Drive safely through the pelvis – know your pelvic roads:

The Vesico-Uterine Space

K C D P Silva^a, S N Samarakkody^b

This is the second article in the series of articles unfolding avascular spaces of the pelvis. Authors recommend reading the series of articles starting from “Drive safely through the pelvis – know your pelvic roads: Retropubic space of Retzius” published in the *Sri Lanka Journal of Obstetrics and Gynaecology*¹.

The vesico-uterine space is the space behind the bladder medially and in front of the anterior aspect of the lower uterine segment and proximal part of the cervix. It is entered by cutting medially about 1 cm below the vesico-uterine reflection while the assistant lifts and holds the bladder up. The space is developed along the anterior aspect of the cervix and the upper vagina. Usually the vagina is found about 4 cm below the vesico-uterine reflection of the peritoneal fold. Provided there are no scars from prior caesarean sections, the first cut of the scissors allows the vesico-uterine space to be opened, making the pericervical fascia visible².

The space is bordered laterally by the vesico-uterine ligaments (“Bladder pillars”) on either side. The lateral resistance related with the vesico-uterine ligaments is distinctly observable via the instruments during this procedure. The vesico-uterine ligaments have superficial and a deep part. The deep vesico-uterine ligament carries vessels and nerves of the bladder and vagina.

The lateral dissection is avoided as the distal part of the ureter is in close proximity to the deep vesico-uterine ligament.

How far the vesico-vaginal dissection needs to proceed depends on the surgery. While 30 to 40 mm is adequate for simple total laparoscopic hysterectomy, dissection will need to proceed lower down, close to the trigone to perform a radical hysterectomy which requires resection of a vaginal cuff³.

Superior to the vesico-uterine space lies the bladder and its floor is bordered by the lower part of the uterus and the cervix. Lateral to the vesico-uterine space lies the para-vaginal space1 (“Space of Yabuki”)².

Figure 1 gives an overview of the anatomy of these spaces.

Figure 2 demonstrates the lateral view of pelvic spaces and ligaments.

Table 1 describes the surgical procedures, which is performed in these spaces.

Figure 3 illustrates the laparoscopic view of vesico-uterine space during a total laparoscopic hysterectomy.

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^a Senior Lecturer, Department of Obstetrics and Gynaecology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

^b Senior Registrar in Obstetrics and Gynaecology, Department of Obstetrics and Gynecology, Colombo South Teaching Hospital, Kalubowila, Sri Lanka.

Correspondence: KCDPS, e-mail: <dammikesilva@sjp.ac.lk>

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<https://orcid.org/0000-0001-7438-4789>

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Figure 1. The schematic representation of anatomy of the pelvic spaces.

Figure 2. Schematic representation of lateral pelvic spaces and ligaments.

Table 1. Surgical procedures carried out in each retroperitoneal pelvic space

Retroperitoneal pelvic spaces		Surgical procedures carried out
Medial spaces	Retropubic	Burch colposuspension Paravaginal repair Bladder mobilization in ureteric re-implantation Mesh removals
	Vesicouterine	Mesh repair for cystocele Total laparoscopic hysterectomy Radical hysterectomy Vesicovaginal fistula repair Bladder endometriosis resection Vaginal cuff resection Sacrocolpopexy / Hysterocolpopexy Laparoscopic abdominal cerclage Scar ectopic excision
	Recto vaginal	Sacrocolpopexy DIE of rectosigmoid Vaginal endometriotic nodule dissection Bowel resection
	Retrorectal/ presacral	Bowel resection for DIE Sacrocolpopexy, sacrohysteropexy, enterocele repair with a mesh Pre-sacral neurectomy Initiation of para-aortic lymphadenectomy
Lateral	Paravaginal	Pelvic lymphadenectomy
	Paravesical	Radical hysterectomy
	Pararectal	Excision of ureteric endometriosis Ureteric reimplantation/ psoas hitch Bowel resection in DIE Excision of endometriosis involving sacral nerve roots

Total laparoscopic hysterectomy is the commonest gynecological laparoscopic procedure performed. Dissection of this space is essential for the prevention of bladder injury. Dissection down to about 4 cm from the vesico-uterine fold of peritoneum is adequate to open into the vagina as well as to leave an adequate cuff of vagina to suture the vault. The dissection must take place in the avascular space between the bladder and the cervix. If this avascular space is properly entered into, there will be minimal bleeding and the bladder will go down effortlessly. Vesico-uterine space

is bordered on the sides by the Vesicouterine ligaments (bladder pillars) which has superficial and deep parts to it. The Vesicouterine ligament carries blood vessels and nerves and must be carefully dissected until an adequate exposure is reached so that the cervico-vaginal junction can be excised for the detachment of the cervix and uterus from the vagina. It must be noted that the para-vaginal space (Yabuki) lies lateral to these bladder pillars. This space is important as development of this space will lateralize the segment of the ureter that enters into the bladder.

Figure 3. Laparoscopic view of vesico-uterine space during a total laparoscopic hysterectomy.

Sacrocolpopexy, Hysterocolpopexy and mesh repair for cystocele uses this space for mesh placement and fixation. In each of these surgeries, mesh is placed in this space. The connective tissue in growth and adhesions will cause this mesh to mimic, replace and strengthen the pubocervical fascia which provides support to the bladder which prevents prolapse. However, it must be noted that the presence of para-vaginal defects may cause the cystocele to be present even after the surgery. Dissection of this space for the mesh placement must never venture too far laterally or the ureters might be in danger. It is always preferable to dissect this space in a medially narrowing tongue like pattern (like a triangle with the tip pointed towards the trigone) without disturbing the bladder pillars. Once the mesh is placed, it can be sutured by non-absorbable material or with delayed absorbable material as the mechanism of strengthening is by adhesion formation. The dissection must not proceed very low down since encroachment towards the trigone may disturb bladder function⁴.

Vesico-vaginal fistula is a debilitating condition which drastically affects a woman's life. It is often a complication of a hysterectomy. Although not strictly related to the utero-vesicle space, the dissection needs to be carried out between the vaginal vault and the posterior aspect of the bladder until the fistula opening is

separated into isolated vaginal and bladder openings. Also, the dissection must continue between the vaginal cuff and the bladder until there's enough space to suture the vaginal cuff once the fistula tract has been excised. This surgery will normally involve opening up the bladder to dissect the fistula tract.

Vaginal cuff resection may be required when the vaginal vault is involved in endometriosis, when there is an endometriotic nodule between the bladder and vagina, inadvertent suturing of the fallopian tube to the vault causing leakage of fluid into the vagina (during hysterectomy) or in uretero-vaginal fistulas. All these entities will require dissection deeper into this space and often the involved vaginal cuff will need to be excised and resutured.

Involvement of the posterior bladder wall with endometriosis or the presence of endometriotic nodules between the bladder and the cervix will necessitate the dissection of this space. Once this space is opened up, the bladder nodule is excised by either by entering into the bladder or by shaving the nodule off the bladder and cervix⁵.

Due to the increased number of caesarean sections, uterine scar ectopic is an entity which is seen more often than before. The uterine scar ectopic will require

the development of the space with exposure of the lower segment. Afterwards, the ectopic along with the scarred tissues need to be excised and the freshened edges are sutured if further fertility is required. However, the woman may also opt for a hysterectomy.

Radical hysterectomy will require the dissection of this space further than that is required for hysterectomy for a benign disease. The usual requirement is at least vaginal cuff of 2 cm to be removed with the specimen⁶.

Abdominal cerclage requires mesh placement around the internal cervical os of the uterus. This requires the dissection of this space and the knot is usually placed on the anterior aspect of the cervix. Removal of the tape will also require the surgeon to enter the vesico-uterine space.

In conclusion, a wide range of gynaecological surgeries require dissection in this space as described above. Surgery in this space should be guided by meticulous anatomical knowledge. It is essential that a proper selection of suture material and needles are chosen and to have expertise in laparoscopic suturing.

Thorough knowledge about pelvic anatomy of these spaces is important for the pelvic surgeon to achieve surgical excellence while minimizing morbidity. Articles describing the other pelvic spaces will follow in future issues.

Authors' contributions

KCDPS was the principal author and conceived the topic for this manuscript and both KCDPS and SNS have done the review. Both authors have critically revised and approved the final version of the manuscript.

References

1. Silva KCDP, Samarakkody SN. Drive safely through the pelvis – know your pelvic roads Retropubic space of Retzius. *Sri Lanka J Obstet Gynaecol*. 2019; 41(2): 55.
2. Schollmeyer T, Mettler L, Ruther D, Alkatout I. *Practical Manual for Laparoscopic & Hysteroscopic Gynecological Surgery* [Internet]. Jaypee Brothers, Medical Publishers Pvt. Limited; 2013. Available from: <https://books.google.lk/books?id=pA0FrBYqDo4C>
3. Puntambekar S, Manchanda R. Surgical pelvic anatomy in gynecologic oncology. *Int J Gynaecol Obstet* [Internet]. 2018 Oct [cited 2019 Sep 1]; 143 Suppl:86-92. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/30306582>
4. Price N, Slack A, Jackson SR. Laparoscopic hysteropexy: the initial results of a uterine suspension procedure for uterovaginal prolapse. *BJOG An Int J Obstet Gynaecol* [Internet]. 2010 Jan 1;117(1):62-8. Available from: <https://doi.org/10.1111/j.1471-0528.2009.02396.x>
5. Moore JG, Hibbard LT, Growdon WA, Schiffrin BS. Urinary tract endometriosis: Enigmas in diagnosis and management. *Am J Obstet Gynecol* [Internet]. 1979;134(2):162-72. Available from: [http://dx.doi.org/10.1016/0002-9378\(79\)90881-0](http://dx.doi.org/10.1016/0002-9378(79)90881-0)
6. Raspagliesi F, Ditto A, Fontanelli R, Solima E, Hanozet F, Zanaboni F, et al. Nerve-sparing radical hysterectomy: a surgical technique for preserving the autonomic hypogastric nerve. *Gynecol Oncol* [Internet]. 2004 May 1 [cited 2019 Oct 2]; 93(2):307-14. Available from: <https://www.sciencedirect.com/science/article/pii/S0090825804000733>