Chapter 2

FEMALE PELVIC VASCULAR ANATOMY IN LAPAROSCOPIC PERSPECTIVE

Gazi YILDIZ[1]

INTRODUCTION

Gynecologic surgery requires close proximity to vascular structures. It is essential that a surgeon has adequate knowledge of pelvic vascular anatomy to perform safe pelvic surgery. There are various anatomic variations in the arterial and venous system in the human body. The surgeon should be aware of the normal anatomy and variations to prevent vascular injury. During lymphadenectomy, the surgeon is required to be in close proximity to these vascular structures, which is the reason for the major complication of haemorrhage, occurring at a rate of 2.21-4.4% (Yan X et al.2009).

The pelvic organs raise their arterial blood supply mainly from the abdominal aorta and its branches. The veins in the pelvis usually accompany the arteries in their name and drain the venous blood into the vena cava inferior.

Laparoscopy enabled us to demonstrate vascular anatomy well, giving a better understanding for surgeons. In this chapter, we demonstrate the pelvic vascular anatomy; the pelvic vascular anatomy is reviewed with an emphasis on clinical importance.

ABDOMINAL AORTA

The abdominal aorta is the main blood vessel in the abdominal cavity that provides the blood supply to the pelvic structures. The aorta usually bifurcates to the right and left common iliac arteries at the level of the L4 to L5 vertebra (Campus B. 1998).

Good knowledge of the anatomy of the abdominal aorta helps us to avoid vascular complications, especially in laparoscopic surgery. In laparoscopic surgery, the majority of vascular complications occur during the first trocar entry to the abdomen. A good understanding of the anatomic relationship between the aortic

[1] MD, Saglik Bilimleri University, Dr. Lütfi Kırdar Research and Training Hospital, drgaziyildiz@gmail.com

Pudendal artery and inferior rectal artery and veins:

The pudendal nerve leaves the pelvis through the greater sciatic foramen and re-enters the pelvis via the lesser sciatic foramen. It runs along the lateral wall of the ischiorectal fossa and gives branches to the labia majora, clitoris, and the perineum.

The pudendal vein travels with the pudendal artery and nerve, entering the pelvic cavity between the sacrospinous and the sacrotuberous ligaments.

The inferior rectal artery arises from the internal pudendal artery and supplies the lower part of the anal canal, anal sphincters, and the skin of the anal valve. It is unusual to dissect and expose these arteries during routine laparoscopic procedures.

The inferior rectal vein drains the inferior part of the rectum. It provides drainage from the left and right internal pudendal vessels, labia, clitoris, perineal veins, and inferior rectal veins. The inferior rectal veins follow the course of the pudendal arteries and leave the pelvis by the infrapiriform foramen. They also anastomose with the superior rectal vein and middle rectal veins. Finally, they then drain into the internal iliac vessels.

Inferior gluteal artery and vein:

The inferior gluteal artery branches from the anterior division of the internal artery, without contributing to the blood supply of the pelvis. It passes above the sciatic nerve and leaves the pelvis through the greater sciatic foramen. This artery has importance because it may be injured during sacrospinous ligament fixation and dissection, and it is necessary to control the bleeding (Barksdale et al.1998).

The inferior gluteal vein enters the pelvis through the lower part of the greater sciatic foramen, then drains to the internal iliac vein.

REFERENCES

Ahmad G., Flynn HO, Duffy JM, Philips K, Watson A. (2015)Laparoscopic Entry Techniques The Cochrane Collaboration, no. 2, 2012,doi:10.1002/14651858.CD006583.

Barksdale P. A., Elkins TE, Sanders CK, Jaramillo FE (1998) An Anatomic Approach to Pelvic Hemorrhage during Sacrospinous Ligament Fixation of the Vaginal Vault. Journal of Pelvic Surgery, 4 (6): 317–18, doi:10.1080/00132581-199811000-00020.

Berger A, Abramowitch S, Moalli P. (2018) 3D Vascular Anatomy of the Presacral Space: Impact of Age and Adiposity.International Urogynecology Journal, International Urogynecology Journal.1–7, doi:10.1007/s00192-017-3542-x.

Campus B, (1998)Surgical Radiolog:63–68.

Cope A., Burnett T. (2017). Approaches for Laparoscopic Uterine Artery Identification..American Journal of Obstetrics and Gynecology. 218 (2):966.doi:10.1016/j.ajog.2017.12.166.

Darmanis S, Lewis A, Mansoor A (2007)Corona Mortis: An Anatomical Study with Clinical Implications in Approaches to the Pelvis and Acetabulum.Clinical Anatomy, 20 (4),433–39, doi:10.1002/ca.20390.

Durga Sc, Janamala RP, Mahalakshmamma V (2015). An Anatomical Study on Blood Supply of Ureter.Int J Anat Res. 3 (1), 970–75, doi:10.16965/ijar.2015.136.

Fătu C, Puişoru M, Fătu, I. (2006).Morphometry of the Internal Iliac Artery in Different Ethnic Groups.Annals of Anatomy, 188 (6), 541–46, doi:10.1016/j.aanat.2006.05.016.

Krishnakumar S,Tambe P. (2009). Entry Complications in Laparoscopic Surgery.Journal of Gynecological Endoscopy and Surgery, 1 (1), 4. doi:10.4103/0974-1216.51902.

Kumar D, Rath G. (2007). Anomalous Origin of Obturator Artery from the Internal Iliac Artery.International Journal of Morphology, 25 (3), 639–41 doi:10.4067/S0717-95022007000300028.

Nordestgaard AG, Bodily KC, Osborne RW, Buttorf JM (1995), Major Vascular Injuries during Laparoscopic Procedures. American Journal of Surgery, 169 (5), 543–45. doi:10.1016/S0002-9610 (99)80214-1.

Pillet J Chevalier JM, , Rasomanana D, Enon B, Mercier P, Lescalie F, Moreau F, Cronier P. (1989). Surgical . Radiologic Anatomy The Principal Artery of the Psoas Major Muscle. pp. 33–36.

Rajive AV, Pillay M. (2015). A Study of Variations in the Origin of Obturator Artery and Its Clinical Significance.Journal of Clinical and Diagnostic Research.9 (8),AC12-AC15, doi:10.7860/JCDR/2015/14453.6387.

Reich H, Decaprio J, Mcglynn (1989). Laparoscopic Hysterectomy. Journal of Gynecologic Surgery, 5, 213, doi:10.1089/gyn.1989.5.213.

Reid GD, Fracog R, Cooper MJW, Franzcog JM (1999), Implications for Port Placement of Deep Circumflex Iliac Artery Damage at Laparoscopy. Journal of the American Association of Gynecologic Laparoscopists, 6 (2), 221–23, doi:10.1016/S1074-3804 (99)80108-X.

StatPearls (2018). Anatomy, Anterolateral Abdominal Wall Veins.

Selçuk I, Yassa M, Tatar I, Huri E. (2018), Anatomic Structure of the Internal Iliac Artery and Its Educative Dissection for Peripartum and Pelvic Hemorrhage. Journal of Turkish Society of Obstetric and Gynecology, 15 (2), 126–29, doi:10.4274/tjod.23245.

Sobkin PR, Bloom AI, MD, Wilson MW, LaBerge JM, Hastings GS, Gordon RL, Brody LA, MD, Sawhney R, Kerlan RK. (2008). Massive Abdominal Wall Hemorrhage from Injury to the Inferior Epigastric Artery: A Retrospective Review. Journal of Vascular and Interventional Radiology, 19 (3), 327–32. doi:10.1016/j.jvir.2007.11.004.

Yan X, Li G, Shang H, Wang G, Chen L, Han Y. Complications of laparoscopic radical hysterectomy and pelvic lymphadenectomy-experience of 117 patients. (2009), *International Journal of Gynecological Cancer*. 19 (5):963-967. doi:10.1111/IGC.0b013e3181a79430