

Drive safely through the pelvis – know your pelvic roads: Pararectal space

K C D P Silva^a, R P J Sumanathissa^b, S N Samarakkody^c, IGDC Ilukpitiya^d, N C Abeysekera^e, R D Jeewantha^f

This is the fourth 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 pararectal space is divided into lateral and medial spaces. The lateral pararectal space (Latzko space) is entered by dissecting between the ureter and internal iliac artery. The medial pararectal space (Okabayashi space) is opened up by dissecting between the ureter and the lateral wall of the rectosigmoid colon².

The pararectal space is bordered medially by the apex of the uterosacrals and the lateral border of the rectum and mesorectum, roofed by the posterior leaf of broad ligament, laterally by the internal iliac artery, anteriorly

by the base of the cardinal ligament and posteriorly by the curvature of the lateral sacrum, while the floor is continuous with the laevator ani muscles. The entire space is roughly divided into two by the ureter.

This space contains hypogastric nerve fibers which can be approached through both the medial and lateral pararectal spaces.

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

Table 1 describes the surgical procedures, which use these spaces.

Figure 2 gives a schematic representation of the pararectal space.

Sri Lanka Journal of Obstetrics and Gynaecology 2020; **42**: 41-44

DOI: <http://doi.org/10.4038/sljog.v42i1.7930>

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

^b Senior Registrar in Department of Obstetrics and Gynaecology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

^c Senior Registrar in Department of Obstetrics and Gynaecology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

^d Registrar in Department of Obstetrics and Gynaecology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

^e Registrar in Department of Obstetrics and Gynaecology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

^f Senior Registrar in Department of Obstetrics and Gynaecology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

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

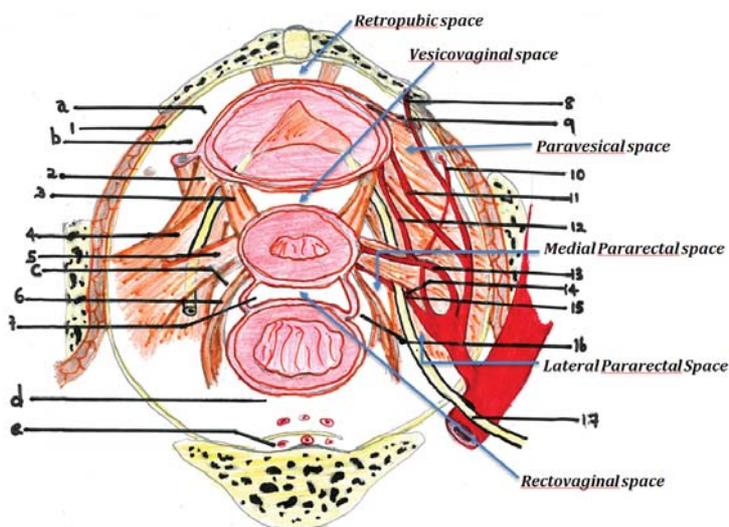
Received 25th March 2020

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

Competing interest: The authors report no conflict of interest



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License, which permits unrestricted use, distribution and reproduction in any medium provided the original author and source are credited.



- a: retropubic space; b: Paravesical space;
 c: Pararectal space; d: retrorectal space;
 e: presacral space
1. Parietal pelvic fascia; 2. Lateral vesical ligament.
 3. Vesico-uterine ligament. 4. Paracervix.
 5. Parametrium. 6. Uterosacral ligament.
 7. Recto-uterine pouch.
 8. Medial umbilical ligament.
 9. Umbilicovesical fascia. 10. Obturator artery.
 11. Superior vesical artery. 12. Vesicovaginal artery.
 13. Uterine artery. 14. Vaginal artery.
 15. Middle rectal artery. 16. Posterior vaginal fornix.
 17. Ureter.

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

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 Paravesical Pararectal Pelvic lymphadenectomy Radical hysterectomy Excision of ureteric endometriosis Ureteric reimplantation/ psoas hitch Bowel resection in DIE Excision of endometriosis involving sacral nerve roots

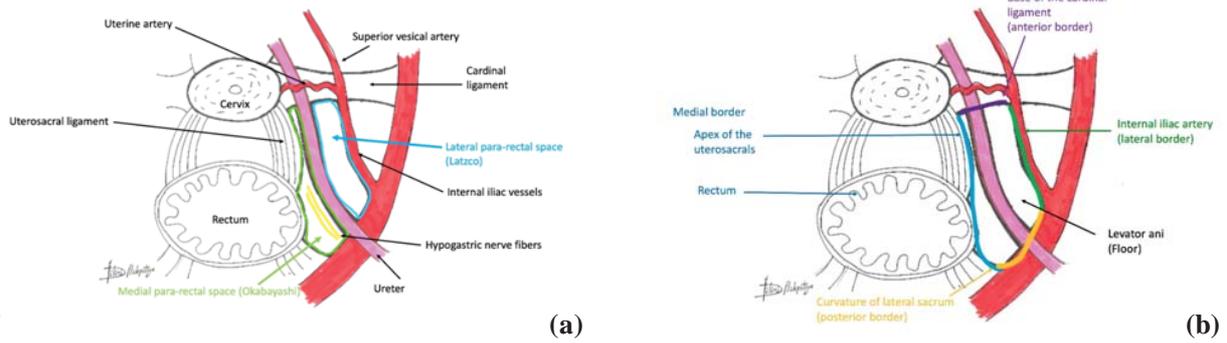


Figure 2. The pararectal space.

(a) schematic representation of the pararectal space.

(b) Boundaries of the paravaginal space.

List 1 – Contents of paravaginal space.

Contents of paravaginal space.
<ul style="list-style-type: none"> • Nerve fibers of the superior hypogastric plexus • Hypogastric nerve • Ureter

Nerve sparing radical hysterectomy is possible only when this space is adequately exposed. The hypogastric nerve lies in the Okabayashi space and can be found about 2 cm below the ureter. Careful dissection around the hypogastric nerve and the origins of the pelvic

splanchnic nerves from S2, S3, and S4 nerve roots can be visualized near the pelvic floor in this space. Careful exposure of the inferior hypogastric plexus can avoid damage to this important nerve plexus thus making the radical hysterectomy nerve sparing.

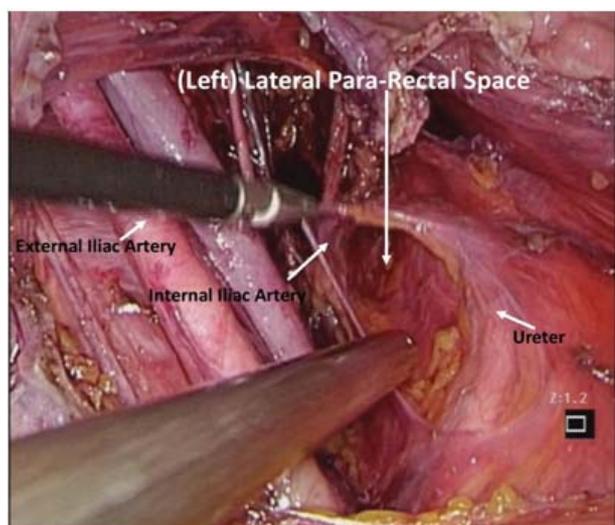
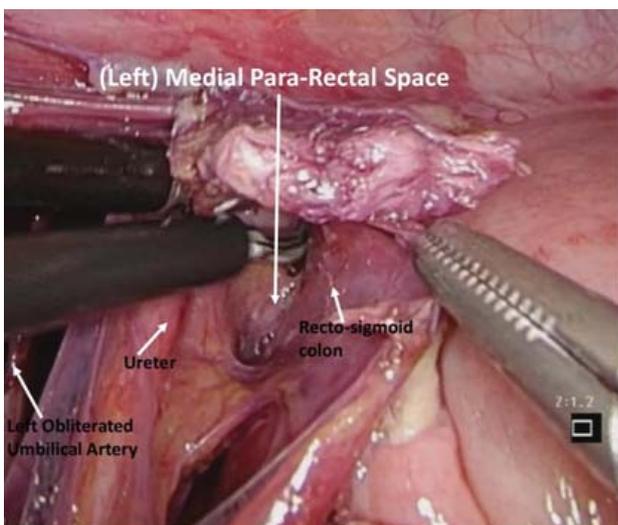


Figure 3. Laparoscopic view of the pararectal space.

Deep infiltrating endometriosis can involve the sciatic nerve, sacral nerve roots and the hypogastric nerve. Endometriosis can also involve the anterior surface of the rectum and the ureters. Careful dissection into the pararectal spaces will enable the surgeon to perform a proper excision of endometriosis from the sacral nerve roots, ureter, as well as from the bowel and utero sacral ligaments. Because there are two hypogastric nerves on either side, damage to one may not cause a considerable effect on bowel, bladder or vaginal function³. It is always beneficial to spare the inferior hypogastric plexus during excision of deep infiltrative endometriosis. However, delicate dissection is necessary for the excision of endometriosis from the sciatic and hypogastric nerve roots⁴.

Excision of ureteric endometriosis, reanastomosis or reimplantation will require dissecting the ureter along the pararectal space before it veers away laterally to the uterosacral ligament. Ureteric reimplantation or ureterocystoneostomy is often needed when a segment of the ureter closest to the bladder is altered beyond salvation due to infiltration or compression by endometriosis¹.

Segmental bowel resection for bowel endometriosis is carried out rarely, where the Okabayashi space must be developed completely enabling circumferential segmental resection of the bowel. This requires opening into the retrorectal space⁵. Care must be taken to avoid injury to the medial rectal vessels which originate from the anterior division of the internal iliac artery⁶.

In conclusion, the pararectal space contains the hypogastric nerves and ureters. 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.

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 and Hysteroscopic Gynecological Surgery* [Internet]. Jaypee Brothers, Medical Publishers Pvt. Limited; 2013. Available from: <https://books.google.lk/books?id=pA0FrBYqDo4C>
3. 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)
4. Talreja D, Salunke V, Pande S, Gupta C. Successful management of ureteric endometriosis by laparoscopic ureterolysis – A review and report of three further cases. *Arab J Urol* [Internet]. 2018; 16(3): 342-9. Available from: <https://doi.org/10.1016/j.aju.2018.03.001>
5. Gray LA. Endometriosis of the bowel: role of bowel resection, superficial excision and oophorectomy in treatment. *Ann Surg.* 1973; 177(5): 580-7.
6. De Cicco C, Corona R, Schonman R, Mailova K, Ussia A, Koninckx PR. Bowel resection for deep endometriosis: a systematic review. *BJOG An Int J Obstet Gynaecol* [Internet]. 2011; 118(3): 285-91. Available from: <https://doi.org/10.1111/j.1471-0528.2010.02744.x>