annual reported HIV+ cases varied across the ten regions of Ghana as indicated in Figure 2. The pattern in Eastern region varied completely from the others. Except in year 2005, during which Greater Accra region reported the highest number of new cases, Eastern region had the highest number of cases over the period 2006-2010. Figure 2, shows a huge jump in the annual HIV cases reported from 3287cases in 2006 to 12259 in 2007 in Eastern Region. In terms of percentage contribution to total reported HIV+ cases seen in Ghana, Eastern region contributed over 50% in 2007 and 2008 and over 30% in 2009 and 2010.

In the other nine regions, the highest annual reported new HIV+ cases over the six-year period was 3690 in Greater Accra region in 2005 and the lowest number was 39, in Northern region in the same year. Northern region had the lowest number of new HIV+ cases in each of the six years (except in 2006 when Upper West region had the lowest number).

2. Pattern of the epidemic among pregnant women (15-49 years) and other High risk groups, 2005-2010

i. *National and regional median HIV prevalence in Antenatal Women, 2005-2010*

Figure 3 demonstrates the median HIV prevalence linear trend analysis curve over the last decade (2000-2010); included to show the prevailing trend prior to the review period. It shows a steady increase in median prevalence from 2.3% in 2000 to 3.6% in 2003.

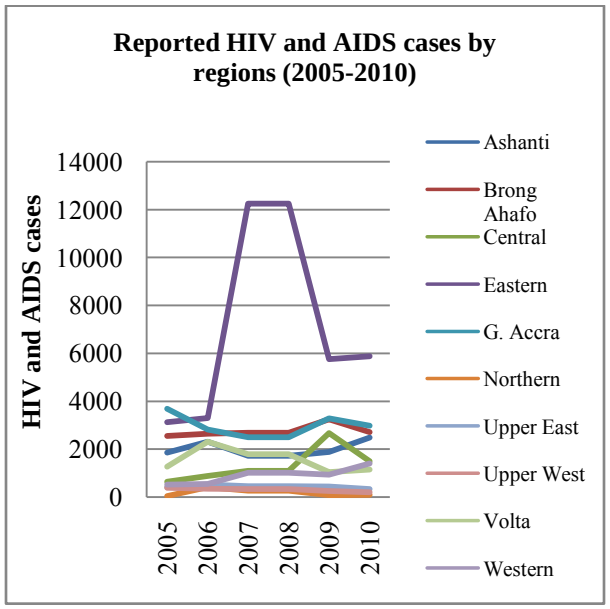

Figure 2: Reported annual new HIV+ cases across the ten regions (2005-2010). Source: Annual Report, National AIDS/STI Control Programme, Ghana Health Service, 2010

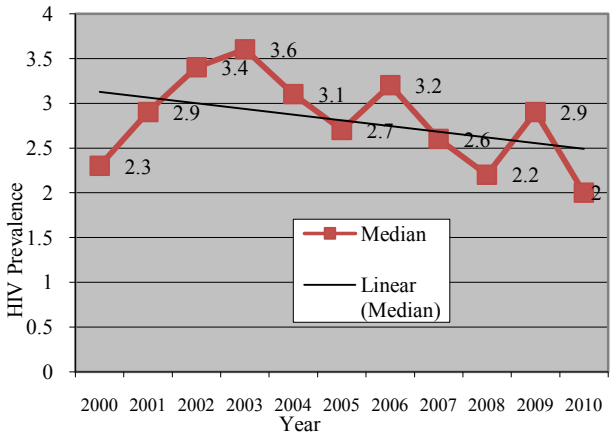

Figure 3: Median HIV Prevalence with Linear Trend, 2000- 2010. Source: HIV Sentinel Survey Report, National AIDS/STI Control Programme, Ghana Health Service, 2010.

The median HIV prevalence by region is demonstrated in Figure 4, and Eastern region had the highest median HIV prevalence among the regions and Northern region had the lowest in antenatal women from all sentinel surveys over the period 2005-2010, (similar to trends in reported HIV+ persons in all age groups). Most of the regions had median HIV prevalence declining during the review period; regional median HIV prevalences were relatively higher in 2005 in most of the regions than in 2010, except Upper East region which had indeed showed progressive increases in prevalence since year 2008. In 2005, the highest median prevalence was 4.9% (in Eastern region) and decreased to 3.2% in 2010 (also in Eastern region).

ii. Patterns of median HIV prevalence by age group, location, among high risk groups and virus type, 2005-2010

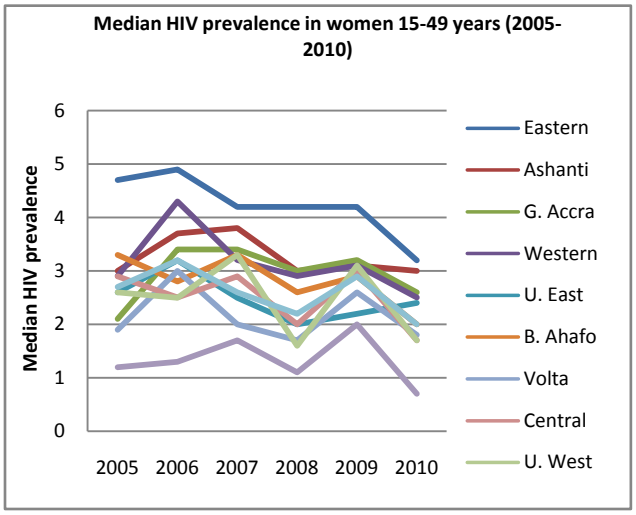

Figure 4: Regional median HIV prevalence in antenatal women, 2005-2010. Source: Annual Report, National AIDS/STI Control Programme, Ghana Health Service, 2010

The prevalence of HIV among antenatal women has varied within the various age groups and over the period 2005 to 2010 as indicated in Table 1. Women in age group 25-29 years have consistently had relatively high median prevalence; indeed this age group had the highest prevalence from 2006 to 2009. The highest prevalence for this age group was 4.2% in 2006 and the lowest was 2.5% in 2010. In 2010 however, age groups 30-34 and 35-39 years had the highest prevalence of 2.8%. Over the review period the highest prevalence rate ever recorded was 5.0% among the 45-49 years group in 2005, and the lowest ever was 0.8% in the 15-19 years group. The 15-19 years group has consistently had the lowest prevalence among all the age groups from 2005-2010.

Table 1: Median HIV Prevalence by Age groups, location and among a high risk group (STI clients)

Age Group (Years)	2005	2006	2007	2008	2009	2010
15-19	0.8	1.4	1.6	1.2	1.9	1.1
20-24	2.4	2.9	2.9	2.3	2.2	2.7
25-29	3.6	4.2	3.5	3.0	3.7	2.5
30-34	3.2	3.7	2.9	2.8	3.4	2.8
35-39	2.4	2.8	3.5	2.9	3.6	2.8
40-44	3.7	3.3	1.7	1.8	4.0	2.1
45-49	5.0	2.5	1.3	2.6	1.8	2.7
Geographical Location						
Urban	2.9	3.4	3.4	2.6	3.6	2.4
Rural	2.6	2.8	1.9	2.1	2.2	1.6
High Risk Groups						
STI clients	7.0	4.1	5.1	10.5	5.5	5.3
National	2.7	3.2	2.6	2.2	2.9	2.0

The median HIV prevalence has always been higher in women from urban sentinel sites than rural sites for each of the years reviewed as shown in Table 1. Among clients from sexually transmitted clinic sites (male and females ages 15-49 years), the median HIV prevalences were much higher than the national rates in each of the years reviewed. It ranged from 4.1% in 2006 to 10.5 % in 2008. Indeed, median prevalence among STI clients in 2008 was four times that of the national rate.

Distribution of HIV Types: Overall, the distribution of HIV type responsible for all HIV infections in the sentinel survey showed HIV type1 to be the most predominant form accounting for over 90% of all infection from 2005-2010. HIV type 2 only infections ranged from a low of 1.4% in 2007 to 5.2% in 2009. Mixed HIV 1 and 2 infections also ranged from 0.4% in 2005 to a high of 4.7% in 2006.

3. *Reported HIV and AIDS mortality patterns across the regions*

As indicated in Figure 5, pattern of reported annual AIDS-related deaths was highest in three regions : Eastern, Greater Accra and Brong Ahafo. Greater Accra region had the highest mortalities in 2005 but the numbers decreased between 2009 and 2010. Interestingly, from being the region with highest mortality in 2005, Greater Accra (the capital region) had the fifth highest rate by end of 2010.

On the other hand, AIDS related mortalities in Eastern region increased progressively from 2005 to 2009. Although mortality rate declined between 2009 and 2010 in Eastern region, the region still had the highest number of AIDS related deaths amongst all 10 regions in the last two years of the review period (2009 and 2010).

It is important to note the mortality pattern in Ashanti region (the most populous region in Ghana), from being the region contributing only 3.5% of the national AIDS related deaths in 2005, the rate had increased progressively to 15.4% of the annual national AIDS related deaths by the end of year 2010.

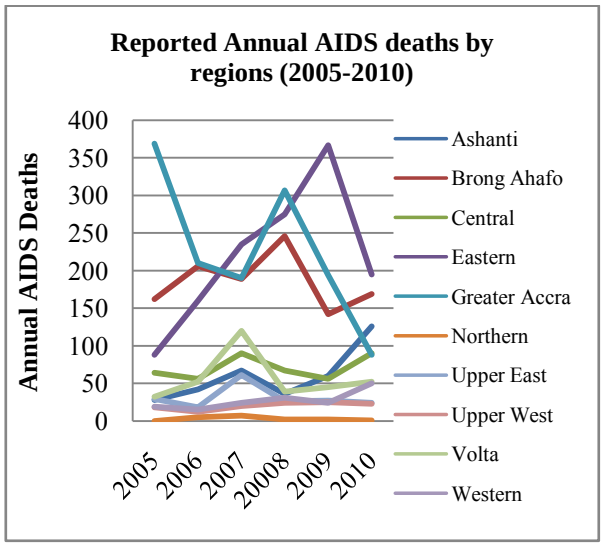

Figure 5: Reported Annual AIDS related deaths in the regions (2005-2010). Source: Annual Report, National AIDS/STI Control Programme, Ghana Health Service, 2010

4. Treatment efforts at combating the epidemic (ART Service provision in Adult and Children, 2005-2010)

In 2005, the cumulative number of persons on ART (adults and children) was 4,060 and this number increased over the period to 47,559 by December 2010, (as shown in Table 2) and represents an increase of over eleven-fold . This increase is for both adult and children and corresponds to increases of over eleven-fold among adults and a much higher increase of over seventeen-fold for children. Despite this progressive increase in enrolment of HIV+ on ART, AIDS related deaths even in clients on ART have also increased from 162 deaths in 2005 to 2550 deaths in December 2010; over fourteen-fold increase in persons of all ages, 14 fold increase among adults and over 30 fold increase in children. Although absolute numbers of AIDS related deaths were fewer in children, there were increases over the period 2005-2010.

From Table 2, some HIV+ clients on ART stopped the treatment and others could no longer be traced (i.e described as lost to follow up). Number of client who stopped treatment increased from 57 in 2005 to 243 in 2010, a change of 326%. However, in clients who were lost to follow up on ART, there were increases over the period especially from 2008 onwards.

Table 2: Characteristics of ART Service provision in Adult (15 years+) and Children (0-14 years), 2005-2010

End of Year	Age group	Cumulative number initiated on ART	Number of Deaths on ART	Clients who stopped treatment	Clients lost to follow up	Clients currently on ART (%)
2005	Adults	3,914	157	56	38	3,663 (94)
	Chn	146	5	1	3	137 (94)
	Total	**4,060**	**162**	**57**	**41**	**3,800 (94)**
2006	Adults	7,070	208	60	66	6,736 (95)
	Chn	268	6	2	3	257 (96)
	Total	**7,338**	**214**	**62**	**69**	**6,993 (95)**
2007	Adults	12,850	482	73	518	11,777 (92)
	Chn	579	29	5	7	538 (93)
	Total	**13,429**	**511**	**78**	**525**	**12,315 (92)**
2008	Adults	22,585	991	96	896	20,602 (91)
	Chn	1,029	64	6	13	946 (92)
	Total	**23,614**	**1,055**	**102**	**909**	**21,548 (91)**
2009	Adults	31,994	1,620	134	1,592	28,648 (90)
	Chn	1,751	96	9	29	1,617 (92)
	Total	**33,745**	**1,716**	**143**	**1,621**	**30,265 (90)**
2010	Adults	44,914	2,368	223	4,135	38,188 (85)
	Chn	2,645	182	20	56	2,387 (90)
	Total	**47,559**	**2,550**	**243**	**4,191**	**40,575 (85)**

Chn = Children (0-14 years).

It was 4.9% in 2008 and 9.2% in 2009; almost a doubling of the proportions lost to follow up. Indeed, increase in number of clients lost to follow (2005-2010) was over a hundred fold (10122%); the highest change in any of the outcome measures of interest. In spite of these losses to follow up and termination of treatment by clients, in all the six years reviewed (except 2010), HIV+ clients eligible for ART who were on treatment were in excess of 90% in both adults and children. In 2010, the last year of review, ART coverage was however, much lower 85% (in adults).

Discussion

This study reviewed National AIDS/STI Control Programme data by describing the time, place and person characteristics of Ghana's HIV epidemic over the period 2005 to 2010 and found an increasing trend in the annual new HIV+ cases. However, the median HIV prevalence amongst pregnant women over the period shows a linear trend downwards towards the right, indicating a decreasing trend. National and international efforts that have contributed to this level of attainment should be sustained.

The HIV epidemic is established within the whole society, and sub-populations with higher prevalence and risk of transmission constitute a reservoir for sustaining the epidemic[2,3]. Thus, although Ghana's national HIV prevalence is low, the epidemic continues to pose enormous challenges to health and social systems of the nation. This review showed that prevalence was highest among ages 20-49 years agreeing with global trends of HIV infections[19] and previous description of the pattern of HIV infection in Ghana[20]. This has health, economic and social implications for the entire population and especially among the active and productive population groups.

It is recognized that both sentinel surveillance and population-based surveys each have strengths and weaknesses but together provide complementary information. HIV Sentinel surveillance (HSS) provides samples that are consistent over time so that good estimates of HIV trends can be obtained. Population-based surveys, on the other hand, provide much better geographic coverage of the general population[13]. Analysis of combined data from sentinel surveillance and population-based surveys do provide a clear picture of both overall trends and geographical distribution of HIV. In Ghana, the HSS Report thus represents prevalence among pregnant women while the National HIV Prevalence Estimates which is derived from HSS data calibrated with Demographic and Health Survey (DHS+) data provides the national HIV prevalence rate[14].

Efforts at sustaining the annual HIV sentinel surveys are essential while other innovative measures (such as the use of HIV service provision data for national estimates) need to be pursued.

As the nation moves forward in its effort to halt the HIV epidemic, stakeholders, Government ministries/agencies and international partners should not see the low prevalence as an incentive for relaxing their efforts but more as a motivation to do more. It has taken enormous efforts and expense to achieve this level of prevalence[3]. Significant investments have been made by the Ghanaian government and their international partners in capital infrastructure and human resources for HIV related activities over the past decade[12]. In 2009, funds expended by the Ghana Health Service/National AIDS/STI Control Program on HIV services excluding the cost of Antiretroviral Therapy (ART) exceeded seven million US dollars. Almost half of this amount went into training health personnel for the provision of HIV Testing and Counselling (HTC) and ART related activities[3]. More resources are required to support existing initiatives to further reduce prevalence trends. However with current global economic downturn and resultant dwindling donor funds, African governments need to demonstrate greater commitment to this fight by investing more in HIV related activities. Governments in Africa need to commit resources (especially in the context of dwindling donor funds) to combating HIV epidemic, through support for behaviour change communication programmes, HIV testing and counselling, provision of antiretroviral therapy, prevention of mother-to-child transmission of HIV, early infant diagnosis of HIV, prevention and management of STIs including condom use, safety in blood and blood products, advocacy and research.

The review clearly demonstrates disparities in HIV prevalence rates across the 10 regions, between rural and urban locations and among clients with sexually transmitted infections (STI) and the general population. Over the period, urban HIV prevalence was higher than rural and much higher among clients with STI, demonstrating the socioeconomic dimensions of the epidemic. Eastern region had the highest number of HIV case among the 10 regions between 2005 and 2010. Indeed the Eastern region contributed over 50% of reported HIV+ cases for year 2007 and 2008. The high number of HIV+ cases reported in 2007 compared to 2006 in Eastern region may be attributed to the introduction of community based HIV testing campaigns-Know Your Status- introduced in 2007[3]. These campaigns increased overall testing in all regions; Eastern region being the region with highest HIV prevalence may likely have garnered more HIV+ results from the campaigns.

Distribution of type of HIV responsible for HIV Infections in the country from HIV sentinel surveys showed that HIV type I is the most predominant form accounting for over 90% of all infections. Type 2 only infections and mixed infections (type I and 2) constituted a small proportion. This pattern agrees with previously described pattern of HIV infection in the late 1980s in Ghana [21,22]. A policy implication of this finding is that although HIV type I is more infectious and progresses from infection to AIDS relatively more rapidly than HIV type [23,24], the type I is more responsive to first line antiretroviral (ARV) treatment regime in the country. Any further increase in prevalence of type 2 only or mixed infection will have consequences for therapeutic decisions and outcomes for these clients. Second line antiretroviral regime (ARV) may be required which is more expensive and available only at tertiary and regional health centres in the country.

The global expansion of Antiretroviral Treatment (ART) to HIV patients has transformed what was once a deadly disease into a manageable chronic condition. ART restores health of most HIV patients and also reduces likelihood of forward transmission, whether through sex, delivery, or breastfeeding[25]. There is undeniable evidence that antiretroviral therapy decreases mortality and morbidity in persons living with HIV[26-28].

Efforts by World Health Organization, Global Fund and other public and private organizations have ensured the scale-up of ART in resource-constrained settings over the last decade[3,29]. In Ghana, a total of 33,745 people were receiving ART by end of 2009, and 90% of these were still on ART at time of review. Over the period (2005-2010), national efforts have increased access to ARVs through expansion of ART centres in the country. Despite these efforts, data from Ghana Health Service/NACP annual report of 2010 indicate the national coverage for ART was 26% in 2009 and 35.2% in 2010[3,11]. This unmet need is comparable to other African countries, for example neighbouring Nigeria, where HIV treatment coverage was only 21% at the end of 2009.

From the review, two regions with the highest AIDS related deaths (Eastern and Greater Accra) showed declines between 2009 and 2010, most of the other regions with lower AIDS related deaths however, showed increases. Estimates from national programme data expect AIDS related mortalities to decline in the coming years[30] if current national efforts continue. National efforts at combating the epidemic however, need to be targeted. Annual reports of NACP indicate rapid increases in HIV Testing and Counselling (HTC) centres across all 10 administrative regions in Ghana[3]. Establishment of these HTC centres has been strategic, responding to needs of high prevalence geographic areas. For instance, Eastern region has had the highest percentage increase in establishment of these centres over the period 2005 to 2010[3]. The tendency to concentrate attention on areas with relatively higher prevalence while underserving areas with much lower HIV prevalence should be vigorously guarded against.

Mortality from AIDS remains high in Africa due to extensive unmet treatment needs and Ghana, despite its efforts in the fight against HIV/AIDS, still has a long way to go. Regarding age-specific mortalities, it is instructive to note that, HIV epidemic exerts higher toll of mortality among younger and economically productive groups. Implying greater number of HIV orphans and its social ramifications and decreased economic productivity. In sub-Saharan Africa, it was estimated that by 2010, about 18 million children would have lost one or both parents to AIDS. Even in countries where HIV infections have plateaued, number of orphans continue to rise due to the time lapse between infection and death of parents[31]. Children (0-14 years) the cherished next generation is not being spared by the epidemic.

While globally, HIV prevalence - percentage of people infected with HIV has levelled off, the total number of people living with HIV is increasing because of ongoing acquisition of HIV infection, combined with longer survival times, in a continuously growing general population[32] . This increased number of HIV patients implies an increase in numbers requiring ART. ART have proven to reduce mortality in persons living with HIV and AIDS. To reduce annual mortality in clients living with HIV demands that no effort is spared in putting as many clients who require ART in Ghana, on treatment. Numbers of clients being lost to follow up or terminating their ARV treatment was observed to have increased over from 2005 to 2010. Thus, while attempting to put more HIV+ persons requiring ARVs on treatment, policy attention should be directed towards reducing the number of clients who are already on treatment and are being lost to follow up, or are terminating their treatment. A policy to qualitatively assess issues regarding this phenomenon is worth pursuing by the Ghana Health Service/ NACP as they continue to lead key HIV intervention areas (such as research, surveillance, prevention, treatment, care and support services) in the nation.

Limitation of study:

Review was for the period 2005-2010, a rather short period of six years which may be a potential limitation of the analysis. The period was however, chosen to reflect current trends of HIV infection in Ghana and also to be able to compare annual trends with a period where similar methods were used in estimating prevalence of HIV among the target population included in the review.

Conclusion:

Ghana's HIV and AIDS epidemic is on the decline, however there are challenges. The low coverage of ART and increases in numbers of clients already on ART who are being lost to follow up or are terminating treatment (from 2005 to 2010) are major challenges. The decline in Ghana's HIV epidemic has been due to deliberate and sustained efforts from the nurse conducting HIV testing at the most peripheral of the health system, the midwife enforcing adherence to PMTCT guidelines in her clients, the doctor, pharmacist, laboratory personnel and counsellors at the various ART centres, the regional HIV coordinators, national level personnel and all local and international partners. It is not time to retreat and relax or relent in the battle against the HIV epidemic in Ghana.

Disclaimer

The views expressed in this paper are those of the authors. No official endorsement by GHS/NACP is intended or should be inferred.

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ASYMPTOMATIC BACTERIURIA AND DRUG SUSCEPTIBILITY PATTERNS OF MID-STREAM URINE SPECIMENS AMONG PREGNANT WOMEN AT BOOKING IN A PRIVATE HOSPITAL IN KUMASI, GHANA

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Abstract

***Background*:**Urinary tract infections (UTIs) are common during pregnancy. Asymptomatic bacteriuria**(ASB)** can lead to the development of cystitis or pyelonephritis if left untreated and could eventually result in very serious sequelae.

Objectives: To determine bacterial isolates and drug susceptibility patterns of mid-stream urinary specimens among pregnant women who were asymptomatic for UTIat their first antenatal attendance (booking).

Subjects and methods: A retrospective review of urine results of antenatal attendants with no symptoms of UTI at booking from January 2010 to December, 2012 was done. As part of routine investigations at booking women provided mid-stream urinary specimens and bacterial isolates and drug susceptibility patterns were determined.

Results: The total number of women was 453 and significant bacteriuria was found in 45/453(9.9%) . The commonest bacterial isolates were *Staphylococcus aureus*18/45 (40%) and ***E. coli*** 15/45 (33.3%). All the bacterial isolates were sensitive to nitofurantoin and the least sensitivities were to erythromycin 13/45 (28.9%) and ampicillin 11/45 (24.4%).

***Conclusion*.** All pregnant women should be screened for bacteriuria at booking since the asymptomatic ones may have significant bacteriuria which could later result in serious infections and poor pregnancy outcomes. The choice of antibiotics used should be based on maternal factors and the gestational age.

Key Words: Pregnancy, Booking, Asymptomatic bacteriuria, Staphylococcus aureus

Introduction

Significant bacteriuria is the finding of more than 10^5colony forming-units per ml. of urine[1].Asymptomatic bacteriuria (ASB) is defined as significant bacteriuria without symptoms of UTI[2].Women with ASB during pregnancy are more likely to deliver premature or low-birth-weight infants[3,4,5]. These pregnant women also have a 20 to 30-fold increased risk of developing pyelonephritis compared with women without bacteriuria[6,7,8]. Other conditions including transient renal failure, acute respiratory distress syndrome, sepsis, shock and haematological abnormalities occur in cases where ASB is untreated or inadequately treated[9] .

Screening and identification of bacteriuria during pregnancy have been recommended.

The main goal of detecting and treating ASB in pregnant women is to prevent UTI and its consequences. The United Kingdom National Screening Committee [10] and The American College of Obstetricians and Gynaecologists recommend screening for asymptomatic bacteriuria in pregnancy [11].

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Conflict of interest: None declared

Escherichia coli is the most common bacterial isolate of UTI during pregnancy[12,13,14]. Other studies have also reported *Klebsiella* species[15] and *Staphylococcus aureus*[16]as the commonest isolates.

Most published studies on ASB in pregnancy have been from the developed world. In developing countries almost all studies on this subject have been in teaching hospitals.

This study was conducted in a private hospital and determined the pattern of ASB among all patients presenting for the first antenatal visit during the study period.

Subjects and methods

In this retrospective study, urine results of patientspresenting for their first antenatal (booking)attendance with no symptoms of UTI from January 2010 to December, 2012 were retrieved and analysed. At booking urine cultures we**re** done for the patient as part of routine investigations.

The study was conducted in Kumasi, Ghana at the Bomso Clinic, a Specialist Hospital situated in a busy cosmopolitan area close to the Kwame Nkrumah University of Science and Technology campus. The patients are local residents and others come from various private enterprises including mining companies, financial institutions and non-governmental organizations.The Hospital offers specialist services in Medicine,Surgery, Paediatrics and Obstetrics and Gynaecology. The details extracted included findings

on urine microscopy, culture and antibiotic susceptibility. The data were analysed using SPSS 15.0 for Windows. Associations were tested using chi square or Fisher's exact test as appropriate; the level of statisticalsignificance was set at $p < 0.05$.

Results

Table 1 shows the characteristics of the patients. The total number of patients booking for ante-natal care during the study period was 453.Significant bacteriuria (> 10^5 colony forming units/mL of urine) was found in 45/453(9.9%) of urine specimens.

. Of the 45 isolates, the commonest organism was *Staphylococcus aureus* 18/45(40%)followed by *Escherichia coli* 15/45(33.3%). The other isolates were *Streptococcus* species 5/45(11.1%), *Staphylococcus saprophyticus* 4/45(9%), *Proteus* species 2/45(4%) and *Klebsiella* species 1/45(2.2%).

Although no statistically significant association was found, the prevalence of significant bacteriuria was highest among women aged between 21 - 30 years, those of parity 1- 4 and in the second trimester.

Table 2 shows the sensitivities of the isolated organisms. All were sensitive to nitrofurantoin followed by gentamycin 42/45 (93.3%), ciprofloxacin 31/45(68.9%), nalidixic acid 27/45 (60.0%), and cefuroxime 24/45(53.3%). Antibiotics with less than 50% sensitivities were ceftriaxone 22/45(48.9%), augmentin 21/45(46.7%) and the lowest sensitivities were to erythromycin 13/45 (28.9%), and ampicillin 11/45(24.4%).

Table 1. Characteristics of patients (total number = 453)

Characteristic	No. of women with significant bacteriuria (n = 45)	No. of women without significant bacteriuria (n=408)	X^2 (p-value)/ Fisher exact test (*)
Age (range 16 to 43years)			
≤ 20years	0	4	*(p=0.44)
21 to 30 years	32	248	
31 to 40 years	13	148	
≥41years	0	8	
Parity (range 0 to 9)			
0	10	139	*(p=0.21)
1 to 4	35	266	
≥5	0	3	
Trimester			
First	14	102	$X^2 = 0.81$
Second	28	274	P=0.66
Third	3	32	

Table 2. Antibiotic susceptibility patterns of isolated organisms(Total = 45)

Antibiotic	Organisms (number and percentage of susceptible organisms)						
	Staph. aureus	*E. coli*	*Strept.* Species	*Staph. saprophyticus*	*Proteus* species	*Klebsiell a*species	**TOTAL**
N	**18**	**15**	**5**	**4**	**2**	**1**	**45**
Gentamycin	18 (100.0)	15 (100.0)	3 (60.0)	4(100.0)	1(50.0)	1(100.0)	42 (93.3)
Nitrofurantoin	18 (100.0)	15 (100.0)	5 (100.0)	4(100.0)	2(100.0)	1(100.0)	45 (100.0)
Erythromycin	6 (33.3)	3 (20.0)	2 (40.0)	2 (50.0)	0 (0.0)	0(0.0)	13 (28.9)
Co-trimoxaxole	7 (38.9)	5 (33.3)	1 (20.0)	1 (25.0)	0(0.0)	0(0.0)	14 (31.1)
Cefuroxime	7 (38.9)	12 (80.0)	2 (40.0)	2(50.0)	1(50.0)	0(0.0)	24(53.3)
Ampicillin	3 (16.7)	6 (40.0)	1 (20.0)	1(25.0)	0(0.0)	0(0.0)	11(24.4
Augmentin	5 (27.8)	10 (66.7)	2 (40.0)	2(50.0)	2(100.0)	0(0.0)	21(46.7)
Ceftriaxone	6 (33.3)	9 (60.0)	2 (40.0)	2(50.0)	2(100.0)	1(100.0)	22(48.9)
Nalidixic acid	6 (33.3)	15 (100.0)	3 (60.0)	1(25.0)	1(50.0)	1(100.0)	27 (60.0)
Ciprofloxacin	12 (66.7)	11 (73.3)	3 (60.0)	3 (75.0)	1(50.0)	1(100.0)	31(68.9)

Discussion

Prevalence

The prevalence of ASB among pregnant women shows wide variations across geographical regions. High rates of 86.6% and 63.3% have been reported from two regions in Nigeria[17,18,]. Rates of 7.0% were reported in Ethiopia[19]and 4-7% in Canada[20]. The rate of 9.9% in this study compares to rates of 7.3% [21] and 9.5% [22]in similar studies in the same region in Ghana. These rates in Ghana also fall within the reported range of 2 %–11% in most reviews [23,24].

These variations could be attributed to the fact that prevalence of ASB varies with geographical locations, age of the subjects, studied populations and diagnostic methods. The observed difference in the prevalence levels could also be linked to environment, social habits of the community, personal hygiene and educational level.

The prevalence tends to increase as pregnancy advances. The pressure effect of a much bigger uterus on the ureters, the increasing smooth muscle relaxing effect of pregnancy hormones and the pressure on the bladder from the descending presenting part, may all lead to stasis of urine, which will encourage bacteria multiplication. Furthermore, the immunosuppressive effect of pregnancy may be most pronounced in the third trimester.

In addition, certain chemicals such as glucose is released in to the urine which changes the pH of theurine and favour the growth of most pathogens present in the bladder[25]. Multi-parity falls within the age-group that experiences increased sexual activities which serves as a risk factor for UTI, as most of the bacterial pathogens isolated formed the normal flora of the vaginal region.

Organisms

In this study, *Staphylococcus aureus* was the commonest cause for ASB which is different from two studies in the same region in Ghana where ***E. coli*** was the commonest [21,22]. However this finding is similar to those of studies in Aba, Abia State[16]. And Edo-Ekiti, Ekiti State[26] both in Nigeria ***E. coli*** was the second commonest organism in this study.

The other organisms are all found in the genital region and changes in pregnancy including urinary stasis and sexual activity could encourage infection. The high prevalence rate of the urinary pathogens in the female population, especially pregnant women might not be a surprising issue considering the anatomical structure and the proximity of the genital tract to the bowel that allows for easy contamination.

Drug Sensitivities

As shown in Table 2 the isolates were highly sensitive to nitrofurantoin, the quinolones (ciprofloxacin and nalidixic acid) and the aminoglycoside gentamycin. The sensitivities were nitrofurantoin 45/45 (100.0%), followed by gentamycin 42/45(93.3%), ciprofloxacin 31/45(68.9%), nalidixic acid 27/45(60.0%), and cefuroxime 24/45(53.3%). Antibiotics with less than 50% sensitivity were ceftriaxone 22/45(48.9%) and augmentin 21/45 (46.7%). The lowest sensitivities were to erythromycin 13/45(28.9%), and ampicillin 11/45(24.4%). In this study the second generation cephalosporin cefuroxime was slightly more active against ***E. coli*** than the third generation cephalosporin ceftriaxone, although this was not statistically significant.

Most studies on ASB in pregnancy report high sensitivity to nitrofurantoin and gentamycin .Nitrofurantoin and gentamycin are both easily available and affordable, but their use are beset with some concerns . Nitrofurantoin is bactericidal and has a broad spectrum of activity against UTIs caused by gram-negative and gram-positive organisms. It is also administered orally.Nitrofurantoin should be taken with food to improve its absorption. It is contraindicated in patients with glucose-6-phosphate dehydrogenase (G6PD) deficiency because of risk of intravascular haemolysis resulting in anaemia. For the same reason, nitrofurantoin should not be given to pregnant women after 38 weeks of pregnancy, or who are about to give birth. Because safer alternatives are available, some experts consider quinolones contraindicated during pregnancy, especially during the first trimester. Nalidixic acid is only recommended for use during pregnancy when benefit outweighs risk[27].

The aminoglycoside, gentamycin is administered parenterally and could pose inconveniences as the patient has to have daily injections by trained health personnel. In our circumstances this would be disruptive to the patient's social and economic activities since she otherwise feels well. Gentamycin is used to treat many types of bacterial infections, particularly those caused by Gram-negative organisms. Gentamycin is also ototoxic and nephrotoxic, with this toxicity remaining a major problem in clinical use. Like all aminoglycosides, when gentamycin is given orally, it is not systemically active. This is because it is not absorbed to any appreciable extent from the small intestine. It is administered intravenously, intramuscularly or topically to treat infections.

It is noted that those drugs considered safe in pregnancy (ampicillin, augmentin, erythromycin) showed the least effectiveness in this study. This could support the assertion that this could be due to widespread and indiscriminate use/misuse as observed by other investigators[28]. Antibiotic prescription in pregnancy depends on proper assessment of the pregnant women by the physician, based on the pharmacokinetic property of the drugs, thereby evaluating the drugs side effect and level of toxicity for the patient and fetus.

Conclusion

The main goal of detecting and treating ASB in pregnant women is to prevent UTI and its

consequences. The value and cost effectiveness of routine screening for ASB in pregnancy is controversial. The choice of antibiotic should however be based on urine culture, stage of gestation, clinical data and the characteristics of the antibiotic.In our circumstances, the G6PD status of pregnant women should be determined at booking and where this is negative the quinolones could be administered because they are affordable and effective orally.

Health education about personal hygiene and cleanliness around the urogenital and anal area to prevent faecal contamination of the urinary tract should be emphasized during antenatal visits.

Urine microscopy and culture for screening for ASB at booking, and in each of the trimesters should be recommended. Identified cases should be treated with appropriate antibiotic therapy based on sensitivity tests.

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ADOLESCENT FEMALE GENITAL TRACT CONGENITAL ANOMALIES IN NORTHERN GHANA

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Abstract

Objective:To ascertain the types of adolescent female genital tract congenital anomalies and their management in the Tamale Teaching Hospital in Northern Ghana

Methods: A cross-sectional study of adolescent female genital tract congenital anomalies that were managed at the Tamale Teaching Hospital from 1st January 2010 to 31st December 2012.

Results: There were 19 cases of adolescent female genital tract congenital anomalies during the study period. The commonest female genital tract congenital anomaly was imperforate hymen 7(36.84%). Other congenital anomalies included transverse vaginal septum 4(21.05%), vaginal atresia 2(10.53%), vaginal agenesis 4(21.05%), didelphus uterus 1(5.26)% andbicornuate uterus 1(5.26%). The management of the adolescent female genital tract congenital anomalies included surgical procedures in 14 (73.68%), dilation of vaginal pouch, counseling and psychological support in 6 (31.57%).

Conclusion:While in resource limited settings, initial workup and management of adolescent female genital tract congenital anomalies may be done without sophisticated equipment, management of more complex cases are usually more challenging requiring referral to more appropriately staffed and equipped centres.

Key Words: Congenital, Adolescent female, Genital Tract anomalies, Tamale Teaching Hospital.

Introduction

The genital tracts remain undifferentiated in human embryos until the ninth week when the paramesonephric (müllerian) ducts begin to differentiate into structures of the female genital tract[1]. Absence of inhibiting substance produced by the testes in male foetuses makes the development of the derivatives of the paramesonephric duct in female fetuses possible[2].

Congenital abnormalities of the female reproductive tract can be caused by a genetic error or by a teratologic event during embryonic development[3]. Minor abnormalities may be of little consequence, but major abnormalities may lead to severe impairment of menstrual and reproductive functions[3,4]. Failure of development or fusion of the sino-vaginal bulbs results in abnormalities of the vagina such as transverse vaginal septum, vaginal atresia and vaginal agenesis[1,5]. Failure of canalization between the paramesonephric duct above and the sino-vaginal bulbs below will result in transverse vaginal septum in the upper vagina. The hymen which is a thin tissue plate at the junction of the sinovaginal bulbs with the urogenital sinus may fail to perforate during embryonic life resulting in an imperforate hymen[1,3,5].

Incomplete fusion or complete lack of fusion, atresia of one of the paramesonephric ducts results in abnormalities of the uterus[3,5,6,7]. Majority of the uterine abnormalities are usually non-obstructive and do not present with severe menstrual symptoms and may not be recognized during the adolescent period until pregnancy and childbirth begins[8,9,10]. Adolescent female genital tract congenital anomalies seen during the study period were mostly those of the hymen and vagina which obstructed menstrual flow with recurrent cyclical pains during the menarcheal ages.

Vaginal agenesis in which the karyotype is 46 XX i.e: Mayer-Rokitansky-Kuster-Hauser Syndrome, has a normal pubertal development due to presence of functioning ovaries but primary amenorrhea is present without cyclical pain because of an absent or infantile uterus[3,11]. In vaginal agenesis with karyotype 46 XY (androgen insensitivity), there is no uterus and the vagina is also absent or a short vaginal pouch may be present with undescended testicles[3,12]. Levels of testosterone are normal male values but these patients have faulty androgen receptors resulting in sparse pubic and axillary hair growth[3,12].

Psychotherapy, surgical and non surgical treatments are used in managing cases of adolescent female genital tract congenital anomalies. The surgical procedures done for imperforate hymen and transverse vaginal septum are usually incision and excision procedures with little morbidity, which is aimed at removing outflow obstruction[3]. Vaginal agenesis can be treated surgically by creating a neo-vagina with tissue from various donor sites depending on the technique adopted or by pressure dilation of the vaginal pouch over an extended period of time[3]. Different surgical procedures can be performed for patients with

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vaginal agenesis with best results if the procedure is performed after puberty[13,14]. The Abbe-McIndoe procedure is the commonest procedure used but there are other procedures such as variants of McIndoe procedure, Davydov, Baldwin and William vulva-vaginoplasty[14,15,16,17]. Psychotherapy and non surgical management of the cases of vaginal agenesis also play an important role in maintaining gender identity and establishing sexual function[18].

Adolescent females with genital tract congenital anomalies present to hospitals sometimes uncertain of their gender identity hoping to get treated. This study was done to ascertain the types of adolescent female genital tract congenital anomalies and their management in a resource limited setting such as the Tamale Teaching Hospital in Northern Ghana. The experience in the management of adolescent female genital tract congenital anomalies may be of benefit to others in low resource settings who come into contact with such cases.

Subjects and Methods

Case notes of adolescent female genital tract congenital anomalies managed at the Gynaecology Unit of the Tamale Teaching Hospital, in northern Ghana between 1st January 2010 and 31st December 2012 were reviewed. Patients with acquired genatresia from female genital mutilation, corrosive substances inserted into the vagina and intrauterine adhesions due to termination of pregnancy managed during the study period were excluded. Patients aged less than 10 years, as well as those 20 years and over who presented with female genital tract anomalies were also excluded from this study.

The adolescent female genital tract congenital anomalies found in this study were of the hymen, vagina and the uterus. The diagnoses were made mainly from findings of physical examination and ultrasound scan assessment. The diagnosis of an imperforate hymen and transverse vaginal septum were usually conclusive after taking the history, followed by physical vaginal and rectal examinations. An ultrasound scan examination of the pelvis was done for the presence or absence of the uterus in cases of vaginal atresia and vaginal agenesis. Clinical examination findings and hormonal studies, including serum follicle stimulating hormone (FSH), luteinizing hormone (LH) and testosterone were done to distinguish between Mayer-Rokitansky-Kuster-Hauser syndrome 46 XX in which functioning ovaries are present and androgen insensitivity syndrome 46 XY which had normal male serum testosterone levels with poorly developed pubic and axillary hair. Karyotype studies could not be done to confirm the cases of Mayer-Rokitansky-Kuster-Hauser syndrome and androgen insensitivity syndrome as this laboratory facility was not available locally and none of the patients could afford the payment for this test to be done at the privately owned laboratories.

The surgical or non-surgical management were the procedures used for management of each specified female genital tract congenital anomaly. Psychotherapy was important in the treatment of some of the patients.

Results

Congenital female genital tract anomalies observed in the 19 adolescent girls represented 2.98% of the 638 adolescent gynaecological cases seen in the study period. These were of the hymen, vagina and the uterus. The ages of the 19 adolescent girls ranged from 10-19 years; 4(21.05%) girls were in their early adolescent ages and 15(78.9%) in the late adolescent ages. Imperforate hymen, 7(36.84%) was the commonest congenital female genital tract anomaly.All the four girls in the early adolescent age group were cases of imperforate hymen. Anomalies of the uterus were 2(10.53%); a case each of bicornuate uterus and didelphus uterus. The details are shown in the table below.

The presenting complaints included amenorrhea, cyclical lower abdominal pain and failure of vaginal penetration during sexual intercourse. The commonest presenting symptom was amenorrhea; 76% of primary amenorrhea cases during the study period were due to congenital anomaly of the genital tract present in 17 of the 19 adolescent girls. Haematocolpos and/or haematometra were present in 13 (68.42%) of the cases after pelvic examination and abdomino-pelvic ultrasound scans were performed.

Management of the congenital anomalies of the genital tract in the adolescent girls included surgical procedures in 14 (73.68%), pressure dilation alone in 4 (21.05%), and psychotherapy in 6 (31.57%).Cases of imperforate hymen had cruciate incision of the hymeneal membranes with satisfactory results. Four cases with transverse vaginal septum in the upper vagina had surgical excision of the atretic portion; in one case, daily dilation using the Hegar's dilators for one week after the excision procedure was necessary because of narrowness of the septum area.

In the two cases of vaginal atresia, the atresic portion was in the middle of the vagina. There was initial dilation of the distal vagina using cylindrically shaped wooden dilators fitted with condom to increase the distal vaginal length before surgical excision of the atretic or thickened portion, followed by "end to endanastomosis" of the proximal and distal portions of the vagina. One of the cases had the surgical procedure performed via both vaginal and abdominal routesbecause of difficulty with access to the proximal vagina from below

To prevent scarring and stenosis, peritoneum about 3x6cm was taken from the anterior parietal peritoneum close to the area of the incision and sutured over the area of the anastomosis after excision of the atretic portion when there was difficulty in getting the vaginal epithelium of the proximal and distal portions to be brought together.

Table: Management of female genital tract congenital anomalies in 19 adolescent girls in Northern Ghana

Structure	Anormalies	Number	Percent	Management
Hymen	Imperforate Hymen	7	36.84	Cruciate incision of hymenal membranes
Vagina	Transverse vaginal septum	4	21.05	Excision of transverse septum
	Vaginal Atresia	2	10.53	Excision of atretic portion, Unification of proximal and distal vagina
	Vaginal Agenesis MRKH† Syndrome	2	10.53	Dilation of vaginal pouch,psychotherapy
	Vaginal Agenesis AI‡ syndrome	2	10.53	Dilation of vaginal pouch,psychotherapy
	Longitunal vaginal septum	0	0.0	-
Uterus	Didelphus	1	5.26	psychotherapy
	Bicornuate	1	5.26	psychotherapy
Fallopian Tubes		0	0.0	
Total		19	99.99	

† *Mayer-Rokitansky-Kuster-Hauser*
‡ *Androgen insensitivity*

Condom loaded with gauze about 3cm wide and 6cm long was packed in the vagina for two days to prevent adhesion formation between the vaginal walls. Daily dilation using Hegar's dilators was done for one week to increase vaginal girth in the area of the repair after the pack was removed. Treatment continued at the outpatient clinic with dilation and psychotherapy during weekly visits for another four weeks with no complication developing.

The cases of vaginal agenesis were managed by daily pressure dilation of the vaginal pouch for a few hours with help of their mothers at home using wooden cylindrically shaped dilators fitted with condom which increased vaginal length and girth gradually overtime. Vaginal length increased from 2.5cm to 4-4.5cm over a 3-month period of daily dilation.Further dilation was to be achieved by sexual intercourse when they became sexually active, since vaginal length had increased for sexual penetration to be possible. In all cases of adolescent female genital tract congenital anomalies, psychotherapy, non surgical treatment and follow-ups were done on outpatient basis while the surgical treatments were inpatient procedures.

Discussion

Congenital malformation of the genital tract in adolescent girls may jeopardize their life as it affects their ability to feel that they are female because of inability to menstruate, or have normal sexual activity and reproductive function. This is usually a source of disappointment with adverse psychological impact on the quality of life in the affected adolescent[18].Though direct comparison cannot be made here, some studies have shown mean prevalence of congenital female genital malformation in the general population ranging from 4% to 7% where more accurate diagnostic methods are used[19,20]. The 19 cases seen in this study represented 2.98% of adolescent gynaecological cases seen in the hospital during the three-year study period. It is possible that these anomalies may be more common, with many unable to come to hospital to seek treatment due to the low socio-cultural setting and lack of access to health facilities.

There were only a few cases of congenital uterine anomalies; 2(10.53%) because the uterine anomalies do not cause severe obstructive symptoms and may not present during adolescent ages. Congenital anomalies of the uterus are common but are not usually symptomatic and may remain unrecognized unless they cause reproductive difficulties. Asymptomatic uterine anomalies are best diagnosed during procedures such as hysteroscopy, hystero-salpingography, MRI and laparoscopy[3,6,9,17,19,20], which are not routinely indicated in our setting.In those with imperforate hymen, their condition remained unnoticed until after menarche when menstrual flow was obstructed and they presented with haematometra and haematocolpos. Imperforate hymen maybe excised before menarche if it is diagnosed or when hydrocolpos or mucocolpos develops[3,4]. The cases of imperforate hymen (36.84%) presented at younger ages than other congenital genital tract anomalies.

The affected girls may have developed mucocolpus or accumulation of menstrual blood leading to obstruction in early adolescence. The simple surgical procedure performed was very successful. Transverse septum as in cases with imperforate hymen, presented with haematometra and hematocolpos after menarche leading to outflow obstruction. Transverse vaginal septum has thicker membrane than imperforate hymen and is located above the hymen in the vagina[3], making surgical management a bit difficult. Difficult excision and narrowness of the septum area after excision may require post-operative dilation.

Though none of these adolescent girls presented with complaints related to the urinary system, occurrence of vaginal atresia or agenesis together with anomalies of the urinary system require investigation of the urinary system for anomalies[21,22]. This could not be done because of resource limitation both on the part of the patients and our facility.

In vaginal agenesis, creation of *neo* vagina should be done for sexual function if a patient wants to be sexually active. The patients in this study had pressure dilation which increased vaginal length from 2.5 to 4-4.5cm, pressure dilation could increase vaginal length with full sexual function being restored[3,15,17,23]. Pressure dilation over several months using vaginal dilators in well motivated patients using the technique devised by Ingram can lead to development of an adequate neo-vagina[3,23]. There are surgical techniques which have been used for creation of vagina. The procedures developed by McIndoe, Davydov, Baldwin, Williams, the Abbe-McIndoe procedure and laparoscopic procedure described by Vecchietti are procedures that are sometimes performed[3,14,15,17,24]. These surgical procedures, including use of the sigmoid colon have high rate of complications including development of scar, making the vagina non functional if intercourse is not frequent, or a plastic mould is not left in place[3]

Follow up is important after surgical treatment to detect complications and offer any other treatment needed. A major objective in the follow up of cases of androgen insensitivity syndrome is to surgically remove the gonads and the rudimentary uterus in their twenties to prevent malignant transformation which may occur after the age of thirty years.Young women diagnosed with Mayer-Rokitansky-Kuster-Hauser syndrome suffer from extreme anxiety and very high levels of psychological distress when they are told they were born without a uterus or a vagina, which induces a feeling of being different from other women[10]. Psychological support is very important in the management of cases of vaginal agenesis, particularly in managing their expectations, in issues of sexual identity, sexual function and desire to get pregnant. There was satisfaction in the possibility of sexual intercourse, but ability to menstruate and have children in the future may never be realized in these girls of low social-cultural and resource limited settings. The cases of Mayer-Rokitansky-Kuster-Hauser syndrome in adequately resourced and rich nations may be able to have a child through a gestational surrogate since functioning ovaries are present. Adoption is also another possibility if they cannot have their own biological children.

Conclusion

Adolescent female genital tract congenital anomalies in this study were mainly of the hymen and the vagina, which were managed successfully.However some cases with vaginal agenesis could not be comprehensively investigated. While in resource limited settings, initial workup and management of adolescent female genital tract congenital anomalies may be done without sophisticated equipment, management of more complex cases are usually more challenging requiring referral to more appropriately staffed and equipped centres. This study did not accurately determine the prevalence of female genital tract congenital anomalies in northern Ghana because the study considered only the adolescent age group presenting with obstructive menstrual symptoms. Some other female genital tract congenital anomalies particularly the uterine anomalies may not present with obstructive symptoms.Therefore, a thorough history, comprehensive and accessible service is required for their diagnosis and management.

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SPECIAL ARTICLES

PRIORITIES OF PROFESSIONAL POSTGRADUATE SPECIALIST TRAINING

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Introduction

I must thank the Chairperson of Council and the Council for the honour and privilege of inviting me here this morning to reminisce on our collective experiences over the past ten years, in the exercise of our basic right to determine the modalities of training and admission into our profession in this country. I sincerely hope that my emphasis strikes the right accord, i.e. less on the facts of history and more on how these events help to direct our efforts towards more effective strategies in training in the ensuing years. This is the reasoning for focusing our attention in this address on the Priorities of Professional Postgraduate Specialist Training.

The ideal health personnel for any population or community is one who is closely attuned to and therefore, most readily responsive to the health needs of the population. This is a universal truth which finds expression in the experiences of health services of many developing countries, and is echoed repeatedly in the exhortations of the World Health Organisation in its educational policies. The implication is that excellence is and should be defined by relevance. This has certainly been the Ghanaian experience in the training of all cadres of health personnel, but particularly of doctors from their basic training through vocational to postgraduate specialist training and education. The crucial issue is the mechanisms that set the priorities of these health needs. What then becomes of global excellence or the "Five star doctor or specialist?" There is no contradiction so long as the criteria of excellence are relevant to the local context.

The answers to these questions can be sourced from the genesis of the undergraduate schools and the preparatory stake holders consultations involving the Universities, Ministry of Health, the Ghana Medical Association and the general public.There were six priorities that emerged at the beginning of the Ghana Medical School; the subsequent schools that followed independently developed variations on the same theme, *viz:*

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- Primarily to produce generalist (multi-purpose) doctors.
- Curriculum to reflect local health problems emphasising preventive, social medicine and emergencies
- Acquisition of experience in medical, surgical and obstetric emergencies
- Exposure to practice in district hospital and health centres.
- Encouragement of continuing self-education and lifelong learning.
- Assuming the role of an integrator of medical and social services.

The first two items were seen as preceding all priorities, but an issue that later gained prominence was the timing of continuing professional education and development. On the premise that postgraduate education has the capacity to strengthen undergraduate programmes, there was an almost unanimous feeling firming into a decision that specialist training should commence at the earliest opportunity, notwithstanding the implications for the work load of the few hard pressed teachers at post; this in retrospect was a wise and crucial decision.

So it was that early in 1972, i.e. three years after the graduation of the premier class of the University of Ghana Medical School the first batch of residents was admitted into a postgraduate programme which was a collaborative effort between the Ministry of Health and the Medical School. The priorities and objectives were a further elaboration of the priorities that guided the undergraduate training, namely:

1. Broad based specialization
2. Relevant Curriculum
3. Appropriate competencies
4. Exposure to community challenges
5. Encouragement of continuing self education

Under this special arrangement young doctors were tutored in Ghana to meet the standards to pass the Part I or Primary Fellowship and Membership Examinations of the Royal Colleges in the UK.

They then proceeded to the UK for further training to pass the Final Sections of these particular examinations. Some of these on completion returned to serve in Ghana, but the vast majority succumbed to the torrent of the brain drain.

It was this continued loss of human resource that gave the impetus to the clamour to train Ghanaian

medical postgraduates locally[1]. Meanwhile throughout English-speaking West Africa there was a ground swell movement towards collaboration in postgraduate medical training to ensure maximum utilization of scarce human and material resources.

The upshot of this was the creation in 1973 of the West African Postgraduate Medical College (WAPMC) an agency of the West African Health Community, as an administrative organ advising various governments on prosecution of medical postgraduate training.

Out of this emerged the transformation of the West African Associations of Surgeons and Physicians into the West African College of Surgeons (WACS) in 1975 and West African College of Physicians in (WACP) 1976[2]. The WAPMC phase of postgraduate training thus started in the mid 1970's and by 1979 examinations had started in earnest. These were however difficult times in Ghana, for the brain drain was at its height, and funds were in short supply to ensure provision of adequate equipment and materials needed for the sustenance of job satisfaction for the trainees.

By mid 1980's misgivings were being expressed by the hierarchy of the Ministry of Health in Ghana in relation to the output, cost and even the morale of all the training processes in the system. In particular the projections in respect of specialist coverage of Regional and District hospitals were not being met. These sentiments found expression in open debates in the profession; the Ghana Medical Association officially weighed in on the exchanges, clearly supporting the notion of a national postgraduate medical college for Ghana.

A number of study groups including Task Forces were commissioned subjecting the priorities and objectives of postgraduate training *vis-a-vis* service provision to searching analysis. The curriculum for training which had grown out of the undergraduate system of education was never in doubt and there was a ground swell agreement that it should be competency based. So what were the controversial issues that emerged?

Duration of the Programme

The West African programmes in general were expected to take four years. For most candidates in practice the programme was more like 5 to 6 years; and of course there were those who were in the system for much longer creating a hold up in flow of trainees. If in mid 1985, some ten years after the inception of training the impact of specialists was not being felt at the periphery in the District, let alone the Regional Hospitals, there really was a problem of output in terms of numbers.

Recognizable Intermediary Stage of Training – The Membership

In most fields the lion's share of the specialist's time is given to solution of common routine problems, which can be imparted in the first half of the training period and recognized as an intermediary attainment. This was the genesis of the concept of the "membership" section of training. In retrospect many postgraduate medical institutions have come to accept this proposal including the Royal Colleges in the U.K; the WACP has already implemented it, and WACS is in process of adopting the innovation.

The Need to Extend the Venue of Training

The manpower projections of the Ghana Health Service and the Ministry of Health envisage adequate specialist coverage of all Regional and District hospitals in all clinical fields and health management facilities. Clearly, with the output of training a decade ago, this objective could not be realized for many years. The innovation proposed then was to extend the training sites to selected and specially accredited Regional and if possible District Hospitals. Efforts were indeed made in this direction but regretfully the vast majority of trainees still congregate at the two leading Teaching Hospitals.

The Need for Structured Programmes in all Fields of Postgraduate Education

A recurrent complaint frequently lodged by trainees was the lack of structured schedules of activity with set targets that must perforce be attained. This gave to all concerned an impression of open-endedness resulting in trainees spending unusually long periods with some exiting virtually empty handed in terms of career attainment.

Absence of a Functional Mentoring Process

With all its modern trappings, professional education and training in the health sciences is still an apprenticeship even at the postgraduate level. Trainees/residents definitely need role models to look up to, and draw inspiration from. This calls for a level of commitment on the part of trainers and trainees alike, a process much in need of reinforcement. Against the swelling tide for change, there were some pressing concerns:

1. The Maintenance of Standards

Ghanaian medical education has always been sensitive to the issue of standards, as far back as the beginnings of undergraduate training. Under the then existing postgraduate training system particular efforts had been made, against some severe constraints to maintain acceptable international standards. How would the surging demand for higher output, cope with

the maintenance of standards? Would standards be sacrificed for numbers?

2. ***Provision of Infrastructure***

Clearly from the change in output being demanded, and also the alteration in strategy of training being considered, more dramatic changes in infrastructure would be required than was available at the time. Change without matching infrastructure in terms of resources, would be meaningless.

3. ***Continued Sustenance of Innovations***

It is one thing to initiate change, but perhaps an even more arduous task to maintain the momentum and ensure against reversion to the *status quo ante*. This would require not only flow of resources but also sustained dialogue on all fronts – trainers, trainees and responsible authority. This intense debate would have raged for much longer but for two factors that weighed in: first Ghana's democratic transition was fast taking roots.

The year 2000 was an election year; the debate for a national postgraduate medical college was captured in the manifesto of the New Patriotic Party which went on to win the election and formed the Government in 2001. Operationalisation of the Medical College idea became a serious issue for the new Minister of Health himself a distinguished practitioner convinced about the merits of the proposal. Secondly opportunities for migration of the young products of African Medical Schools to Europe and America, even for further training, had been, as a matter of policy in these countries severely curtailed, effectively halting the brain drain of health personnel from Ghana.

These were the factors that significantly turned the scales in favour of a national college, at the famous crucial consensus meeting in Kumasi in January 2002. After two days both sides in the debate had had their say. The consensus – Ghana should have its own postgraduate medical college. For me the important signal was the very strong backing from the Government of the day which has found expression in these magnificent buildings in which the College operates today.

I have resisted the temptation to single out personalities to attribute this change to, because so many have contributed, but naturally some names will go down in the annals of this College as the material agents of change. Permit met to mention but a few candidates: the first rector, Prof. Paul Nyame, the first president Prof Samuel Ofosu Ammah and the Minister of Health under whose watch these developments took place, the Honourable Dr Richard Anane.

The College did come into existence in December 2003 with its priorities and objects captured in Law 635 now updated to Law 833. These objects in the Law addressed the contentious issues raised by the stakeholders, but outstanding was object (d).

GHANA COLLEGE OF PHYSICIANS AND SURGEONS SPECIALIST TRAINING ACT. 635 TO ACT. 833

OBJECTS

a. Provide specialist education in medicine, surgery and related disciplines.
b. Promote continuous professional development in medicine, surgery and related disciplines.
c. Provide and coordinate education and research in medicine, surgery and related disciplines.
d. Contribute to the formulation of policies on sound health and public health generally.

For the first time a training institution is being tasked to participate in formulation of health policies, and in particular public health policies. I wonder if as fellows we have spent enough time to take in the full import of this provision in the Act. I feel certain however, that in the ensuing years College will rise up increasingly to this challenge.

The difference in approach to training is the close correlation of training with needs of practice in the health service – the arrival of "generalist specialist training" – the Membership, followed later by the Fellowship (for emerging teachers); appearance of structured and competency based programmes and their evaluation.

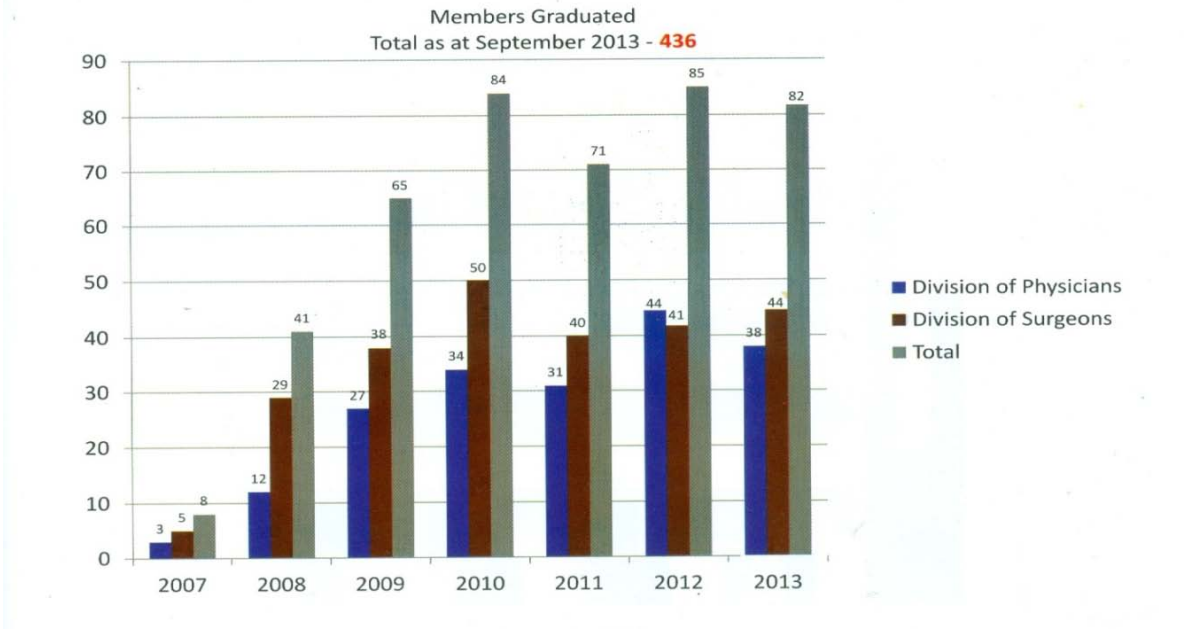
The Outcome of Training

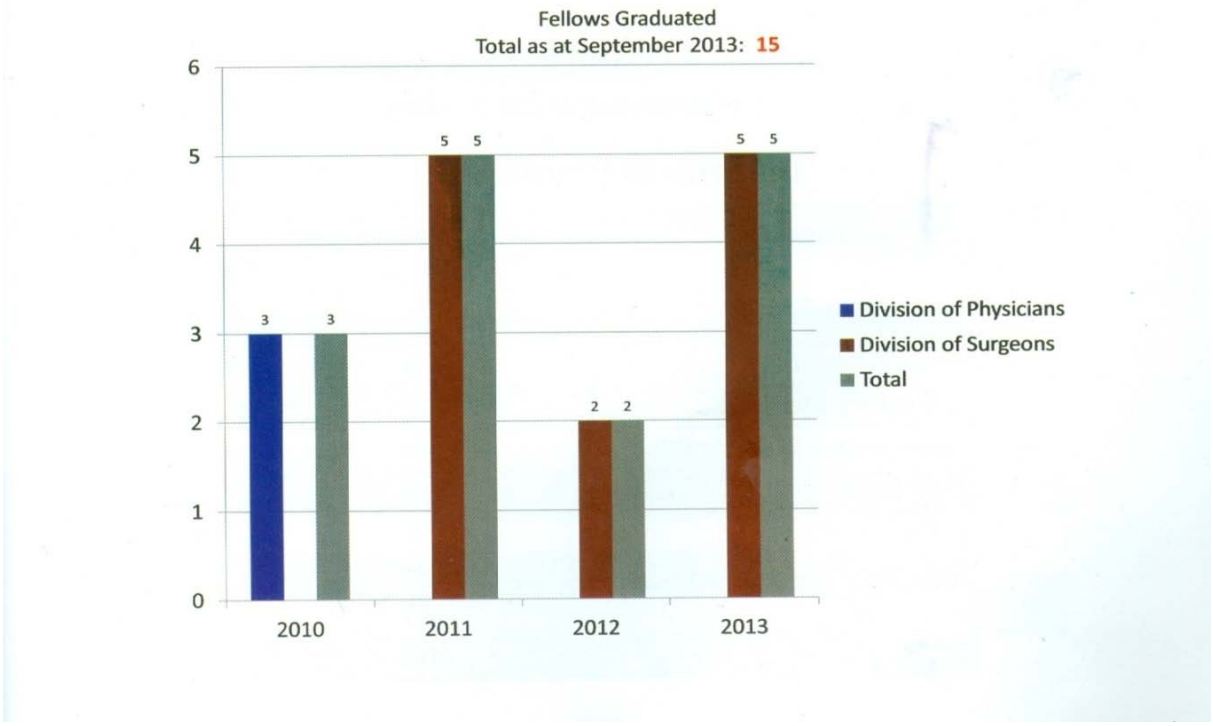
The College has been fully operational since 2004. Since first graduation in 2007 it has at the last count in September 2013 graduated 436 membership holders who are all practising throughout the country. (Fig 1)

The numbers are clearly building up; in terms of pairs of hands at the workplace there is no doubt that the MOH/GHS in these past 7 years have received a veritable shot in the arm. Training has continued at the senior resident or fellowship level since 2008 and to date a total of 15 Fellows have been produced by the College. These indeed have the trappings of teachers and trainers. (Fig 2)

The numbers of specialists are building up impressively, but what about the quality? This is where the College has been remarkably proactive in response to current best practice. Each faculty has a quality assurance unit, monitoring College wide performance criteria. With regard to this there has already been one review of curriculum in the decade of the College's existence, which means that curriculum review in response to population dynamics and health needs is very much an active ongoing process. Furthermore as reported in an article carried by the

STATISTICS


Members Graduated
Total as at September 2013 - 436
90
80
70
60
50
40
30
20
10
0
3
5
8
12
29
41
27
38
65
34
50
84
31
40
71
44
41
85
38
44
82
2007
2008
2009
2010
2011
2012
2013
Division of Physicians
Division of Surgeons
Total


Fellows Graduated
Total as at September 2013: 15
6
5
4
3
2
1
0
3
3
5
5
2
2
5
5
2010
2011
2012
2013
Division of Physicians
Division of Surgeons
Total

College's Journal, College itself has undertaken an internal in-depth evaluation of the assessment of the exit professional competencies in the membership residency programmes[3].

In a study of Focus Group Discussions sampling the views representing a wide range of residents and newly qualified specialists, as well as administrators and Clinical Coordinators of institutions participating in training, the investigators found strong leanings towards indicators of Good Practice in Higher Education, namely:

i. Regular assessment of the assessor, but with a felt need for College rules to protect resident's anonymity and the supervisor's rights.
ii. Openness to peer assessment, notwithstanding the risks entailed.
iii. Higher weighting of continuous assessment in the final analysis, but with a preference for the establishment of an "Independent monitoring Authority" for the avoidance of bias.
iv. Competency based assessment with a willingness to explore modern modalities of achieving this.
v. Verification of standards with the implication that the College documents stake holders opinion about the quality of residents exit professional competence. The stake holders here include clients as well as Co-professionals –Pharmacists, Nurses and Paramedics.
vi. Extrapolation of these priorities must perforce therefore, lead us into our next decade.

The issue of general acceptance by the Ghanaian public of the home grown specialists produced by this College is of central importance to the entire process of training. It requires detailed and sophisticated data collection through an independent broad based survey, and yet not entirely devoid of the impression and compassion of alumni such as ourselves. It is a verdict we need to know comprehensively whichever way it turns out to be, so an appropriate response by the College can be mounted, for these specialists bear the imprint of the College. It is a project, which I am sure is of primary importance to Council as we enter our second decade of existence.

If the College is to lead in the development of specialist manpower that is most responsive to the health needs of the population, then the College must participate more actively in the genesis of the National Strategic Plan for training of specialists as Law 635 now L 833 demands. This can be achieved through transparent collaborative deliberations with Policy decision makers in the Ministry of Health (MOH) and Ghana Health Service (GHS).

What have we learnt about conditions at the training sites preparing candidates for the College in the country? As the number of undergraduate training schools and colleges increases so will the output. Soon the private Universities will be adding their quota to the annual output of doctors in the country. A conservative estimate puts this currently at about 500. If only 50% of these opt for specialist training this would more than double the current intake of 140 residents.

The College had at its beginning envisaged training at suitably equipped regional and district hospitals, besides the two main teaching hospitals; this has unfortunately not materialized and there is a feeling of overcrowding at the training centres. The need for decentralization is evident and College in collaboration with MOH/GHS needs to press for upgrading and accreditation of targeted hospitals and ensure circulation of residents through these hospitals in the country at large. Active collaboration with the main regulatory body in medical education in the country i.e. the Ghana Medical and Dental Council is crucial. Although there has been extensive discourse on the establishment and maintenance of a specialist register, the reality is that this statutory provision is still not in place. As the principal professional training agency of specialization in Ghana, College has a crucial role in setting the criteria and format for registration; College must also fully exploit the opportunities for continued medical education and continued Professional Development, and contribute to the ongoing debate on maintenance and revalidation of registration.

Finally some comments in the global context. We in the Developing World benefited from the first set of global reforms, the Flexner Reforms of 1910 in medical education, which integrated modern science into the curriculum of schools that led to the doubling of life span during the 20th century. These dramatic health advances have not been equitably shared, both within and between countries, and laudable attempts to address these deficiencies have mostly floundered because of so-called tribalism of the professions i.e. tendency to act in isolation or even in competition with each other. A second generation of reforms was introduced around mid 20th century in the form of problem based instructional innovations. That the inequities continue and widening is not in doubt. A third generation of reforms has been proposed over the past decade by an independent think tank of distinguished teachers and practitioners suggesting education by mobilization of knowledge worldwide to engage in critical reasoning and ethical conduct, so that practitioners are competent to participate in patient and population centred health systems as members of locally responsive and globally connected teams.

This vision emphasizes Transformative learning and interdependence in education (Table 1 and Fig 3). There are three successive levels: Informative to Formative learning is about acquiring knowledge and skills to produce experts. Formative leaning is about socializing learners around values and its purpose is to produce professionals.

Figure 3. Priorities of Postgraduate Specialist Training

Transformative learning, the peak, is about developing leadership attributes, and its purpose is to produce enlightened change agents. Inter dependence is a key element in team work – the creative adaptation of resources to focus on identified priorities.

Table 1. Levels of Learning

Level	**Objectives**	**Outcome**
Informative	Information, Skills	Experts
Formative	Socialisation, Values	Professionals
Trans Formative	Leadership Attributes	Charge Agents

I am aware that our College in engaging in so much interaction with corresponding regional bodies in the area of harmonization of curricula, programmes and even talking of harmonization of examinations is on its path to this highly productive and innovative transformative form of education. It however has to be extended to co-professions first within country, because charity begins at home, and subsequently internationally and regionally. In the 21st Century this would be the global context in which our national College of Physicians and Surgeons has to grow and flourish.

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CONSENT TO MEDICAL TREATMENT: A DOCTOR'S VIEW ON HOW THE GHANAIAN COURTS MAY RESOLVE CONSENT RELATED INFORMATION DISCLOSURE DISPUTES.

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Summary

Many doctors may be unaware of how the courts may rule on disputes on 'consent to medical treatment' in Ghana. The knowledge of how the courts may resolve an allegation of failure to obtain consent brought by a patient against a doctor may help doctors improve on how they communicate with their patients and consequently improve patient care.
The primary purpose of consent for medical treatment is respect for individual autonomy. There is no evidence that the Ghanaian society values respect for individual autonomy any less than anybody in any other culture. There are no specific legislations in Ghanaian law or reported cases from Ghanaian courts that establish how a 'valid or informed consent is defined in Ghanaian law. The Ghanaian legal system operates the 'common law'. If a patient brings a claim alleging that his doctor did not seek his consent prior to treatment or that the information provided to him prior to granting his consent was inadequate, the Ghanaian court's approach to resolving it is likely to be patient focused and similar to the approach used in other common law jurisdictions. Good doctor-patient communication is therefore, very important.

Key Words: Consent, negligence, information disclosure, material risk, standard of care, patient autonomy

Introduction

In a recent conversation with two medical colleagues it transpired that it was unclear to them how 'consent to medical treatment' is viewed legally. They admitted that knowledge of how the court will judge them in the event of a legal claim against them by a patient who alleged that they did not seek his consent prior to an investigative or treatment procedure would help them communicate better with their patients and improve the care they provide to them. They went on to suggest that many doctors, like them are unaware of how the court may resolve consent related claims, and that communication of many doctors with their patients will improve if they knew how the courts dealt with such claims. The reason for writing this article is to raise awareness among doctors on how the courts may deal with disputes on 'consent to medical treatment'. It is my hope that such awareness will improve doctor-patient communication.

The focus of this article is limited to consent of the autonomous adult patient to medical treatment. It describes how the common law has determined valid and informed consent to medical treatment in other common law jurisdictions and concludes that although one cannot say for certain how the Ghanaian court will determine valid and informed consent to medical treatment they are likely to adopt those determinations.

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The law on consent

Consent to medical treatment in this article refers to a 'free or voluntary' and 'informed' authorization of medical treatment by a patient.
The law in Ghana comprises the constitution, legislation enacted by parliament, rules and regulations of authorities under a power conferred by the constitution, the existing law and the common law[1]. In Ghana, like many other countries, there are no specific legislations on consent to medical treatment[2]. A search through the major 'law data bases' in Ghana [3,4,5,6,7]reveal that there are no reported cases in Ghanaian case law that establish directly what constitutes a valid or informed consent to medical treatment. There are however general laws on battery and negligence in Ghana[8]. In addition to this there are other provisions on information disclosure. The code of ethics of the Ghana Health Service[9]requires that 'All service Personnel shall provide information regarding patient's condition and management to the patient…'.The Patient's Charter[10]provides that: *'The Patient is entitled to full information on his/her condition and management and the possible risks involved…'; 'The patient is entitled to know of alternative treatments and other health care providers within the service if these may contribute to improved outcomes'; and 'The patient has a right to know the identity of all his/her caregivers and other persons who may handle him/her including students,*

trainees and ancillary workers'. These provisions attempt to ensure that patients are informed when they have to consent to medical treatment. The content and scope of the information to be provided has to be determined in the context of the particular situation.

If a patient were to bring a claim to court on 'consent to medical treatment', the court through the common law will interpret these existing provisions to define what constitutes a valid or adequately informed consent. The 'common law' allows Judges to make rulings which become precedents that must be followed as subsequent cases present to court. Rulings in common law are often influenced by precedents in other countries with similar jurisdictions[11,12,13,14,15]. The principle that the court in Ghana will apply in common law to determine how much information disclosure satisfies the requirement for valid, as well as informed consent is unlikely to differ from that applied in other common law jurisdictions. Ghanaian judges like judges in other common law jurisdictions often refer to precedents in similar jurisdictions[13,15].For example in the reported medical negligence case: *Kumah v Attorney-General*[13],Justice Taylor referred to precedents in Courts in western countries such as the UK and USA in his ruling, as did Justice Dery in his ruling in: *Elizabeth Vaah v. Lister Hospital and Fertility Centre*[15].

As far back as 1914 it was determined in a court in the USA that every human being of a sound mind and adult years has a right to determine what shall be done with his own body[16]. Medical treatment is not without risks. No patient is likely to subject himself to a medical procedure which he knows will result in more harm to him than the benefit to be derived from it. Unsurprisingly a patient may become unhappy if he is not told of a significant medical risk and he suffers that risk on undergoing treatment. This is the basis for the law requiring doctors to seek their patient's consent before they treat them. The basis of consent to medical treatment has its roots in the protection of patients from infringements on their personal liberty, freedom and choice[17]. Personal autonomy and the respect of individual autonomy is something that is valued by most people irrespective of culture, race, educational or social status[18].

When patients bring medical claims in court it is often because the treatment was badly executed, they did not authorise the treatment or the doctor did not inform them of a risk that materialised[19].

Misconceptions about consent

Some mistakenly believe the need for 'consent to medical treatment' is to protect the doctor from legal action. Although a doctor fulfils his legal obligation by seeking a patient's consent prior to treatment, the primary purpose for seeking consent is respect for patient autonomy. Many institutions have a consent form that patients sign as a written document of the consent process. It is mistakenly believed that a signed consent form is proof of patient consent. Although the signed form may be *prima facie* evidence of consent by the patient, that in itself is no conclusive proof that the patient gave consent to treatment. If the patient can show that in spite of that document he did not give his consent to treatment, the doctor may still be liable.

The doctor's obligation

The perception of some in Ghanaian society is that doctors often inadequately inform them or fail to inform them at all about their treatment[20]. Many patients are subjected to treatment and investigations that they know very little or nothing about. Traditionally the relationship between the doctor and his patient has been described as a 'fiduciary relationship'. That relationship means the doctor owes his patient a duty of good faith, trust, confidence and candour[21]. This kind of doctor-patient relationship is based on the assumption that the patient is unlearned in medical sciences and therefore dependent upon and trusts his doctor to act in his best interest and provide him with adequate information and appropriate treatment. In the past it was accepted that the doctor provided to the patient only the information he deemed necessary and proceeded to treat the patient without regard for what the patient wanted to know. With the increased emphasis on individual rights, liberty and freedoms and respect for individual autonomy things have changed[22,23]. Now patients have a right to, and expect to actively take part in decisions about their treatment.

Consent related claims: Battery and Negligence

The legal channel for bringing claims on lack of valid consent to court is in the tort of battery whereas those on failure on the part of the doctor to disclose adequate information are brought in the tort of negligence. Tort law is the law that deals with ensuring compensation for individuals who have been wronged by other individuals in ways that may not be punished as crimes.

Battery:

The tort of battery is designed to protect the individual from non-consensual touch or contact by another (where they had the requisite capacity to provide consent but did not). It is based on the principle of respect for another individual's bodily integrity and the related principle of respect for individual autonomy. A person who touches another person against that other person's consent commits battery against the other person. If an individual is found liable in the tort of battery he is also guilty of criminal assault and could face a jail sentence[24].

If a doctor does not seek consent from a patient and goes ahead with treatment of the patient that involves physical contact he commits battery against the patient. A patient does not need to establish any tangible injury nor is he required to prove that he

would have refused the procedure had he been asked about it. Barring emergency situations where it is impossible for the doctor to obtain consent, if a doctor performs an operation on a patient, even if it is medically indicated in the patient's best interest, but without the patient's consent and even if the patient recovers well, the doctor has still committed battery. In one case a surgeon who obtained consent from a patient for an operation on her right ear realised while the patient was under a general anaesthetic that the patient needed an operation on the left ear and proceeded to operate on the left ear. The patient subsequently sued the surgeon for battery and won[25]. In another case[26] a woman who was given an injection in her left arm although she had expressed her wish to be injected in her right arm sued her doctor for battery and won.

If a doctor accidentally performs a wrong procedure on a patient or obtains consent from a patient by deception or omission of relevant information in bad faith he commits battery because the patient would not have provided a valid consent for treatment[27]. In *Appleton v Garrett*[28], a dentist was found liable in the tort of battery because he deliberately misled patients as to the necessity and benefits of treatment and grossly over-treated them in a manner that was considered inappropriate.

It is important to note that the onus is on a patient to prove in a claim in battery that he did not agree to the treatment[29].In order to avoid the charge of battery the doctor needs to disclose a certain minimum amount of information to the patient prior to treatment. It is only after such disclosure that the consent to treatment is considered valid. The landmark judgment that defines what patients must be told to ensure a valid consent to treatment is the judgment in *Chatterton v Gerson*[30].The principle from the judgment in this case is used widely in English speaking common law jurisdictions[31,32]. It is likely that the Ghanaian courts will use it. In this case it was held that:'…once a patient is informed in broad terms of the nature of the procedure which is intended, and gives her consent, that consent is real, and the cause of the action on which to base a claim for failure to go into risks and implications is negligence, not [battery]'[30].

What was established in this judgment is that the provision of information in broad terms about a procedure is sufficient to obtain a valid consent for the procedure. It has been suggested that information in broad terms should include details of what the treatment involves, why the treatment is being administered and who is performing the treatment[33].Some patients opt not to receive any information or opt for the doctor to make decisions on their behalf. Treating such patients in their best interest will not constitute battery[32], although it is recommended that the doctor makes every effort to establish that that is what the patient actually wants.

As was established in the ruling, although the doctor who provides information in 'general terms' may not be liable in battery he may still be liable to the charge of medical negligence. This means that a doctor does not need to provide detailed information to his patient about the procedure to obtain a valid consent, but is required to do so if consent is to be informed.

Negligence:

Negligence in tort law is the failure on the part of one person to take reasonable care which causes foreseeable damage to another[34]. For the doctor to be found guilty of the charge of negligence, he must first owe the patient a duty of care. Then he must breach that duty of care owed to the patient and that breach of duty of care must cause the injury that the patient complains of[35]. A doctor often treats a patient because he owes the patient a duty of care. This duty of care includes disclosure of adequate information to the patient to enable the patient make an autonomous decision about whether or not to undergo the said treatment. Legal causation is then determined by whether or not the patient would have undergone the treatment had he known about the risk. If the patient proves that had he known about the risk he would not have undergone the treatment, then the failure of information disclosure has been legally proven to have caused the injury that he suffered.

Standard of care in information disclosure

The court decides what standard to use as the standard of care in information disclosure. The doctor who fails to meet that standard is considered to be in breach of his duty of care. In determining the standard of care in information disclosure, the courts generally adopt one of two standards. These have been referred to as the 'Professional Standard' and the 'Patient Standard'.

The Professional standard:

This standard requires the doctor to provide to the patient information that a body of reasonable or responsible doctors consider appropriate to disclose to the patient in the particular situation[35]. If a body of reasonable doctors do not routinely disclose a particular piece of information to their patients in similar situations then the doctor who failed to disclose such information has not breached his duty of care. The criticism with this standard is that it does not take account of the importance of the information to the patient and therefore does not respect patient autonomy enough. It is also thought that it perpetuates the attitude of 'doctor knows best' which society has become less tolerant of lately[36]. There is also a general belief that doctors protect one another and are unlikely to testify against a colleague who has failed to deliver on what is the 'proper' standard of care[37]. It has been documented that the Ghanaian courts have difficulty in getting doctors to provide expert evidence for claimants in

medical negligence cases[37]Although the professional standard is still widely used as the standard for information disclosure they are no longer used 'uncritically'. There is increased emphasis on the patient's need for information[38].
Some courts are moving away from the use of the professional standard because of its perceived shortcomings and instead adopting the 'patient standard'[32,39,40,41].

'***The Patient Standard':***

This standard requires that every piece of information that the patient considers important in coming to a decision about the treatment is disclosed regardless of whether or not a body of reasonable doctors routinely discloses it[42]. This standard is prone to abuse of hindsight and patient self-interest. As a solution to that the court uses an objective patient standard. This objective standard is the standard of the reasonable patient. Here, doctors are expected to provide to their patients any 'material' risk inherent in the proposed treatment[39]. 'A risk is said to be 'material' when a reasonable person, in what the doctor knows or should know to be the patient's position, would be likely to attach significance to the risk or cluster of risks in deciding whether or not to forgo the proposed therapy'[39].

It has been suggested that 'material information' should generally include details about the proposed treatment, its risks and side effects and the consequences of these to the patient, alternative treatments, their risks and side effects, the consequences to the patient and the consequences of refusing treatment[33]. Even with this suggestion questions still remain about how much detail to provide.

The incidence of a risk alone does not determine the 'materiality'. In one case[31], it was accepted that failure to warn a patient of a risk of about 1% incidence is not negligent whereas in another[40], failure to warn of a risk whose incidence is 1:14000 was found to be negligent. Frequently occurring side effects even if minor in nature are generally considered 'material'. Serious side effects even if of low incidence are considered 'material'. A risk is also considered 'material' if the patient asks specifically about it[40]. It is therefore the duty of the doctor to always give the patient the opportunity to ask questions in the consent process and to answer as honestly as he can, all questions that the patient poses to him during the process.

Importance of doctor-patient communication

Regardless of the standard used to judge the adequacy of information disclosure in 'consent to medical treatment' there is an increased emphasis on the patients' need for information. The doctor therefore needs to work with his patient to find out the information needs the patient has and meet them.

Conclusion

In conclusion, the Courts in Ghana are likely to determine what constitutes valid as well as informed consent in common law. This is likely to be based on precedents from other common law jurisdiction. The legal determination of information requirement for consent to medical treatment is patient focused. Doctors who fail to communicate well with their patients may find themselves liable if claims are brought against them either in battery or negligence whereas those who work with their patients in order to provide the patients with information that those patients require are unlikely to find themselves in court let alone be found liable in information disclosure disputes.

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CLINICAL PRACTICE

AIRWAY ASSESSMENT BY NON-ANAESTHETISTS

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Summary

Patients who may require surgery, visit our hospitals daily. Various forms of anaesthesia are given for these surgeries, which include local, regional and general anaesthesia. General anaesthesia may involve the use of devices to maintain a secure and safe airway. The improper management of the airway is still an important cause of morbidity and even mortality in anaesthetic practice. This paper seeks to give guidelines for the non-anaesthetist to be able to identify patients whose airway may be difficult to manage during surgery, since the surgeons see the patients first, long before the anaesthetist does. These airway assessment guidelines have been given based on the various surgical specialties such as general surgery, maxillofacial and neurosurgery. Specific surgical disorders which have a relatively high percentage of difficult airway have been discussed. They include goitre, mediastinal masses, abscesses and burns around the head and neck. Medical conditions such as diabetes mellitus with expected difficult airway have also been discussed. A simple algorithm has been added as an additional guide. The paper ends with recommendations which include the establishment of difficult airway database and the running of regular workshops for anaesthetists and non-anaesthetists as a means of maintaining skills in the management of the airway of the surgical patient and thus improve on their outcome.

Key Words: Airway assessment, preoperative difficult airway, non-anaesthetist, Mallampati score

Introduction

Every year thousands of patients attend the outpatient clinic with surgical complaints in Ghana. Some of these patients will eventually require surgery which may be minor, intermediate or major. Surgery is done at the various levels of health facilities from the district hospital to the teaching hospital. Depending on the nature of the surgery, patients will require local, regional or general anaesthesia. Some of the patients who require general anaesthesia may require the use of airway devices such as an oropharyngeal airway, laryngeal mask airway or endotracheal intubation. Since the patients are initially seen by the surgeons, long before the anaesthetist does, it is important that the surgeon forms an opinion about the difficulty of the management of the patient's airway which may include intubation.

Difficult intubation of a patient during anaesthesia is classified as anticipated or unanticipated. In one anaesthetic report, out of 133 cases of difficult airway, 66 were anticipated difficult airway and 67 were not anticipated.[1] This indicates a high rate of anticipated or expected difficult airway in surgical patients. Translated into clinical practice, this study clearly shows that clinical assessment can detect a large percentage of patients with anticipated difficult airway. Hence diligent preoperative airway assessment can improve anaesthesia safety and patient outcome.

It is this group of patients with expected or anticipated difficult airway that the surgeon may be able to identify from the first encounter with the patient, based on some criteria which will be made clearer later in this paper.

This paper is being written as a guide for non-anaesthetists to help them identify some of these patients, if not all of them. Improper management of the airway can lead to various degrees of morbidity or even mortality. The prevalence of difficult intubation is about 1-2% of surgical population.[2] According to a report by a committee of the American Society of Anesthesiologists, even though complications related to the respiratory system have declined over the years they still constituted 32% of all claims[3] in one series.

Since most hospitals in Ghana do not have physician anaesthetists, it is even more important for surgeons working in this country to have some knowledge and expertise in the assessment of the airway of the surgical patient.

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Definitions

Airway: The term airway refers to the extra pulmonary air passage which starts from the nasal passage down to the large bronchi.[4]

Difficult airway: A difficult airway is one in which there is a problem in establishing or maintaining gas exchange via a mask and artificial airway or both.[4] Difficult intubation is still responsible for 6.4% of claims according to one closed claims database[5]

Respiratory events are the most common causes of anaesthetic related injuries. They are second only to dental damage.[2] The airway of a surgical patient is so important that a Difficult Airway Society has been formed in the United Kingdom since 1995.[6] The Society aims to improve the management of the airway of patients by anaesthetists and critical care personnel. The Royal College of Anaesthetists of the United Kingdom runs regular workshops on the management of difficult airway to equip or re-equip anaesthetists with the skills and knowledge to enable them to manage such patients.

Steps required in assessment of the airway

The general principles used in the assessment of every patient can also be used in the airway assessment of a patient, that is: history, examination and investigations.

History

A detailed medical and surgical history is required. A patient who gives a previous history of difficult airway offers important information. However this information is rarely obtained from patients in our environment as medical practitioners rarely give such information to patients. In the ideal situation, the patient is informed and is also given a letter on discharge from the hospital. Most patients given this information may not even remember to take it to the hospital when requiring surgery especially in an emergency situation.

Surgical history

Even though every surgical patient potentially has a difficult airway, some are more obvious. This is what was referred to in the introduction as anticipated difficult airway. The patients with anticipated difficult airway can be classified under congenital or acquired causes. The congenital causes include such anomalies as Pierre-Robin syndrome, cleft lip with or without cleft palate, and occipital meningocele. The acquired causes are more common and can be classified under the following headings:

a. Tumours/growths - in the head and neck region such as thyroid enlargement, ameloblastoma
b. Trauma – fracture of cervical spine, maxilla, mandible
c. Endocrine- obesity, acromegaly
d. Infections- Ludwig's angina, retropharyngeal abscess
e. Burns around head and neck

This list is not exhaustive neither does it exclude other causes of expected difficult airway. A detailed history should be taken from a patient who presents with any of the above conditions. This should include the onset, any previous management including surgery and any complications encountered during the management. History of radiation therapy for thyroid cancer or any head and neck cancer should be noted as this can lead to contractures around the neck. Contractures around the head and neck from whatever cause may lead to difficult intubation.

In addition to the history of the presenting condition, one has to take past surgical and medical history. The past surgical history should include previous surgery (other than the presenting complaint) and its complications. Any surgery on the cervical spine is an important pointer to expected difficult airway. A medical history is also important in a surgical patient. A patient with a history of diabetes mellitus, rheumatoid arthritis or ankylosing spondylitis may present with difficult airway.

Examination

Examination of the patient includes general examination and examination specific to the airway. On general examination, obvious abnormalities of the jaw, head and neck areas should be noted. The length and thickness of the neck as well as its range of movement should also be noted. The patient should be able to touch the chest with the tip of the chin. Large head and mandible, deformed mandible, small chin, macroglossia and prominent incisors are all pointers to difficult airway.

In recent years, some female patients come to the hospital with hair styles such as "rasta" and attachment of "human/artificial hair" which sometimes extend below the waist line. When these are tied into bows at the back, the extension of the head during intubation becomes difficult or impossible.

The American Society of Anesthesiologists has updated its guidelines for the management of difficult airway. These guidelines recommend the assessment of the airway using several criteria[7] as no single criterion is specific enough. One of the commonest assessment tools used is the Mallampati classification of the airway.[8]The patient sits up with the tongue maximally protruded. The ability to visualize the faucial pillars, the soft palate and uvula is used to classify patients into four classes: class 1 where there is full visualization of all three structures to class 4 where even the soft palate is not visible. Mouth opening may reveal asymmetry, trismus or pain. As a rough guide a normal mouth opening should admit 3 fingers of the examining hand or should be 3.5-6cm wide.

The weight of the patient is important even though obesity on its own does not necessarily mean difficult airway. General examination should include the hands and feet which may give information about arthritis that the patient may be suffering from.

Examination of the upper chest and neck

Masses may extend from the neck region to the upper chest. These include cystic hygroma and huge thyroids. There could also be huge, hypertrophied scars around the head and neck area which could limit the movement of the neck. Enlarged neck veins may indicate mediastinal masses including extension of thyroid gland.

Investigations

In addition to essential investigations like full blood count and blood urea and electrolytes, one may have to do imaging studies like plain radiographs of the chest, neck and thoracic inlet. Both antero-posterior and lateral radiographs may be required.[4] Ultrasonography of, for example, the thyroid gland may be useful in the evaluation of the airway.[4]One may require CT scans and sometimes MRI to define some of these complex airways. Investigations such as ECG, echocardiograph and /or pulmonary flow volume loops may be required in patients with mediastinal masses.[9] Direct and indirect laryngoscopy; and arterial blood gases may be useful in some patients[4].

Airway Consideration for Specific Specialties

General surgery

In addition to the general considerations mentioned, above some of the common disorders will be discussed.

Thyroid gland enlargement: This is one of the commonest surgical disorders in Ghana. There are a number of districts in Ghana where non-toxic goitre is endemic. In recent years, the average patient present for surgery with good outcome. A thorough history including pressure symptoms should be ascertained from the patient. Any previous thyroid surgery (in cases of recurrence) and complications should be ascertained. The answers to these questions may give a fair idea of the difficulties to be expected as far as the airway is concerned. Malignant thyroid enlargement may involve cervical lymph nodes. The presence of cervical lymphadenopathy will make the airway more complicated and hence more difficult to manage. Mediastinal involvementand tracheal deviation should also be noted.

Key points:

- History- previous surgery, pressure symptoms
- Size of gland
- Malignancy
- Cervical lymphadenopathy
- Mediastinal involvement
- Trachea position

Mediastinal masses

In addition to the thyroid gland which may extend into the superior mediastinum, other masses such as lymph nodes can compromise the airway. Depending on the size of the mass, signs and symptoms such as stridor, orthopnoea, dyspnoea, decreased breath sounds and wheezes may be present. When there is significant obstruction of the superior vena cava by a tumour, the patient may have what is called the "superior vena cava syndrome." This is characterised by cyanosis, engorged veins and/or oedema of the upper body.

Key points

- History
- Signs of compromised airway-stridor, orthopnoea, cough
- Rule out "superior vena cava syndrome"

Maxillofacial surgery

Tumours of the jaw of varying sizes, intraoral tumours and fractures of the facial bones are not uncommon in this specialty. Patients may present with huge tumours sometimes with intraoral extension. Some of these intraoral tumours became ulcerated and may also bleed readily on contact. The presence of blood in the oral cavity may obscure the vision of the anaesthetist during laryngoscopy even with the fibreoptic laryngoscope.

Some of these tumours may lead to loosening of the teeth of the patients. The risk of the dislodgement of loose teeth is high during laryngoscopy. If a dislodged tooth is not found, a radiograph may have to be taken to locate the tooth. If the tooth is found in the gastrointestinal system it will be passed per rectum. In the unfortunate situation that the tooth is lodged in the tracheobronchial system, a bronchoscopy or even a thoracotomy may be required.

Dental abscess is not an uncommon emergency in maxillofacial surgery. The infection sometimes spreads to the floor of the mouth and there could be trismus as well. These patients present with expected difficult airway. In some patients with jaw tumours, there may be secondary bacterial infection when the tumour ulcerates. This could also spread to the floor of the mouth. Infection of the floor of the mouth adds to the difficulty of laryngoscopy.

Fractures of the facial bones especially the mandible presents difficulties during laryngoscopy, when the jaw is moved by the laryngoscope. Mandibular fractures may also be associated with dental problems like loose teeth. Soft tissue damage of the face may make placement of the face mask difficult because of pain or bleeding. Most of these patients are usually classified as expected difficult airway.

Key points

- History
- Exclude intraoral tumours/extension
- Note abnormalities in dentition
- Note bleeding on contact

Infections including abscesses

Another group of patients who may present with difficult airway are patients with infections around the head and neck region which may involve the floor of the mouth. This may spread to involve the pharynx or even the larynx which may lead to difficult airway. In

addition to dental abscess which has already been mentioned, Ludwig's angina, retropharyngeal abscess and any infection of the head and neck region may all lead to difficult airway. There is also the additional risk of rupture of the abscess and the soiling of the tracheo-bronchial tree.

Key points

- History
- Mouth opening
- Neck mobility
- Examination of the floor of mouth

Ear, Nose and Throat

Laryngeal papilloma and cancers, and nasopharyngeal tumours present special challenges in the management of the airway. These may present as acute upper airway obstruction making the diagnosis of expected difficult airway more obvious. The airway management however, becomes critical in emergency situations as there may be limited time to transfer the patient to a health facility with the necessary expertise. Adult patients with airway obstruction may have a surgical airway done under local anaesthesia. Children, however require general anaesthesia for any intervention as it is difficult to restrain a child who is struggling as a result of hypoxia. The limitation in the supply of consumables and anaesthetic expertise may make the management of such patients difficult at the district hospital level.

In other non-malignant cases, huge tonsils, obstructive sleep apnoea syndrome, nasal obstruction all point to difficult airway. These patients should be identified by history and examination as they may come for another type of surgery not related to any of the above disorders.

Key points

- History-snoring
- Examination- nose, throat
- Indirect laryngoscopy

Plastic and reconstructive surgery

This specialty deals with a number of congenital anomalies such as cleft lip with or without cleft palate which may be associated with airway abnormalities. With acquired conditions, such as trauma to the soft tissues of the face and burns injury around the head and neck lead to difficult airway in the patient. Thermal injury of the tracheobronchial system as well as the lung parenchyma may lead to additional airway difficulties. Even though burns injury around the head and neck is a pointer to expected difficult airway, the extent of the difficulty may only become obvious at the time of induction of anaesthesia. Third degree burns around the head and neck may lead to contractures. Patients so affected may require multiple general anaesthesia to correct some other deformities, in addition to those around the head and neck. They may also require fibreoptic intubation to secure the airway.

Key points

- History- nature of the injury
- Examination - note especially contractures
- Note other abnormalities

Neurosurgery

Congenital anomalies such as occipital meningocele and hydrocephalus are causes of expected difficult airway. Most patients in Ghana who present with hydrocephalus come late. Positioning of the head becomes problematic during induction of anaesthesia. This may require stabilization by another person before laryngoscopy can be attempted.

Cervical spine fracture is not uncommon after road traffic accident. These patients will need surgery under general anaesthesia to fix the fracture or deal with any other injury. Intubation of these patients requires expertise which is available at tertiary level of health care. Some of these patients may require fibreoptic intubation.

Other surgical specialties

The above specialties have been discussed because of the more common causes of difficult airway encountered in those specialties. As mentioned earlier under Ear Nose Throat section, a patient may present for surgery of any part of the body and may have difficult airway which may be overlooked if the surgeon does not pay attention to the history. Some of the factors have been mentioned earlier. For example, a patient presents for inguinal hernia repair but on examination, also has thyroid gland enlargement; or the patient who presents for intranasal surgery but has congenital abnormality of the cervical spine.[10]These two case scenarios stress the importance of thorough history and examination of every patient booked for surgery. The patient may not die from the primary disorder but rather from complications of the airway management during anaesthesia.[10] A simple algorithm for airway assessment is shown in Figure 1

Medical Conditions Which May Present With Difficult Airway

Diabetes mellitus

Diabetes mellitus is not uncommon in surgical patients. They may require surgery for complications of the disease or for any other incidental surgery. A study by Amoah and colleagues in the Greater Accra Region put the crude prevalence of diabetes meillitus at 6.3%.[11] The examination of the palms of a diabetic patient especially those with long-standing disease can give a fair idea as to the anticipated difficulty or otherwise of the airway. This is due in part to the diabetic "stiff joint syndrome." The fourth and fifth

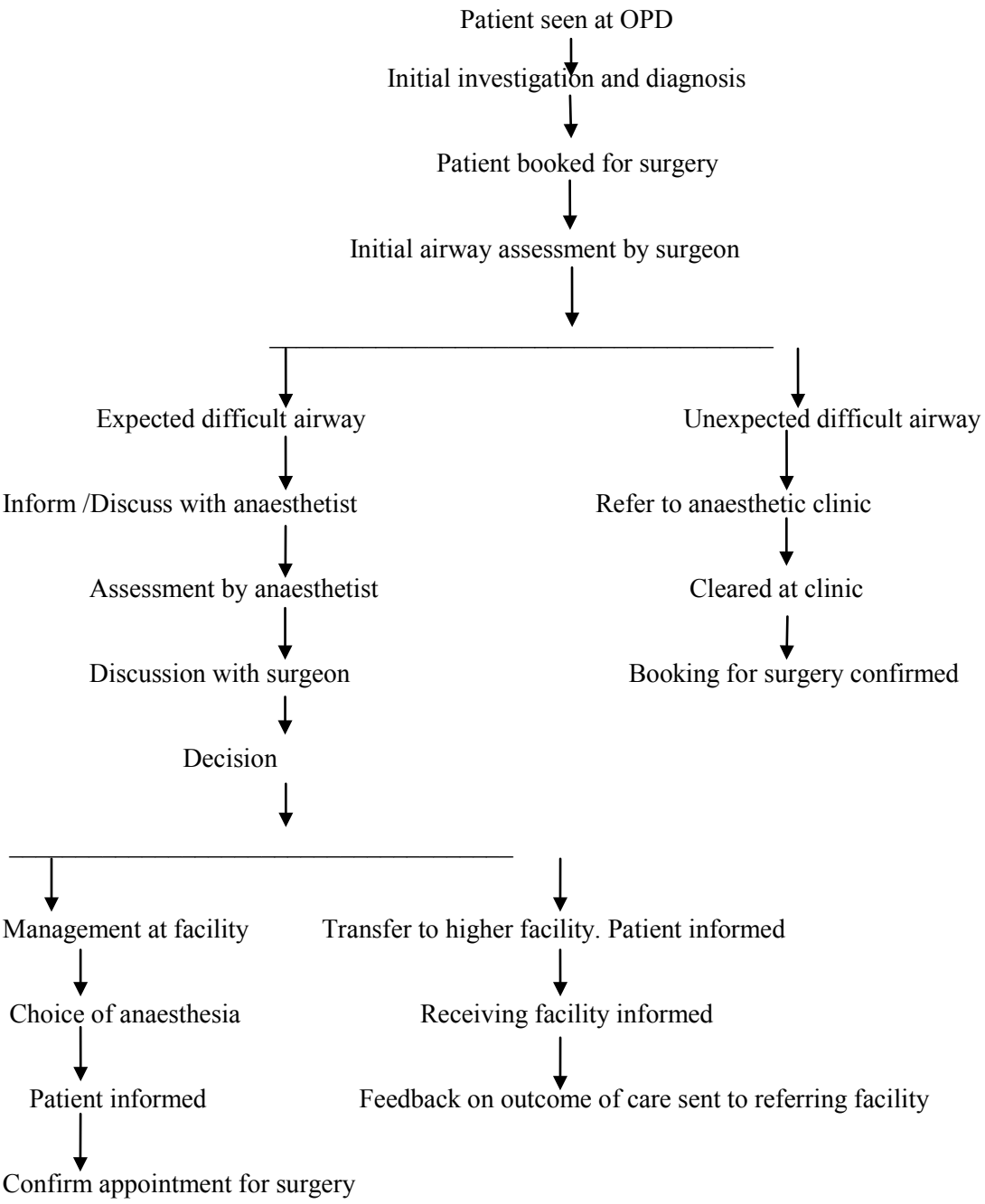

Figure 1. Algorithm for the airway assessment of a surgical patient

Proximal phalangeal joints are most commonly involved[9].

The stiffness of the joints can be used to elicit two signs: "palm print"[12,13] and the "prayer sign." [12,14] The "palm print" tests how much contact a patient's palm can make on a flat surface. A coloured substance is used as an indicator. The patient is graded from zero when all the phalangeal areas are visible to three when only the tips of the digits are visible. The "prayer sign" is very easy to do at the bedside. The patient is asked to bring both palms together. It is categorized as "positive" when there is a gap between the palms and "negative" when there is no gap between the palms.

The involvement of the cervical spine can result in limited atlanto-occipital joint movement which will make laryngoscopy difficult. This is believed to be due to the glycosylation of tissue protein from chronic hyperglycaemia.[9]

Rheumatoid Arthritis

Patients suffering from rheumatoid arthritis may present with difficult airway because of cervical spine instability, temporo-mandibular joint or arytenoid joint immobility. The larynx may also be abnormally placed because of erosion and general collapse of the cervical vertebrae.[9]

Obesity

Morbidly obese patients may present with difficult airway because of their short thick neck, large tongue and redundant oropharyngeal tissue.[9]The large breasts in females may make laryngoscopy difficult. Obese patients desaturate easily at induction and there is the additional risk of regurgitation and/or aspiration during anaesthesia. The importance of securing the airway in the obese patient cannot be overemphasized.

The HIV/AIDS patient

Patients suffering from AIDS can develop Kaposi's sarcoma and opportunistic infections such as candidiasis involving the mouth, trachea and bronchi can result in difficult airway.[9]

Perioperative management of the patient

When a patient with expected difficult intubation is being induced, the surgeon should be in theatre until the airway has been secured. Since a certain proportion of patients with unexpected difficult airway may turn out to be difficult, it is essential that the surgeon is not far away to help the anaesthetist in case of difficulty especially in health facilities where the anaesthetist may be alone and also in situations where the anaesthestist may not be experienced enough. In some instances, the surgeon may be required to do a tracheostomy either as an elective procedure under local anaesthesia before the start of the surgery or as an emergency procedure when it becomes impossible to maintain oxygenation by the methods available at that point in time. It is better for the surgeon to establish a surgical airway at the opportune time noting that delay may cause irreversible brain damage.

Equipment used in management of difficult airway

Some of the equipment required for the management of difficult airway are simple and are available in most district hospitals in the Central Region of Ghana as at the beginning of 2012. These include stylets, bougies and laryngeal mask airways. There are other more sophisticated items of equipment for the management of difficult airway such as the flexible fibreoptic laryngoscope which is considered the "the gold standard" for difficult intubation. Another group of equipment which is becoming popular is the Rigid Indirect Laryngoscope. Examples are Airtrach, T-Trach and C-Mac. C-Mac is currently available at the Korle Bu Teaching Hospital in Ghana. These devices view the larynx indirectly with the assistance of a video screen. The learning curve for the Rigid Indirect Laryngoscope is shorter than that of the flexible laryngoscope which views the larynx directly. It is worth noting that the initial and maintenance cost of these equipment is high.

Assessment of the paediatric airway

The assessment of the paediatric airway follows the same principles as that of adults. That is: history, examination and investigations. History of snoring and day time somnolence may be pointers to expected difficult airway. Examination of children may reveal congenital anomalies such as cleft palate and some of the other disorders mentioned earlier. It may be difficult to do certain examinations such as Mallampati classification in children due to lack of co-operation.

Recommendations

The expertise and equipment required in the management of patients with difficult airway are not always available even in tertiary institutions. It is important that the management of health facilities takes steps to acquire some of these equipment. A large number of airway devices continue to be developed by manufacturers. Acquisition of these devices does not necessarily mean that practitioners will have the necessary skills or interest in their use, as revealed in surveys conducted in the USA and Canada where only 2 techniques, namely: direct laryngoscopy and fibreoptic intubation remained the most popular means of intubating patients.[15, 16]

To ensure that anaesthetists, as well as surgeons are trained in the use of these equipment, regular workshops with the use of models and simulators are important. The use of simulators has improved safety in the aviation industry; the same can be applied to anaesthesia.[17] The Ghana College of Physicians and Surgeons can act as a facilitator in the whole process. Regular workshops on the management of the difficult airway can be organised by the College for all Fellows, Members, as well as Residents. The training of all practitioners has become more important as patients may require the

management of their airway outside the operating theatres, especially, when surgery is being done under local anaesthesia and there is no anaesthetist available.

The Role of Database

Currently there are no data in Ghana on patients with difficult airway and no international database exists either. Some societies and individual hospitals elsewhere, however, have maintained their own database.[18-20] If practitioners, including non-anaesthetists are encouraged to collect data and transmit to a central location, for example, to the Faculty of Anaesthesia of the Ghana College of Physicians and Surgeons, Ghana will soon create a register of patients with difficult airway. Since many patients with difficult airway may return for another operation at a later date, the database can be utilised as the basis for information and the management of such patients. The Difficult Airway Society in the UK has created a national difficult airway base linked to the Medic Alert registry in that country.

Conclusion

This paper has outlined the assessment of the airway of surgical patients by using the same principles used in the assessment of patients as a whole. That is: history, examination and investigations. Even though all surgical patients have potential difficult airway, some may be more obvious than others. No single criterion is sensitive enough in the diagnosis of difficult airway. Early identification by the surgeon, communication with the anaesthetist and assistance at induction will help in minimizing or preventing critical incidents arising from the airway management of the surgical patient.

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DIAGNOSING ANAEMIA: AN OVERVIEW

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Summary

The World Health Organisation (WHO) provides a definition for anaemia in both adults and children based on haemoglobin values determined in the laboratory. However, not all patients with haemoglobin values lower than these thresholds warrant investigation. The decision to investigate those with minor abnormalities must be based on clinical judgement, and from what is known about the individual's previous blood counts. Anaemia is therefore said to be present when the blood haemoglobin (Hb) value is below the reference value for the age, sex and place of residence (altitude) of the individual. Anaemia is a public health problem in most developing countries including Ghana and therefore important to thoroughly investigate these patients. This paper discusses the different types of anaemia and provides a simple overview of issues related to the investigation of different types of anaemia. It should serve as a guide for the practicing doctor in Ghana and elsewhere.

Key words: Anaemia, classification, investigation

Introduction:

The global prevalence of anaemia in 2010 was estimated to be 32.9%[1]. The under fives still have the highest prevalence (16.3% in males and 18.1% in females)[2]. The World Health Organization (WHO) defines anaemia in adults as haemoglobin levels lower than 13 g/dl (males) or 12 g/dl (females)[3]. In children, normal haemoglobin levels are highly dependent on age. At birth, the mean normal haemoglobin level is 18g/dl, dropping to a nadir of 10-12g/dl at two to three months of age in full term infants. In preterm babies, the haemoglobin nadir occurs earlier at six to eight weeks of age due to physiological and iatrogenic factors and may be as low as 7-8g/dl (often termed 'anaemia of prematurity')[4]. In children from 2 years to puberty, haemoglobin level of less than 11.0g/dl signifies anaemia. In the under 5 years, it has been defined by the WHO and the US Centers for Disease Control as haemoglobin level less than 11g/dl[3]. Anaemia is present when the blood haemoglobin (Hb) value is below the reference value for the age, sex and place of residence (altitude) of the individual[3]. Anaemia is always secondary to a disease or disorder including malnutrition, thus anaemia is not a diagnosis in itself, but an objective sign of disease or disorder which must be searched for if the anaemia is to be properly treated.

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In summary, anaemia could be caused by acute or chronic blood loss, increased destruction of red cells in haemolysis or decreased production due to nutritional deficiency, bone marrow failure, hereditary conditions or congenital anomalies. In investigating a patient with anaemia, it is important to take a good history, examine the patient thoroughly, request essential haematology blood tests, and order additional investigations and specialized tests as necessary. Depending on the person's age, sex, occupation and social standing, emphasis may be placed on certain aspects of the history, examination and investigations.

History and Examination

As in all areas of medical enquiry a detailed history and physical examination are essential, with particular attention to:*Patient'sdiet.*An adequate nutritious balanced diet is necessary for building up haemoglobin. *Abnormal bowel habits* such as diarrhoea and steatorrhoea impair absorption of nutrients necessary for building up haemoglobin. *Nutritionalhistory* is very important in children, as well as pregnant and lactating mothers. In infants, it is important to obtain birth history, including gestational age at delivery, as these may affect the level of haemoglobin, the lower the gestational age, the lower the iron stores and thus the higher the chances of neonatal anaemia[5].

Unusual bleeding or bruising, blood in stools, excessive menstrual blood loss, increased number of pregnancies are all important. Bleeding haemorrhoids must be specifically asked for as the information may not be volunteered. Presence of 'cola-coloured' urine may suggest intravascular haemolysis. Family history of anaemia is important in inherited forms of anaemia. Medication history may reveal drugs which are known

to cause anaemia. Other co-existing medical problems eg acute infections, chronic non-infectious inflammatory diseases or other chronic diseases as in kidney disease may also contribute to the anaemia. Information on recent surgery may also be helpful[6].

A thorough physical examination is important. Examination of the conjunctiva for pallor is an important start to anaemia investigation. The mouth should be checked for glossitis, stomatitis, gum disease and other changes; and nails for koilonychia. Koilonychia and pallor suggest iron deficiency. Pedal oedema which may be a sign of cardiac failure is usually seen in severe anaemia (Hb less than 7g/dl or worse in an adult). Note that this may not be present in young children even when severely anaemic. Jaundice may be suggestive of a haemolytic process. Signs of infection, purpura, and bruises may together suggest pancytopenia. Hepatosplenomegaly and lymphadenopathy are important signs for lymphoproliferative disorders. The abdomen and pelvis must be examined for liver, spleen, uterus and other masses; and rectal, scrotal and vaginal examination performed as appropriate.

Investigations

After the history and examination, working and differential diagnoses must be made and a decision taken as to what investigations should be done. In general the investigations can be divided into two broad groups: (a) those which help to confirm and classify the anaemia, (b) those which help to elucidate the cause. The first tests (essential haematology tests) to be requested are the full blood count (FBC), film comment and reticulocyte count. The results of these will confirm not only the anaemia, but also give parameters to enable its classification, give information on the activity of the bone marrow, and on occasion give the final diagnosis away.

Classification of Anaemia

Anaemia may be classified in terms of the morphology of the red cells as seen on a blood film, assisted by red cell indices provided in an automated full blood count or in terms of its aetiology, or both. Understanding the figures in a full blood count will also assist in the understanding of anaemia.

Morphological classification of anaemia

This is based on the red cell size, shape and colour in a stained blood smear often correlating with the red cell indices as explained later in this article. Thus, the three main morphological distinctions are:

Normocytic and normochromic anaemia- the red cells have normal size, shape and colour but there are not enough of them. E.g. dilutional anaemia of pregnancy, haemolytic anaemia,uncomplicated anaemia of chronic disease.

Microcytic and hypochromic anaemia - the red cells are smaller and paler than normal, as in iron deficiency and thalassemic states.

Macrocytic anaemia - the majority of the red cells are larger than normal e.g. folate or vitamin B_{12} deficiency[7]. Combinations of these three main morphological types are common in practice, making the diagnosis less obvious than one might presume. Other morphological and numerical changes in the red cells themselves, white cells and platelets give clues as to the aetiology of the anaemia e.g. sickle cell anaemia, acute eukaemia, aplastic anaemia etc.

Aetiological classification of anaemia

This is based on the underlying cause of the anaemia

1. Excessive loss of red cells as in chronic blood loss.
2. Excessive destruction of red cells as in haemolysis. Haemolysis may be due to inherited causes e.g. sickle cell disease, G6PD deficiency (favism, drug-induced or infection-provoked) or acquired causes such as autoimmune haemolysis, and infections like malaria and septicaemia.
3. Inadequate production as occurs in:
    i. Nutritional deficiencies like deficiencies of iron, folate, vitamin B12 and protein which are all vital to the synthesis of haemoglobin.
    ii. Bone marrow failure e.g. aplastic anaemia.
    iii. Infiltration of the marrow as in leukaemia.
    iv. Miscellaneous causes such as endocrine disorders, chronic renal failure, chronic inflammatory disease and cirrhosis of the liver[7,8].

The red cell indices

Red cell indices are specific parameters related to red cell morphology as determined with the aid of electronic equipment such as the Coulter machine, which has largely replaced manual methods. Without looking at the blood film, the red cell indices, particularly MCV (mean corpuscular volume), MCH (Mean corpuscular haemoglobin), and RDW (Red Cell Distribution Width) have been used to enhance the morphological classification of anaemia to a large extent, as follows:

MCV (mean corpuscular volume): This describes the mean size of the RBC, the reference range is 76-96fl. Values above 100fl indicate macrocytosis, and microcytosis is indicated by values (usually) below 76fl.Values are (most) often raised in megaloblastic anaemia as mentioned above.

MCH (mean corpuscular haemoglobin): This defines the haemoglobin content of the red cell.The reference range is 27-30pg, hypochromia results from values below 27pg. Low MCH occurs in iron deficiency and the thalassaemias as mentioned below.

RDW (red cell distribution width): The extent of the red cell size variation is measured by the RDW i.e. it is a measure of the degree of anisocytosis as seen on a blood film. It is useful in distinguishing between iron deficiency and Beta–thalassaemia trait. A low MCV

with an increased RDW suggests iron deficiency and a low MCV with normal RDW suggest thalassaemia trait. It is also useful in differentiating high MCV due to aplastic anaemia from that due to megaloblastic anaemia – the RDW is normal in aplastic anaemia but high in megaloblastic anaemia. Its unit of measurement is either the coefficient of variation (CV) or standard deviation (SD). The normal range of RDW as CV is 11.6-13.0%. Values above 15% are regarded as increased[9].

Other Essential Haematological Tests

Reticulocyte count – this is raised in response to acute blood loss, and also in haemolysis or as a result of specific therapy for a deficiency of an essential nutrient.eg. Folic acid.

Blood Film examination – for fragments, spherocytes, polychromasia, blasts and nucleated red blood cells (NRBCs). This could be diagnostic such as in haemolytic anaemias or anaemia due to bone marrow failure. A leuco-erythroblastic picture (presence of immature red and white cells in peripheral blood) may be suggestive of bone marrow infiltration. E.g. by malignant cells.

In the next section, each morphological subtype as well as other tests will be discussed in more detail.

Microcytic anaemia i.e. Low MCV (<76fl)

1. *Iron deficiency anaemia* (low MCV, MCH and high RDW): This is the commonest cause of anaemia worldwide. Iron deficiency starts with inadequacy of iron (negative iron balance) leading to depletion of body stores, followed by functional iron deficiency in which there is inadequate iron for normal bone marrow activity and tissue function plus, sometimes mild anaemia. Further iron depletion causes frank iron deficiency anaemia.

Clinical assessment of the patient should include the diet, weight loss, indigestion, change in appetite, and bowel habits, including frequent fatty stools and bloody stools; genitourinary symptoms including menorrhagia, haematuria and abdominal symptoms. Poor dietary intake may be contributory if there is inadequate red meat intake. Iron is poorly absorbed from vegetable sources. Iron in haem molecules in meat is much better absorbed than the inorganic iron in vegetables, even spinach. Menstrual loss is the most common cause of iron deficiency anaemia in pre-menopausal women; in men and post-menopausal women, gastrointestinal (GI) blood loss is the most frequent cause.

Clinical examination should include weight and nutritional assessment, abdominal examination for GI malignancy, uterine fibroids, renal masses and assessment of any lymphadenopathy including supraclavicular nodes. Koilonychia (spoon-shaped nails) is occasionally seen.

2. *Thalassemic disorders*: This covers an entire spectrum of conditions ranging from thalassaemia minima through thalassaemia trait (RDW is usually normal and the RBC count may be high) to thalassemia major. Their clinical manifestations range from completely asymptomatic microcytosis to profound anaemia that is incompatible with life and can cause intrauterine fetal death. In heterozygous alpha+ or alpha^0 thalassemia, or heterozygous beta thalassemia, the hypochromia is often less marked, in relation to the degree of microcytosis, than in iron deficiency. In homozygous beta thalassemia, there, is severe microcytosis, hypochromia and nucleated red cells are usually present on the thin blood flim.

Lifelong low or very low MCV and mean cell haemoglobin (MCH), with a normal or near normal haemoglobin, strongly suggests a thalassaemic disorder. The red cell count is often raised or may be normal while the Hb is low. The thalassaemic disorders are inherited disorders of reduced specific globin chain production, causing microcytosis and variable degrees of anaemia. If a patient with thalassaemia trait develops iron deficiency, both the haemoglobin and MCV will fall further.

3. *Sideroblastic anaemia:* as defined by the presence of ring sideroblasts in the bone marrow and occasionally the peripheral blood.

4. *Anaemia of chronic disease:* In the early stages this may be normocytic and normochromic, but with increasing cytokine production may become microcytic and hypochromic on account of poor iron utilization. Examples are chronic infection, such as tuberculosis, chronic inflammatory disease, such as rheumatoid arthritis and chronic renal disease.

Macrocytic anaemia: i.e. MCV high (>100fl)

These include vitamin B12 or folate deficiency, hypothyroidism, liver disease, chronic alcoholism, myelodysplasia and high reticulocyte count (from any cause). Abnormal liver function, excess alcohol consumption and hypothyroidism can all cause macrocytosis without anaemia. Some drugs, such as azathioprine, zidovudine, methotrexate and hydroxycarbamide, cause significant macrocytosis due to interference with DNA synthesis.

When assessing patients with macrocytic anaemia, history taking must include diet, alcohol consumption, personal or family history of jaundice. Clinical examination should include search for peripheral sensory neuropathy, signs of chronic alcoholism and chronic liver disease, jaundice and splenomegaly. First-line tests for further investigating the cause of a macrocytic anaemia are: serum vitamin B12 and folate, thyroid function and liver function tests. Myelodysplasia should be suspected in elderly patients with isolated macrocytic anaemia, neutropenia, thrombocytopenia or any combination of these. Review of previous results may show a progressive change over months or years. Sometimes there has been a macrocytosis for many years but neutropenia or anaemia has more recently developed.

The blood film may be diagnostic if it shows dysplastic neutrophils or macrocytic red cells. Features of myelodysplasia on a blood film include anisopoikilocytosis (variation in size and shape), hypogranular neutrophils (lack the usual quantity of granules), pseudo-Pelger or bilobed neutrophils (neutrophils with only two nuclear lobes, instead of the usual 3, 4 or 5 nuclear lobes).

Normocytic Normochromic Anaemia

In patients with normocytic anaemia, clinical assessment is essential to guide further investigations. The early phase of any cause of anaemia may be normocytic, but a significant change in the MCV can suggest developing iron or Vitamin B_{12} deficiency even while the MCV is still in the normal range. Causes include acute blood loss, anaemia of chronic disease, including renal disease and malignancy.

For all patients with normocytic anaemia, an abdominal ultrasound scan must be considered to look for splenomegaly, renal lesions, liver abnormalities, unsuspected malignancy and metastases. Chest X-ray must also be considered to look for malignancy and other pulmonary lesions.

The mechanisms of the anaemia of chronic disease, also called anaemia of inflammation, involve cytokines. Pro-inflammatory cytokines such as tumour necrosis factor are increased, so is hepcidin, a regulator of iron transport, whose increase results in reduced availability of iron for haematopoiesis. There is also decreased erythropoietin production and decreased response of red cell precursors in the bone marrow to erythropoietin.

Anaemia of chronic disease should be considered as a cause in patients with diabetes, heart failure, mild renal impairment, leg ulcers, inflammatory arthritis, polymyalgia rheumatica, etc. In practice, since the anaemia of chronic disease cannot be tested for directly, but is a diagnosis of exclusion, some patients are referred to a haematologist for further assessment, particularly if the haemoglobin is less than 10 g/dl and there is no obvious cause[8].

Other tests

- Renal and hepatic function: Renal function tests are mandatory for all anaemia patients, especially normocytic normochromic anaemia. Inadequate production of erythropoietin in renal disease is the cause of the anaemia. Hepatic function is useful in the investigation of macrocytic anaemia and other red cell abnormalities
- ESR (Erythrocyte Sedimentation Rate) and CRP(C-reactive protein): These are raised in plasma cell myeloma and inflammatory conditions.
- Serum vitamin B_{12}/folate levels: In macrocytic anaemias.
- Iron studies: Serum Ferritin measurement is one of the first-line tests to confirm iron deficiency and a significantly low level is diagnostic. However, a normal or high serum ferritin level does not exclude iron deficiency. Ferritin is an acute phase protein, and its level rises in infection, other inflammatory conditions and malignancy. It is good practice to check C-reactive protein at the same time. If this is raised, the patient may still be iron deficient despite having a serum ferritin level in the normal range.

Where ferritin is not diagnostic, the next step is to test fasting serum iron and transferrin saturation. Transferrin may also indicate total iron-binding capacity. Low transferrin saturation indicates low levels of iron available to the bone marrow.

- Stool examination for intestinal parasites, especially hookworm ova, and stool occult blood especially in the elderly, for the possible presence of bleeding, be it from an ulcer or malignant tumour.
- Thick and thin blood films for malaria parasites which may cause haemolysis.
- Urine routine examination – To demonstrate proteinuria, haemoglobinuria, haematuria and also the presence of excess urobilinogen in haemolytic anaemia.
- Coombs test to look for antibodies in autoimmune haemolytic anaemia.
- Sickling and haemoglobin electrophoresis for suspected haemoglobinopathies.
- Glucose 6 phosphate dehydrogenase screening tests and or assay in cases of intravascular haemolysis.

Patients with a red cell microcytosis who are not iron deficient will often require specialised tests (e.g. Hb electrophoresis and assays of other uncommon types of haemoglobins) and are best discussed with a consultant haematologist. Patients who have macrocytic anaemia with no evidence of megaloblastic anaemia should have the following done in addition to the tests above:

- Thyroid function tests (TSH). Macrocytosis may be seen in hypo or hyperthyroidisim.
- Serum protein electrophoresis (to look for a paraprotein) in multiple myeloma. The reported falsemacrocytosis may just be due to aggregation of red cells being assessed as single cellsin autoimmune haemolytic anaemias.
- Level and duration of alcohol intake should be documented. This can cause liver disease as well as have direct toxic effect on red cells.
- Investigations for haemolysis (Direct antiglobulin test, Lactate dehydrogenase (LDH) and haptoglobin). There is usually polychromasia in Romanowsky-stained blood smears due to increase in reticulocyte count in haemolytic anaemias and this causes an increase in MCV as well.

Patients who have significantly macrocytic red cell indices without a clear cause found after these tests should be discussed with a consultant haematologist.

Case scenarios

a. Patient with Haemolytic Anaemia:

Haemolytic anaemia is defined as anaemia due to shortened red cell lifespan. The most common causes are the haemoglobinopathies, red cell enzyme deficiencies e.g. G6PD deficiency, hereditary spherocytosis (HS) and autoimmune haemolytic anaemia (AIHA). The normal red cell lifespan is about 120 days but in some haemolytic states may be as short as ten days.

In haemolytic anaemia the following observations are important:

- Family history- to check for hereditary conditions and their mode of inheritance.
- Ethnic origin - G6PD deficiency occurs worldwide but is most common in Mediterranean and Chinese populations.
- Drug history in association with G6PD deficiency as evidenced by dark urine etc.
- Favism: (haemolysis following ingestion of broad or fava beans). is also an important cause of haemolysis in certain types of G6PD deficiency.

Tests for patient with suspected haemolytic anaemia:

- Hb estimation (low Hb) - reticulocyte count (raised); peripheral film examination for the presence of polychromasia, spherocytes, elliptocytes, irregularly contracted cells, schistocytes, or auto-agglutination.
- Direct Coomb's Test - usually positive in immune haemolysis.
- LDH - non-specific but is often raised in haemolysis.
- Haptoglobin - a low level suggests haemolysis, especially the intravascular type.
- Liver function tests. This will show an increase in unconjugated bilirubin. Elevated unconjugated bilirubin and reticulocytosis suggest haemolytic anaemia.
- Osmotic fragility tests: Increased in conditions associated with red cell membrane loss, defect or damage.
- Urinary haemosiderin, especially in patients with intravascular haemolysis.
- Past history - Neonatal jaundice may be indicative of congenital conditions as hereditary spherocytosis or G6PD deficiency.
- Triggering events- history of drugs, infections

Important Points to Remember

- Clinical findings seldom are sufficient to enable a definitive diagnosis of a particular haemolytic condition to be made.
- Lab investigations play a central role in the accurate diagnosis and assessment of severity of haemolytic anaemia.

b. Patient suspected to be suffering from plasma cell myeloma

Myeloma should be considered if there is anaemia with bone pain in the middle aged and elderly, particularly vertebral pain or collapse, or new or worsening renal impairment.

- FBC and blood film: This will confirm anaemia and show the presence of excessive rouleaux formation and occasionally plasma cells (seen only in advanced cases).
- Serum protein electrophoresis may detect the presence of a monoclonal band
- Urine for Bence Jones Protein: About 30% of myeloma cases do not have a paraprotein but instead show hypogammaglobulinaemia (low serum immunoglobulins), serum free light chains and have detectable urinary light chains (Bence Jones protein)
- Skeletal survey for lytic lesions and extent of bone involvement.
- Bone marrow examination should normally reveal increase in percentage of plasma cells and can also be used for monitoring of disease.
- Serum free light chains are particularly important in patients with normal serum protein electrophoresis
- Serum Beta-2 Microglobulin is often raised and is a useful indicator of prognosis.
- Flow cytometry and cytogenetics if facilities available. Immunophenotyping by flow cytometry will confirm the presence of abnormal plasma cells in peripheral blood as well as bone marrow samples. The characteristic immunophenotype of malignant plasma cells is CD38high, CD138high and CD45low. Cytogenetics will detect chromosomal abnormalities[9].

It is not necessary to try and complete all the tests before referring to the haematologist. Precious time is wasted that way. If any two or three of the above bullet points are suggestive, the haematologist should be called.

c. Pregnancy

The mild anaemia of pregnancy is principally dilutional. The red cell mass increases by up to 32%, but the plasma volume expands even more, (40% at term). It is usual for the MCV to rise slightly in pregnancy. A tandem fall in both haemoglobin and MCV suggests developing iron deficiency. National Institute for Health and Care Excellence (NICE) Clinical Guideline 62 (2008) on antenatal care recommends checking the full blood count at booking and again at 28 weeks.

Haemoglobin below 11.5 g/dl at booking or 10.5 g/dl at 28 weeks should prompt investigation and treatment of anaemia. Iron deficiency constitutes 75% of cases of anaemia especially in developing countries[6]. Other known causes of anaemia in pregnancy include folate and vitamin B12 deficiency, hookworm infestation and malaria in endemic areas.

d. The suspected bleeding patient

There should be a high index of suspicion of occult

bleeding in the individual with microcytosis and hypochromia as well as a high platelet count. The following tests and any specialized tests depending on the patient's presentation should be done.

- Stool tests for occult blood, especially in adults with iron deficiency anaemia to exclude hookworm infestation, ulcers or GIT malignancy.
- Coagulation screening tests, for inherited and acquired bleeding disorders
- Endoscopy/colonoscopy- if upper or lower gastrointestinal bleeding is suspected.
- Urine dipstick/urine for haemosiderin - this is also seen in haemolytic anaemias with haemoglobinuria.
- Urine microscopy for red blood cells

Stool test for Helicobacter pylori antigen. This is important since the prevalence of H.Pylori in Ghanaians and other developing countries is high[10,11.] H.pylori may cause iron deficiency anaemia (refractory to iron therapy), immune thrombocytopenic purpura and mucosa associated lymphoid tissue (MALT) lymphoma.

e. Neonatal anaemia

Co-morbidities such as congenital infections, bacterial sepsis and repeated blood sampling in hospitalized neonates may worsen the physiologic drop in haemoglobin levels in both term and preterm babies. In addition, preterm babies have a diminished response to erythropoietin, shorter red cell survival, rapid postnatal growth and little or no iron stores, which contribute to anaemia of prematurity[5]. Haemolysis is also an important cause of anaemia in neonates e.g. from blood group incompatibility or red cell membrane or enzyme defects. Babies with underlying haemolytic disease may also be severely jaundiced and require exchange blood transfusions to both correct anaemia and lower bilirubin levels. Diamond-Blackfan anaemia, an inherited red cell aplasia often presents in the neonatal period. Detailed history of past and current pregnancies should be obtained. Any intra-partum complications that might have contributed to blood loss should be noted. Physical examination should include evaluation for any dysmorphic features or congenital anomalies such as abnormal skin pigmentation, dysplastic radii and thumbs, microcephaly, hypogonadism etc. Phlebotomy blood losses in the neonatal or babies' units should be monitored and minimized as much as practicable. Red cell transfusions may be considered at haemoglobin levels 9-12g/dl, depending on gestational age, postnatal age and need for respiratory support[5].

Specialised Tests.

- Serum erythropoietin levels (for patients with renal impairment)
- Bone marrow examination - to establish a bone marrow infiltration such as leukaemia or carcinomatosis as the cause of anaemia.
- Paroxysmal Nocturnal Haemoglobinaemia (PNH) Screen - Hams test, glycerol lysis test, Fluorescent - labeled inactive toxin aerolysin test.
- Haemoglobin electrophoresis and quantification of haemoglobin fractions for the diagnosis of haemoglobinopathies.
- Red cell membrane/enzyme studies- For G6PD and pyruvate kinase deficiencies[12].

When to refer an anaemic patient

- Anaemias where the cause is unclear after initial routine investigations are best discussed further with a consultant haematologist
- When there is microangiopathic haemolysis (red cell fragments on film).
- Suspected leukaemia or myeloma
- Pancytopenia (anaemia with either a low platelet count or a low WBC count)
- Leucoerythroblastic blood picture on film comment
- All immune haemolytic anaemias
- Drug induced anaemias
- Congenital anaemias, including haemoglobinopathies
- Severe anaemia (Hb< 8 gm/dl) with no obvious cause after preliminary investigation

All patients requiring specialised tests like bone marrow examination, cell markers, cytogenetics, haemoglobin quantification etc.

Conclusion

This paper provides a summary of the doctor's approach to diagnosis and management of anaemia, one of the most common global public health problems which is often underdiagnosed and undertreated. It is important to give it the necessary attention as that would contribute in good measure to reducing morbidity and mortality resulting from its neglect. Since anaemia is always secondary to a disease or disorder, it is imperative to aim at diagnosing the underlying cause. Doctors are encouraged to take a good history, examine the patient thoroughly, request essential blood tests ie FBC, reticulocyte count and blood film comment. Additional investigations and specialized tests must be carried out where necessary and the Specialist or Consultant Haematologist must be consulted in cases where the underlying cause is not clear.

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CASE REPORT

ANORECTAL MALFORMATION IN A TEENAGER IN GHANA- A CASE REPORT

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Abstract

Anorectal malformation is a congenital anomaly comprising a wide spectrum of diseases, which can affect male and female and can involve the distal anus and rectum as well as the urinary and genital tracts. The late presentation of patients with anorectal malformations especially in adolescence is known but rare. This is particularly true in females with rectovestibular fistulas. We present the case of a 17-year old female who underwent a posterior sagittal anoplasty on this account with satisfactory outcome.

Key Words: Anorectal malformation, Rectovestibular fistula, Anovaginoplasty, Colostomy

Introduction

Anorectal malformation is a congenital anomaly comprising a wide spectrum of diseases, which can affect male and female and can involve the anus and rectum as well as the urinary and genital tracts. The approximate incidence of anorectal malformations is stated as 1 in 5,000 births. In females, recto-vestibular fistulas are most commonly encountered while recto-urinary fistulas are the most common anomalies in males[1].

Delayed presentations of patients with these malformations are known especially in developing countries, majority being outside the neonatal period but within infancy or early childhood[2,3]. Presentation as adolescents, teenagers or young adults is a rare event and is associated with undesirable sequelae. Multi-staged surgical procedures are also required to tackle these anomalies at this late presentation[4,5].

Reasons adduced for late presentations are varied and these include poor neonatal services at birth, poverty, poor social support and wrong diagnosis and/or treatment[4].

We present the case of a female teenager who was first seen at our out-patient department at 17 years of age. She had been passing faeces and flatus via a rectovestibularfistula. She was managed successfully with a posterior sagittal anovaginoplasty after a diverting colostomy.

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Conflict of interest: None declared.

CASE REPORT

A 17-year old female was seen at our facility with the complaint of passage of faeces from an abnormal opening close to her vagina. She had noted this for as far back as she could remember. She recalled that her mother made attempts to get medical help but this failed to materialise before her demise. She was however continent of faeces and did not suffer from any chronic illness. Menarche was attained at the age of 15 years and menstrual cycles have been regular since then. She hailed from Anloga (Volta region of Ghana) and was engaged in peasant farming. Her presentation was occasioned by preparations for marriage.

Physical examination confirmed the presence of a vestibular fistula. There was no anal opening (Figure 1). Her gluteal muscles were well developed and the natal cleft and anal dimple were prominent. The rest of the systemic examination was unremarkable. Sacral X-ray was normal.

Figure 1: 17 year old girl with no anus but faeces in the vagina

A staged surgical treatment was then scheduled starting with a divided sigmoid colostomy. Six months later, a minimal anorectoplasty was done through a posterior sagittal approach. The fistula was first circumferentially mobilized and the rectum was then meticulously separated from the vagina before creating a neoanus. The procedure was complicated by wound dehiscence and retraction of the neoanus, necessitating a revision anoplastytwo weeks after the initial procedure (Figure 2).

Figure 2: Anal orifice after surgery.

Serial anal dilatation was commenced on the 14th post-operative day and the colostomy closed 4 months afterwards. Out-patient follow up has been regular, revealing normal bowel opening habits and faecal continence. During her last clinic visit, two years after her first presentation, she was married and 7 months pregnant.

DISCUSSION

Meticulous inspection of the perineum of a female newborn is sufficient for the diagnosis of an anorectal malformation (ARM) with a rectovestibular fistula. The fistula is usually seen as a third orifice apart from the urethral and vaginal openings. It is the commonest form of the condition in females[1].

Surprisingly late presentations of such cases have and are still being reported[6,7,8,9]. This is usually in developingcountries and is linked with poor neonatal services at birth and poverty[4]. Poor social support and wrong diagnosis and/or treatment advice have also been cited as causes of late presentation to the appropriate care giver[2]. In the case presented there was evidence of poor social support, coupled with ignorance and illiteracy. The reason for her eventual presentation which was linked to concerns about marriage has also been previously documented in the literature[9].

ARM could be syndromic[1]. Even the non-syndromic varieties often present with associated anomalies represented by the VACTERL association (Vertebral; Anorectal; Cardiac; Tracheo-Esophageal fistula; Renal; Limb). There was no clinical or radiological evidence of anomalies in other systems in the case of our patient. Constipation, the major pre-treatment complication in such cases[10,4], was also absent.

Although Sanchez Martin et al[6] reported treating all but one of their cases of vestibular fistula in older girls with a single stage procedure followed post-operatively by administration of parenteral nutrition, we opted for a multi-stage approach. The existence of a megarectum at this age and our limitation in administering parenteral nutrition necessitated this approach. We also wanted to minimise the risk of post-operative infection and dehiscence[1]. Late presenters, like our patient, are more likely to have multiple procedures[11,12,4]

We used the posterior sagittal approach for the definitive anovaginoplasty as described by Pena, an approach which has been reported to have favourable outcomes even in late presentations[1,2]. We attributed the wound dehiscence and subsequent retraction of the neoanus post operatively to sub-optimal post-operative nursing care. The revision surgery however had an uneventful post-operative period. Serial anal dilation was prophylactic to forestall stenosis. Underestimation of this simple but vital post procedure practice carries with it the development of megarectum and faecal incontinence from chronic constipation[1]. As expected, there were no issues with continence following the closure of the colostomy. Our patient has since married and is now pregnant for 7 months.

CONCLUSION

The late presentation of ARM with rectovestibular fistula is avoidable since the diagnosis can be made by simple inspection of the perineum at birth. A 17-year old female was treated successfully, following a divided colostomy, using the posterior sagittal approach described by Pena. This approach is associated with favourable anatomical and functional outcomes and it also addresses the psycho-social challenges associated with this condition.

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FROM THE PAST

HISTORY OF ANAESTHESIA IN GHANA (3): ANAESTHETIC TECHNIQUES, CARE OF THE CRITICALLY ILL, EXTENSION OF ANAESTHETIC SERVICES AND INTERNATIONAL COLABORATION

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Summary

This is the third instalment in the series on **HISTORY OF ANAESTHESIA IN GHANA.** The first instalment was on **Human Resource Development in Anaesthesia.**The second was on **Developmentof Equipment, Consumables and Anaesthetic Drugs.**

The history of medicine in Ghana has been documented but there has not been any documentation of the history of anaesthesia in the country. Anaesthesia in Ghana has seen a number of changes in the last fifty to sixty years. These changes have been seen especially in the areas of anaesthetic drugs, anaesthetic techniques, the training of anaesthetic manpower and introduction of intensive care facilities. There has been an introduction of new and modern anaesthetic machines and monitors which were completely absent some decades ago.

This article seeks to highlight some of the major changes that have taken place in the specialty. The challenges facing the specialty in terms of the supply of consumables, the lack of maintenance of equipment and the low numbers of enrolment into the specialty by physicians are discussed. The role of international collaborations and the setting up of new specialised units like the National Cardio-thoracic Centre are also mentioned in this article.

Key Words: Anaesthetic techniques, Obstetric anaesthesia, Intensive care, Patient Controlled Analgesia.

Anaesthetic techniques

Non-obstetric patients

Anaesthetic techniques have seen a lot of changes with the introduction of newer agents as indicated above. Maintenance of anaesthesia which was previously done using diethyl ether has given way to a relaxant technique with opioids. In the past, no opioids were given intra-operatively. The use of suppositories and wound infiltration with local anaesthestic agents such as bupivacaine is now routinely done.

Obstetric patients

Obstetrics anaesthesia

There have been a lot of changes in obstetric anaesthesia. Caesarean section which was done with diethyl ether under spontaneous respiration was changed to controlled ventilation using a relaxant technique in the mid-1980s. Intra-operative opioids are given after the delivery of the baby. There has been also a shift from general anaesthesia to spinal anaesthesia. The Spinal anaesthesia rate which was about 1% in 1999 at KBTH is currently around 80%. Spinal anaesthesia is used for all obstetric patients throughout the country unless there is a contraindication. Nurse anaesthetists are doing these blocks for obstetrics cases.

One of the disturbing complications of spinal anaesthesia in obstetric patients is Post Dural Puncture Headache (PDPH). This is a well known complication of spinal anaesthesia but it is more prevalent in obstetric patients because they are young. The incidence has been variably reported to between 0.1-36%[1]. The exact cause of this headache is not known but a number of theories have been proposed. One of them is the continuing loss of cerebrospinal fluid after the procedure. As far back as 1914, Babcock described a spinal needle with a finer cannula to limit the incidence of PDPH[2]. In the 1960s and 1970s, spinal needles were made of metal and were autoclaved and reused. Later on spinal needles with a plastic introducer becameavailable but they were also autoclaved and re-used. Single use spinal needles were introduced in the mid 1990s.

At the beginning, G20 and G22 spinal needles were used. With the above theory in mind, smaller gauges, G25, G27 and G29 are now available. Gauge 25 is available in most hospitals in the country and G27

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is available in the Teaching Hospitals. The smaller gauges are more difficult to use and they usually require an introducer.

The bevel tip of the spinal needles was also blamed for the high incidence of PDPH. Whitacre was the first to develop a pencil-point needle. This was followed by Sprotte needles which tried to solve the problems of slow cerebrospinal fluid flow, difficulty in aspiration and resistance to the injection of the local anaesthetic solution. Even though the pencil-point spinal needles are better than the bevel tip, most hospitals in the country use the latter because of cost.

Obstetric analgesia

Obstetric analgesia was not started until the reign of Queen Victoria of England[3]. This is because of the "curse" God placed on the woman in the Garden of Eden as recorded in the book of Genesis. Pain relief in labour has undergone a number of changes in the developed countries. These include the use of regional analgesia such as epidural and patient controlled devices. In Ghana pain relief in labour has remained unchanged. Parturients still receive intermittent injections of pethidine and in some instances nothing at all for fear of neonatal depression.Epidural analgesia for labour started in the 1970s. However up to now the the two oldest Teaching Hospitals in Ghana, KBTH and KATH use it on selected parturients only. This is mainly due to the lack adequate manpower in these health facilities.

Regional anaesthesia and nerve blocks

Regional anaesthesia, especially spinal, is increasingly being used for surgery. Patients coming for gynaecological, orthopaedic and lower limb surgery are being given spinal anaesthesia and other forms of nerve blocks. The increasing use of spinal anaesthesia has led to a situation where practitioners, especially the newly qualified nurse anaesthetists, are losing the skills of endotracheal intubation.

Nerve blocks are increasingly being used by physician anaesthetists in the Teaching Hospitals as the sole anaesthetic or in combination with general anaesthesia for surgery. The recent availability of portable ultrasound machines has enabled more blocks to be done with confidence. Single and multiple nerve blocks where appropriate are being done. Nerve blocks include femoral, sciatic and three-in-one nerve blocks. Some of the nurse anaesthetists are able to do spinal anaesthesia but not the various nerve blocks. Epidural analgesia and anaesthesia are still not widely practiced in the country. Prof Oduro used to do epidural anaesthesia at KBTH. The needles were metal ones and they were reused after autoclaving. Doctors who do epidural anaesthesia have to do the top-ups, reload the syringes and monitor the patients themselves. With their already heavy workload, doctors are not keen to add to it.

Complications of central neuraxial blockage

Even though central neuraxial blockade and other nerve blocks provide excellent anaesthesia and analgesia, they are not without complications. The Royal College of Anaesthetists of England has published its third audit report on the major complications of central neuraxial block[4]. The situation is not the same in Ghana. Postoperative follow up of patients in the Ghana is poorly done and as such no such data is available even though spinal anaesthesia is widely practised.

Challenges

The availability of local anaesthetic agents and other consumables are erratic and this causes frustration to practitioners who want to do some of these new techniques for their patients. The introduction of spinal anaesthesia for caesarean section was met with "opposition" from both the obstetricians and the midwives at least in KBTH. One of the reasons was that it took a relatively longer time to do a spinal compared to general anaesthesia. The midwives argued that the "paralysis" of the legs of these "heavy" patients was making it difficult to clean them and transfer them to the bed after the caesarean section. These objections soon gave way to advocacy by those same personnel as the benefits of the spinal anaesthesia became evident: fully conscious patients after the surgery, less postoperative nausea and vomiting and less depressed babies on delivery, early bonding between the mother and baby. Another benefit is the lower cost of spinal anaesthesia compared to general anaesthesia.

Postoperative analgesics

Traditionally postoperative analgesia has been achieved using intermittent intramuscular injection of opioids such as pethidine. This method does not give satisfactory analgesia especially after major surgery. With the increasing number of patients compared to nurses, it is obvious a number of patients experience long periods of pain as the only nurse on duty may be too busy to attend to them as quickly as possible. The supply of pethidine and morphine in the hospitals is far from satisfactory. Most health facilities have to buy these drugs from their Central Medical Stores and not directly from the company. This situation has its own inherent problem in the supply of these drugs to the health facilities.

New methods of postoperative analgesia including a continuous infusion of opioids using syringe pumps and regional analgesia like epidural, give better postoperative analgesia. These methods are however

not available to a large number of the patients. Wound infiltration with local anaesthetic agents such as bupivacaine or lidocaine is widely practiced. Similarly the use of paracetamol or NSAIDs suppositories like diclofenac is being practiced throughout the country. Some hospitals use the suppositories as the only form of postoperative analgesia after most operations. These hospitals are more concerned about safety issues more than good postoperative analgesia for their patients.

Patient controlled analgesia

Patient Controlled Analgesia devices are used in the management of postoperative pain in the developed countries. The device enables the patient to deliver a predetermined dose of opioids intravenously on the press of a "button" for the relief of pain. These devices have proven to be useful for the management of postoperative pain not only in adults but in children as well.Unfortunately, the devices are not available in the country not even in the three Teaching Hospitals. The cost of the device I believe is one of the main reasons.

Barriers to good postoperative analgesia

Even though studies have proven the benefits of good postoperative pain management, postoperative pain management is poorly done in all health facilities. Barriers include the belief that pain is a "necessary evil" associated with surgery. There are instances where nurses tell patients about the harmful effects of the drugs rather than the benefits. The most frequently cited problem is addiction to the drugs especially opioids even though there are no studies to substantiate this claim.

Care of the critically ill

One of the most important developments in anaesthesia in this country is the care of patients who are very ill and who a decade or two ago would have been declared unfit for anaesthesia and surgery. With the increasing knowledge in resuscitation of patients, the availability of drugs such as dopamine and adrenaline, anaesthetists have been involved in the preoperative resuscitation and the postoperative management of these patients. Central venous catheterization of subclavian and internal jugular veins has helped in the fluid resuscitation of some of these sick patients.

This has come about because of increased knowledge of the pathophysiology of diseases and resuscitation methods, increased ancillary support like laboratory investigations, imaging techniques including computerized tomography scan and ultrasonography. Previously, even patients with typhoid perforation would be anaesthetised without basic investigations such as haemoglobin and sickling let alone serum electrolytes and creatinine. These investigations are now routinely done on all emergency patients before anaesthesia and surgery at least in KBTH. The opening of private medical laboratories have contributed to this improvement at least in the urban areas, Newer and safer anaesthetic agents, new techniques including regional anaesthesia and nerve blocks have all contributed to the improved outcome of these patients.

Intensive Care Units

Until recently, the very ill patients were nursed in the recovery wards (where available) or in the ordinary wards. The recovery wards are used as High Dependency Units. Intensive Care Units have now been established in a number of hospitals: 37 Military Hospital, KBTH, KATH and Tamale Teaching Hospitals. The Intensive care Unit at the 37 Military Hospital started 12 years ago. It has 6 beds each for the ICU, HDU and burns unit. The unit in KBTH started in January 2010 with 4 beds; KATH started in 2009 with 8 beds; Tamale Teaching Hospital started in August 2009 with 4 beds at the old site. It is currently using the new site which has 16 beds, 4 of which are being used for ICU patients and the remaining 12 for neurosurgical patients.

The National Cardiothoracic Centre of KBTH has had its own ICU since its inception. It has been used as a training Centre for both residents and critical care nurses from Ghana and other countries like Nigeria. Because the Centre is financially autonomous, it does not experience most of the problems facing the general ICUs. The Centre has its own fully equipped laboratory supporting its patient care. The laboratory is open to the non-cardiac patients and the general public.

Challenges in the running of Intensive Care Units

All the units have similar challenges. The cost of the management of patients in the units per day is between GH₵120.00 to GH₵1000.00 for a ventilated patient. This amount is beyond the reach of most Ghanaians. The other challenges include lack of personnel especially nurses and in some cases physicians anaesthetists, the absence of essential equipment such as arterial blood gas and electrolyte machines and the shortages of essential consumables such as sensors for machines and transducers.

Extension of anaesthetic services

Korle Bu Teaching Hospital over the last two decades has had additional specialist surgical units established. These are the National Cardiothoracic Centre (NCTU) and the Reconstructive Plastic Surgery and Burns Centre. The National Cardiothoracic Centre started on the first floor surgical theatres in 1989 with Dr Frempong-Boateng as the only surgeon. Only thoracic operations were done during that period. The dedicated theatres were opened on the ground floor surgical unit in 1992. The Centre moved to its present building about 6 years ago. The first two anaesthetists were from Germany.

Dr. E. Aniteye a Ghanaian, joined the unit in 1997, followed by Dr. D. Kotei in 1999. The unit has been manned by these two doctors since 1999 when the last

German anaesthetist left the country. Dr M N K Nelson did some sessions at the unit at the beginning. Dr H Baddoo does weekly sessions. Dr E Ofosu-Appiah joined the Centre about two and half years ago. Six Ghanaian, ten Nigerian and one Ethiopian surgeons have been trained at the Centre.Residents from our department do a one-month rotation before their part I WACS examination and 4 months before the part II exanimation. In addition residents from KATH and Nigeria do rotations in the unit. A few consultant anaesthetists mainly from Nigeria have done some training at the unit. The Centre also offers clinical training for nurses doing the Critical Care Nursing programme of the Ministry of Health. Nurses from the sub-region such as Sierra Leone and Nigeria have also been trained at the Centre

The reconstructive plastic surgery and burns centre

This unit started at the Children's Block Theatre in KBTH with a visiting Plastic Surgeon, Mr Chris Bainbridge in January 1992. The department provided anaesthesia services at the beginning. Later on there were a number of visiting anaesthetists from the UK to the unit. The permanent building was commissioned in 1995. Dr M N K Nelson was in charge of the unit until she left for the Pacific in 2001. The unit continues to receive visiting anaesthetists notable among them is Dr Nick Scott from Glasgow.

International collaboration

International collaboration started during the time of late Prof Oduro when he was the head of department. The department received visitors mainly from the UK. Links were formed with some department in the UK such as the University of Leeds after Prof Oduro visited the University of Leeds and other UK departments in 1970s.

Basic Life Support Workshop

One notable link between our department and the USA was with the University of Iowa. This led to the visit to the department by one American physician anaesthetist, Dr Margaret S Emmons and a critical care nurse to help run the first ever workshop in Basic Life Support in 1983 at the KBTH. This was made possible through Dr Jack Moyers a friend of Prof Oduro who was the chairman of the Department of Anaesthesia of the University of Iowa from 1967 to 1977[5]. Dr Emmons died on 16th January 2010[6].

This workshop trained a number of facilitators in the department who then continued with the training after the departure of the Americans. Two members of each department in KBTH were trained in Basic Life Support. Unfortunately, this laudable initiative could not be sustained as it was originally intended to.

Foundation for Complex Orthopaedic Surgery

This foundation, a Non-Governmental Organization, started its activities in 1999 doing a few cases over a 2 to 3 day period. This has grown over the years to the present level of two-week operations twice a year. Our department has been the main provider of anaesthetic services. The collaboration with organization has exposed our department to new monitoring techniques like "evoked potentials" The management of these major cases has added to the acquisition of knowledge and skills by residents in the department. Patients operated upon come from Ghana and other countries such as Sierra Leone, Ethiopia and Nigeria. The Foundation has now built its own hospital in Ghana.

World Federation of Societies of Anesthesiologists and American Society of Anesthesiologists

The collaboration with these two organizations has already been written about.

Cuban Medical Brigade

The initial membership of the Brigade, which was 17 in 1982, rose to 54 in May 1994, 62 in 1999, 138 in 2000[7]. There were anaesthetist among the doctors who came from Cuba who worked in various hospitals including KBTH and the Central Regional Hospital in Cape Coast. There is currently one ICU physician from Cuba at the Central Regional Hospital.

Other collaborators

A number of hospitals in the country have collaboration from other institutions. The Department of Anaesthesia of the University of Utah, USA has been associated with the nurse anaesthetist training school in Kumasi for over 10 years. The team is led by Dr Jeff Peters. The team also helps to run the annual update course for the nurse anaesthetists in Kumasi. The number of participants at this refresher course is usually over 200. Other teams come from the Duke and Wakeforest Universities, from North Carolina, USA. The teams visit the Ridge Hospital and the Tamale Teaching Hospital at least once a year to help in the training programmes and to contribute to patient care.

The anaesthetic clinic

This was started in June 2000 in KBTH. It was initially run in the afternoons. Because of the increased numbers of patients over the years the clinic was done every day Monday to Friday. The clinic had seen about 35,000 patients as at October 2007. The shortage of manpower has led to the clinic being run on Mondays, Wednesdays and Fridays since 2011. Tuesdays and Thursdays are used for booking of patents. After the initial resistance, surgical colleagues have come to appreciate the positive contribution of the clinic to patient care. The improvement in patient care,the reduction in unnecessary cancellation of elective

patients and shorter hospital stay before elective surgery are some of the benefits from the clinic. The clinic is a regular source of income for the KBTH. Other hospitals in the country such as KATH and the Central Regional Hospital have also started similar clinics.

Research and publications

Research and publications in local and international journals have been going on from the inception of the department particularly in KBTH and KATH. Research in anaesthetic management of sickle cell patients in KBTH received international recognition. Similarly the department in KBTH pioneered the use of heminevrin for the management of eclampsia. Heminevrin is no longer used in the management of eclamptic patents. Magnesium sulphate is now being used for such patients.Research and publications are still being carried out by anaesthetist especially those in the teaching hospitals.

Mission and private hospitals

These hospitals have played a very important role in the delivery of health care in Ghana especially in the rural areas. Various types of surgery are done in these hospitals. The shortage of anaesthetic manpower including Physician anaesthetists have impacted negatively on the scope of operations done in these hospitals. There is a lot of collaboration between the mission hospitals and overseas partners. The supply of consumables and other agents are therefore better in these mission hospitals than most government hospitals.

The future of anaesthesia

The scope of anaesthesia related services can only be expanded if there are adequate numbers of specialists in the country. Some of the areas that will be developed in the future include Acute Pain Service (APS), chronic pain management and Obstetric Epidural Analgesia.

There is the need to put in place strategies to attract young graduates to choose anaesthesia as a specialty. The recent dwindling of the number of doctors choosing the specialty is a worrying development.

Advances in and the increase in complexity of surgical operations can only be achieved if there are adequate numbers of well trained physician anaesthetists.

Conclusion

This paper has sought to highlight the development of anaesthesia in Ghana. It has highlighted where we were some years ago and the major changes that have taken place over the last 50 or more years. It is hoped the paper will stimulate healthy discussion among all medical practitioners who have the specialty at heart. It is also hoped that anaesthesia will make great strides in the next 50 years.

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GOVERNOR HUGH CLIFFORD

Governor Hugh Clifford

He came into office in 1912.

He changed colonial government policy to extend health care to the general African population, not just European trrops and Africans working for government.

African exclusion from the health care system ended in 1915 under his governorship.

He launched works on the first pipe-borne water schemes in the Gold Coast, for Accra and Sekondi.

There were not enough doctors to open clinics or hospitals to serve the entire population at the time, so he began a country-wide dispensary scheme which would make medications and limited health services available.

He protested to the Colonial Office in England about the exclusion of African doctors from the government service, which he thought was unfair because Africans paid taxes, but the Colonial Office made no changes.

INFLUENZA EPIDEMIC—1918/19

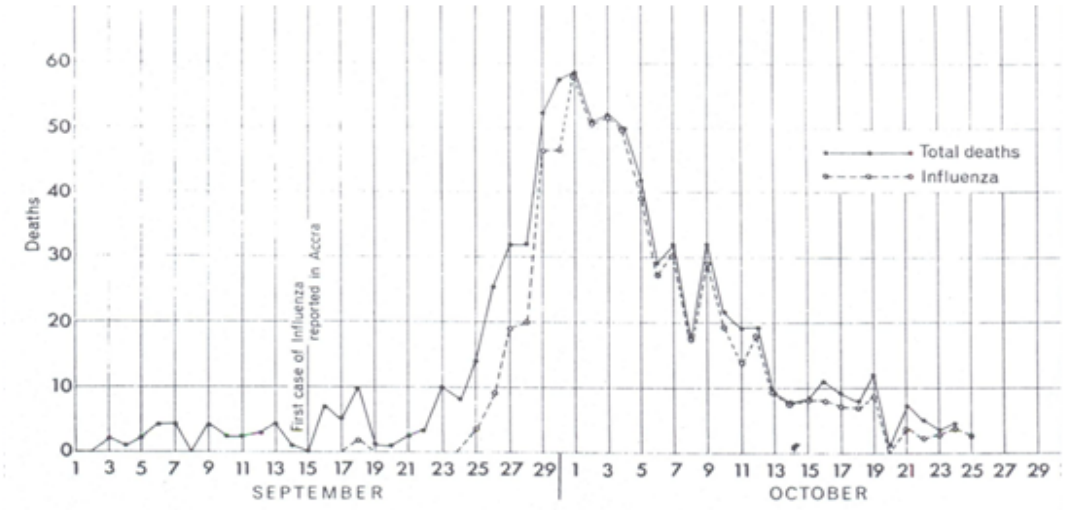

FIG. 18. Daily numbers of deaths reported in Accra in September and October 1918, showing the effect of the epidemic of influenza.

The Gold Coast was hard hit by the global pandemic. This epidemic claimed more lives globally than any other epidemic in history. Total number of deaths was put at about 15 million worldwide.

Estimated number of deaths was at least 60 000 and possibly as high as 85 000 for the Gold Coast Colony, Ashanti and the Northern Territories combined.

In the Legislative Council, Africans criticized the colonial government for the shortage of physicians, many of whom had been sent to other posts because of the First World War, and for its discriminatory practices against training and hiring African doctors.

Thomas Rice was principal medical officer.

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