Applied anatomy

Laparoscopic inguinal anatomy

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Summary: Irrespective of the merits of laparoscopic herniorrhaphy, the anatomy of this surgical approach is poorly understood by most surgeons. To describe and document the normal anatomy and its variations, the inguinal region was dissected from peritoneum outward by the open method in 70 cadaveric sides and by the closed laparoscopic method in 28 cadaveric sides. In our results we describe the various layers, fossae, spaces and their contents. The data presented include variations of nerves in the inguinal area and measurements of bony landmarks from important neurovascular elements. In 74%, the distance from anterior superior iliac spine (ASIS) to pubic tubercle (PT) was 11 cm (10.0-14.0); in 56% ASIS to external iliac vessels was 6 cm (4.5 - 7.5 cm); ASIS to femoral nerve in 64% was 5 cm (3.0 - 7.5). The lateral femoral cutaneous nerve was found 1 - 4.5 cm medial to ASIS in 15%, increasing the possibility of nerve injury. In 25.5% the ilioinguinal nerve ran through the iliac fossa, in some cases passing through the iliopubic tract. In 18% the lateral femoral cutaneous and ilioinguinal nerves were combined, and in 7.7% the ilioinguinal and genitofemoral nerves were combined. It is critical for laparoscopic surgeons to be aware of the normal inguinal anatomy and its variants to avoid unnecessary injury and pain. It is important to remember that in approximately 30% of cases, the laparoscopic anatomy of one side will not be a mirror image of the other side.

Key words: Laparoscopy — Herniorrhaphy — Inguinal anatomy — Iliopubic tract — Transversalis fascia

“Of herniae: But it is most worthy of observation, and admiration, that Nature but a little helped by Art, healeth diseases that are thought incurable” Ambroise Paré, 1585, Apology and Treatise

The anatomy of the inguinal region as seen with the laparoscope, from the peritoneum to the posterior surface of the myopectineal orifice of Fruchaud, has been presented by a number of different authors in recent years. Among these reports are some works of beauty and others that lack anatomic precision. For all practical purposes, exploration of this area was spurred, and even dictated by necessity, by the entrance upon the surgical scene of the laparoscopic approach to herniorrhaphy. To most surgeons, this area was terra incognita. This study is based upon the dissection of 70 cadaveric sides by the open method and 28 cadaveric sides by the closed laparoscopic method. In our results we emphasize the various layers, fossae, spaces and their contents, plus other morphologic details in a way that we hope will help
the reader understand the enigmatic and peculiar anatomy in this area. The data presented include variations of nerves in the inguinal area and measurements of bony landmarks from important neurovascular elements. Unintentional damage to nerves and vessels is rather unusual in the performance of inguinal hernia repairs using the “classic” anterior approach because this is the anatomy with which surgeons are generally familiar. Far fewer surgeons are familiar with the inguinal anatomy from the posterior or extraperitoneal (internal) approach. Several internal features effectively conceal the presence of regional nerves and vessels. These include the peritoneum, the internal fasciae of the transversus abdominis and the iliopsoas mm. and, significantly, varying quantities of adipose and membranous connective tissue. Table 1 and Figs. 1 – 5 will guide us in the step-by-step dissection of the layers, “walking” through the spaces, and studying the anatomic entities within.

**First layer:**
**peritoneum and peritoneal fossae**

**Peritoneum**

The peritoneum, this primitive lining of the early fetal celomic cavity, is the innermost layer of the internal abdominal wall. In the pelvis and, to be more specific, in the inguinal area, it has several characteristics related to the several anatomic entities with which it is associated. If one operates by the transperitoneal laparoscopic approach, that is, by beginning the herniorrhaphy from within the peritoneal cavity, knowledge of the characteristic features of the peritoneum lining the lower part of the anterior abdominal wall is of cardinal importance in initial orientation for subsequent operative procedures.

The parietal peritoneum lining the anterior abdominal wall is eleva-