SPECIAL ARTICLE

SURGICAL MANAGEMENT OF PELVIC ORGAN PROLAPSE

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Summary

Pelvic organ prolapse (POP) is a common condition that affects the quality of life of affected women. A prevalence of 12% has been reported in Ghana with the condition affecting mainly the emotional wellbeing, sexual life and women's relationship with their partners. This review discusses the adequacy of the available surgical options for managing POP and provide our expert opinion and recommendations based on our experience.

Surgical management of POP is undertaken through 2 main approaches i.e., obliterative and reconstructive. Obliterative procedures should only be considered for women who are not sexually active and have no desire for future sex as it closes the vagina. Because of the significant contribution of the apex to vaginal support, inadequate apical support during prolapse repair may lead to a vault prolapse or failure of anterior and posterior vaginal wall repairs. Vaginal mesh is not recommended for the repair of POP. We advise the performance of concurrent anti-incontinent procedure for women with symptomatic and occult stress incontinence at the time of prolapse repair. We do not however advocate the performance of prophylactic anti-incontinent procedure (i.e., anti-incontinent procedure for continent women with POP) at the time of prolapse repair.

Surgical repair of POP is expected to achieve good anatomical and functional outcome. It is therefore important that surgeons equip themselves with the skills and knowledge necessary to address all the problems confronting the patient.

Key Words: *Pelvic Organ Prolapse, Surgery*

Introduction

Pelvic organ prolapse (POP) defined by the International Urogynaecological Association and the International Continence Society as the descent of one or more of the anterior vaginal wall, posterior vaginal wall, the uterus, or the apex of the vagina (vaginal vault after hysterectomy)[1] is a common problem that affects the quality of life of affected women. The global prevalence range from 3-6% when defined by symptoms and up to 50% based on examination findings.[2] In Ghana a prevalence of 12 % has been reported with the condition affecting mainly the emotional well-being, sex life and women's relationship with their partners.[3]

The available management options for pelvic organ prolapse include watchful waiting in women with asymptomatic prolapse; conservative interventions (such as the use of vaginal pessaries and pelvic floor muscle training) and surgical management. Though conservative treatments may be effective in alleviating patients' symptoms, surgical corrections of the defects may eventually be needed for the satisfactory treatment of pelvic organ prolapse.

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The objective of this review is to discuss the adequacy of the available surgical options for managing pelvic organ prolapse.

Surgical management of pelvic organ prolapse

"There is no condition that cannot be made worse by surgery". This quotation by Ulf Ulmsten finds relevance especially in surgery for pelvic organ prolapse where one is expected not only to achieve anatomical success but to restore the pelvic organs to function at their optimum. It therefore goes without saying that in pelvic organ prolapse repair, the surgeon faces a complex and intriguing challenge. Circumventing that challenge requires the surgeon to consider the following factors before embarking on surgical repair of pelvic organ prolapse.

1. Will the surgery be reconstructive or obliterative?
2. Will the uterus be conserved or removed?
3. Will the repair be done abdominally or vaginally?
4. Will the repair be done with native tissue or a graft?
5. Will a surgery for stress urinary incontinence be done concomitantly?
6. Can a general gynaecologist perform the surgery adequately?

1. Reconstructive or obliterative

Contrary to the reconstructive approach that involves suspension of the prolapsed vagina to restore anatomy and function, the obliterative approach involves vaginal closure with consequent loss of vaginal

function. The obliterative procedure is typically reserved for the elderly who are no longer sexually active and have no desire for future sexual intercourse. Occasionally it may be used for women with significant anesthetic risk who have failed conservative management. Careful patient selection and adequate pre-operative counselling is key to avoid future regret.

Colpocleisis (an obliterative surgery) can be done with the uterus in-situ (Le Fort procedure) or after a hysterectomy and colpectomy.

The Le Fort procedure involves removing a rectangular section of the vaginal epithelium from the upper two thirds of the anterior and posterior walls of the vagina and approximating the edges together whiles reducing the cervix in a cephalad direction. Two tunnels are created on the lateral sides of the vagina to allow for evacuation of possible uterine secretions. The cervical os is concealed after Le Fort procedure making evaluation of uterine bleeding difficult if not impossible after the procedure. A pap smear and evaluation of the endometrium should be performed before a le Fort procedure.

A colpectomy with colpocleisis involves removing the vaginal epithelium after a hysterectomy. Sequential interrupted purse-string sutures are placed in the fibromuscularis of the denuded vagina beginning from the apex and progressing distally towards the hymen. As the purse string suture is tightened, the prolapse is reduced into the pelvic cavity. Colpoclesisis be it Le Fort or Colpectomy is usually combined with perineorrhaphy to narrow the genital hiatus.

During colpocleisis the distal 3 cm of the vaginal epithelium (under the urethra) is usually not removed. This is termed partial colpocleisis. By preserving this area under the urethra, access is maintained to perform concurrent or future suburethral procedures should stress urinary incontinence develop.

Complications include injury to the bladder and rectum during dissection of the vaginal walls. Regret over the loss of ability to have vaginal intercourse has been reported in some women.[4]

2. Hysterectomy or uterine conservation

Uterine preservation may be preferred by some women for a variety of reasons. Aside preservation of fertility, uterine preservation may be desired for psychological and cultural reasons as well as the perception that the cervix is vital for sexual satisfaction. Women at increased risk of cervical and endometrial carcinomas are however not candidates for uterine preservation and should be counselled for hysterectomy.

It is, important for surgeons to be skilled in uterine preservation procedures to ensure satisfaction of their patients. Equally important is the ability to offer adequate apical support after hysterectomy.

3. Abdominal versus vaginal repair

The choice of the route of surgery must be decided on after careful consideration of the risk and benefits associated with the abdominal (open, laparoscopic and robotic) versus vaginal routes. The vaginal route allows for the correction of all prolapsed anatomic sites as well as the treatment of concomitant stress incontinence. In addition, it is associated with faster recovery and short hospital stay. The abdominal route (abdominal sacrocolpopexy) on the other hand is considered as the Gold standard as it is associated with lowest risk of dyspareunia, recurrence and repeat surgeries.[5] It is however not suitable for the repair of isolated anterior and posterior vaginal wall defects. It is more invasive, stressful and associated with longer recovery time. The nature of the defect to be repaired, age of the patient, overall health of the patient and surgeons' skills determines the approach to the surgery.

Apical support of uterus and vagina

The apex of the vagina is suspended by the cardinal-uterosacral ligament complex which is directed towards the hollow of the sacrum supported by the pelvic floor muscles. The upper vagina rest horizontally over the levator ani which allows the vagina to close with rise in intraabdominal pressure. Loss of the muscular support leaves the connective tissues alone to bear the stress of increase in abdominal pressure which eventually leads to prolapse. When apical prolapse occurs, maintaining the vaginal length and directing the axis to rest on the pelvic floor is essential to ensue adequate function of the vagina and to prevent recurrence. There is a general acknowledgment that adequate support for the vaginal apex is an essential component of a durable surgical repair for women with advance pelvic organ prolapse.[6] Because of the significant contribution of the apex to vaginal support, inadequate apical support during prolapse repair may lead to failure of anterior and posterior vaginal wall repairs.[7] This therefore leaves one to wonder whether good anatomical and functional outcome can be achieved in pelvic organ prolapse repair without good apical suspension.

There is a spectrum of options for managing apical prolapse. This can be achieved vaginally or abdominally. The abdominal route can be accomplished via the open, laparoscopic or robotic technique.

Vaginal surgeries for apical prolapse.

The available options include the Manchester operation, McCall Culdoplasty, Colpocleisis, high uterosacral ligament suspension, sacrospinous ligament suspension and iliococcygeus vaginal vault suspension.

I. The Manchester Operation

This procedure has undergone several modifications after it was first introduced by Archibald Donald of Manchester. The procedure involves cervical amputation with the shortening and anterior plication of the cardinal-uterosacral ligament complex on the remaining uterus. This can be combined with anterior and posterior vaginal repair.

The procedure is indicated in women who have completed childbearing and desire uterine preservation or have medical condition that make short operation desirable. It avoids the morbidity associated with vaginal hysterectomy but should never be performed in women desirous of future fertility as the cervical amputation leads to cervical stenosis or incompetence. It is important to rule out endometrial pathology before performing the procedure.

Specifically, the operation includes a circumferential incision around the cervix, dissecting the bladder off the cervix and uterus up to the vesicouterine fold without entry into the peritoneal cavity as the cervical stump lies outside the peritoneal cavity. The cardinal-uterosacral ligament complex on each side is dissected and isolated. Once isolated, they are transected from the cervix, shortened and resutured to the upper portion of the cervix near the internal os. The cervix is then amputated and Sturmdorf sutures are placed anteriorly and posteriorly to cover the amputated edges of the cervix with vaginal epithelium. An anterior colporrhaphy and posterior colpoperineorhhaphy are performed as indicated.

II. McCall Culdoplasty

McCall Culdoplasty described by Milton McCall was originally used for the treatment and prevention of enterocele at the time of hysterectomy. The procedure which also maintains vaginal length is widely performed by gynaecologist today.

The procedure is performed by passing a series of non-absorbable sutures to plicate the uterosacral ligaments beginning inside the peritoneal cavity at one uterosacral ligament followed by reefing the peritoneum to the contralateral uterosacral ligament. (Internal McCall sutures). In addition, 1 or 2 absorbable sutures are passed from the vaginal lumen just lateral to the midline of the posterior vagina wall into the peritoneal cavity. This same suture is then taken through one uterosacral across the intervening peritoneum and through the contralateral uterosacral ligament. It then exits the vaginal cuff just close to the midline (External McCall sutures). The external McCall sutures which provide apical support are tied in the lumen of the vagina whiles the internal McCall sutures are tied intraperitoneally.

McCall sutures utilizes the distal end of the uterosacral ligaments to provide apical support hence may not provide adequate vaginal length in cases of advanced apical prolapse where the apex of the vagina (and by inference the distal end of the uterosacral ligaments) is outside the vagina. In our practice the McCall culdoplasty is utilized as an apical procedure only when in our preoperative assessment point D on the POP-Q (i.e., the posterior fornix) is at negative 4 or less. The commonest complication of this procedure is ureteral kinking or obstruction.

III. High Uterosacral Ligament Suspension

Whiles the McCall culdoplasty utilizes the distal end of the uterosacral ligament to suspend the vaginal apex, High uterosacral ligament suspension makes use of the proximal ends (Sacral portions) of the uterosacral ligaments to suspend the apex of the vagina directing it to the hollow of the sacrum and allowing it to be supported over the pelvic floor muscles.

The procedure involves placing 2 or 3 sutures on the proximal portions of each uterosacral ligament (the most distal suture should at least be at the level of the Ischial spine). The superior arms of these sutures are exteriorized sequentially through the anterior vaginal cuff and the inferior arms are exteriorized through the posterior vaginal cuff. Because this procedure utilizes non-absorbable sutures, there are exteriorized through the fibromuscularis of the vaginal cuff. When these sutures are tied the fibromuscularis of the apical vagina is closed (closing the vagina at the apex) and resuspended to the proximal uterosacral ligament.

The commonest complication of this procedure is ureteral kinking/ligation. It is therefore necessary to perform a cystoscopy at the end of the procedure to ensure ureteral patency.

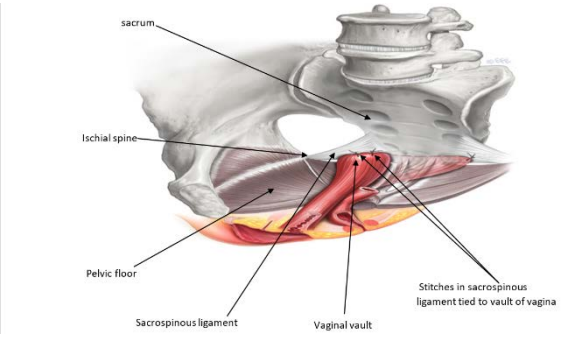
IV. Sacrospinous ligament suspension

This strong ligament which spans between the ischial spine and the sacrum has been utilized in apical suspension procedures for decades. The procedure can be done either bilaterally or unilaterally and studies have shown no difference in efficacy between the two. The sacrospinous ligament and the overlying coccygeus muscle can be accessed either through the paravesical space (anteriorly) or the pararectal space (posteriorly). Once accessed, the ligament is cleaned and delayed absorbable sutures are placed in the ligaments. A number of devices such as the aneurysm needle, the Miya hook and the Capio are used to facilitate the placement of these stitches into the ligament. The stitches should be placed 2-3 cm medial to the ischial spine and should not go beyond the superior edge of the ligament. The stitches are then anchored to the apex of the vagina and tied to suspend the vault of the vagina.

Placing the stitch about 2-3cm medial to the ischial spine prevents the common complication of postoperative gluteal pain and life-threatening vascular injury which can result from entrapment of the pudendal nerve and injury to the internal pudendal artery respectively. The nerve and the vessels travel around the ischial spine. Again, the inferior gluteal artery passes posterior to the sacrospinous ligament and stitch placement through the 'belly' of the ligament (and not beyond its superior edge) avoids injury to this vessel. It is common to encounter some minor bleeding during the dissection to the sacrospinous ligament. These usually resolve with packing of the space. Recurrent or de novo post-operative anterior vaginal wall prolapse is common and result from deviation of the vaginal axis more posteriorly than the "natural" axis. This deviation places

the anterior vaginal wall in a position to receive most of the intraabdominal pressure.

Sacrospinous ligament fixation of vaginal vault



Anterior prolapse repair

The anterior vaginal wall is the most common site of prolapse and the less likely to achieve a long-term cure after repair. Repair of the anterior compartment is accomplished through three main methods. This includes anterior colporrhaphy, paravaginal repair and graft augmentation

a. Anterior colporrhaphy

Anterior colporrhaphy developed more than 100 years ago involves the plication of the fibromuscularis (pubocervical fasciae) of the anterior vaginal wall. The epithelium of the vagina is incised and dissected away from the underlying fibromuscularis or "fasciae". The dissection is carried laterally to the sidewall. A midline plication is then performed with interrupted or continuous sutures. Complications include haemorrhage, injury to the bladder, changes in bladder function, postoperative dyspareunia and urethral obstruction (expecially after plication of the fibromuscularis underneath the trigone)

b. Paravaginal repair

This procedure described by George White may be performed vaginally, or abdominally (laparoscopically or open) abdominally. The aim is to reattach the anterior vaginal wall to the arcus tendinous fasciae pelvis (the white line). In the vaginal approach an incision is made in the anterior vaginal wall and the vaginal epithelium is dissected from the fibromuscularis. The dissection is extended laterally and the retropubic space entered. Using blunt dissection in the retropubic space the arcus is dissected from the posterior aspect of the pubic bone to a point just distal to the ischial spine. With the aid of a capio device , about 6 sutures are placed into each lateral pelvic sidewall incorporating the arcus tendinous fasciae pelvis. These sutures are attached to the anterior vaginal wall fibromuscularis or through the vaginal epithelium (if absorbable sutures are used) and tied. Anterior colporhhaphhy can be used to compliment this procedure for repair of midline defects. The major complication of this procedure is haemorrhage and urethral obstruction.

Paravaginal repair can also be approached abdominally. Here, entry and dissection is made into the retropubic space of Retzius to expose the pelvic sidewalls from the pubis to the ischial spine. With the bladder retracted medially, multiple sutures can be placed in the arcus tendinous fasciae pelvis and reapproximated to the pubocervical fasciae.

c. Graft augmentation

In an effort to improve anatomic outcomes of anterior repair, the placement of mesh to augment support of the anterior vaginal wall was introduced. This however became associated with a lot of problems arising from complications of mesh insertion including infection, mesh exposure and erosion, pain, sexual dysfunction and allergic reaction to the mesh. These complications coupled with the lack of evidence that vaginal mesh worked better than surgery without the use of mesh to repair POP led the U.S. Food and Drug Administration in 2019 to order the manufacturers of all surgical mesh products indicated for the transvaginal repair of pelvic organ prolapse (POP) to stop selling and distributing their products in the united States of America.[8]

Posterior prolapse repair

Posterior wall prolapse repair is commonly accomplished through posterior colporrhaphy though graft augmentation has been performed. The authors do not recommend the use of graft in repair of posterior wall prolapse because of mesh associated complication such as exposure and erosion, infection, and particularly scarring (which increases the occurrence of dyspareunia).

Posterior colporrhaphy which is a midline plication of the fibromuscularis (rectovaginal fascia) of the posterior vaginal wall is normally combined with perineorrhaphy. The procedure increases the fibromuscularis in the midline and decreases the posterior vaginal wall. The vaginal epithelium is incised in the midline and dissected off the underlying fibromuscularis. Plication of the fibromuscularis begins proximally and progresses towards the hymenal ring. Complications include injury to the rectum, constipation and dyspareunia.

Abdominal surgeries for apical prolapse.

The 2 commonly performed procedure for abdominal repair of apical prolapse are the abdominal sacrocolpopexy (ASC) and the uterosacral ligament suspension.

I. ASC

This procedure is considered the gold standard in apical prolapse repair as it is the most durable. It also provides longer vaginal length compared to the vaginal counterparts. Surgeons differ in opinion regarding which group of patients should be considered for abdominal sacrocolpopexy. While some surgeons believe it should be reserved for younger healthy women

who are better placed to withstand the stress of surgery and are more likely to place increased stress on the repair than older patients, others are of the opinion that the native tissue in older women are intrinsically deficient and they should receive a more durable repair than their younger counterparts. Our centre individualized patients to benefit from ASC based on their general health status and their need for adequate vaginal length for sexual intercourse.

The technique for Asc whether done laparoscopically, robotically or openly is virtually the same. It involves the placement of a graft material at the vaginal apex which is then anchored to the sacrum at the level of s1-s2. The peritoneum covering the vagina is opened and the rectum and bladder dissected to expose about 3-4cm of the rectovaginal fasciae and the pubocervical fascae . One end of the graft is attached to the pubocervical fasciae anteriorly and the other end is attached to the rectovaginal fasciae posteriorly. Next the retroperitoneal space is open and the presacral space is dissected to expose the anterior longitudinal ligament. Care should be taken to identify and ligate the middle sacral vessels as injury to them can cause an uncomfortable bleeding at this area. The opened retroperitoneal space is extended from the presacral space superiorly to the previously dissected vaginal cuff inferiorly. The vaginal straps are joined together and anchored to the anterior longitudinal ligaments in front of the sacrum using interrupted permanent sutures. The mesh is then laid in along the curve of the sacrum and retroperitonealised.

Mesh erosion and life-threatening bleeding that can result from injury to the vessels in close proximity to or within the presacral space remain the major complications of this procedure. This procedure can be combined with culdoplasty or Burch colposuspension for stress incontinence.

II. Uterosacral ligament suspension

This procedure which is typically performed vaginally can also be approached abdominally. Similar to the vaginal approach, abdominal uterosacral ligament suspension involves placing permanent or delayed absorbable sutures through the proximal uterosacral ligament and attaching these sutures to the respective vaginal apex. When tied, these sutures resuspend the vaginal apex to the proximal uterosacral ligaments.

4. Native tissue versus graft repair

Repair of anterior and posterior vaginal wall prolapse has traditionally been achieved with the use of native tissue plication. This method has however been associated with high rate of recurrence especially in the anterior compartment. Attempts to improve the long-term outcome led to the use of synthetic mesh in prolapse repair. The use of transvaginal mesh in POP repair has however been associated with complications including infection, mesh exposure and erosion, sexual dysfunction, vaginal pain and allergic reaction to graft material. Considering the risk-benefit profile of using transvaginal mesh in prolapse repair, U.S. Food and Drug Administration in 2019 ordered the manufacturers of all surgical mesh products indicated for the transvaginal repair of pelvic organ prolapse (POP) to stop selling and distributing their products in the united States of America.[8]

5. Concomitant surgery for stress incontinence

stress urinary incontinence; the leakage of urine with rise in intraabdominal pressure is commonly associated with pelvic organ prolapse. Stress incontinence may be symptomatic, occult (stress incontinence is evident only with the prolapse reduced) or may develop de novo (occurrence of stress incontinence in continent women after surgical repair of pelvic organ prolapse). Evidence supports the performance of concurrent anti-incontinent procedure for women with symptomatic and occult stress incontinence at the time of prolapse repair.[9] The jury is still out and surgeons are split in the middle when it comes to performing a concurrent anti-incontinent procedure for continent women with pelvic organ prolapse. The practice at our centre is in favour of a two-stage procedure for continent women with pelvic organ prolapse hence we defer anti-incontinent procedure for continent women at the time of prolapse repair and will only perform an anti-incontinent procedure when de novo stress incontinence develops.

6. Can a general gynaecologist perform the surgery adequately ?

Patients with pelvic organ prolapse are delighted when surgery results in good anatomical and functional outcome, and resolution of all associated problems. It is therefore important for surgeons to evaluate themselves whether they have the skills and knowledge to resolve the problems confronting women with pelvic organ prolapse. Referring patients with pelvic organ prolapse to the appropriate specialty when one feels inadequate to provide the needed solution will be a step in the right direction. The ability to provide an adequate apical support and retain functional vagina length should be the prerequisite for taking on vaginal hysterectomy for POPs

Conclusion

Surgical management of prolapse goes beyond mere vaginal hysterectomy, anterior repair and posterior repair. Adequate suspension of the apex is perhaps the most important surgery in the management of POP. Failure to treat apical prolapse may not inure to the benefit of affected women and will eventually lead to dissatisfaction. It is therefore important that surgeons equip themselves with the skills necessary to treat apical prolapse satisfactorily.

References

1. Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, et al. (2010) An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. Neurourology and Urodynamics: *Official Journal of the International Continence Society* 29: 4-20.
2. Barber MD, Maher C (2013) Epidemiology and outcome assessment of pelvic organ prolapse. *Int Urogynecol J* 24: 1783-1790.
3. Wusu-Ansah OK, Opare-Addo HS (2008) Pelvic organ prolapse in rural Ghana. *Int J Gynaecol Obstet* 103: 121-124.
4. von Pechmann WS, Mutone M, Fyffe J, Hale DS (2003) Total colpocleisis with high levator plication for the treatment of advanced pelvic organ prolapse. *Am J Obstet Gynecol* 189: 121-126.
5. Maher C, Feiner B, Baessler K, Christmann-Schmid C, Haya N, et al. (2016) Surgery for women with apical vaginal prolapse. *Cochrane database of systematic reviews*.
6. Brubaker L, Maher C, Jacquetin B, Rajamaheswari N, von Theobald P, et al. (2010) Surgery for pelvic organ prolapse. Female pelvic medicine & reconstructive surgery 16: 9-19.
7. Hsu Y, Chen L, Summers A, Ashton-Miller JA, DeLancey JO (2008) Anterior vaginal wall length and degree of anterior compartment prolapse seen on dynamic MRI. *International Urogynecology Journal* 19: 137-142.
8. Food U, Administration D (2019) FDA Takes Action to Protect Women's Health, Orders Manufacturers of Surgical Mesh Intended for Transvaginal Repair of Pelvic Organ Prolapse to Stop Selling All Devices [press release]. Online document at: www fda gov/news-events/press-announcements/fda-takes-action-protect-womens-health-orders-manufacturers-surgical-mesh-intended-transvaginal Accessed July17.
9. Baessler K, Christmann-Schmid C, Maher C, Haya N, Crawford TJ, et al. (2018) Surgery for women with pelvic organ prolapse with or without stress urinary incontinence. *Cochrane Database Syst Rev* 8: Cd013108.