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EDITORIAL

EBOLA HEMORRHAGIC FEVER: LESSONS FOR OUR STATES.

Pandemics of global proportions in modern times have included Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) and Severe Acute Respiratory Syndrome (SARS). The most recent one, Ebola is associated not only with high fatality and morbidity rates but also stigmatization and desolation in individuals, communities and nations. By the close of December 2014, a total of 18 603 confirmed, probable, and suspected cases of Ebola virus disease (EVD) have been reported in five affected countries (Guinea, Liberia, Mali, Sierra Leone, and the United States of America), and the three previously affected countries (Nigeria, Senegal and Spain). There have been 6915 reported deaths[3]. The disease can wipe out a weak and dysfunctional public health system. However if the public health system is strong and functional, most of the dying patients can be saved. Some countries in West Africa namely, Guinea, Liberia and Sierra Leone have experienced the largest epidemic of the Ebola hemorrhagic fever ever, since the initial description of the disease in 1976 in the Democratic Republic of Congo. Following this discovery, about 20 isolated cases and outbreaks of various forms of the virus have been reported over the past 38 years in Sudan, Uganda, Ivory Coast and the Philippines with no significant public health consequences. Hardly 100 people have been affected by the disease in any of these previous outbreaks

The disease derived its name from the Ebola River in rural Congo[1] and is a zoonosis caused by a filovirus. In man, following a variable incubation period of up to 21days, the infectious stage is characterized by acute onset of fever, abdominal pain, vomiting, diarrhoea and bleeding episodes. Fatality usually results from dehydration, electrolyte imbalance, anaemia and multiple organ failure. Prompt and aggressive rehydration with electrolyte replacement and blood transfusion prevent fatality in many cases. However, in situations where the health delivery system is in a poor state or non-existent, the fight against Ebola could be likened to an ill-equipped person facing the lion with their bare hands.

The spread of the infection has been attributed to many factors, including the phenomenon of "lack of staff, stuff, space and systems"[1]. Whether the infection resulted from the alleged consumption of bush meat or contaminated fruits dropped by a fruit bat, the epidemic fears no national boundaries. As a matter of fact, in Africa, there are usually no barriers in the thick forest.

Several health workers have been murdered in their quest to go out to the communities to provide health education to various communities. Intensified health education is required to combat some of the deep-seated traditions, such as the rituals associated with funerals, including bathing of corpses by family members before burial. Such education has been shown to improve the understanding of the indigenes, leading to a reduction in the rate of spread of the disease. Corpses of victims have to be buried under safety conditions without delay, and sick persons should have to report early to the Ebola treatment centres instead of going to prayer camps or the traditional healer, a common phenomenon in many African countries.

Women should participate in decision-making and priority attention should be given to their needs[2]. They care for, feed and bathe the sick. They may themselves get infected and die. Reproductive health services in the affected countries have suffered greatly because of the Ebola disease and access to family planning services is almost non- existent. Many of the recent gains in the MDGs have been reduced or reversed in these affected countries. More women are dying in pregnancy and delivery; there are more perinatal deaths, and more orphaned children to care for, but by whom?

The world's nations and international organizations have major roles to play in containing Ebola. The United Nations and the World Health Organization have been actively involved. The UNFPA is supplying emergency reproductive health kits to pregnant women and also equipment to midwives. Some organizations are however, getting the flak. The International Monetary Fund has been severely criticized for advocating austerity measures in these poor countries. The ultimate result has been that there is less budget provision for social services including health delivery services.

Ethical clearance for experimental treatment has been accelerated. These treatment modalities include: administration of plasma from a patient who had survived and recovered from Ebola, giving newly developed drugs, and providing vaccination. However, ethical conventions must be adhered to in the quest to contain the epidemic. Attempts to fast-track treatment and preventive methods should be strictly controlled to avoid the use of humans for experimentation.

We may have learnt a lesson: to build stronger health delivery services and systems that can cope with some aspects of these epidemics and thereby reduce the avoidable spate of mortality and morbidity. Ghana has

been putting up various measures for the prevention and treatment of the Ebola disease, should any infection be reported. The Noguchi Memorial Institute of Medical Research (NMIMR) has tested blood samples of all the nearly 130 suspected cases and all these suspected cases have tested negative for Ebola and other Viral Haemorrhagic Fevers. There is currently therefore, no confirmed case of Ebola reported in Ghana[3].

Can we proceed as a nation to build a strong public health system, and also have at least a centre of excellence for managing infectious diseases? If so then the time to begin is now. Uganda did so in the wake the devastating burden of HIV/AIDS.

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COMMENTARY

BARRIERS TO SKILLED BIRTH ATTENDANCE IN INDONESIA: ANY NEW LESSON FOR GHANA?

The presence of a skilled birth attendant at childbirth, backed-up by transport in case emergency referral is required, is perhaps the most critical intervention for making motherhood safer[1]. Defined as the process by which a woman is provided with adequate care during labour, delivery and early postpartum period[1], skilled birth attendance is critical in reducing the high Maternal Mortality Rates in Indonesia and many developing countries. There must be a health worker with midwifery skills and an enabling environment including infrastructure, equipment and logistics with efficient and effective communication and referral systems. The enabling environment broadly includes geographic, political, policy and socio-cultural context in which the skilled personnel operates; as well as the pre- and in-service training, supervision, deployment, regulation, and healthcare financing systems in place[1]. Minimum important skills are those for detailed history and examination, antenatal care, patient education on pregnancy's danger signs, recognition of maternal and fetal complications and appropriate intervention, life saving skills when needed, appropriate and timely referral including transport arrangement; and care during transportation[1].

The World Health Organisation (WHO) Global Health Observatory reported in 2013 that Indonesia is developing country with a population of nearly 250million, 300 ethnic groups living across 13,700 islands with 250 languages [2]. 60% of the population is rural. Political governance is decentralized to 33 provinces made up of 73,405 villages under 497districts[2]. The Maternal Mortality Ratio nationally averages 228/100,000 live births nationally; but figures as high as 608/100,000LB were reported in some province. Skilled Birth Attendance is 40% – 82% reflecting the wealth quintiles, the highest in Java, Indonesia's most populated, modernized province, with over 50% of all doctors, and 66% of Indonesia's obstetricians in the year 2010[3].

In Indonesia, evidence suggests the cost of skilled obstetric care is unaffordable by many poor households and constitute a major barrier to utilization and access to safe maternal care [4]. The introduction of voucher for reproductive health services, the unconditional community cash transfer, and the social health insurance (Jamkesmas) resulted in increased village health centre deliveries attended by doctors or midwives; increased utilization of Reproductive Health Services, facility delivery by 40%[1,5] and large reductions in neonatal and infant mortality rates. However, all these schemes lack provisions for transport and time costs, which have been shown to constitute a significant 50% of total normal delivery expenditure. A similar scheme in India additionally covered transport and wage loss for one accompanying person, and achieved 99.7% facility delivery[5].

Inequitable distribution of doctors; unskilled and experienced midwives, despite heavy government investment in their training, constitute another major barrier. The resulting poor quality of care perceived by patients further reflects the midwives' inadequacies even in normal delivery skills. The midwives therefore lose the confidence of clients, and this further strengthens the barrier [2, 3, 5.] Similar factors prevail in the Ghanaian context.

In Ghana, the introduction of free maternal care services and locating Community Health Planning Services (CHPS) compounds closer to where people live are some of the efforts that have been made to remove barriers to accessing skilled maternity care. Consequently, by the year 2012, approximately two thirds (68%) of women gave birth in health facilities and were assisted by skilled personnel during delivery – this percentage was highest in Greater Accra (90%) and lowest in the Northern Region (37%), (previously 17% in 2008) of Ghana following the implementation of the free maternal care policy in the year 2008[6].

Many sub-district and district facilities in Indonesia lack the logistics to provide Emergency Obstetric Care (EmOC) and the health system also lacks effective referral network with ambulance and communication technology to link Traditional Birth Attendants, village midwives, health centres, private and district facilities for the provision of timely EmOC[6], This unfortunate missing link makes the three delays almost insurmountable, resulting in slowing of progress towards the Millennium Development Goal [5] targets by Indonesia.

Just like in Ghana, the overall lack of adequate development and basic social amenities to guarantee acceptable quality living standards in many rural areas makes it difficult and unattractive for healthcare professional to accept postings there. Consequently, many villages lack a midwife despite government's aggressive "village midwife programme"[2]. This programme reduced socioeconomic inequalities in professional birth attendance, but the gap in access to potentially life-saving emergency obstetric care widened[4].

In conclusion, the factors constituting barrier to skilled birth attendance in Indonesia are numerous and

varied, requiring a holistic concerted multi-sectoral approach, implemented alongside long-term poverty reduction and health systems strengthening. These are largely similar to the Ghanaian context. Specific actions need to improve transport, effective referral-ambulance system, private sector engagement and overall focus on socioeconomic development and family planning. Unlike Indonesia, Ghana has made significant strides in removing the financial barrier through the implementation of the free maternal care policy[6]. In both Indonesia and Ghana, the inclusion of transport cost for the pregnant women needing EmOC may potentially augment the gains by the existing interventions, as the Indian scheme exemplifies[5].

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ORIGINAL ARTICLES

BURN INJURIES IN KUMASI: A TEN-YEAR REVIEW

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Abstract

***Objective*:** To document the clinical and epidemiological features; and the outcome of management of patients with burn injuries at Komfo Anokye Teaching Hospital in Kumasi, Ghana, from January 2003 to December 2012.
Patients and Methods: Data on all burn patients managed within the study period were retrieved from the records of the Burns Intensive Care Unit (BICU), theatre and Surgical Outpatient Department (SOPD) and analyzed. Data included name, age, sex, cause of burn, medical and surgical treatment given, post burn complications and the outcome of the treatment.
Results: 1361 patients were treated for burn injuries and their complications at KATH, comprising 707 males and 654 females (M: F = 1.08:1). Ages ranged from 0.25 to 92 years; mean 15.5 (SD 14.1) years, median 11.9 years. About 77% of the patients were aged 20 years or less; 45% were children aged 10 years or younger. The highest annual admission was 172 patients in 2005; the lowest 104 in 2007. Scalds comprised 60% of the injuries, hot water accounting for 45%. Dry heat was responsible for 37% of the burn injuries. Chemical burns accounted for 28 (2%) injuries which led to loss of vision in two cases and one death; all of which were through assault. Electrical burns accounted for 12 (0.9%) of the injuries and led to six limb amputations and three deaths, all of them workers of electricity companies. A total of 162 patients died of burn injuries, giving an overall mortality of 11.9%. The highest annual mortality of 32 (29%) occurred in 2008, which coincided with 4 major burn disasters. Peri-operative deaths occurred in four epileptic patients.
Conclusion: Though injuries from hot liquids account for most admissions for burns at KATH, significant morbidity and mortality also result from dry heat. Electrical and chemical burns and epilepsy are increasingly becoming responsible for most burn morbidity.

Key Words: Burn injuries, scalds, electrical, chemical, contractures

INTRODUCTION

A burn injury to the skin usually results in local destruction of tissue and also elicits a systemic inflammatory response[1]. The injury can damage the epidermis alone, the epidermis and a portion of the dermis, or the entire skin, and can even involve the underlying subcutaneous tissue[2]. Severe burn injury impairs the host defence mechanisms against invading micro-organisms.

This increases susceptibility to infections by human pathogens, and also by organisms not normally pathogenic in the uncompromised host[3]. Burn survivors are often left with stigmata such as hypertrophic scars, keloids and contractures. In addition to cosmetic problems, these scars may cause dysfunction and discomfort leading to significant morbidity[4]. Cosmetic problems may affect burn survivors psychologically, socially and economically[5].

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Conflict of Interest: None Declared

The causes of burn injuries in a community may be related to social, recreational, occupational and economic factors. Burn injuries are usually sustained accidentally, though on some occasions, they may be sustained intentionally through assault[6]. The objective of the study was to document the clinical and epidemiological features; and the outcome of management of patients with burn injuries at Komfo Anokye Teaching Hospital in Kumasi from 2003 to 2012. This knowledge would aid in improving overall management of burn injuries and identify opportunities for prevention of burn injuries.

PATIENTS AND METHODS

This is a retrospective study of patients with burn injuries who were managed at the Reconstructive Plastic Surgery and Burns Unit (RPSBU) at Komfo Anokye Teaching Hospital (KATH) in Kumasi, Ghana, between the period from January 2003 to December 2012. Data on all the burn patients managed within the study period were retrieved from the records of the Burns Intensive Care Unit (BICU), theatre, and the surgical out-patient department (SOPD) of KATH. Data collected included the name, age, sex of the patient, the cause of the burn injury, the medical and

surgical treatment given, and the outcome of the treatment. Data was also collected on post-burn complications, how they were managed, and the outcome of management.

The patients with acute burn injuries were admitted to the RPSBU at KATH. Initial assessment included ensuring a patent airway with adequate respiration and circulation. Intravenous access was then established. After exclusion of any other life threatening injuries, the extent of the total body surface area (TBSA) involved was estimated using the Lund and Browder chart[7]. The patient was then weighed. Fluid requirements were calculated using the Parkland formula[8] (4ml/kg/% TBSA). Patients selected for fluid resuscitation included children with more than 10% TBSA [Fig. 1], or adults with more than 15% TBSA and patients with electrical or chemical burns. The fluid of choice for initial burn resuscitation was Ringer's lactate.

Fig.1: Full thickness burns in a 4 month old baby requiring urgent resuscitation and wound excision

The burn wounds were toileted with a warm antiseptic (e.g. savlon) solution and rinsed with normal saline. Silver sulphadiazine (dermazine), a topical antibiotic was applied to the wounds. Closed (occlusive) dressing was done for wounds involving the trunk and limbs. Open dressing of the wounds were done for injuries involving the face, genitalia or perineum and the hands.

Surgery for burn injuries was either performed as an emergency (within 24 hours of injury) or early (acute stage up to complete healing) or late (after complete healing of wounds). The following categories of injuries were selected for surgery: full thickness burns, especially circumferential ones of the trunk or extremities, deep dermal burns of special areas such as the hands, face and genitalia, infected burns, burn wounds not healed after three weeks of conservative treatment, and deep dermal chemical and electrical burns. Emergency surgery for burns included escharotomy, early excision and grafting of deep dermal wounds, and wound debridement of deep electrical burns. Early surgery involved excision and grafting of burn wounds, wound debridement, skin grafting and flap reconstruction. Late or secondary surgery involved the release of contractures and repair with z-plasty, local or distant flaps, or skin grafts to improve or restore function. Late surgery also included revision of scars to improve cosmesis.

RESULTS

A total of 1361 patients were treated for burn injuries at the RPSBU of KATH in Kumasi from January 2003 to December 2012. They comprised 707 males and 654 females, giving a male to female ratio of 1.08: 1.The yearly admissions and deaths from burn injuries are shown in Fig. 2. Out of the 1361 admitted for treatment 162 died from causes related to the burn injuries, giving a mortality of 11.9%. The year 2005 recorded the highest admission of 172 patients, but with 14 (8%) deaths. The highest mortality of 32 (29%) occurred in 2008 with a lower admission of 110 patients.

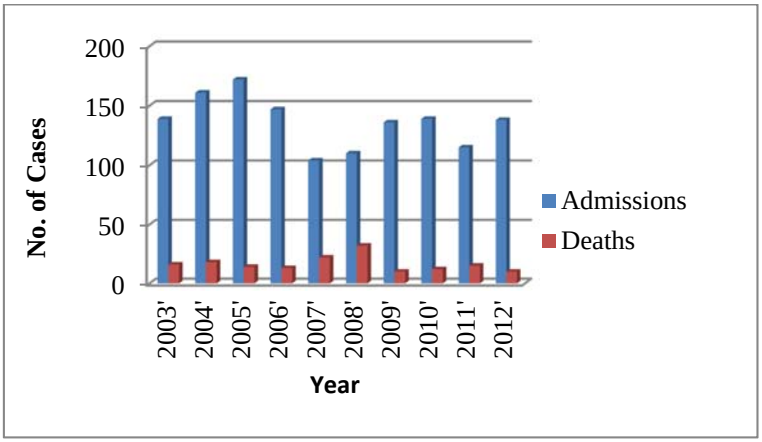

Fig. 2: Admissions and deaths of 1361 patients treated for burn injuries at KATH.

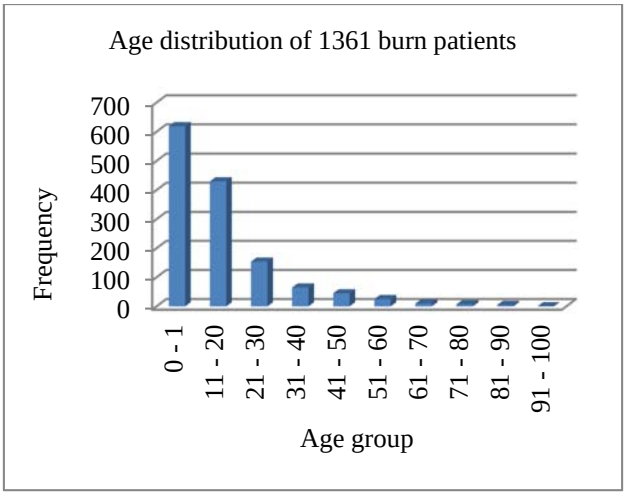

Fig. 3: Age distribution of 1361 patients treated for burn injuries at KATH

The age distribution of the 1361 patients treated for burn injuries at KATH is shown in Fig. 3. Their ages ranged from 0.25 to 92 years with mean age of 15.5 years, median of 11.9 years and standard deviation of 14.1. About 77% of the patients were aged 20 years or less, with about 45% comprising children aged 10 years or younger.

Burn injuries caused by hot liquids (scalds) comprised 60%; hot water alone was responsible for 44% of the admissions [Fig. 4]. Most of the children who were 10 years or younger sustained their burn injuries from hot water [Fig. 5]. Dry heat comprising fire and flames, including domestic (liquid petroleum) gas explosions comprised 502 (37%). Injuries from hot water, domestic gas, soup and cooking oil (1045, 76.8%) occurred in the homes, especially in the kitchen.

Conservative management of burn injuries including fluid and electrolyte resuscitation, analgesics, antibiotics and wound dressing was adequate treatment for 719 (52.8%) of the patients. These patients had partial thickness wounds which healed by the third week. 642 (47.2%) of the patients had to undergo a surgical procedure, some more than once [Tables 1 & 2], for the following reasons: to replace the damaged epithelial layer, to reduce fluid and electrolyte loss, to reduce bacterial load in infected cases , to save limbs at risk of ischaemia and gangrene, and to restore or improve function and cosmesis in those who had survived the acute injury.

Skin grafting was the commonest (48%) surgical procedure performed for burns in this series; it was performed as an emergency, as an early procedure,

Table 1: Surgical procedures performed on 642 patients with acute burn injuries

Emergency	
Escharotomy	10
Excision and grafting	10
Debridement	19
Early	
Split Thickness Skin Grafting	290
Debridement	16
Excision and grafting	13
Amputations: below elbow	10
Above knee	6
Below knee	3
Flap repair	6
Late	
Release of contracture	248
Flap repair	68
Full thickness skin graft	50
Total number of procedures	**749**

and for late burn reconstruction. In the latter situation only full thickness skin grafting (7%) was done. Wound debridement was performed as an emergency procedure in 19 (2.5%) patients who had sustained deep dermal burns from electricity, and as early procedure in 16 (2.1%) patients with thermal burns.

Amputation had to be performed in 19 (2.5%) patients whose injuries were sustained through full thickness electrical burns (10) and epileptic patients who had sustained burns during a seizure (9). Escharotomy was performed as an emergency procedure in 10 patients with circumferential burns to the lower extremity to decompress neurovascular structures (8 cases), and the trunk to prevent respiratory impairment (2 cases).

Release of contracture, which is usually performed as a late or secondary procedure for burns, was a common surgical procedure (248, 33%) in this series, second only to skin grafting. Repair of some defects following contracture release were done with flaps (68, 9%); some flaps were also employed in early burn surgery (6,0.8%). Details of the flaps used in the reconstruction of the burn wounds in this study are shown in table 2

Table 2: Flaps used in burn reconstruction

Type of flap	Number used
Z-Plasty	28
Cross finger	20
Parascapular	12
Groin (SCIA)	10
Cervical (X-plasty)	2
Local	2
Total number of flaps used	74

DISCUSSION

The higher incidence of burn injuries in the age group 0 – 10 years, followed closely by 11 – 20 years (Fig. 3) coincides with the higher incidence in the months of August, September and October.

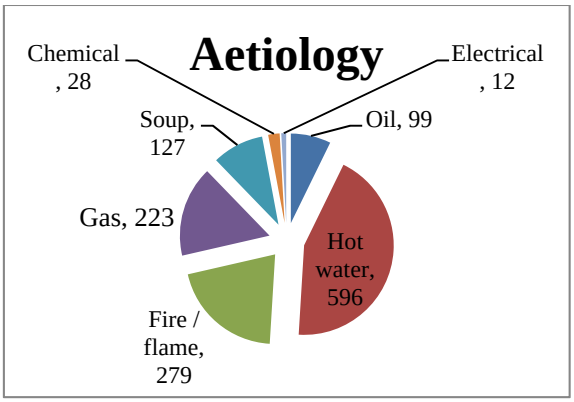

Fig. 4: Aetiology of 1361 cases of burn injuries managed at KATH

The commonest cause of burns in these age groups was hot liquids, especially hot water (Fig. 5). The

weather in these months is much cooler, requiring hot water baths in most homes. Water for bathing is usually heated to boiling point before diluting with cold water to the desired temperature for bathing children. In the meantime toddlers playing around may either fall into it or spill it over themselves sustaining scalds. Similarly burn injuries are sustained from hot soups and frying oils in the big compound houses with no running water and poor electricity supply, where several tenants cook in front of their rooms. The children playing nearby in the court yard become victims of burn injuries. Even though the total body surface area involved in such injuries may be large, most wounds tend to be superficial and heal by conservative management without surgical intervention.

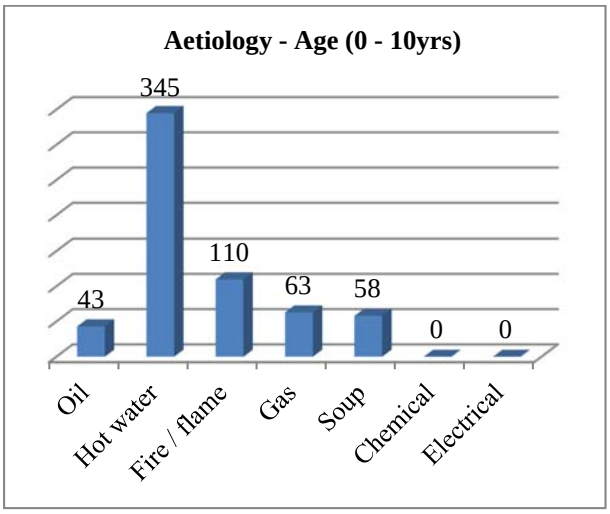

Fig. 5: Causes of burn injuries in children aged 0 – 10 years seen at KATH from 2003 to 2012

The higher incidence of burns in children under 10 years of age has also been documented in similar studies. A study in the Western Cape province in South Africa [Nierkerk et al, 2004] [9] revealed that burn injury incidence was particularly high for toddlers and infants, for boys and for African children. Burn injury incidence was highest in winter but only significantly greater than the rate in summer[9]. A similar study in Bangladesh also revealed that the highest proportion of non-fatal burn injuries (57%) was found among children one to four years old[10]. It appears that parental guidance for these vulnerable children trying to explore their environment is not meticulous.

Scalds are the most frequent form of burn injuries worldwide and cause over 100,000 patients to seek treatment in hospital emergency units, but fire or flame burn is the most frequent cause of burn injury requiring hospital admission[11]. The number of children admitted to hospital for burn treatment has varied by geographic area from a low rate of 4.4/100,000 population in America to a high of 10.8/100,000 population in Africa[12].

Domestic gas (223, 16%) was responsible for several house wives and house helps becoming victims of burn injuries. Leaking gas cylinders, faulty cylinder caps and tubes resulted in frequent gas explosions in homes. These findings support the observations in South Africa[9] and Bangladesh[10] which found the home, especially the kitchen, as the most dangerous place in terms of burn injuries.

Chemical burns constituted 2% (28) of the cases of burn injuries seen during the study period. Unlike the other cases these injuries were not accidental. The chemical had been used as a weapon of assault on the patients. The chemical involved was usually concentrated sulphuric acid used as the electrolyte in some automobile batteries. This is purchased, prepared or stored by auto-electricians and used to service vehicles. Similar chemicals are stored by small scale miners and are used to extract minerals from ores. The reason for the assault was usually related to love or marital relationship failures, chieftaincy or land disputes, religious or political conflicts. The victims were usually young men and women within the ages of 20 and 40 years. The assailants usually aimed at the victim's face, especially the eyes.

Most patients were not aware of, and did not do the copious irrigation of the site with water before arrival at the hospital. The injuries were extensive, and required multiple surgical procedures before satisfactory healing could be achieved. One patient died, and two patients lost vision in one of their eyes from chemical burn assaults. A study on chemical burn injury in Nigeria[13] revealed that the injury was intentional in all cases with the assailant known to the victim in 73% of the cases. The face was the usual target with an incidence of blindness of 55%. The study recommended public education on the usefulness of continuous water irrigation as the first aid measure[13].

Electrical burns constituted 0.9% (12) of the burn injuries seen in this study. The victims comprised 2 electrical engineers, 4 technicians and 2 student electricians. Four children also sustained their electrical burn injuries by playing near electrical installations. The tissue damage caused to these patients were extensive and required several surgical procedures including wound debridement (10), amputations (6) and flap repair (4). The initial wound debridement was essential as any remaining non-viable tissue could lead to infection and tissue loss[14]. Despite aggressive debridement and escharotomy the likelihood of amputation is usually very high in electrical burn injuries especially in the upper extremity[15]. Full recovery from electrical burn injuries in this series was rather prolonged, with a minimum period of three months. It was also associated with co-morbid conditions such as malnutrition (2 cases), anaemia (2 cases) and renal failure (one case). Three patients died from electrical burn injuries in this study.

About 88.1% of the patients survived the acute burn injuries due to prompt and effective fluid and

electrolyte resuscitation, wound care, infection and pain control. However most of these patients presented with complications, some of which required surgical correction. Contractures were the commonest complications, involving especially the head and neck and upper extremity, especially the hand. Most of these contractures were repaired through multiple Z plasty (28, 38%) technique. The contractures on the fingers tended to involve the volar aspects, causing flexion of the digits. The cross finger flap (20, 27%) was found to be useful for repairing defects following release of these flexion contractures[16]. Post burn axillary contractures were very common in adults, and resulted from flame burns, especially involving clothing. The parascapular flap (12, 16%) was employed to repair major defects in the axilla following release of these contractures [Fig.6][17]. For most extensive defects on the hand and forearm from electrical burn injuries pedicled groin flaps (10, 13.5%) provided good coverage[18].

Fig.6: Post burns axillary and elbow contractures, before and after surgical release and flap repair.

The highest mortality per year from burns in this study occurred in 2008 with 32 deaths. That year recorded four major fire disasters in the middle belt of Ghana, which form part of the catchment area for Komfo Anokye Teaching Hospital in Kumasi. The Asokwa gas filling station explosion injured 136 patients and claimed three lives: the Asafo petrol tanker accident injured seven people out of which one died; the Atwedie gas tanker accident injured seven patients out of which three died; a major petrol tanker accident at Techiman injured 19 people, out of which 13 died. These observations support the finding by other workers [11, 12] that dry heat (flame burns) is responsible for most burn mortality.

One medical condition which predisposes to burn injuries in Ghana is epilepsy[19]. Epileptics tend to sustain severe burn injuries because they are sustained during a seizure, when they are unconscious and hence cannot escape until the seizure is over, or are rescued by a passer-by. In some communities in Ghana some people believe that epilepsy is contagious; such people are reluctant to rescue epileptics lest they come into contact with their body fluids such as saliva, which they believe, transmits the disease. Most burn injuries in epileptics require surgical management. In the current study, seven epileptic patients underwent wound debridement and skin grafting for full thickness burns. Three of them had persistent seizures intra-operatively, and died from hypoxic brain damage. The fourth died in the second postoperative week from multiple organ failure. Nine other epileptic patients underwent amputations for severely burnt and gangrenous limbs. Public education by health personnel on the nature of the disease and the need to protect the patients from fires is highly recommended.

CONCLUSION

Though injuries from hot liquids are responsible for most admissions for burns at Komfo Anokye Teaching Hospital, significant morbidity and mortality result from dry heat. Electrical burns as occupational hazard, chemical burn as weapon of assault and epilepsy as a predisposing medical condition are increasingly becoming responsible for major burn morbidity. Chemical burn injury is gradually becoming a public health hazard in Ghana. We recommend that the sale of these chemicals should be regulated by law.

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PERIPHERAL INTRAVENOUS CANNULATION AND PHLEBITIS RISK AT CAPE COAST TEACHING HOSPITAL

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Abstract

Introduction: Intravenous (IV) cannulation is the commonest invasive procedure among hospitalised patients. It is however associated with risks and complications that can have an adverse impact on the clinical outcome of the patient.

Aim: To assess the incidence of and risk factors for development of phlebitis following peripheral IV cannulation at Cape Coast Teaching Hospital (CCTH), and establish the optimal day for routine replacement of IV cannulas in our setting.

Method: A prospective observational study was conducted over a period of three months from September 2013 to December 2013 at the Medical and Surgical Wards at CCTH. Patients were assessed using the Visual Infusion Phlebitis (VIP) Score. Results were analysed and chi square was used to test associations and significance level set at p value ≤ 0.05.

Results: A total of 224 patients were assessed. The incidence rate of phlebitis was 52.2%. Phlebitis was higher among patients who had cannulas in situ beyond day four (66.3%) compared to those who had cannulas for up to four days (44.4%)(p=0.002). Phlebitis was also higher among patients with ongoing infections (69%) (p=0.023).

Conclusion: Over half of cannulated patients studied developed phlebitis. Phlebitis rates were significantly increased four days post-cannulation and in patients with ongoing infections. Routine replacement of cannulas by day four is therefore recommended.

Key Words: Phlebitis, IV cannulation, Cannula, Routine replacement

Introduction

Peripheral intravenous (IV) cannulas provide relatively easy and comfortable venous access for hospitalised patients allowing for sampling of blood as well as administration of fluids, medications, parenteral nutrition, chemotherapy, and blood products. Although cannulas provide necessary vascular access, there are some associated complications such as phlebitis, local site infection, occlusion, extravasation and cannula-related bloodstream infections (CRBSI). These complications lead to patient discomfort, increased medical treatment, length of hospital stay and cost of treatment, as well as increased morbidity and mortality. Phlebitis or vein inflammation is a common complication of IV therapy with between 2.3%[1] and 60%[2] of patients developing phlebitis; depending on the populations studied. When accompanied by thrombus formation it is referred to as thrombophlebitis. The more serious complication of IV therapy, bacteraemia, occurs in about 0.8%[3] of cases.

Many risk factors of phlebitis have been identified in other studies. These include lengthy cannulation periods, cannula material, cannula size and infusate characteristics. Factors which are more patient specific include gender, insertion site, concurrent infection and presence of underlying medical illnesses[4].

Early phlebitis is possibly related to the insertion procedure such as poor hand hygiene, poor skin preparation, inexperienced personnel doing insertion and multiple attempts at different sites with the same IV cannula. Phlebitis that occurs later is possibly caused by colonisation along the skin tract or contaminated hubs or fluids[5].

Contamination of the cannula hub contributes substantially to intraluminal colonization of long-term cannulas. Occasionally, cannulas might become haematogenously seeded from another focus of infection. Rarely, infusate contamination leads to cannula-related bloodstream infections (CRBSI). Cannulas that are left in longer also have increased exposure to handling and drug infusions which may explain the higher rate of phlebitis for longer duration of cannulation[6].

In view of the above, Centre for Disease Control (CDC) recommends routine replacement of peripheral IV cannulas every 72 to 96 hours in adult patients to restrict the potential of developing phlebitis[5, 7]. Current guidelines from the United Kingdom and Australia recommend routine replacement of peripheral intravenous cannulas every 48-72 hours to prevent infusion phlebitis and rare but life threatening peripheral cannula related bacteraemia[8]. Other studies suggest that it is better to re-site the IV cannula only when clinically indicated due to highly improved IV cannula materials and dressings used in the hospitals under study[1, 4, 9]. To date however, no studies have been done in Ghana to inform local practice.

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Various grading systems have also been proposed to facilitate and clarify the diagnosis of phlebitis. These include the Maddox scale and the Baxter scale, which rank infusion thrombophlebitis according to the severity of clinical signs and symptoms[9]. The tool recommended by the Royal College of Nursing - the Visual Infusion Phlebitis (VIP) score was first developed by Jackson in 1998 as a standardized approach for monitoring peripheral IV cannula sites. It has content validity, reliability and is clinically feasible. It facilitates the timely removal of peripheral IV cannulas at the earliest sign of phlebitis. It is also recommended by the Department of Health (UK), Infusion Nursing Standards of Practice INS (US), Royal College of Nursing (RCN) (UK) and the English Department of Health and Health Protection, Scotland.
This study seeks to identify the optimal day for routine replacement of IV cannulas and to explore the factors that influence the development of peripheral IV cannula-related phlebitis in our local hospital. The paper specifically examines the direction and strength of association between cannula dwell time and ongoing infections, and the incidence of phlebitis. Findings from the study would provide useful information for the improved care of IV cannula sites and subsequently decrease the incidence of peripheral IV cannula-related complications.

Methods

Design and setting

A prospective observational study was conducted on patients admitted to the medical and surgical wards of Cape Coast Teaching Hospital, Ghana, over three months(16^{th} September – 20^{th} December, 2013). The study sample included all patients aged 12 years and above who had at least one IV cannula in situ during their hospital stay. Only patients who gave informed consent participated in the study. Patients were assessed visually to determine the degree of associated phlebitis after cannulation. Additional information included patients' age and sex, ward of admission, diagnosis, co-morbidities, ongoing infections, antibiotic infusion, other in-dwelling catheters (central venous catheters, urinary catheters), insertion site of cannula, personnel who did the cannulation and the cannula dwell time. The patients were seen daily and examined for signs of phlebitis using the Visual Infusion Phlebitis (VIP) Score until the time of removal of cannula (i.e. development of phlebitis, discharge or death). The VIP score is a phlebitis assessment scale which classifies IV cannula sites on a scale of 0 – 5 based on signs and symptoms. A score of 0 implies no signs of phlebitis; a score of 1 indicates possible first signs of phlebitis; a score of 2 indicates early stage of phlebitis; 3, 4 and 5 indicate medium stage of phlebitis, advanced stage of phlebitis / start of thrombophlebitis and advanced stage of thrombophlebitis, respectively (Appendix).

Analytical technique

The data was entered using the Statistical Package for Social Sciences (SPSS) version 16.0 and transferred to Stata 11.0 software for analyses. Univariate analyses were conducted to provide a summary on the study sample, while bivariate and multivariate analysis procedures were employed to assess the factors influencing the phlebitis. The dependent variable (Phlebitis) was derived from the VIP scores and constructed as a binary variable for the purpose of this study. A VIP score of "0" and "1" was categorized as "no phlebitis" and coded "0", while any score from 2 to 5 was coded "1" and categorized as "phlebitis". Cannula dwell time and presence of ongoing infection were considered as the main independent variables. Cannula dwell time was captured as a count variable, but was re-categorized into a dichotomous variable (1-4 days and >4days) to suit the aim of the study. Similarly, ongoing infection was grouped into two; present and absent.

In order to examine the strength and direction of association between the dependent variable and the main independent variables, there was the need to control for the effect of other mediators. Theoretically relevant covariates of phlebitis were identified and classified into clinical factors (insertion site, co-morbidities, presence of other in-dwelling catheters and antibiotic infusion) and "other" factors (age, sex, ward of admission and personnel who cannulated). Since the dependent variable (Phlebitis) was constructed as a binary outcome, binary logistic regression was used in the multivariate analysis. Three successive logistic regression models were estimated, starting with a model with cannula dwell time and ongoing infections (Model 1). In Model 2, clinical factors were tailored in to assess their influence on the association between the factors in Model 1 and the outcome variable. Then in Model 3, "other factors" were fitted in to assess their influence on the factors in the preceding models. Using the results from the final model (Model 3), the overall effect of number of days of cannulation and presence of infection on phlebitis was assessed. The results were presented in the form of odds ratios.

Results

Univariate analysis

A total of 224 patients with cannulas were assessed of which over 50% were males (Table 1). The mean age of participants was 43.4 (+/- 19.07) years.

More than half of the patients had no co-morbidities, about a third had ongoing infections (surgical site infection, diabetic foot infections, cellulitis, pneumonia, urinary tract infections, osteomyelitis and septic arthritis); and more than two - thirds were on antibiotic infusion.

Table 1: Patient Characteristics (N=224)

Characteristics	Frequency	%
Sex		
Male	121	54
Female	103	46
Age		
10 – 19	25	11.2
20–29	36	16.1
30–39	38	17.0
40–49	45	20.1
50–59	31	13.8
60–69	18	8.0
70+	31	13.8
Ward of admission		
Female Medical	55	24.6
Female Surgical	48	21.4
Male Medical	57	25.4
Male Surgical	64	28.6
Personnel who cannulated		
Doctor	68	30.4
Nurse	145	64.7
Student	11	4.9
Insertion site		
Cubital fossa	35	15.6
Forearm	87	38.8
Hand (dorsum)	66	29.5
Wrist	36	16.1
No. of comorbidities		
None	129	57.6
One or more	95	42.4
Other in-dwelling catheter		
Absent	151	67.4
Present	73	32.6
Ongoing infections		
Absent	151	67.4
Present	73	32.6
Antibiotic infusion		
Absent	72	32.1
Present	152	67.9
Cannula dwell time		
1 - 4 days	144	64.3
>4 days	80	35.7
Outcome		
No phlebitis	107	47.8
Phlebitis	117	52.2
VIP score		
0	98	43.8
1	9	4
2	101	45.1
3	16	7.1
4	0	0
5	0	0

The duration of cannula placement ranged from one to eighteen days with mean cannula dwell time of 3.94 (+/- 2.55) days. About six out of ten patients had cannulas in situ for four days or less compared to about three out of ten patients who had cannulas in situ for more than four days. Over 50% of the patients in the study developed phlebitis. Among those who developed phlebitis, over 80% had early stages of phlebitis (a VIP score of 2).

Trend of phlebitis

As shown in figure 1, the incidence of phlebitis rose gradually from day one of insertion to day three of insertion after which there was a slight decrease on day four. After day four, there was a steep rise until it reached its maximum at day eight and beyond.

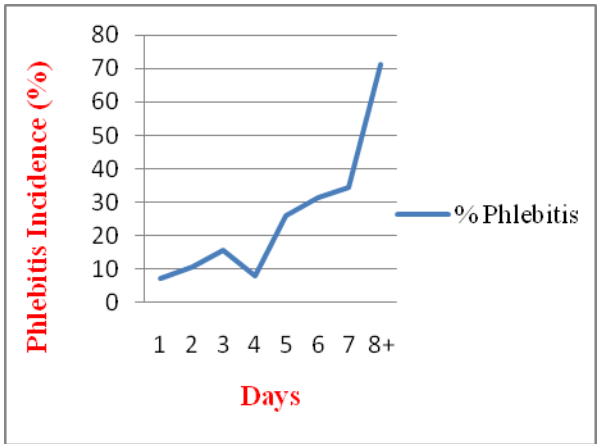

Fig. 1: Trend of phlebitis in relation to IV annula dwell time

Cannula dwell time	No phlebitis	Phlebitis	Population at risk*	Phlebitis Incidence (%)
1	208	16	224	7.1
2	170	20	190	10.5
3	129	24	153	15.7
4	96	8	104	7.7
5	60	21	81	25.9
6	37	17	54	31.5
7	19	10	29	34.5
8+	4	10	14	71.4

*Denominator for calculating each corresponding phlebitis incidence

Bivariate analysis

Results at the bivariate level (Table 2) show a significant ($p = 0.002$) association between cannula dwell time and phlebitis. About seven in ten patients cannulated for more than four days developed phlebitis

compared to about five in ten cannulated for at most four days. A similar association (p = 0.023) was also found between patients with ongoing infections and phlebitis. The proportion of patients with phlebitis did not vary between men and women.

The highest proportion of phlebitis was observed among patients aged 70 years and above, although there was no statistical significance across all age groups.

Almost two-thirds of patients with cannulas situated at the wrist developed phlebitis. The male medical ward had the highest incidence of phlebitis (57.9%).

Table 2: Clinical characteristics by Phlebitis (N=224)

	No Phlebitis	Phlebitis	Total	Percentage Phlebitis	X^2	P-value
Sex						
Male	59	62	121	51.2	0.10	0.747
Female	48	55	103	53.4		
Age						
10 – 19	10	15	25	60.0	2.96	0.813
20 – 29	17	19	36	52.8		
30 – 39	19	19	38	50.0		
40 – 49	24	21	45	46.7		
50 – 59	17	14	31	45.2		
60 – 69	8	10	18	55.6		
70 +	12	19	31	61.3		
Ward of admission						
Female Medical	27	28	55	50.9	2.31	0.511
Male Medical	24	33	57	57.9		
Female Surgical	21	27	48	56.3		
Male Surgical	35	29	64	45.3		
Personnel who cannulated						
Doctor	33	35	68	51.5	0.26	0.877
Nurse	68	77	145	53.1		
Student	6	5	11	45.5		
Insertion site:						
Cubital fossa	16	19	35	54.3	3.97	0.265
Forearm	44	43	87	50.0		
Hand (dorsum)	35	31	66	47.0		
Wrist	12	24	36	66.7		
No. of comorbidities						
None	65	64	129	49.6	0.84	0.360
One or more	42	53	95	55.8		
Other in-dwelling catheter						
Absent	77	74	151	49.0	1.93	0.165
Present	30	43	73	58.9		
Ongoing infections						
Absent	76	77	153	50.3	5.18	0.023
Present	22	49	71	69.0		
Antibiotic infusion						
Absent	31	41	72	56.9	0.94	0.331
Present	76	76	152	50.0		
Cannula dwell time						
1 – 4 days	80	64	144	44.4	9.80	0.002
>4days	27	53	80	66.3		

Multivariate analysis

To answer the main objective and adequately explore the hypotheses of the study, three logistic regression models were estimated as shown in Table 3.

Cannula dwell time and ongoing infections were the main variables considered in Model 1. The results indicate that, patients who had cannulas in situ for more than four days were significantly more likely to

Table 3: Results of multivariate logistic regression on incidence of IV cannula-related phebitis among patients on admission at the CCTH

Factor	Model 1	95% CI	Model 2	95% CI	Model 3	95% CI
Cannula dwell time						
1-4 days						
>4 days	2.70**	[1.48,4.92]	2.72**	[1.45,5.09]	2.71**	[1.42,5.16]
Ongoing infections						
Absent (Ref)						
Present	1.91*	[1.03,3.54]	2.98**	[1.45,6.09]	2.85*	[1.27,6.38]
Insertion site						
Cubital fossa (Ref)						
Forearm	N/A	N/A	0.77	[0.32,1.86]	0.57	[0.22,1.47]
Hand	N/A	N/A	0.75	[0.30,1.87]	0.58	[0.22,1.49]
Wrist	N/A	N/A	2.01	[0.72,5.59]	1.94	[0.66,5.69]
No. of comorbidities						
None (Ref)						
At least one	N/A	N/A	1.07	[0.60,1.92]	0.88	[0.41,1.85]
Other in-dwelling catheter						
Absent (Ref)						
Present	N/A	N/A	2.18*	[1.09,4.33]	3.20**	[1.39,7.38]
Antibiotic infusion						
No (Ref)						
Yes	N/A	N/A	0.39*	[0.18,0.80]	0.43*	[0.19,0.95]
Age						
10-19 (Ref)						
20-29	N/A	N/A	N/A	N/A	0.63	[0.18,2.18]
30-39	N/A	N/A	N/A	N/A	0.53	[0.15,1.88]
40-49	N/A	N/A	N/A	N/A	0.44	[0.13,1.50]
50-59	N/A	N/A	N/A	N/A	0.27	[0.072,1.0]
60-69	N/A	N/A	N/A	N/A	0.52	[0.11,2.34]
70+	N/A	N/A	N/A	N/A	0.80	[0.20,3.12]
Sex						
Female (Ref)						
Male					0.54	[0.16,1.81]
Ward of admission						
Female medical (Ref)						
Female surgical	N/A	N/A	N/A	N/A	1.03	[0.37,2.83]
Male medical	N/A	N/A	N/A	N/A	3.67	[1.33,10.10]
Male surgical	N/A	N/A	N/A	N/A	-	-
Personnel who cannulated						
Doctor (Ref)						
Nurse	N/A	N/A	N/A	N/A	1.26	[0.64,2.47]
Student	N/A	N/A	N/A	N/A	0.488	[0.09,2.38]

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

N/A – Not applicable

develop phlebitis compared with those who had cannulas in situ for up to four days. The odds of developing phlebitis were higher among patients with ongoing infections compared with those without ongoing infections. The inclusion of clinical factors in Model 2 neither changed the direction nor the strength of association between the cannula dwell time and the incidence of phlebitis. The association between phlebitis and patients with ongoing infections became stronger in Model 2. Among the clinical factors fitted in model 2, the odds of developing phlebitis were significantly higher for patients with other in-dwelling catheters, but significantly lower for those on antibiotic infusion. The "other" variables (age, sex, ward and personnel who cannulated) in the final model (Model 3) had little effect on the associations observed in the preceding models.

The results of the final Model are thus used to measure the main objective of the study, as well as the two hypotheses the study set out to test. The composite model shows that, the odds of developing phlebitis were about three times higher ($p = 0.002$) for patients who had cannulas in situ for more than four days compared to those who had cannulas in situ for four days or less. Similarly, patients with ongoing infections were about three times ($p = 0.011$) more likely than those without ongoing infections to develop phlebitis. In addition, the odds were over three times higher for patients with other in-dwelling catheters such as central venous catheters and urinary catheters ($p = 0.006$), than others without other in-dwelling catheters. On the contrary, patients on antibiotic infusions had significant lower odds ($p = 0.039$) of developing phlebitis compared with those not on antibiotic infusions.

Discussion

The insertion and daily use of IV cannulas is associated with risks and complications that can have an impact on the clinical outcome of the patient. The present study was undertaken to investigate various risk factors responsible for the occurrence of phlebitis and to find the optimal day for routine replacement of IV cannulas at CCTH.

The incidence of phlebitis in this study was more than 52%. This is much higher than the recommended rate of 5% or less by the Infusion Nursing Society (INS) [10]. That notwithstanding, previous research have recorded rates between 2.3% and 60%[1, 2]. The cannula dwell time is the most significant risk factor identified in this study for the development of phlebitis. The current study found a gradual rise in the incidence of phlebitis from day one to day three and a drop by day four; after day four (96 hours) phlebitis rate rose steeply (Figure 1). This supports the conclusion of Cicolini et al that phlebitis risk increases after 96 hours[11]. In contrast to other studies[12], this study found significantly higher incidence of phlebitis after day four of IV cannulation at both the bivariate and multivariate levels. Although it is argued that replacing cannulas only when clinically indicated would provide significant cost savings and spare patients the unnecessary pain of re-siting cannulas, this current finding favours the routine replacement of intravenous cannulas by day four as recommended by CDC.

Patients who had ongoing infections had significantly increased phlebitis. This is expected and is possibly due to the spread of microorganisms by septic emboli from the focus of infection to the cannula tip.

Other in-dwelling catheters may have also served as a nidus predisposing these patients to other infections, (bacteraemia from central venous catheters and urinary tract infections from urinary catheters), accounting for the increased phlebitis in this group.

Patients who were on antibiotic infusions had less phlebitis compared to patients who did not use antibiotic infusions. In contrast to this finding, other studies reported that the use of IV antibiotics which are vein irritants, increased the incidence of phlebitis[14].

As seen in this study, the majority of patients cannulated at the wrist and the cubital fossa developed phlebitis. Flow of infusate can be affected by flexion and extension movement at joints and this increases the risk of mechanical phlebitis[13]. This makes these sites less preferable.

Females had slightly higher phlebitis rates compared to males; however, there was no statistical significance. Some studies showed female preponderance[8] and others, male preponderance[17]. A study by Uslusoy and Mete show no difference between the two sexes[13]. Similarly, correlation between age and phlebitis was not significant though patients 70 years and above had the highest phlebitis rate. One such study established that patient aged 60 years and over were more at risk of phlebitis[14].

Patients with at least one co-morbidity had slightly higher incidence of phlebitis and this could be explained by the possibility of reduced immunity to infections compared to patients who had no co-morbidity.

The cannula material used – Teflon (polytetrafluoroethylene) may have adversely influenced the development of phlebitis as shown in previous studies[14, 15]. One of such studies demonstrated that Teflon had higher bacterial adherence compared to Vialon (polyurethane). Also, Vialon softens at body temperature thereby generating lesser degree of endothelial injury and therefore less risk of mechanical phlebitis. Vialon (polyurethane) was associated with a decrease of 30 – 45% on the incidence of phlebitis, when compared to Teflon [15].

This study did not evaluate the gauge size of the cannulas and the technique of peripheral IV cannula insertion and their effects on phlebitis. The identification of cannula-related bloodstream infections was not part of this study. The stringent CDC

definition defines CRBSI as a positive blood culture from a peripheral vein; clinical signs of infection; no other apparent source for the bloodstream infection except the intravenous cannula; and colonised intravenous cannula tip culture with the same organism as identified in the blood[10].

Conclusion

There is a high incidence of phlebitis in the CCTH, mainly from cannula dwell time of over four days and the presence of ongoing infections. Routine replacement of cannulas on day four is recommended for all adult patients. The cannulas must be reviewed on a daily basis and the condition of the site documented using the VIP score system (Appendix). Additionally, patients who have ongoing infections prior to or during the event of cannulation have to be adequately treated as infections contribute to the development of phlebitis. A readily available policy and care documentation system must be put in place to provide a standard for peripheral intravenous cannulation practices.

Appendix

V.I.P Score (Visual Infusion Phlebitis Score)

OBSERVATION		ACTION
I.V. site appears healthy	**0**	**No signs of phlebitis** ☐OBSERVE CANNULA
One of the following is evident: • Slight pain near I.V. site or slight redness near I.V. site	**1**	**Possible first signs of phlebitis** ☐OBSERVE CANNULA
Two of the following are evident • Pain near I.V. site • Erythema - (redness) • Swelling	**2**	**Early stage of phlebitis** ☐RESITE CANNULA
All of the following are evident: • Pain along path of cannula • Erythema • Induration (Tissue feeling firm and swollen)	**3**	**Medium stage of phlebitis** ☐RESITE CANNULA ☐ CONSIDER TREATMENT
All of the following are evident and extensive: • Pain along path of cannula • Erythema • Induration • Palpable venous cord	**4**	**Advanced stage of phlebitis or start of thrombophlebitis** ☐RESITE CANNULA ☐ CONSIDERTREATMENT
All of the following are evident and extensive: • Pain along path of cannula • Erythema • Induration • Palpable venous cord • Pyrexia	**5**	**Advanced stage of thrombophlebitis** ☐INITIATE TREATMENT ☐ RESITE CANNULA

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PROSPECTIVE EVALUATION OF HOSPITALIZED PATIENTS WITH ATRIAL FIBRILLATION IN SENEGAL

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Abstract

Introduction: The purpose of this study was to determine the prevalence, complications and therapeutic strategy in the management of atrial fibrillation.

Patients and methods: This was a prospective, descriptive study conducted at the Cardiology Department of the Aristide Le Dantec University Hospital in Dakar, Senegal which included all patients with atrial fibrillation, admitted between September 2006 and June 2007. We studied the clinical, para-clinical variables as well as the therapeutic strategy adopted. For the comparison of parameters we used the student t-test with significant values considered when $p<0.05$.

Results: One hundred patients with atrial fibrillation were admitted during the study period giving a prevalence of 14.2% among admitted cases. The average age of our study cohort was 47.7±18.4years. In our study population, there was heart failure in 58%, stroke in 15%, left atrial thrombus in 2% and acute is chemia of the leftleg in one patient. Transthoracic echocardiography showed dilated left atrium in 61% of patients, left ventricular systolic dysfunction in 25 of patients and two cases of left intra-atrial thrombus. Valvular heart diseases was found in 53% of cases. Anticoagulation therapy with low molecular weight heparin and with vitamin K antagonist was given in 80% and 95% of patients respectively. Pharmacological cardioversion and direct current (DC) cardioversion were performed in 11% and 22% of patients respectively.

Conclusion: Atrial fibrillation was more prevalent in young adults with rheumatic valvular heart disease, with rate control the most commonly used therapeutic strategy. The findings justify the need for primary prevention.

Keywords:*Atrial fibrillation, epidemiology, evaluation, Dakar*

Introduction

Atrial fibrillation is the most common sustained cardiac arrhythmia encountered in clinical practice[1, 2]. It is a complete disorganization of atrial electrical activity and results in the loss of atrial systole. It is a serious disease mainly due to the frequently associated thrombo-embolic (including cerebral) complications[1.] In sub-Saharan Africa, rheumatic valvular heart diseases remain one of the main causes of atrial fibrillation, even though we now see a progressive increase in cases of ischemic heart diseases[3].

The aims of this study were to evaluate the prevalence of atrial fibrillation in a hospital setting, to determine the background in which it occurs, evaluate its tolerance and complications as well as to assess the treatment strategy in order to establish the most effective means to manage and prevent this disease.

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Conflictinterest: none declared

Patients and methods

This was a prospective descriptive study conducted at the Cardiology Department of Aristide Le Dantec University Hospital in Dakar, Senegal, between September 2006 and June 2007 including 100 consecutive admitted patients. Atrial fibrillation (AF) was considered paroxysmal when it terminated spontaneously in less than 7 days, persistent when sustained beyond 7 days and permanent when cardioversion failed or was not attempted[4]. Patients with atrial fibrillation seen at the outpatient department were not included in this study.

The evaluation was based on: 1) Patient's history including biographical data (age, gender), presenting medical complaints and past medical history 2) a full clinical examination 3) thyroid gland activity by hormone assay 4) a 12-lead electrocardiogram with a long lead II strip 5) a transthoracic echocardiography and 6) the therapeutic strategy adopted.

For the comparison of parameters we used the student t-test with significant values considered when $p<0.05$.

Results

During the specified study period, 705 patients were admitted out of which 150 were for arrhythmia. One hundred patients had AF representing a prevalence of 14.2%among admitted cases and

accounting for 66.7% of all arrhythmias. The average age of our study cohort was 47.7±18.4 years, with an age range of 16 to 86 years (Figure 1).

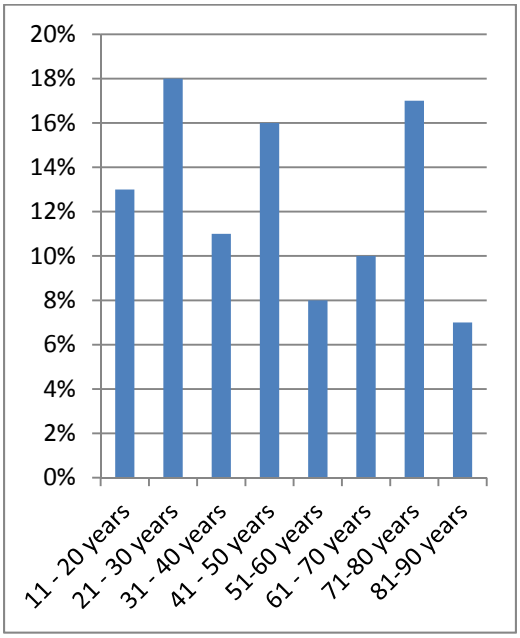

Figure 1: Distribution of patients according to age groups

Atrial fibrillation was not well tolerated (i.e. resulted in hemodynamic instability) in 13% of cases and was concomitant with heart failure in 58% of cases, with stroke in 15% of patients, with a left atrial thrombus in 2% of cases and with acute left leg ischemia in one patient.

In our study cohort, 31% had persistent atrial fibrillation and 69% had permanent atrial fibrillation. There was hyperthyroid activity in 3 patients.

The 12-lead electrocardiogram, with a long lead II strip, found 96 cases of atrial fibrillation with fine, low amplitude fibrillatory waves, and 6 cases of coarse atrial fibrillation. The average ventricular rate was 116.4 ± 28.6 cycles per min, with extremes ranging from 60 to 190 cycles per minute. Other electrocardiographic abnormalities are summarized in Table 1.

Table 1: Electrocardiographic anomalies

Electrocardiographic anomalies	Percentages
Leftventricularhypertrophy	38%
Right ventricularhypertrophy	15%
Bi-ventricularhypertrophy	7%
Right bundle branch block	5%
Left bundle branch block	1%
Repolarisation disorder	11%
Conduction aberration	9%
Low voltage	5%

Transthoracic echocardiography showed a dilated left atrium in 61% of patients, an impaired left ventricular systolic function in 25% of patients and 2%of left intra-atrial thrombus.We found valvularheart diseases in 53% of patients; including 20.7% of mitral stenosis, 26.4% of isolated mitral valve disease and 52.8% of multiple valvular affections. Other associated heart diseases found are shown in Figure 2. Trans-esophageal echocardiography performed in 4 patients found a left atrial spontaneous contrast in 2 of them.

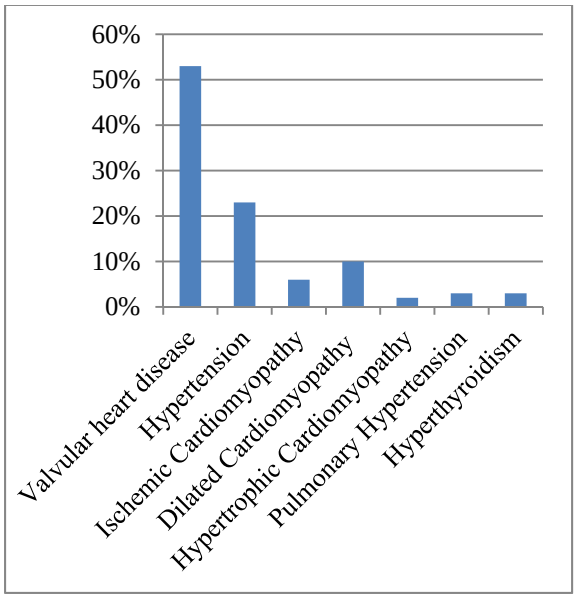

Figure 2: Associated heart diseases found in the study cohort

An anticoagulation therapy with low molecular weight heparin and vitamin K antagonist was given in 80% and 95% of patients respectively. Pharmacological cardioversion(Table 2) or DC cardioversion was performed in 13% and 22% of patients respectively. In 65% of patients no attempt to re-sinusalize was performed. These patients had received a heart rate-reducing treatment based on oral digoxin in 59% of cases, and beta-blockers in 6 patients.

In twenty six patients the atrial fibrillation became sinus, including 22 by DC cardioversion, 3 with amiodarone and 1 patient with sotalol. Recurrence of arrhythmia was observed in 4 patients who all had very dilated left atria. There was a mortality rate of 6%.

Discussion

Atrial fibrillation (AF) is a public health problem because of its high prevalence rate and the severity of its complications, especially embolic, since on average, the risk of stroke increases by 5-fold compared to a population in sinus rhythm and by 17-fold in the presence of rheumatic valve disease[1].

Table 2: Characteristics of patients who received pharmacological cardioversion

No.	Sex	Age (yrs)	Underlyingcardiacdisorder	Left atrial diameter (mm)	Anti-arrhythmic	Outcome
1	M	60	Cor pulmonale	45	Amiodarone (p.o)	Failure
2	F	40	Mitral disease, Tricuspidincompetence	36	Amiodarone (p.o)	Failure
3	F	79	Hypertension	-	Amiodarone (p.o)	Failure
4	M	60	DCM	47	Amiodarone (IV)	Success
5	F	77	Hypertension	-	Amiodarone (p.o)	Failure
6	F	75	Hypertension	40	Amiodarone (p.o)	Success
7	F	40	Mitral stenosis	42	Amiodarone (p.o)	Failure
8	F	36	MD, AI, TI	58	Amiodarone (p.o)	Success
9	M	75	DCM	46	Amiodarone (p.o)	Failure
10	F	75	Ischemicheartdisease	40	Sotalex (p.o)	Success
11	F	55	Hypertension	34	Amiodarone (p.o)	Failure
12	M	73	DCM	49	Amiodarone (p.o)	Failure
13	F	74	DCM	32	Amiodarone (p.o)	Failure

Abbreviations: M: male; F: female; MD: mitral disease; AI: aortic insufficiency; TI: tricuspid insufficiency; DCM: dilated cardiomyopathy; p.o: oral; IV: intravenous

In this study population, the hospital prevalence of atrial fibrillation was 14.2% representing 66.7% of arrhythmias thus making it the most frequently encountered arrhythmia in patients hospitalized at the Cardiology Department of Aristide Le Dantec University Hospital. This predominance of atrial fibrillation in people hospitalized for cardiac arrhythmia was emphasized in the work of Ciaroniet etal (2000) with a reported prevalence of 40%[2]and also in the retrospective study by Wen-Hang in China[5].

In the general population, the prevalence of atrial fibrillation is variable and highly dependent on age. It is less than 1% in patients younger than 60 years and about 6% in those over 80 years of age[6, 7]. In the currentstudy, the average age of patients was 47.7 ± 18.4 years, with ranges between 16 and 86 years. The majority of our patients were young adults. These results contrast with those found in the ALFA study with a mean age of 66.5 years for males and 71.4 years for females[8].

In a study by Ellengaet al in Brazzaville[3], the average age of patients with atrial fibrillation was 59.3 ± 18 and ranged from 16 to 93 years[3]. This difference results from the predominance of rheumatic valvular disease as etiology of atrial fibrillation in our region. In our study, contrary to what is in the literature, the underlying heart diseases were mainly represented by valvular (53%), followed by hypertensive heart disease (23%), dilated cardiomyopathy (10%) and ischemic heart disease (6%). This is due to the high incidence of rheumatic heart diseases in Senegal. This also contrasts with the AFIB Cameroon Study, in which the main underlying heart disease was hypertension (64.5%). However 25.6% had a rheumatic mitral valve disease[9].

The occurrence of atrial fibrillation is a turning point in the evolutionary path of the natural history of patients with rheumatic valve diseases. It potentiates thereby the risk of embolism, the morbidity and mortality of these diseases. In the ALFA study, 71% of patients had an underlying heart disease with hypertensive heart disease, representing 21% of likely causes of atrial fibrillation. The other underlying heart diseases were mainly coronary heart disease in 17%, valvular disease in 15%, dilated cardiomyopathy in 9% and hypertrophic cardiomyopathy in 5% [8].

In our study, a large number of patients received anticoagulant treatment compared to that found in the AFIB Cameroon study[9] in which only 34.2% of eligible patients received oral anticoagulation.

Rate control was the most frequently observed therapeutic approach in this study corresponding to echocardiographic findings of a dilated left atrium in 61% of patients. A Similar strategy was also

observed in the AFIB Cameroon study[9]. However, the size of the left atrium should not be a barrier to cardioversion with the exception of values greater than 60mm[10]. Indeed Paziaudet al[11] included patients with left atrial diameter less than 60mm, which was not a discriminative parameter in the success of electrical cardioversion[11]. Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM) and RAte Control versus Electrical cardioversion for persistent atrial fibrillation (RACE) studies report similar findings as per our therapeutic approach by showing that the rhythm control versus rate control does not improve the prognosis of patients with atrial fibrillation[12, 13].

Conclusion

Atrial fibrillation constitutes the most frequently encountered arrhythmia in hospitals. In sub-Saharan Africa, it predominates in young adults with rheumatic valvular heart disease and potentiates morbidity and mortality of these diseases. Heart rate control is the most frequently seen therapeutic approach due to cardiac chamber sizes in general and to left atrial diameter in particular.

These findings justify the need for primary prevention but also for early secondary surgical treatment of rheumatic valve disease.

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SPECIAL ARTICLES

IMPROVING EMERGENCY CARE IN GHANA*

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Introduction

It is an immeasurable honour to be in the company of His Excellency the Vice President of the Republic of Ghana Vice President Kwesi Amissah-Arthur, and with you all today, and to share my humble thoughts on "Improving Emergency Care in Ghana". It is also an inestimable honour to be in the company of so many highly-skilled health professionals, and I feel an even greater honour that I have been asked to deliver this year's College Lecture. I never for once thought that one day I would give a lecture to those who taught me in Medical School, but there you are; in the audience I see a number of my former lecturers!

Last year in Lome I was a facilitator on a Trauma management session held by the West African College of Surgeons. I wanted to make the point that in these austere times we as health workers should be looking for ways to improve care without expecting more money or more resources from government.

I took the liberty to quote from His Excellency President John Dramani Mahama's State of the Nation address in February 2013. The President had stated, and I quote, "Mr. Speaker, the meat is now down to the bones, and it is time for serious rethinking about the level of wages in relation to our national competiveness and the related productivity issues."[1]

The room remained quiet for a while - I am not sure whether because the audience agreed or disagreed with me. Then suddenly one Nigerian colleague shouted from the back "As for you Ghanaians and complaining! You should come to Nigeria where you would see that we are down to the marrow!" and the room erupted with laughter. Upon sober reflection, however, it remains my opinion that meat, bone, or marrow, a case can still be made for more efficient use of health care resources to improve how we look after emergencies. And I will share evidence from the literature which shows that it is possible to improve some care without spending a pesewa more.

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Conflict of interest: None declared

*College Lecture AGSM 2014

Emergencies occur everywhere, and each day they consume resources regardless of whether there are systems capable of achieving good outcomes[2].

Overview of lecture

In this talk I will give a brief overview of the developments in formal emergency care provision in Ghana over the past ten or so years. I will describe our experience at Komfo Anokye Teaching Hospital (KATH) in setting up a novel Emergency Medicine (EM) training program, and some achievements we have chalked. I will use a number of narratives to illustrate points about what I consider to be areas where change is likely to yield the greatest impact in improving emergency care in Ghana. I will describe one pitfall you should avoid, and state why, if you wish to establish a formal emergency department (ED) in your hospital. I will end by suggesting further ways of improving emergency care in a low resource setting such as Ghana.

Brief history of Emergency Medicine practice in Ghana

Prior to the Millennium Year there had been some interest shown in developing formal emergency care systems in Ghana, notably by groups from US universities, but it took the tragic Accra stadium disaster in May 2001 to push official Ghana into action. That is when the Government of Ghana established the National Ambulance Service (NAS) and built a national Accident & Emergency (A&E) Center at KATH, laying the groundwork to start a training program in emergency medicine.

Even though sub-Saharan Africa faces a disproportionate burden of acute injury and illness, few clinical facilities are configured to take an integrated approach to resuscitation and stabilisation. The statistics are sobering. Sub-Saharan Africa bears 24% global disease burden, and yet is home to only 3% of the world's health workforce[3]. The population has been increasing, outstripping the already poor doctor/patient and nurse/patient ratios. The number of deaths reported annually as attributable to injury has been increasing.

Ghana road traffic accident mortality statistics

Statistics available from the Ministry of Transport indicates that as at October this year, a total of 11,035 cases of road traffic crashes had been reported involving 16,749 vehicles, 9,648 injuries and 1,606 deaths[4]. These statistics unfortunately have a very personal resonance. Nearly six months ago the KATH ED lost Mr. Daniel Opoku, affectionately called "Sketcher", in a horrific road crash. Our valiant staff resuscitated him in our department but sadly could not revive him. He was a remarkable young man, totally devoted to his calling and we miss him dearly.

In a study published by London et al. in 2002 injuries accounted for 8.6% of all deaths recorded in Komfo Anokye Teaching Hospital mortuary, and for 12% of deaths in the age range 15-59 years[5]. The paper further reported that 80% of deaths caused by injury occurred outside the hospital and thus would not have been indicated in hospital statistics; 88% of injury-related deaths were associated with transport, and 50% of these involved injuries to pedestrians. Among their conclusions were that many of these accidents could be prevented, for example by improving roads and safety of vehicles, and by better enforcement of drink-driving legislation.

Prevention is always better than cure. But, of course, no matter how much we might improve, there will always be accidents. Then, highly skilled emergency physicians, emergency nurses, and paramedics are often the last hope for a seriously injured patient. Recent serious accidents e.g. Melcom building collapse, highlighted the vital role of emergency teams in rescue and saving lives. It is fitting to remember that they do this not only in relation to accidents, but also to other medical emergencies, for example, heart attacks, strokes, or acute respiratory problems.

I wish to pay tribute to Professor Paul Nyame, former Rector of the Ghana College of Physicians and Surgeons, who had the foresight to establish Emergency Medicine as a Faculty in the Ghana College of Physicians and Surgeons - an important reform of the Ghanaian health care system with an integrated emergency care system as an essential pillar.

Pre-hospital care in Ghana

The pre-hospital care system in Ghana remains in the early stages of development. While ambulance stations since inception have grown from 7 stations in Ghana to 121 stations country-wide within a span of 8 years, most accident victims are often transported in vehicles such as taxis and minibuses by untrained personnel.

As at end of 2013 NAS had trained more than 1316 Emergency Medical Technicians (EMTs), and were transporting an annual total of 5,500 cases with an average call-to-response time of about 20 minutes. If today the majority of ambulances reach patients within 20 to 30 minutes, this is largely a result of the sustained development of NAS under the leadership of Prof. Ahmed Zachariah. I am sure that this important plank of emergency care will continue to grow in leaps and bounds and the end result will contribute to improved emergency care.

Barriers to improving emergency care in Ghana

A lack of data on the acute burden of disease hampers planning and equitable resource allocation. Our national literacy rates may be high but most people do not know what to do in emergencies. Some people are gullible, preferring pastors and untested herbal concoctions to early hospital care. Late arrival in hospital, mishandling of severely injured patients by untrained persons, inadequately trained staff, and inadequate equipment are all known contributory factors for the high mortality rates. It is estimated that persons with life-threatening, but salvageable injuries are six times more likely to die in Ghana (36%), than in the USA (6%)[6].

To the toll of road traffic accidents are added domestic accidents, natural disasters, medical, surgical, and obstetric emergencies. The pressure on the health system is immense and there is a need to invest in emergency systems which are cost effective and also proven to reduce mortality and morbidity. Barriers to improving emergency care in Ghana go beyond technical and training issues. Economic and cultural barriers exist as well. The government funds 80% of the public health services through the NHIS, general taxation, and donor funds. Unfortunately a residual "cash and carry system" persists for supplies and medicines frequently resulting in a significant barrier to health care.

The Ghana Emergency Medicine Collaborative

Currently Emergency Medicine exists as a specialty in Ghana only in Komfo Anokye Teaching Hospital (KATH), though efforts are in place to expand to Tamale and Tema. Generally speaking, hospital emergency areas are not autonomous entities under focused leadership by a trained specialist. Interestingly that is how hospital-based emergency care was organised in the UK about 60 years ago.

In conjunction with the Kwame Nkrumah University of Science and Technology, the Ghana College of Physicians and Surgeons (GCPS), the University of Michigan, the Ghana Health Service, and the Ministry of Health, training programs for Emergency Physicians and other health professionals in emergency care have been developed[7]. The training programs also undertake

data collection and research as a basis for planning and developing emergency care across the country.

After 5 years, the program has graduated 11 specialists and there are 29 residents in various stages of training. The first ever 25 Diploma emergency nurse trainees graduated in November 2013. The specialists teach junior doctors and medical students, and also provide advanced training for EMTs. Even though the GCPS now has a Faculty of Emergency Medicine, the discipline is not yet an undergraduate medical student module in Ghana; this notwithstanding, nearly 500 medical students have rotated through the Emergency department at KATH.

Notable achievements include the implementation of Nurse-led triage using the South African Triage Score (SATS)[8], 24-hour physician provided emergency airway care, Focused Assessment with Sonography for trauma patients (FAST scans) and ultrasound guided interventional procedures. Trainees have made oral and poster presentations at international conferences, and contributed to 12 peer-reviewed publications in reputable international journals. They have also contributed chapters to the African Federation of Emergency Medicine (AFEM) Handbook of Emergency Medicine[9]. We hold low-cost simulation trauma courses at KATH annually. We are planning to start an Advance Trauma Life Support (ATLS) course in conjunction with GCPS in April/May 2015.

We have recently acquired computer equipment and are currently collecting Data which will develop a Trauma and Injury registry. This will improve our ability to answer some research questions too. I am particularly proud that we have instituted a computer calculated Triage score. This is based on open-source technology, is web-based, scalable, and therefore offers the exciting prospect of being able to use the internet to assign a triage score to any emergency case anywhere in the country.

Another piece of research which we have conducted assessed HIV/AIDS prevalence at the KATH A&E Directorate[10]. It showed an incidence rate of 13.5% as compared with the national rate of 2%. This has implications for practice in EDs across the country. Guidelines and Standard Operating Procedures (SOPs) for care of HIV/AIDS patients in EDs have been developed for the Ministry of Health to use throughout the country[11].

Low cost improvements to emergency care – start by improving communications

The first story I am going tell you is about a road traffic accident which occurred in September 2014 on the Accra-Kumasi road. Two VIP buses collided head on in the early hours of the morning. There were reportedly 20 fatalities. Initially patients were taken to a nearby Hospital by Ambulance and following primary triage, transfers commenced to KATH at 10:00 am. Four patients were subsequently transferred to KATH ED by ambulance. The KATH ED was severely overcrowded at the time these patients arrived.

There was unfortunately no pre-alert communication. KATH switch board had no contact details for the referring Hospital. The irony is that there is a well written National Referral document[12], but these guidelines are usually not followed when a referral is made to the KATH ED. If there had been even a few minutes of pre-alert notification the department could have freed some trolleys to transfer the patients on to. The chances for patient survival improve with adequate pre alert notification.

The provision of a reliable communication system is essential for emergency care in all its modern guises. It can improve referrals to the appropriate level of care, whether in the community or to a tertiary hospital. A good communication infrastructure will also enable the lay population to gain access to existing emergency care facilities.

Lessons from another industry - setting standards can improve care

The second story is partly true and partly fiction, but still illustrates a number of important principles about improving emergency care. I was travelling to Accra from Kumasi about nine months ago. The plane was getting ready to take off. There was a chap sitting in the same row reading Daily Graphic. I could not help noticing the headline about a patient who had died in a hospital that will remain unnamed. Another chap reading over his shoulder retorted "I hope the pilot in our plane does not do his work like those doctors!"

The airline industry has an enviable safety record. Pilots possess the technical expertise for flying complex airplanes, but still go through extensive checklists with each flight. There have been a lot of expert comments about airline safety record, and questions have rightly been asked if lessons from the airline industry could be applied to medical care to improve patient safety. Such lessons include practicing well laid down protocols, focusing on preventing accidents rather than just reacting to them, good team working, clear leadership, as well as operating to standards.

Patients have a right to expect that we operate according to some minimum standards. Our oath and our regulatory bodies hold us to that sacred account. If we forget that, then the press and the public have the right to remind us to do what is right as health professionals.

Lessons from other countries – planning, partnership, and team working can improve emergency care quality

The third narration is not really a story, but more like history. In the past 10 years the UK government

has launched an initiative requiring 98% of A&E patients to be seen, treated, and discharged or admitted within 4 hours. People worried that it was a non-clinical target, and would not improve care in anyway. But it has improved care in the UK by encouraging doctors and nurses to change the way they work to benefit patients. The government set the standard and that standard drove change, modified practice, and improved emergency care[13; 14].

The 4 hour target positively influenced the way health workers organised and cooperated across the whole emergency care system[15]. The process was largely implemented with no "new money". Hospital staff came together to form emergency services collaboratives, and emergency care networks. In this way they ironed out problems, and spread good ideas and practice to improve emergency care. The teams focused seemingly on one target. What were the things that kept patients waiting in A&E? The findings were that bed management, diagnostics, admissions and discharge procedures, could present complex problems, but that does not mean they are insoluble. And the solutions were achieved by modifying practice.

While a lot of things can be done without extra money, progress should not be held back by a lack of resources. Some investment in training infrastructure and equipment was necessary to keep the 4-hour standard on track.

Good systems and process redesign improve patient safety

The last story to share with you relates to making effective change without spending much money. No new equipment, staff, or (clinical) resources. Improve outcomes with no improvement in skills and competencies.

Between October 2007 and September 2008, eight hospitals in eight cities representing a variety of economic circumstances participated in the World Health Organization's Safe Surgery Saves Lives program. Prospective data was collected on clinical processes and outcomes from 3733 adult patients undergoing noncardiac surgery.

After introducing the Surgical Safety Checklist further data was collected on 3955 patients. The primary end point was the rate of complications, including death, during hospitalisation within the first 30 days after the operation. Implementation of the checklist was associated with statistically significant reductions in the rates of death and complications among the patients[16].Today the Surgical Safety Checklist is used in theatres all over the world. It is a cost neutral intervention.

One of the researchers has stated that embracing the checklists is not the idea; embracing a culture of teamwork and discipline is[17].

Managing change – embedding formal emergency care in the wider health system

The problem is that as humans we get into a comfort zone and we do not like change. We are creatures of habit. Most of us are used to working in a certain way, and feel that "if it ain't broke don't fix it". Changing to a newer form of emergency care provision can be a bit like that. Resistance to change may be couched in the following phrases. "It is not our way of working here". "The emphasis is wrongly placed on process whereas real doctors are only interested in diagnoses". "It will cost too much". "It cannot work here". "We just don't have the resources".

Listen to Machiavelli, Renaissance Politician, Diplomat, and Historian: "There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things. Because the innovator has for enemies all those who have done well under the old conditions, and lukewarm defenders in those who may do well under the new"[18].

There was initial difficulty establishing the EM training program in KATH. Some did not like the idea of Triage nurses referring patients to doctors. Some just did not like the whole idea, and did not want an interloper to see their patients first. We got over most of these teething problems. But one pitfall remains.

Minimising delay to definitive care improves outcome

The Ghanaian press often publishes reports about emergency cases with fatal outcomes. For example, a patient with a strangulated hernia died in February 2014. In October 2014 newspapers reported about an 18 year old emergency patient who died in an Accra hospital. In November 2014 a 19 year old Legon student died allegedly because "the doctors at the emergency department failed to call for the assistance of a senior medical officer after 10 hours effort to diagnose and treat his ailment".

The common thread in all these press cases is delay in seeing the patient or in instituting definitive care. I will dwell on this a little bit, because the ugly twin of delay in emergency care is overcrowding. The excited press usually reports these cases as negligence, without even the necessary adjectival legal euphemism of "alleged". If these reports are all to be believed then we might be forced to accept Napoleon Bonaparte's cynical prediction that "Doctors will have more lives to answer for in the next world than even we generals[19]."

Writing in the World Journal of Surgery in July 2014 Yeboah, Mock, Karikari, and others found that a high proportion of trauma fatalities could have been prevented by decreasing pre-hospital delays, adequate

resuscitation in hospital, and earlier initiation of care, including definitive surgical management[20]. To reduce delays in the patient journey, hospitals need to look for causes both within and outside A&E departments.

The role of professional colleges and regulatory bodies: focused training and centralised standards

In addition to the UK government 4-hour target discussed earlier, the UK Royal Surgical Colleges have also periodically published recommendations for the organisation of emergency services and management of patients with serious trauma injuries[21, 22, 23]. These recommendations advise more consultant involvement in the early management of trauma, improved training of prehospital staff, expanding access of carers to ATLS courses, establishing Trauma teams within hospitals, establishing trauma centres for the care of the more seriously injured, and a national audit scheme. I believe the Ghana College of Physicians and Surgeons could play a similar role by setting the required standards in this country. For example, GCPS accreditation visits could verify what evidence a teaching hospital is making towards reducing delay in the care of emergency patients and by extension ED overcrowding.

I believe that following these principles will achieve better outcomes for emergency patients and without too excessive a financial cost.

Train the healthcare workforce and community-based practitioners to provide emergency care

The goal of improving emergency care will be well served by training the health care work force, organisation of existing facilities, and equitable financing. Training should be directed to the entire emergency care work force, from Community First Aiders, GPRTU drivers, CHPS compound staff, and staff in the various levels of hospitals. We need to use strategies that are simple and effective; in certain situations training people who may come into contact with emergency patients to recognise life threats may prove more effective in improving outcomes than installing expensive technologies. We need public education on recognition of illness, to reduce harmful practices, to train people in basic CPR, and to help them understand the chain of survival. Clearly education is also important for the health care work force to stay up to date with their knowledge and skills.

Organisation of emergency care teams – trauma systems reduce mortality

Time will not allow me to go through published evidence in the literature showing how arrangements such as Trauma Teams, Regional Trauma systems or networks significantly reduce mortality. One study[24] in the literature based trauma care on the following standards: 1)ATLS trained doctor always available; 2) Consultant attends within 30 minutes; 3) Emergency theatre available within 30 minutes; 4) CT scan available 24/7; 5) Pathology service available 24/7; 6) Agreed transfer protocols; 7) Results externally audited. It would have been surprising if this study had reported anything but improved trauma outcomes.

It would appear that the ingredients in all these is to identify a problem, institute policy to establish standards, modify infrastructure and/or train staff, and imbue the staff with a philosophy of team work. Communication joins all these dots together.

Avoid emergency department overcrowding

There are probably colleagues here who will want to run a dedicated autonomous emergency department along the lines we have in KATH. I promised to talk about one pitfall in establishing an emergency department. That pitfall is ED overcrowding. Once it gets a foothold it is like a cancer. Even your best colleagues will sleep on with a spotless conscience, once they appreciate the ED as a place of safety. But there is a reason it is called Emergency Department not Emergency ward. The truth is that the ED is like an operating theatre – patients must leave A&E after they have received a disposition.

Why is emergency department overcrowding such a bad thing?

A study by Richardson in 2006 found a 43% increase in mortality at 10 days after admission through a crowded A&E[25]. Liew et al. found that long waits strongly correlated with increasing length of stay in hospital, and that length of stay in the emergency department independently predicted inpatient length of stay. ED stay 4-8 hours increases inpatient length of stay by 1.3 days; ED stay more than 12 hours increases inpatient length of stay by 2.35 days[26].

There is evidence that patients in overcrowded EDs receive delayed care[27]. Furthermore there is association between waiting times in the ED and increased 7-day mortality, perhaps reflecting lower quality of care from an overcrowded A&E department[28].

Emergency department overcrowding often reflects poor care in the institution

The best solution to ED overcrowding is to recognise that it is hardly ever an isolated ED problem. Emergency patient flow, or the lack of it, is not an A&E specific function; it is a barometer of how well we manage flow though the whole hospital. If one accepts that it is a hospital-wide problem then it may be resolved by actions including early senior review on

the wards, with a sustained focus on discharging patients home whenever it is safe to do so.

A National Directorate of Urgent Care coordinating emergency care and planning

Some of the methods in use in more mature emergency settings include establishing a National Directorate of Urgent Care, with a National Director of Urgent Care to give ministerial advice in integrated reform of the emergency care system. Institutions, on their part provide, high visibility management actions to unblock bottlenecks in the patient flow pathway, escalation policies, and regular audit of patients failing to meet the 4 hour target. Some institutions have invested in a designated emergency surgeon with a dedicated team and theatre for only emergencies.

Above all, it is critical that departments separate from the ED understand their role in supporting patient flow through the ED.

A vast and fascinating topic

Our subject matter this morning is a vast and fascinating topic, and I have barely scratched the surface with my remarks about improving emergency care through the use of operational standards in the ED. Time has not allowed one to do more than make a passing reference to prehospital care. I have not touched on multidisciplinary working, workforce planning, interagency working involving the Police, Fire Service, or organisations like NADMO. I have not mentioned major incidents, mass casualties, epidemic outbreaks, disaster planning and management. I am sure that we will have time during this conference to deliberate on all these important topics. But I hope that at least I have given you a tantalising flavour of how emergency care may be improved in a cost neutral way.

The Ghana College of Physicians and Surgeons as advocate and champion

Emergencies occur everywhere, and each day they consume resources regardless of whether there are systems capable of achieving good outcomes[2].The Ghana College of Physicians and Surgeons, with her vast repository of expertise, is well placed to act as advocate and champion in meeting the challenges of establishing safe and effective emergency care systems in this country.

Conclusion

In conclusion, I would like to thank and congratulate the GCPS for organising this year's annual meeting under the present theme. It raises the profile of emergency care and provides great practical inspiration to all whose mission is to improve the care of emergency patients. A good communication infrastructure, redesigning patient process pathways, training health care personnel, team and hospital organisation, involving multi-professional stakeholders, and locally relevant research which accurately characterises the burden of injuries and acute disease, will all help to improve the quality of emergency care.

There is scope for achieving better outcomes for all emergency patients with better planning and structured training of all levels of health care professionals, and without placing intolerable strain on the national budget. I would remind you during your discussions and deliberations in this meeting, paraphrasing Kwame Nkrumah's words in 1953[29] that the eyes of the world are upon us, and that our people are looking to us with desperate hope to improve and strengthen emergency care.

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RESPECT FOR PATIENT AUTONOMY: A PATIENT PERSPECTIVE

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Summary

There appears to be dissatisfaction by patients in Ghana with the way their doctors communicate with them. The perception is that doctors fail to respect their autonomy by failing to adequately inform them of their health condition and also fail to involve them in their health care decisions. Patients want doctors to use their medical training to promote a partnership in the doctor-patient relationship where the doctor uses his or her superior knowledge and skill in medicine to acknowledge, encourage and support the patient's right to self-determination in his or her health care. If doctors did that, patients will be more satisfied, the doctor-patient relationship will be enriched, trust between the doctor and his patient will be enhanced and patient care will also be enhanced. Although there may be difficulties for doctors to adopt this approach, those difficulties are not insurmountable

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Key words: *Autonomy, Patient autonomy, Self-determination, Doctor-patient relationship, paternalism*

Introduction:

The last few decades has seen an increased emphasis on respect for 'human rights' in many countries in the world. This has led to changing attitudes and expectations in society. Individuals in society increasingly expect their human rights to be respected in every walk of life, including in their health care. In health care respect for human rights translates into respect for patient autonomy. Respect for patient autonomy has been interpreted to mean a number of different things in different circumstances. However the ways that patients universally appear to want their autonomy respected are; to be listened to, be provided with information about their health condition, and be involved in the management decisions about their health care[1,2,3]. A number of studies conducted in Ghana have shown these expectations to be true of Ghanaian patients[1, 4, 5, 6]. Respect for patient autonomy, which is believed by some to be the most important[7] of the four principles of modern medical ethics is also a major determinant of patient satisfaction in health care which in turn is a measure of the quality of health care delivered[1, 8,9,10]. This means that if doctors are to provide a good quality of care, they not only have to cure their patients' diseases and illnesses, they have to do so by respecting their patients' autonomy, and their patients have to feel satisfied with the care provided. It follows from the above, that if patients are to be able to participate in any meaningful way in their health care decisions, they need doctors to provide them with the relevant information to enable them do so.

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Many doctors in Ghana, as part of their desire to provide a high quality service and in accordance with the requirement of the code of ethics and the patient charter of the Ghana health service, put in a lot of effort to provide information to their patients about their health condition and management, and wish they could do more. However every now and again some patients feel that such information is not forthcoming from doctors, and this makes them feel their autonomy is not respected by their doctors.

The scale of the problem

Recently I came across a Ghanaian online health care blog while searching the Internet, in which I read a story of a woman and her mother's disappointment at the interaction between her mother and the doctor when she accompanied her mother to a doctor's appointment in Ghana[11]. She was disappointed because she thought the interaction was so brief, the doctor did not explain her mother's condition to her, nor give much thought to her mother's thoughts, ideas, concerns or expectations.

In another Ghanaian online health care blog[12] the recurrent theme was that doctors in Ghana generally fail to inform patients of their health condition when patients consult them. What appears to frustrate these patients the most is the fact that doctors refuse to provide them with information even when they make direct requests for it. Here are just two quotations from this blog;

'…why is it so difficult for doctors to tell their patients what is wrong with them and what they are doing to cure them? Why the silence, the sarcasm or even insults when a patient wants to know what you have found after asking all those 'weird' questions and probing and prodding him/her in all sorts of private places?';

'The arrogance and condescension is sometimes absolutely unbelievable'.

There was a sense in the communications in this blog that many patients feel offended by doctors' attitudes and practices in Ghana in this regard and certainly feel that their autonomy is not respected by doctors.

Reading these blogs brought back memories of an experience that my father and my siblings had not too long ago when my father was admitted to a hospital in Ghana with a very serious illness. The medical care from the doctors and nurses was excellent but my father and the rest of the family had serious concerns about the flow of information from the doctors about his condition and progress.

I believe the majority of doctors in Ghana work very hard and do a very good job. I also know that these blogs do not provide opinions in a scientific manner and one cannot draw scientific conclusions from them. I also believe that if I search hard enough I may find a blog containing praises about the good work that Ghanaian doctors do with communication with their patients. However much I like to think that the views expressed on these blogs are that of a few disgruntled patients, and my family's experience is the exception rather than the norm, if indeed the views are in any way shape or form representative of the views of the Ghanaian society, then doctors have a lot of work to do about the way they relate to patients and the ethics of their practice.

My little experiment

Against the background of what I had read in the online blogs on respect for patient autonomy and patient satisfaction, I decided to do a little study. I had a conversation with a patient within the community that I work in Saskatchewan, Canada, on the subject of 'respect for patient autonomy'. My aim was to find out what her experience with doctors within our community had been when she had consulted them, what her expectations were, and also what she thought most patients expect from their doctors in the doctor-patient consultation. With her views in mind I spoke to a patient who had just recovered from a surgical operation in one of the major teaching hospitals in Ghana to find out what her views on her doctors-patient interactions were and whether her experiences were different from her expectations. I also asked her to tell me what she though most patients in Ghana expect from their doctors when they consult them. The responses from both patients were similar in many ways. They both want doctors to respect their autonomy and they want doctors to do so by communicating with them. Both of them also believed that most patients expect the same from their doctors.

The aim of this article is to raise awareness among doctors in Ghana of some of the ways in which patients want to see respect for their individual autonomy shown in practice by describing the views of the two patients above, together with my own views, of how patients expect the doctor-patient relationship to look like, and also to provoke a debate on the issue of respect for patient autonomy in Ghana, particularly with respect to doctor-patient communication.

It is my hope that this article will provide a stimulus for reflection by the busy clinician and the clinician in training on his interaction with his patients and lead him or her to make positive changes in the way he cares for his patients.

Although I refer to the views from these two patients as what patients want, I admit that a study involving the collection of views from just two patients who have university education, in a casual conversation, is insufficient to draw up any meaningful scientific conclusions about the views of all patients. However, these views, I believe provide a good insight into how some if not many, patients expect the doctor-patient relationship to look like and how they want the respect of their autonomy to be in their day-to-day interaction with their doctors.

Autonomy

The word Autonomy means 'self-rule' or 'self-governance'. It derives from the two Greek words 'autos' which means 'self' and 'nomos' which means 'rule' or 'governance'[13]. Autonomy was originally used to refer to nations and states with respect to their ability to run their own affairs. Now it is also used to describe persons[13]. A person is autonomous if he or she is able to act intentionally with understanding of the relevant issues without controlling influences[13].

Philosophically the meaning and scope of autonomy is very wide. It is the case that everybody is influenced in a way by the environment he grows up in and lives in and by his relationships such as his family and friends[14]. In this regard everybody is influenced in a way by others and nobody acts independently of the influences around him. It is also the case that nobody has a complete understanding of all the issues that he deals with prior to making decisions[14]. As such, complete freedom from coercion or internal limitations and full understanding are ideals that can only be aspired to and not attained. This being the case, nobody is fully autonomous[14]. For practical purposes, most people are considered sufficiently autonomous. The laws in many countries require that every adult of a sound mind and adult years be considered sufficiently autonomous and his autonomy respected unless there is a good reason to do otherwise. In effect individuals with sufficient autonomy should be able to live their own lives according to their own idea of what a good life entails. Respect for autonomy flows from a recognition that all persons have unconditional worth, each having the capacity to determine his or her moral destiny. To violate a patient's autonomy amounts to treating him merely as a means to achieve another person's goal without regard to that patient's own goal[15].

In health care, respect for autonomy has to do not only with respect for the individual, but for the decisions

and choices that the individual makes. Just like the individual, a decision or choice is autonomous if it is made with understanding and without controlling influences[16]. Patients can only make free choices and decisions if they are properly informed. Properly informing patients about their condition includes telling them the truth even when the prognosis of their condition is bad and also when mistakes are made about their care.

Instead of respect for their autonomy, some patients feel, as has been described above, that doctors are paternalistic in their relationship with them.

Paternalism

Doctors have traditionally practised by the ethics prescribed by the Hippocratic Oath[17]. The original Hippocratic Oath requires the doctor to exercise skill for the benefit of his patient without any mention of respect for the patient's right to self-determination. Traditionally, therefore, the practice of medicine has largely been paternalistic. This means that the doctor has the power to and may override his patient's preferences, choices and decisions and justify doing so by appeal to the goal of benefiting his patient or preventing or mitigating harm to his patient[18]. The ways in which patient choices and decisions can be overridden include deception, lying, manipulation of information, non-disclosure of information, the use of coercion and force or indeed outright refusal to carry out the patient's wishes[13].

Paternalistic attitudes and practices by doctors have until recently been accepted as right by society. They are now considered morally wrong[18]. Now the number of people who accept the notion that 'the doctor knows best' and that 'the doctor is better able to determine the patient's 'best interest' than the patient himself is dwindling[17]. A patient's best interest is believed to be more than just medical[19, 20].

Paternalism was tolerated by society because it was thought that the doctor always behaved in a gentlemanly and benevolent manner and it was believed that any dilemmas that he faced in treating his patient he could resolve by relying on his conscience and integrity to act in the patients' interest[17]. History has, however, proven that this is not always the case[21]. Unfortunately, the practice of medicine in Ghana just like in many other countries around the world still remains largely paternalistic[22, 23].

So what do patients want their doctor do on a day-to-day basis?

Views from the patients

As stated earlier, the patients I interviewed, just like patients of every background, race or culture, want their autonomy respected[24]. They expect their relationship with their doctors to be a partnership in which the doctor uses his superior knowledge and skill in medicine to acknowledge, encourage and support their right to know about their health condition and be involved in their health care decisions. How this relationship should look in practice, as they describe it, is consistent with what proponents of the principle of respect for patient autonomy suggest; which is that their doctor would use his or her medical training and expertise which includes an understanding of the diagnosis and the available treatment options to provide information to them, in ways that they understand and involve them in the management of their medical condition[25]. They expect their doctor to develop an understanding of them as individuals, not as a disease and to show empathy. They want the doctor to listen attentively, to elicit their concerns and calm their fears, answer their questions honestly, inform and educate them about treatment options and demonstrate sensitivity to their individual and cultural diversity. They expect their doctor to adopt an attitude that enables them to query or clarify their understanding of options that are offered to them and to be able to choose against the doctor's recommendation without jeopardising their on-going care. They do not expect the doctor to consider himself or herself as the final arbiter of all-important decisions[26].

At the same time, they do not want the doctor to just do whatever the patients request, or fail to reason with or persuade them to change their minds if their choices or decisions are irrational. They also do not want their doctor to say to them 'this is the diagnosis of your condition and these are your treatment options, make a choice because it is your body', and just stand by and let them make a choice without even providing the relevant information to enable them do so. They do not want their doctor to treat them in an individualistic manner, without regard for their family or social support system. Instead they acknowledge that their social support system is important to them and accept that sometimes other members of their family may make decisions on their behalf. In many parts of Ghana[27, 28] community elders and others make important decisions including health care decisions on behalf of other members, especially women and children. Both patients accepted that a system where 'recognised' members of the community make decisions for other members is not inconsistent with respect for patient autonomy. They cautioned that the doctor should ensure that patients are in agreement with such decisions and look out for signs of oppression of the patients by others and support the patients against such oppression.

They believe that if doctors practised these, the doctor-patient relationship will be enriched, trust between the patient and his or her doctor will be enhanced and patient care and patient satisfaction would also be enhanced. They admitted that there are still many individuals, particularly in developing nations including Ghana who are still not aware of their rights, and point out that a doctor should not take advantage of that.

One of the striking, albeit unsurprising, things that I picked up from the conversations with both patients was a suggestion that many more people in Canada are aware of their individual rights and liberties and also of channels for redress if they feel their autonomy has been disrespected by their doctor, and are more assertive than the case is in Ghana. This may mean that health care organisations in Ghana and those in positions who are capable of establishing patient redress channels need to put in place the necessary channels if they are not already in place and make patients aware of them.

Barriers to respecting patient autonomy

There are undoubtedly problems that affect doctors' ability to respect their patients' autonomy, particularly in developing countries. This was acknowledged by the patients, who hoped that doctors will take steps to minimize these problems. Some of the problems are outlined below.

A doctor may find himself or herself practising in a location where there is a language barrier. Sometimes interpreters cannot be found. Even when there are interpreters, the doctor may find that there is limited vocabulary to explain medical terms to his or her patient in the language that the patient understands[29]. Doctors are expected to provide the best health care they can with the tools available to them. A doctor who does his or her best for a patient in a difficult circumstance in which the patient's situation makes him or her incapable of making an autonomous choice is not disrespecting his or her patient's autonomy.

Patients may be illiterate. Illiteracy does not mean inability to comprehend. People who cannot read or write may understand things if explanations are given to them in simple terms and with analogies that they understand.

Doctors' often have a very heavy workload[29]. Allocating time to explain things to patients and giving patients the opportunity to ask questions may be considered time consuming and problematic. The patients pointed out that doctors need to accept that providing information to patients is just as important as taking a history, examining the patient, making a diagnosis and prescribing treatment. If this is accepted, they believe that making time to provide patients with information about their health care should not be considered problematic. With good training, they reckon, providing relevant information to the patient should not unduly prolong the consultation. This calls for increased emphasis by medical trainers on training in 'doctor-patient communication' in the medical schools and residency training programs.

Sometimes patients make decisions that some doctors consider imprudent. I asked them whether such decisions should be respected by doctors. The patients were of the view that whether or not a decision is prudent alone does not determine whether it is worthy of respect. The test, they think, is whether or not the decision is rational. A rational decision being one based on appreciation of all the relevant facts and a reasonable, normative deliberation prior to coming to a decision. A Jehovah's witnesses' decision to refuse blood transfusion because of his or her faith may appear imprudent to a doctor but does not make the decision irrational. This emphasises the need for doctors to inform and educate their patients.

On the issue that sometimes doctors think that disclosing information to patients particularly about poor prognosis will harm the patient, they believe that patients need to be told about their condition almost always unless they choose not to be told or when the doctor has very good reasons to think that telling the patient will cause significant harm or render the patient incapable of making further rational decisions. I couldn't agree with them more on this. After all, instances where patients are harmed to the extent that they are incapable of making subsequent rational decisions exist only rarely[30, 31].

Conclusion

To conclude, respect for individual autonomy in health care is just as important to patients as it is in any other walk of life. Regardless of his or her background, every patient seeks it. Doctors in many parts of the world including Ghana are still paternalistic in their approach to patient care. Patients want doctors to respect their individual autonomy by informing them about their health condition and involve them in decisions about the management of their health conditions.

Respecting patients' autonomy in a busy clinical practice, particularly in a resource limited setting can be challenging but that should not prevent doctors from doing so. When doctors respect their patients' autonomy, patients are happier and satisfied.

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CLINICAL PRACTICE

BASIC LABORATORY INVESTIGATION OF THE CRITICALLY ILL EMERGENCY PATIENT

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Introduction

During the past 10 to 20 years, the demand for emergency medical service has grown almost exponentially and major hospitals throughout the world have set up emergency medical units. Recognition of Emergency Medicine as a specialty has also catalysed this development.

In Ghana, the Komfo Anokye Teaching Hospital (KATH) in Kumasi took the lead in setting up an Emergency Department a few years ago. A new Emergency Department will soon replace the Central Out-patient Department (COPD) at Korle-Bu Teaching Hospital.

The National Cardio-Thoracic Center at the Korle-Bu Teaching Hospital has run an Intensive Care Unit (ICU) for many years. The ICU cares not only for cardio-thoracic patients but also for patients suffering from a wide variety of emergency ailments such as acute renal failure, cerebral malaria and stroke. The theme for this year's (2014) Annual General and Scientific Meeting (AGSM) of the Ghana College of Physicians and Surgeons is "Improving Emergency Care in Ghana."

The author considers it timely, therefore, to write the article now. This article will focus on the laboratory needs of Emergency Departments (ED), with particular emphasis on appropriate diagnostic services for the new ED at Korle-Bu Teaching Hospital.

Management of the Emergency Patient

It must be kept in mind that management of an emergency patient is not always based on a clear-cut diagnosis, but on the presented clinical picture.

A common practical approach for the emergency physician is to distinguish and address a disorder which is immediately life-threatening or which requires admission, from other less urgent complaints.

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This strategy combined with a high patient throughput means that a final definite diagnosis is often not made at the Emergency Department, but much later after admission and treatment of the patient.

To deal with emergency cases, clinical experience, the appropriate use of clinical decision rules and use of supportive investigative methods such as analysis of blood and urine samples are of utmost importance.

The Emergency Laboratory

A limited set of standard analyses will help the emergency clinician to diagnose and accordingly treat immediately life-threatening disease.

Immediately life–threatening pathologies include, in order of the ABCDE-approach, hypoxia and respiratory insufficiency, shock and circulatory collapse, coma, acute neurological impairment, meningitis, sepsis, hypothermia and hyperthermia.

These conditions can be grouped (for ease of memory) into the following well-known categories:

A. Airway (impaired): Trauma, foreign body, bleeding, infection (e.g. diphtheria) angiooedema, tumour, coma.
B. Breathing (respiratory insufficiency): Pneumothorax, pulmonary oedema, asthma, pulmonary embolism, pneumonia, pleural effusion, bulbar poliomyelitis.
C. Circulation (shock): Cardiac tamponade, bleeding, cardiac arrhythmia (fibrillation), acute (left ventricular): cardiac failure, acute myocardial infarction, anaphylaxis, intoxication, acute Addisonian crisis, dehydration, electrolyte disorders.
D. Disability (coma): Hypoglycaemia, diabetic ketoacidosis, HONK, hyperosmolar states, intracranial pathology, epilepsy, intoxication, infection (sepsis or meningitis), cerebral malaria.
E. Exposure (temperature): Hypothermia, Hyperthermia.

Need for rapid Laboratory Analyses at the ED

The ED must set up a small multi-purpose laboratory of its own (housed under its roof).

"Point of care" (POC) testing equipment in the ED can reduce "turn-around times" and enable rapid provision of some laboratory measurements.

Developed in connection with Sports Medicine, POC testing devices now produce results as accurate as large central laboratory instruments. They have the further advantage that they can be easily brought to the patient's bedside.

Whole (uncentrifuged) blood samples as little as 100µL suffice for analyses on some of these POC instruments. Acid-base parameters and blood glucose result can be obtained within seconds of introduction of blood specimens into the instruments. Lactate as well as Na+, K+, ionised calcium (Ca++), magnesium, creatinine, urea, Li and osmolality can be obtained together on some instruments.

TABLE I. Emergency Laboratory Analysis

Heamatology	"Electrolytes"	Liver/ Prot	Coagulation	Infection	Additional
FBC	Na^+	ASAT	INR	CRP	HCG(pregnancy)
Hb	K^+	ALAT	aPTT		Troponins
Haematocrit	Ca^{++}	ALP	D-Dimer	Urinary Dipstick	Myoglobin
MCH	Mg^{++}	γ-GT			TSH,T_3,T_4
MCHC	$C1^-$	LDH	Platelets		
	Urea	Tot.Bilirubin		Mononucleosis	Tox-screen
Leucocytes	Creatinine	Conjugated			
5- Diff	Lithium	Bilirubin		Malaria	Alcohols/Ketones
Platelets	Arterial Blood Gases			Sepsis	Paracetamol
Erythrocytes		Amylase		Viral hepatitis	Valproic acid
	Glucose	Lipase		Influenza	Carbamazepine
ESR				Typhoid	Local panel
	Lactate	Total protein		HIV	
Blood Grouping		Albumin		Ebola	
Ab - Screen	Osmometry				LIQUOR Erythrocytes Tot. Leucocytes Differential Xanthochromia Glucose Lactate Z–N stain Culture

Therapy before Analysis of Blood Samples

If the patient is comatose and is a known diabetic or suspected to be one, as soon as a blood sample for glucose determination is taken, without waiting for results of the analysis, a therapeutic trial with intravenous glucose can be made. If the patient is shown to be hyperglycaemic (instead of hypoglycaemic) no great harm would be done. If the coma is due to hypoglycaemia, the patient should wake up within seconds of the injection. Insulin therapy, on the other hand, should be withheld in a case of diabetic coma until the patient is settled in bed and 0.9% saline intravenous infusions started.

Choice of Laboratory Tests

This, of course, will depend on the clinical diagnosis or suspected diagnosis. In a broader view no single analysis can be called the most important one, when the diagnosis is not clear.

However, with the limited set of blood glucose, arterial blood gases, lactate, Hb, platelet count, Na+, K+, Ca++, and creatinine. INR, APTT, D-dimer, liver enzymes, amylase or lipase, troponins, limited toxicology screening (alcohols, Lithium, and the most common local intoxications), a WBC, CRP and ESR, the experienced physician should be able to manage the emergency presentation of the vast majority of common emergency and life-threatening disease conditions.

In case of infection or suspected infection complementary samples for urinary dipstick testing should be carried out.

If the patient is unconscious it may be necessary to obtain a catheter specimen of the urine.

In case of a febrile illness, pyrexia should be confirmed and malaria testing by direct microscopy, HIV or Hepatitis rapid test and PCR may be necessary to allow early identification of infectious agents. Cases of suspected Ebola infection should be referred to special isolation units. The Noguchi Institute at Legon is the only laboratory in Ghana accredited by the WHO to confirm the disease by tests.

Summary and Recommendations

The ED at Korle Bu should be well-equipped with the latest but basic ”physiological” instrumentation (such as thermometers, pulse oximeters, defibrillators and ultrasound) necessary for the running of a modern ED.

Ambulance staff should have basic resuscitation skills to reduce the number of cases of BID (“brought in dead”).

The Unit should have portable X-ray machines as well as bedside Doppler ultrasound. The ED should have its own small multi-purpose laboratory as well as POC instruments (that can be brought to the patient’s bedside).

The ED should be manned by physicians. The radiology and laboratory facilities should be manned by skilled technical staff backed by medical laboratory consultants or specialists either working there all the time or on call 24 hours. Heads of the radiology and laboratory facilities should be medically qualified.

CASE REPORT

CLEIDOCRANIAL DYSOSTOSIS- A CASE REPORT

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Abstract

Objective: First report of cleidocranial dysostosis (CCD), a rare genetic disorder, in Ghana.
Case report and intervention: The condition presented in a 13 year old boy with most of the classical features. He had cranial features in the form of open fontanelles, underdeveloped paranasal air sinuses and hypertelorism. Thoracic features were severely underdeveloped clavicles which allowed him to appose both shoulders in the midline. He had an open bite, several unerupted permanent teeth and several retained teeth most of which were discoloured which was why he was seen at the Dental department. After restoration of some of these teeth the patient was very satisfied.
Conclusion: Though the definitive treatment in these patients can be sophisticated major craniofacial surgery, early restoration of malformed teeth can help ease patient's anxiety and improve quality of life.

Key Words: Cleidocranial dysostosis, Ghana, genetic, disorder, jaws, dentition

Introduction

Cleidocranial dysostosis (CCD) is a rare congenital disorder of bone and dentition[1, 2, 3]. Also called cleidocranial dysplasia, mutational dysostosis and Marie-Sainton disease[4], the condition is mainly characterized by clavicular aplasia or deficient formation of the clavicles, delayed and imperfect ossification of the cranium, moderately short stature, and a variety of other skeletal abnormalities[5] The principal oral manifestations are a delayed exfoliation of primary teeth, delayed or multiple impactions of the permanent dentition, and multiple impacted supernumerary teeth[6]

It may be inherited as an autosomal dominant pattern or occur as de novo mutation of the affected gene. The gene has been mapped on the short arm of chromosome 6p21, core binding factor a-1 (CBFA1). This disorder can be caused by a mutation in the transcription factor CBFA1 (RUNX2). The CBFA1 gene controls differentiation of precursor cells into osteoblasts and is, therefore, essential for both membranous and endochondral bone formation. This may be related to delayed ossification of the skull, teeth, pelvis, and clavicles[7] Diagnosis of CCD is usually based on clinical and radiographic findings and affected individuals may live a normal life[4,5,8].

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Cases have been published in South Africa[9] and Nigeria[10] but to the best of our knowledge, this is the first reported case of the condition in Ghana

Case Report

A 13 year-old male presented to the Dental Surgery clinic, 37 Military Hospital, Accra, with a complaint of discoloured and carious teeth in both upper and lower jaws which had been present since childhood. He requested improvement in his appearance and the colour of his teeth.

His only relevant medical history was the surgical removal of a sixth finger next to the right little finger which was carried out under local anaesthetic without complications a "few" years previously. He also said he could approximate his shoulders to meet in the midline

He had never visited a dental surgeon in the past. There was no social or family history of note. The patient's stature was small for his age but otherwise looked generally well. Initial examination focused on the head and neck.

The site of the anterior fontanelle was soft. He had hypertelorism and flaring of alae nasi.
The skeletal jaw relationship was class III with a protrusive mandible and an anterior open bite.

Almost all his deciduous teeth were retained. The only permanent teeth present were the first permanent molars. There was discolouration of several teeth in both jaws. Some of the teeth had caries. There was a notch in the midline of the palate which otherwise looked flat. On further examination he could demonstrate the almost meeting in the midline of his two shoulders with ease. He also had pes planus. Fig 1

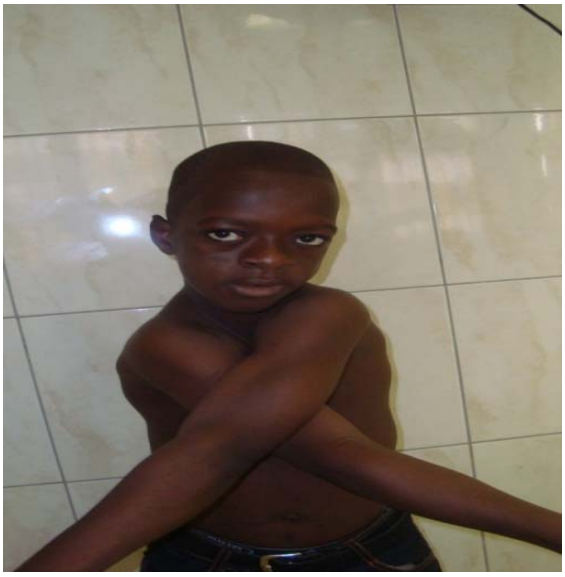

Figure 1: Shows the apposition of the shoulders close to the mid-line.

Figure 2: Presence of pes planus in the patient

Plain radiographs of the patient's jaws (Orthopantomogram [OPG] and lateral skull views) and posterior- anterior radiographs of the chest were requested on account of the missing teeth, the skeletal class III appearance and the ability to bring his shoulders close to the midline with ease.

Figure 3: Orthopantomogram view of the jaws showing several unerupted teeth.

The OPG and lateral skull views showed several teeth impacted and unerupted in both jaws. Some of these were supernumeraries. (Fig. 3, 4).

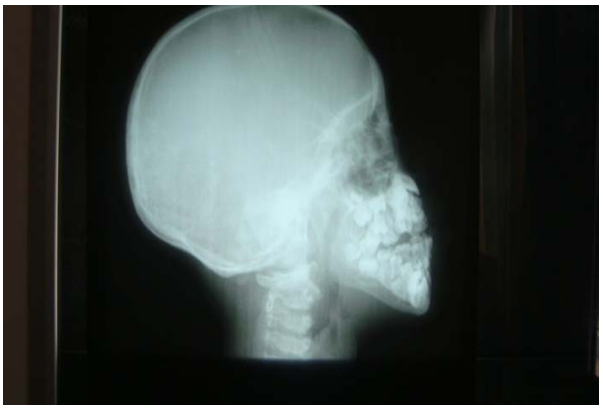

Figure 4: Lateral skull radiograph showing open skull sutures, large fontanelles, and underdeveloped paranasal sinuses.

Figure 5: Chest radiograph (PA View) of the patient showing thinning and hypoplasia of the clavicles and bell shaped rib-cage.

The lateral skull view also confirmed the skeletal III jaw relationship. The chest radiograph showed clavicular hypoplasia and bell shaped rib-cage (Figure 5). These radiographic and clinical features confirmed our diagnosis of CCD.

Management: The patient and the parents were reassured. Dietary advice and oral hygiene instructions were reinforced. Composite restorations of his carious teeth as well as veneers for the discoloured teeth were carried out fig 6. Badly damaged primary teeth were extracted and where there was a high chance for eruption of the permanent teeth, the corresponding primary teeth were extracted to make way for their permanent counterparts. Future orthodontic repositioning of some of the teeth and artificial replacement of missing teeth as well as orthognathic surgery was discussed and this will be considered at a future date.

The patient was also referred to the ENT, Orthopedics and medical departments for further investigations. These further examinations and evaluations did not reveal any new clinical features.

Figure 6: Appearance of dentition after composite restorations.

Discussion: The descriptive term cleidocranialdysostosis was first used by Pierre Marie and Paul Sainton in 1898[11, 12]. The condition was originally thought to involve bones of intramembranous origin only, namely the bones of the skull, clavicles and other flat bones, hence the name cleidocranial. Hesse was first to describe in detail the association of the defects of dentition and jaws[13]

The prevalence of CCD is one per million of the population. It is inherited as autosomal dominant trait with complete penetrance and variable expressivity[8]. It is most likely underdiagnosed because of the relative lack of medical complications in comparison with other skeletal dysplasias. It may be discovered at any age, but the cranial deficiencies may be noticed at birth. There is no gender predilection. The defect often appears in several successive generations[14, 15, 16]

The most characteristic and pathognomonic feature of this disorder is hypoplasia or aplasia of the clavicles, which results in hypermobility of the shoulders allowing the patients to approximate the shoulders in the midline. Muscle attachments to the clavicles may also be dysplastic, leading to distortion of the neck. Defects of the cervical and lumbar vertebrae are included in the clinical findings. Absence of the pubic symphysis and hypoplasia of the pelvis is common in females. Postural defects and spinal curvature are common. Frequently, genuavalga and pes planus are found in children younger than 5 years of age. In our case our patient had pes planus. They are of moderately short stature[14, 15, 16]

Delayed ossification of the cranial sutures and fontanelles occurs, and may remain open throughout life. The skull is usually large and broad.

The face appears small in relation to the cranium with hypoplastic maxillary, lacrimal, nasal, and zygomatic bones. The paranasal sinuses may be underdeveloped. The bones of the middle part of the face are also less well developed than the cranial bones. Defects in the skull appear to be always symmetrical. The frontal, parietal, and occipital bones are prominent. The maxillary sinuses may be small or missing, and the maxilla is underdeveloped, causing a Class III skeletal relationship and a maxillary retrusion (a relative mandibular prognathism). The palate may be abnormally high, and, occasionally, a cleft palate has been reported. Ocular hypertelorism and mild exophthalmus are seen[16].

In the hands and the feet, various abnormalities have been found, the most constant and curious being the presence of epiphyses at both ends of the metacarpals and metatarsals, particularly of the second and fifth, and an abnormally long second metacarpal. The intermediate phalanges may be small. Association with mental retardation has been shown, but most patients apparently possess normal intelligence. These individuals have no significant physical handicap[16].
The eruption of primary teeth is normal or sometimes delayed, but the exfoliation of primary teeth is always delayed and may be due to the failure of most permanent teeth to erupt[17]. The presence of supernumerary teeth has been hypothesized to result from incomplete or delayed resorption of the dental lamina. Dental manifestations include delayed eruption or failure of eruption of the primary dentition. Delayed tooth development has been reported in association with malocclusion and supernumerary teeth[15]. The significant variability in clinical expression of this syndrome reflects a degree of phenotypic polymorphism[16]

Confirmation of the diagnosis was based on the examination of the cranium, the face, the intra-oral features (mainly the dentition), clavicles, including shoulder mobility.

Our patient had most of the classic features.
Our patient had an open anterior fontanelle, hypertelorism, flared alae nasi, a relative mandibular prognathism, an anterior open bite, several carious and discoloured teeth, shoulders that nearly met in the mid-line, pes planus and a notch in the hard palate.

Radiographically, a PA chest radiograph confirmed his clavicles were nearly missing, and an OPG showed he had several supernumerary teeth, several impacted and unerupted teeth, a maxillary antrum nearly filled with unerupted teeth and skeletal mandibular prognathism or maxillary hypoplasia.

The patient's treatment is restricted in our environment. Quality of life is such as the facilities we have in our health service will allow. There was a huge smile after the initial treatment. There are plans to involve other specialists to provide an integrated team service, made up of a pedodontist, an orthodontist, and an oral and maxillofacial surgeon, however we could not confirm this with the parents. No doubt aesthetic improvement brought a smile to their face and to some extent improves their quality of life.

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GOVERNOR FREDERICK GORDON GUGGISBERG

GOVERNOR FROM 1919—1927

Gordon Guggisberg
Surveyor (about 1910)

He opened the Gold Coast Hospital at Korle Bu in 1923.

Improved the quality and quantity of hospitals, dispensaries and medical training, along with improvements in sanitation of towns and general health education; these measures dramatically improved Africans' access to health care.

He made health care more accessible to the common African.

Percy Selwyn-Clark translated Guggisberg's sanitation into reality.

He wanted to establish a complete system of medical training from secondary school at Achimota and onwards towards a medical school, for which plans were laid but it was not completed due to the Depression.

YELLOW FEVER

Dr. Hideyo Noguchi

Microscopes used by Dr. Noguchi during his research at his study room in Korle Bu

Mr. Asibi, from whom the virus of yellow fever was first isolated

Dr. Noguchi dissecting a monkey at his office in Accra

Dr. Young in the laboratory

The Noguchi Memorial Garden at Korle Bu constructed by Government of Japan in June 1962

Largest epidemic of yellow fever in the Gold Coast occurred in 1937

Yellow fever is found in two broad areas of the world:

i. Across the middle of Africa in the tropics, more to the west
ii. In the western hemisphere, Central America, Caribbean islands, and northern part of South America.

In the non-immune, the disease is manifested by jaundice and albumin in the urine.

In 1881, Dr. Carlos Finlay, in Cuba suggested, and proved in 1901, that the disease was transmitted from man to man by the tiger mosquito, Aëdes aegypti. Also by accidental contamination e.g. in the laboratory. Drs. Stoke, Noguchi and Young died through accidents in the laboratory.

The Rockefeller Foundation sponsored research in the Americas, a short one to West Africa in 1920, and a longer one in 1925. Important discoveries of the Rockefeller Commission in West Africa were:

i. Yellow fever not caused by Leptospira infection – L. icteriodes as hypothesized by Noguchi
ii. Rhesus macacus monkey imported from India proved to be susceptible host, with blood inoculated from a suspected case of a 27-year old labourer called Asibi, in Kpeve, in the Volta Region of Ghana.

A vaccine was first prepared in New York by inoculating the Asibi strain of the virus intracerebrally in mice. From the Asibi strain a non virulent strain called D17, produced both safe and effective vaccine.
Until date

P. K. N.

GHANA COLLEGE OF PHYSICIANS & SURGEONS

GHANA COLLEGE OF PHYSICIANS AND SURGEONS

ADMISSION TO POSTGRADUATE MEDICAL AND DENTAL TRAINING COMMENCING SEPTEMBER 2015 (MEMBERSHIP)

Applications are invited from qualified medical and dental practitioners for the following programmes:

1. ***3-year residency training in any of the following***
Anaesthesia and Intensive Care; Paediatrics/Child Health; Dental Surgery; Family Medicine; Internal Medicine; Obstetrics and Gynaecology; Psychiatry; General Surgery; Otorhinolaryngology and Ophthalmology.

2. ***4-year residency training in Radiology***

3. ***3-year residency training in Laboratory Medicine, Emergency Medicine and Radiation Oncology***

4. ***2-year residency training in Public Health***

Entry requirements common to all programmes

a) Full registration with the Medical and Dental Council of Ghana.
b) Must have completed two (2) years housemanship/rotation in all four (4) major disciplines
c) Must have served one (1) year in a district hospital after housemanship as defined by the Ministry of Health.

Specific Requirements

- *Applicants for* ***(1)*** *above must have passed the Primaries of GCPS or Primaries of the West African Colleges.* ***Selection will be by interview only.***

- *Selection for* ***(2) and (3) above*** *will be based on* ***an entrance examination and an interview****.*

- *Applicants for* ***(4)*** *above must have a Masters degree in Public Health (MPH).* ***Selection will be by interview only****.*

The entrance examination for ***(2) and (3)*** *is scheduled for Monday, 1st June, 2015 at the* ***College of Physicians and Surgeons, 54 Independence Avenue, Ridge, Accra at 9.00am.*** *All interviews will be held on Tuesday, 2nd June 2015* ***at the same venue at 9.00am prompt.***

Registration

Registration
Forms are available at the College, 54 Independence Avenue, Ridge, Accra. Applicants can also send requests for application forms to exams@ghcps.org. The registration fee of ***Four hundred and fifty cedis (¢450.00)*** *must be paid by Cash/Cheque to Ghana College of Physicians and Surgeons Donor Pool Fund Account Number* ***0010 1344 0464 8401, ECOBANK GHANA LTD., RIDGE WEST BRANCH*** *or by bank draft to* ***GHANA COLLEGE OF PHYSICIANS AND SURGEONS (GCPS) DONOR POOL FUND ACCOUNT.***

Closing Date

Completed application forms must reach the Examinations Officer on or before ***Friday, 17th April, 2015.***
Late registration will attract a fee of GHS100.
Late Registration ends on Friday, 24th April, 2015.

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Applications are invited from qualified specialists in medical and dental professions for the following programmes:

1. *Fellowship training in any of the following:*

Anaesthesia and Intensive Care; Paediatrics/Child Health; Dental Surgery; Family Medicine; General Internal Medicine; Gastro-Enterology Endocrinology AND Hepatology; Nephrology; Cardiology; Laboratory Medicine; General Obstetrics and Gynaecology, Reproductive Medicine & Family Planning; Gynaecological Oncology; Uro-Gynaecology; Psychiatry; Public Health, Radiology; Radiation Oncology; General Surgery; Orthopaedics/Trauma; Urology; Plastic and Reconstructive Surgery; Paediatric Surgery; Cardiothoracic Surgery; Neurosurgery; Otorhinolaryngology; Ophthalmology.

2. *Entry Requirements (common to all programmes)*

a) *Full registration with the Medical and Dental Council of Ghana.*
b) *Membership of the Ghana College of Physicians and Surgeons and in good standing*
c) *Post Membership work experience in Ghana for one (1) year in a Regional or District hospital.*

3. *Selection is by Interview only.*

*The Interview is scheduled for Tuesday, 2ndJune, 2015 at the **College of Physicians and Surgeons, 54 Independence Avenue, Ridge, Accra at 9.00am prompt.***

Registration

*Forms are available at the College, 54 Independence Avenue, Ridge, Accra. Applicants can also send requests for application forms to exams@ghcps.org. The registration fee of **four hundred and fifty cedis (¢450.00)** must be paid by Cash/Cheque to Ghana College of Physicians and Surgeons Donor Pool fund Account Number **0010 1344 0464 8401, ECOBANK GHANA LTD., RIDGE WEST BRANCH** or by bank draft to **GHANA COLLEGE OF PHYSICIANS AND SURGEONS (GCPS) DONOR POOL FUND ACCOUNT.***

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