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Pelvic Anatomy: Unusual Anatomical Ureteric Variation

Do we need to be aware of? Video Case report

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Abstract

In this video article, we are presenting the pelvis side wall anatomy, the spaces, the vascular system, and the nerves, also the ureteric pathway and unusual ureteric anatomical variation. The main objective of this video article is to present the pelvic side wall anatomy with evidence of an unusual ureteric anatomical variation. This is a surgical educational video in which the pelvic sidewall dissection is performed, and the pelvic anatomy is narrated step-by-step.

Every pelvic surgeon needs to have complete anatomical knowledge of normal pelvic anatomy. In this way, you can find any anatomical variation. The bottom line is to perform better surgical procedures. There are

some anatomical variations described in the global literature that we must consider during every surgical procedure

Key words: Anatomy, pelvic anatomy, anatomical variations, laparoscopy, minimally invasive surgery

Objective: To present the pelvic side wall anatomy with evidence of an unusual ureteric anatomical variation.

Design: Surgical educational video. Pelvic sidewall dissection is performed, and the pelvic anatomy is narrated step-by-step.

Setting: Every pelvic surgeon needs to have complete anatomical knowledge of normal pelvic anatomy. In this way, you can find any anatomical variation. The bottom line is to perform better surgical procedures. There are some anatomical variations described in the global literature that we must consider during every surgical procedure.

Introduction:

We never know what we can find in the retroperitoneal space until it is opened.

["Life is like a box of chocolates; you never know what you're going to get." –Forrest Gump.].

Interventions:

In this video article, we show a lateral pelvic wall dissection to get into the retroperitoneal space through the "Bermuda's Triangle", which is an inverted triangle right on the pelvic side wall, formed by the Utero-Ovaric-IP ligament and the ureter [1].

Its name is based on " Bermuda's Triangle, " which is a geographical region of the Atlantic Ocean. Many people believe that some airplanes and ships have gone missing as they were crossing the triangle, but the evidence of this is

poor. The same feeling can apply to surgeons; some of them are afraid to get into the retroperitoneal space, but once you get used to it, it is straightforward and safe.

Once the retroperitoneal area is opened, the critical anatomical structures are identified and narrated. There are very well-visualized structures, like the infundibulo-pelvic (IP) ligament, external iliac artery and vein, internal iliac artery or well known as hypogastric artery and vein giving the bifurcation into a superior vesical artery or obliterated artery, and the uterine artery.

Knowing the anatomy, medially to the ureter we will find the Okabayashi space, lateral to the ureter the Latzco space, and the 4o space or Yabuki space is the space formed from the posterior peritoneal sheet that is just below the ureter getting into the bladder.

The complex nerves are formed by the obturator nerve which is not considered a "pelvic nerve" but is rather the primary nerve to the medial thigh, injury to the obturator nerve may cause painful spasms of the abductor muscles of the thigh and sensory deficits in the medial thigh region. The autonomic innervation of the pelvis is formed by sacral sympathetic trunks, hypogastric plexuses, splanchnic nerves, and peri-arterial plexuses. The hypogastric plexuses receive sympathetic fibers via lumbar splanchnic nerves and parasympathetic fibers via the splanchnic nerves, which innervate all the pelvic organs. The sympathetic fibers produce vasomotion, inhibit peristaltic contraction of the

rectum, and stimulate contraction of the genital organs during orgasm; The parasympathetic fibers stimulate contraction of the rectum and bladder for defecation and urination, respectively.

Knowing the pelvic nerve anatomy will allow us to preserve the integrity of the nerves during radical pelvic gynecological surgery.

Typically, the ureters enter the pelvis over the common iliac artery and medial to its bifurcation at the pelvic brim, so the ureter pathway goes into the retroperitoneal space beside the hypogastric roadway and below the uterine artery, the so-called "water under the bridge." In this case, the ureter is over the uterine artery and reveals a scarce anatomical variation for which there are no accurate statistics in the literature.

The only vessel that goes below the ureter is the uterine vein (2). Anatomical variations of the ureter and its relationship to surrounding

structures are therefore significant from an academic, as well as clinical and surgical perspective. Recently an article was published on this topic, and the researchers found a ureteric anatomical variation in cadaveric dissection. They conducted a literature search, which revealed no sources, suggesting that their case was the first one to make known this rare anatomical variation [3]. As such, we can assume that this is the first case reported in vivo model and evidenced by video surgery. Malformations of the urinary system are uncommon and comprise about 3% [4], which includes the horseshoe kidney, duplex ureter, megaureter, ectopic ureter, and ureterocele [5][6].

Conclusion: Every pelvic surgeon needs to have complete knowledge of the pelvic anatomy, which will allow her or him to detect any anatomical variation and, thus, perform better and safer surgical procedures to improve our women's health.

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