

Original Articles

Complications during Vaginal Sacrospinous Fixation along with McCall Culdoplasty in Stage III and IV POP

BILKIS BEGUM¹, BILKIS BEGUM², ROWSHAN ARA BEGUM³

Abstract:

In Bangladesh, about half a million women are suffering from stage III or IV pelvic organ prolapse (POP). With traditional surgical methods, there is a chance of recurrence, especially of apical prolapse. Sacrospinous fixation (SSF) along with MacCall Culdoplasty during vaginal hysterectomy can reduce this recurrence rate enormously. This study was designed to identify, manage as well as to prevent per-/post-operative complications during SSF. The study period was from August 2017 to December 2021 at Kumudini Women's Medical College and Hospital, Bangladesh. Total 335 stage III and IV utero-vaginal prolapse cases were included in this study. The surgeries performed were vaginal hysterectomy followed by modified McCall Culdoplasty and right-sided vaginal sacrospinous ligament fixation (SSF) along with anterior and posterior fascial closure and perineorrhaphy. A standard data collection sheet was used to record the information. Per-operatively, main complications were hemorrhage (3.57%) due to vessel injury and rectal injury (0.90%). The immediate early postoperative complication was buttock pain (24%). Of these, in 97.53% cases, pain subsided within 6 weeks with analgesic and counselling. Only one patient had recurrence of apical prolapse within 1st week of operation. It should be concluded that with proper knowledge of anatomy and careful surgical technique, most of the complications can be avoided.

Keyword: POP, SSF, McCall Culdoplasty, Complication.

Introduction:

Pelvic organ prolapse (POP) refers to protrusions of the pelvic organs into or out of the vaginal canal¹ It can be the uterus, bladder, bowel or top of the vagina. In Bangladesh, about half a million women are suffering from stage III or IV POP²

Normally, the vaginal axis lies almost horizontally, superior to the levator plate. The key elements which give utero-vaginal supports: i) at the vaginal apex are the connective tissue, the cardinal-uterosacral ligaments (DeLancey level 1)³ and paracolium, and ii) the levator ani muscles along with levator plate. When these are intact, the cervix and upper vagina remain in their proper position specially during

straining. Stretching or weakness of the supportive structures may result in uterine or vaginal prolapse. POP is a common gynecological condition especially in the parous women⁴ and its incidence increases after menopause⁵. The etiology is multifactorial. Childbirth injury, menopausal atrophy, genetic factors along with lifestyle modifications are the important risk factors. There is a high correlation of POP with parity⁶ and vaginal birth^{7,8}. Increasing weight of the vaginally delivered fetus also might be an important risk factor⁹.

The uterine prolapse and its treatment has been recognised since ancient times. It was addressed in the Egyptian Papyri, the authentic oldest medical

1. Associate Prof. (Obstetric and Gynecology), Special Training on Vaginal SSF, Kumudini Women's Medical College, Mirzapur, Tangail.
2. Consultant (Obstetric and Gynecology), Special Training on Vaginal SSF, Sahera Hasan Memorial Hospital, Manikgonj
3. Ex-Dept Head, Obstetric and Gynecology, Holy Family Red Crescent Medical College & Hospital

Address of Correspondence: Dr. Bilkis Begum, Associate Prof. (Obstetric and Gynecology), Special Training on Vaginal SSF, Kumudini Women's Medical College, Mirzapur, Tangail.

literature. To correct the prolapsed uterus, "honey or oil-of-the-Earth (Petroleum) was used"¹⁰ followed by rubbing the organ to push back in its place. Also here described the pessary (not mechanical) used to support the displaced prolapsed womb, made by "impregnating a piece of lint with various drugs, then rolling it into a rod-shaped body"¹¹.

POP can be managed conservatively or surgically. Surgical treatment is individualised. Traditionally, vaginal hysterectomy (V.H) with anterior / posterior colporrhaphy with or without perineorrhaphy is done and vault support is given with plication of the uterosacral ligaments.

Over time, there have been changes of surgical technique for each component of procedure with an aim to prevent recurrence along with restoring normal vaginal length. Apical fixation is utmost important to prevent or repair apical prolapse. Apical prolapse is the descent of the cervix or after hysterectomy, the vaginal vault. Apical fixation is indicated in stage III, IV and sometimes in stage II uterine prolapse; also in post hysterectomy vault prolapse.

The different surgical options for treatment or prevention of apical prolapse are: 1) Abdominal Sacro-colpopexy (ASC), 2) Vaginal Sacro-spinous Fixation (VSF or SSF), 3) High Utero-sacral Ligament Suspension (USLS), and 4) McCall Culdoplasty during vaginal hysterectomy^{12, 13, 14}. Abdominal sacro-colpopexy has the lowest recurrence rate but is invasive and expensive. In High Utero-sacral Ligament Suspension, more chances of ureteric injury, may be as high as 11%^{15, 16} and need routine cystoscopy.

In POP surgery, during transvaginal hysterectomy, McCall Culdoplasty or a modification of this procedure is done to treat or prevent enterocele and also helpful for vault support^{17, 18, 19}. Roy M. Pitkin has emphasized the classic paper "Posterior Culdeplasty: Surgical correction of enterocele during vaginal hysterectomy: a preliminary report" (The original McCall Culdoplasty)²⁰. Milton Lawrence McCall started this surgery since 1943 to correct the enterocele during vaginal hysterectomy.

In McCall Culdoplasty, the posterior peritoneal surface (the cul-de-sac) is obliterated by stitching with absorbable suture material, incorporating with the uterosacral ligaments. The modified McCall Culdoplasty includes the incorporation of the vaginal vault into the sutures²¹. After removing the uterus and cervix transvaginally, the angles of the vagina are attached to their respective uterosacral ligaments with

absorbable suture material (using Vicryl No.1 or "0"). When these sutures are tied, the Pouch of Douglas is obliterated bringing the uterosacral ligaments toward the midline; also to some extent, it helps to draw up the posterior vaginal apex up to the supporting structures, thus lifting it to a normal position.

Vaginal sacrospinous ligament fixation (SSF) is one of the commonly done procedures for apical fixation. Two German gynecologists, Sederl and Richter, introduced the SSF in 1958. In 1971, Randall and Nichols, two American gynecologists reported that SSF is an effective surgical procedure to treat the vault prolapse²². SSF involves stitching the sacrospinous ligament (SSL) to the vaginal vault (Sacrospinous Colpopexy) or to the cervix (Sacrospinous Hysteropexy, where the uterus is preserved).

SSL is a triangular ligament, about 5 cm in length, extending from ischial spine up to lower sacrum and coccyx. Coccygeus muscle lies over the SSL forming the Coccygeus - Sacrospinous ligament complex (CSSL) (Fig. 1). And rectum is medial to it. Inferior gluteal artery is a large calibre vessel, passing closely superior, posterior and inferior to SSL. So during dissection & stitching of SSL, utmost care is important to avoid injury to rectum and inferior gluteal vessel (Fig. 2).

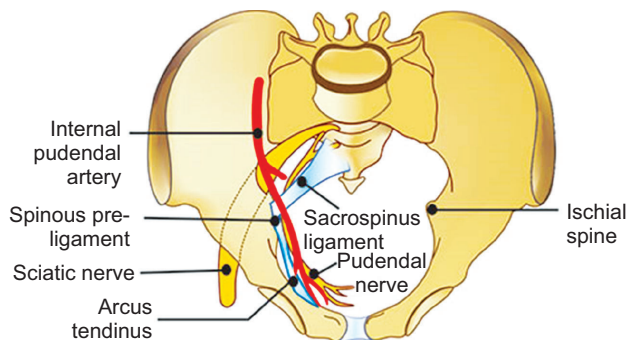


Fig.-1: Anatomy of SSL (Sacrospinous ligament)

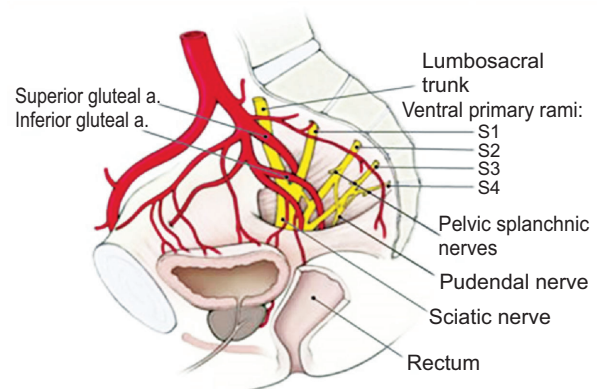


Fig.-2: Structures around SSL

SSF can be done unilaterally or bilaterally, either through anterior or posterior vaginal approach with specially designed instruments. If unilaterally done, usually two ligatures are placed closely through the SSL. Traditionally right-sided SSF is done for minimum disturbing the rectum and sigmoid colon, also retraction of the rectum might be easier^{23,24}, and usually done via the posterior approach.

Many different types of devices have been used for anchoring suture in the SSL during vaginal SSF. The blunt, angular Deschamps ligature carrier was the first to be used to insert silk ligatures through the SSL²⁵. The Capio SLIM suture capturing device remains confined even within the thin ligament but costly. The Deschamps device may divert behind the thin ligament, possibility of injury to vessels in this regard should be kept in mind. But the Deschamps' device and Miya hook are reusable, suitable for low resource settings²⁶.

The advantages of SSF are: Less anaesthetic hazards as can be done under local or regional anaesthesia; less invasive procedure, less chance of blood loss and less hospital stay; so it is economic^{21,27}. Apical prolapse recurrence rate is lower than most other per-vaginal vault suspension procedures²⁸. Ureteric injury rate is also lower in comparison to high uterosacral ligament suspension.

The objective of this study was identification as well as management, and prevention of per-/ post-operative complications during stage III and IV utero-vaginal prolapse operation.

Materials and Methods:

This study was carried out in the obstetric and gynecology department of Kumudini Women's Medical College and Hospital. Study period was from August 2017 to December 2021. Total 335 POP cases were included in this study. All had utero-vaginal prolapse, of which 250 presented with stage III and 86 with stage IV uterine prolapse (based on POP Q classification), along with varying stages of cystocele, enterocele and rectocele.

A standard data collection sheet was used. The information recorded on the sheet was taken by interviewing the patients/attendants, after proper clinical examination and also after performing the surgical procedure. All the data were entered into an Excel database.

Before operation, careful preoperative evaluation was done to exclude or treat any comorbidities. All these

patients were operated under spinal anaesthesia. The surgeries performed were vaginal hysterectomy followed by modified McCall Culdoplasty and right-sided sacrospinous ligament fixation (SSF) along with anterior and posterior fascial closure and perineorrhaphy.

Here figures show modified McCall Culdoplasty and SSF (Fig: 3-7).

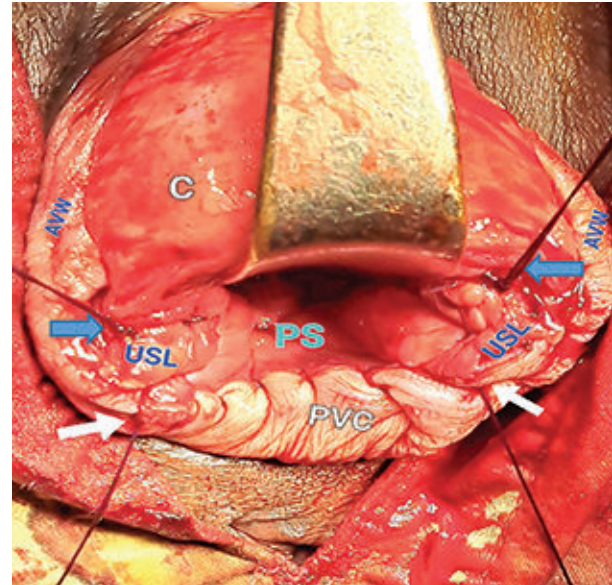


Fig.-3: Modified McCall Culdoplasty. PVC (Posterior vaginal cuff). PS (Peritoneal surface). USL (Uterosacral ligament). AVW (Anterior vaginal wall, cut end on both sides). C (Cystocele). White arrows indicate the sutures which incorporate the vaginal angles on either side with the respective USL along with posterior peritoneum. Blue arrows indicate (holding the sutures in 1st clamp i.e. Cardinal- USL on either side during vaginal hysterectomy).



Fig.-4: Instruments - Lone star ring retractor, Deschamps ligature carrier device, Miya hook, Breisky-Navrital retractor (From right to left).

Here right sided SSF was done blindly by palpating the SSL, (the landmark is tip of the ischial spine) through posterior vaginal approach. The special instruments used for SSF were the Deschamps ligature carrier device and Miya hook. The two ligatures were placed in the SSL at 0.5 cm apart using delayed absorbable suture (PDS '1'). Then each end of these sutures were placed through the top of the upper posterior vaginal wall, on either side and tied. This tying helps in approximation of vaginal epithelium to the SSL. With time, after healing, the vaginal epithelium is fused with the SSL; so the vault remains nicely suspended up at that level.

Anterior and posterior fascial closure was done in two layers. Per rectal examination was performed routinely after suture placement on SSL and at the end of surgery; even sometimes during rectal mobilization. At the end of operation, before vaginal packing, vaginal

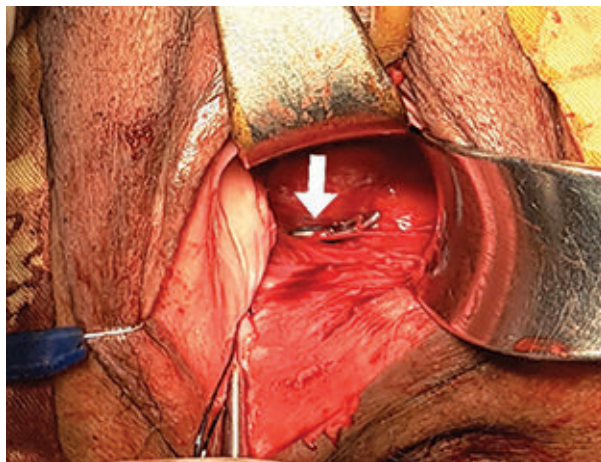


Fig.-5: 1st ligature anchored on SSL with Deschamps device using PDS-1 [white arrow]

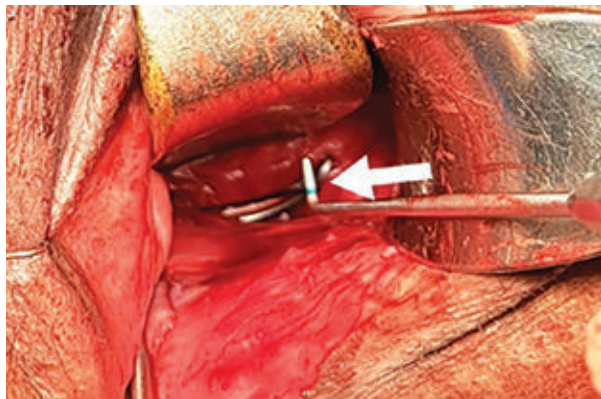


Fig.-6: The suture material is bringing out with Miya hook from the Deschamps device [white arrow].

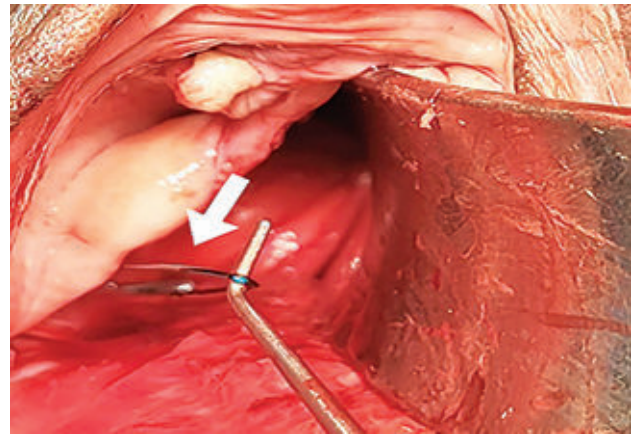


Fig.-7: The suture material is drawn with Miya hook [white arrow] to bring it outside the introitus.

length was measured/assessed in all cases. In all patients, post-operatively, the vaginal pack was kept for 48 hours and bladder catheter for 3 – 4 days.

All the information and data were systematically recorded and analyzed.

Results:

The average age of patients at the time of surgery was 59.63 years, among them about 20% were in between 70 - 89 years of age. All these 336 patients were postmenopausal for an average period of 12.65 years (range: 4-35 years). All had a history of home delivery vaginally; of these, about 35% patients had parity index 5 or more [Table- I].

Table-I

Distribution of patients according to age, parity, menstrual status and mode of delivery. N=336

Variables	Number of Patients	Percentage
Age (years):		
45 - 49	8	2.38 %
50 - 59	144	42.86 %
60 - 69	114	33.92 %
70 - 79	56	16.67 %
80 - 89	14	4.17 %
Parity :		
10 - 15	4	1.19 %
5 - 9	118	35.11%
4	86	25.59 %
3	99	29.47 %
2	23	6.85 %
1	6	1.79 %
Post-menopausal:	336	100 %
Vaginal delivery:	336	100 %

Table-II shows, during SSF, per-operative complications were haemorrhage and rectal

Table-II
Complications (Per-/Post-operative) N=336

Complications	Number of Patients	Percentage
Per-operative:		
Haemorrhage (due to vessel injury)	12 (2 needed blood transfusion)	3.57%
Rectal injury	3	0.90 %
Short vaginal length	0	00%
Post-operative:		
Buttock pain (Immediate):	81	24.10%
*subsided within 6 days to 6 week(79 i.e 97.53%)		
*continued > 6 week (3)		
Recurrence of apical prolapse (within 1st week):	1	0.30 %
Urinary retention:	8	2.38 %
Urinary tract infection	11	3.27 %

injury. Immediate significant post-operative complications were mainly buttock pain but overtime reduced (follow-up done mainly over telephone). Only one patient had recurrence of apical prolapse.

Discussion:

Based on demographic data, there is high correlation between POP and parity, childbirth along with menopause. A study done by Luber et al²⁹, about 57% women with POP were 60 years old or above. In this study, all patients were post- menopausal, and about 54% women were aged 60 years or more. In one Indian study found that patients with vaginal birth 3, and 4 or more had higher incidence

of POPQ stage III/IV³⁰. Present study shows, about 25% and 35% patients delivered vaginally with parity 4, and 5 or more respectively. In another study, an association between levator muscle injury during vaginal childbirth and POP was observed³¹.

In this study, in all cases, modified McCall Culdoplasty was done following vaginal hysterectomy. Already mentioned the aim of McCall Culdoplasty is to treat/prevent enterocele. It also helps in prevention of apical prolapse. One study done by Barber E et al. concluded that the McCall culdoplasty was an effective option for apical suspension regardless of prolapse stage³². After this procedure, routine cystoscopy is done by some surgeon to see ureteral patency³³. Here, cystoscopic

facilities were not available, but continuous free flow of urine was ensured after the procedure.

The first step of SSF is identification of SSL. With sharp and blunt (finger) dissection respectively through the recto-vaginal and para-rectal spaces, SSL was identified. At this time, especially during rectal mobilization, sometimes the author put one finger of opposite hand per rectally to see rectal intactness. With care, rectal injury can be avoided. Here, 0.90% cases had rectal injury, occurred during rectal mobilization and repaired primarily in the same sitting.

During SSF procedure, bleeding might be a possibility due to vessel injury or retroperitoneal haematoma formation. In present study, per-operatively, about 3% patients had bleeding, during ligature placement on SSL (most probably due to inferior gluteal vessel injury) and managed by tight vaginal packing. Already mentioned previously anatomical relation between inferior gluteal artery and SSL. The coccygeal branch of this vessel passes behind the SSL, about 2.5 cm away from ischial spine and only 3-5 mm away from superior border of CSSL complex (seen in cadaveric dissection)³⁴. Precaution must be taken during suture placement on SSL. Needle tip direction should be upside down and full thickness penetration to SSL should never be done. This will help in avoiding inferior gluteal vessel injury (Fig. 8 & 9).

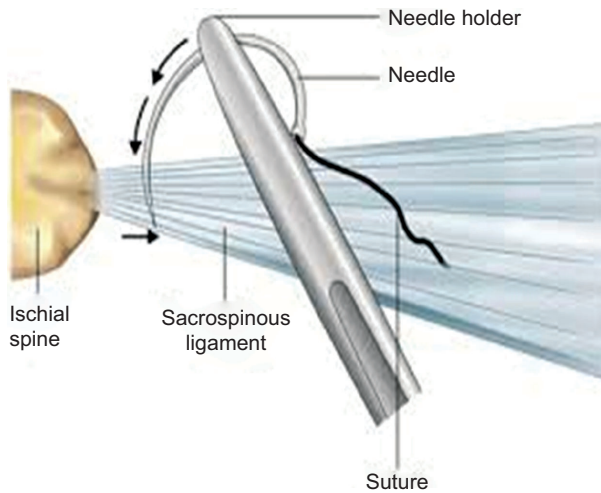


Fig.-8: Needle tip direction

To avoid pudendal neuro-vascular injury, the 1st bite on SSL should be placed 1.5 cm (1 finger breadth) medial to ischial spine. The pudendal vessels/nerve courses within 0.5 cm of the spine (just infero-medial to the spine and on the back of the SSL)³⁴. In this study, no one had pudendal vessels/nerve injury (Fig. 10).

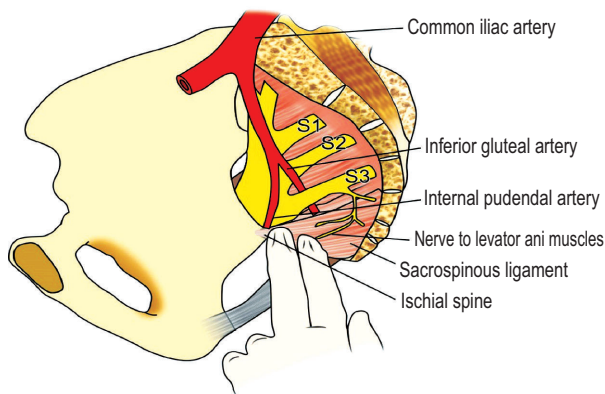


Fig.-10: Place suture about 1.5 cm (1 finger breadth) medial to ischial spine.

In present study, all patients had good vaginal length at the end of surgery. All of them needed perineorrhaphy which strengthen the perineal body and also increase the vaginal length.

Here, immediate early post-operative complications was buttock pain. But in about 97% cases, the pain subsided over a 6 week period with analgesic and counseling. Buttock pain can be somewhat minimized, if the suture between the SSL and top of the vaginal wall is not tied too tightly. Urinary retention was observed in 2.38 % patients, someone needed

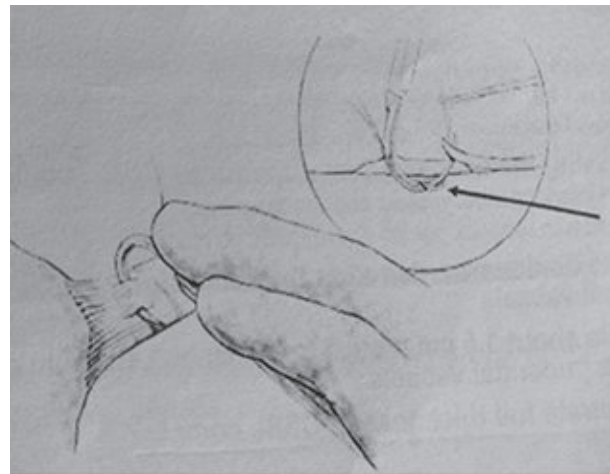


Fig.-9: Never full thickness penetration

re-catheterization. Only 3.27 % patients suffered from UTI and were managed by proper antimicrobial agents. During hospital stay, adequate hydration, proper analgesia and optimal catheter care was tried to ensure.

Only one patient had recurrence of apical prolapse during hospital stay and proper treatment given after 6 months.

POP surgery is individualized. Main objective is restoration of normal anatomy along with prevention of recurrence. In one Swedish study found that in anterior repair, symptomatic recurrence rate was lower with slow absorb suture material (PDS vs Vicryl was 22% vs 30%)³⁵. In present study, in all cases slowly absorbable suture material (PDS “00”) was used for anterior and posterior fascial closure.

Conclusion:

Apical support is utmost important to prevent recurrence, although there might be some risks. But with proper knowledge of anatomy along with careful surgical technique, most of the complications can be avoided.

Acknowledgement:

Reference of figure 1, 7, 8, 9 respectively from State-of-the-Art Vaginal Surgery [2nded. 2013], Urogynecology & Pelvic Reconstructive Surgery [1/e, 2016], ATLAS of PELVIC ANATOMY and GYNECOLOGIC SURGERY [PHILADELPHIA: ELSEVIER HEALTH SCIENCES, 2006] and Journal of South Asian Federation of Obstetrics and Gynaecology [12(3): 2020].

References:

1. Malhotra N, Malhotra J, Saxena R, Malhotra Bora N. Jeffcoate's Principles of Gynecology. 9th ed. Jaypee Brothers Medical Publishers (P) Ltd. 2019; 326
2. Bangladesh Maternal Mortality and Health Care Survey (BMMS) 2016
3. Ashton-Miller JA, DeLancey JO. Functional anatomy of the female pelvic floor. *Ann N Y Acad Sci.* 2007 Apr; 1101: 266-96.
4. Dutta DC. Textbook of Gynecology. 7th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd. 2016; 165
5. Nygaard I, Barber MD, Burgio KL, Kenton K, Meikle S, Schaffer J, et al., for the Pelvic Floor Disorders Network. Prevalence of symptomatic pelvic floor disorders in US women. *JAMA* September 2008; 300 (11):1311- 1316.
6. Yan W, Li X, Sun S, Xiang Y, Zhou Y, Zeng X, Xie F, Jiang H, Liu Q, Xiang J. [Risk factors for female pelvic organ prolapse and urinary incontinence]. *Zhong Nan Da Xue Xue Bao Yi Xue Ban.* 2018 Dec 28;43(12):1345-1350.
7. M Gyhagen, M Bullarbo, TF Nielsen, I Milsom. Prevalence and risk factors for pelvic organ prolapse 20 years after childbirth: a national cohort study in singleton primiparae after vaginal or caesarean delivery. *BJOG.* 2012 November; 120 (2): 152-160
8. Vergeldt TF, Weemhoff M, IntHout J, Kluivers KB. Risk factors for pelvic organ prolapse and its recurrence: a systematic review. *Int Urogynecol J.* 2015 Nov; 26(11):1559-73.
9. S Swift et al. Pelvic Organ Support Study (POSST): the distribution, clinical definition, and epidemiologic condition of pelvic organ support defects. *Am J Obstet Gynecol.* 2005 March; 192 (3):795–806
10. C. P. Bryan, *Ancient Egyptian medicine : The Papyrus Ebers*, Ares Publishers, Chicago, Ill, USA, 1974. Chapter xiv, Disease of women ; 86
11. W. J. S. McKay, *The History of Ancient Gynaecology*, Balliere, Tindal and Cox, London, UK, 1901. Part-1, Chapter-II; 13
12. Cardozo L, Staskin D. Textbook of Female Urology and Urogynecology. 4th ed. New York: CRC Press, Taylor & Francis Group. 2017; 1312-1321
13. K K Mi, B W Sang, Surgical treatment for vault prolapse. *Obstet and Gynecol Sci.* 2016 July; 59 (4): 253-260
14. Cruikshank SH. Sacrospinous fixation—Should this be performed at the time of vaginal hysterectomy? *Am J Obstet Gynecol* 1991 April ;164 (4):1072–1076.
15. R U Margulies, M A M Rogers, D M Morgan. Outcome of transvaginal uterosacral ligament suspension: systemic review and metaanalysis. *Am J Obstet and Gynecol.* 2010 July; 202 (2): 124-134
16. Gustilo-Ashby MA et al. The incidence of ureteral obstruction and the value of intraoperative cystoscopy during vaginal surgery for pelvic organ prolapse. *Am J Obstet Gynecol.* 2006 May;194(5):1478–1485
17. J. M. Montella, M. Y. Morrill, Effectiveness of the McCall culdeplasty in maintaining support after vaginal hysterectomy. *Int Urogynecol J.* 2005 Jun; 16: 226–229.
18. Cruikshank SH, Kovac SR: Randomized comparison of three surgical methods at vaginal hysterectomy to prevent enterocele. *Am J Obstet Gynecol*, 1999 Apr; 180 (4):859-65.
19. Given F T, Jr. "Posterior culdeplasty": Revisited. *Am J Obstet Gynecol.* September 1985 ; 153 (2): 135-139
20. R M Pitkin Commentary on "Posterior Culdeplasty : Surgical Correction of Enterocele during Vaginal Hysterectomy; a Preliminary Report" *Obstet Gynecol.* 2003 April; 101 (4) : 625
21. Cardozo L, Staskin D. Textbook of Female Urology and Urogynecology. 4th ed. New York: CRC Press, Taylor & Francis Group. 2017; 1277
22. K T. Downing, "Uterine Prolapse: From Antiquity to Today". *Obstet Gynecol Int.* November 2011; 2012
23. GW Morley, J O.L. DeLancey , Sacrospinous ligament fixation for eversion of the vagina. *Am J Obstet Gynecol.* April 1988;158 (4):872–881.
24. Gupta P. Transvaginal Sacrospinous Ligament Fixation for Pelvic Organ Prolapse Stage III and

- Stage IV Uterovaginal and Vault Prolapse. *Iran J Med Sci.* 2015 Jan; 40(1): 58–62
25. R.E. Schlesinger, Vaginal sacrospinous ligament fixation with the Autosuture Endostitch device. *Am J Obstet Gynecol.* June 1997; 176(6): 1358-1362
 26. J A Manning, P Arnold, A review of six sacrospinous suture devices. *Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG).* December 2014; 54 (6): 558-563
 27. Monk BJ, Ramp JL, Montz FJ, Lebherz TB. Sacrospinous ligament fixation for vaginal vault prolapse: complications and results. *Journal of Gynecologic Surgery.* 1991 January ; 7(2) : 87–92. DOI: 10.1089/gyn.1991.7.87.
 28. Barber DM, Maher C. Apical Prolapse. *International Urogynecology Journal.* 2013 October; 24 (11) : 1815-1833
 29. K M Luber , S Boero, J Y Choe The demographics of pelvic floor disorders: current observations and future projections. *Am J Obstet Gynecol.* 2001 Jun; 184(7):1496-501
 30. P Kushwah, S Soni. Analytical study to evaluate the relation between vaginal birth and pelvic organ prolapse quantification stages. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology.* July 2019; 8(8): 3067-72
 31. H P Dietz, J M Simpson, Levator trauma is associated with pelvic organ prolapse. *British journal of obstetrics and gynaecology (BJOG).* Jul 2008; 115(8):979-984.
 32. Barber E, Kleiner I, Tairy D, et al. The effectiveness of McCall culdoplasty following vaginal hysterectomy in advanced stages of uterine prolapse. *Int Urogynecol J.* 2021 August ; 32 (8) :2143-2148
 33. Vargas Maldonado D, Chen H A, Gebhart B J. Transvaginal approach to surgery for pelvic organ prolapse. *Journal of Gynecologic Surgery.* 2023 February; 39 (1): 12-18
 34. J R Thompson et al. Anatomy of pelvic arteries adjacent to the sacrospinous ligament: importance of the coccygeal branch of the inferior gluteal artery. *Obstet and Gynecol.* Dec 1999; 94(6): 973-977
 35. I Bergman, M W Soderberg, A Kjaeldgaard, M Ek, Does the choice of suture material matter in anterior and posterior colporrhaphy? *Int Urogynecology J.* September 2016; 27(9):1357-1365.