



Artificial Arcuate Line: Surgical Creation during TEPP Hernioplasty

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Abstract

Level and technique of entry into the preperitoneal space during Total Extraperitoneal Preperitoneal (TEPP) hernioplasty is always a matter of dilemma, differing markedly among the experts across the globe. In presence of long posterior rectus sheath with low arcuate line of Douglas and complete posterior rectus sheath with absent arcuate line, a transverse cleavage in the posterior rectus sheath was surgically made at or just below the mid-point of the umbilico-pubic distance to mimic the classical arcuate line in order to keep the 'effective rectus sheath canal' to within 2 cm for optimal surgeon's ergonomics, excellent endoscopic vision, and ample working space. The level of the transverse cleavage in the posterior rectus sheath, i.e., surgical creation of the artificial arcuate line, corresponded to the level of the middle working port in the 3-midline-port technique of TEPP hernioplasty, and proved extremely rewarding without failing and is strongly recommended.

Keywords: Arcuate line; Artificial arcuate line; TEPP hernioplasty; Low arcuate line; Absent arcuate line; Long posterior rectus sheath; Complete posterior rectus sheath

Short Communication

During the Total Extraperitoneal Preperitoneal (TEPP) inguinal hernioplasty through the posterior rectus sheath approach with the standard 3-midline-port technique, level and technique of entry into the preperitoneal space is always a matter of dilemma, differing markedly among the experts across the globe [1-3]. This dilemma may be a reflection of the wide anatomic variations in the posterior rectus sheath (Ansari, 2017a) [4] and/or the arcuate line of Douglas (Ansari, 2017b) [5].

Posterior rectus sheath approach for the TEPP hernia repair utilizes the tunnel formed by the anatomic disposition of the anterior and posterior rectus sheaths. If this posterior rectus tunnel/canal (PRC) is very long, the available working space during preperitoneal laparoscopy is grossly limited with impairment of the endovision. In our study of TEPP hernioplasty with the standard 3-midline-port technique, the posterior rectus tunnel/ canal (PRC) longer than 2 cm also adversely affected not only the endoscopic vision but also the ease of procedure and operation time because of the wide fulcrum effects, and the distance between the first optical port and the arcuate line of Douglas was labelled as the 'Effective Rectus Sheath Canal', abbreviated as the 'ERSC'. Moreover presence of a complete posterior rectus sheath also impacted adversely the endovision and the ease of procedure as well as it also did not allow lateral extension readily. To optimize the functioning of the preperitoneal laparoscopy, the 'ERSC' needs to be shortened in presence of a very long PRC (in case of a low/very low arcuate line) or a complete PRC (in case of absent arcuate because of the extension of the posterior rectus sheath up to the pubic bone) by cutting open the posterior rectus sheath [1-3]. A specific technique was developed and consistently followed [4-7]. Details of the technique for creation of an artificial arcuate line are presented here. In case of a complete posterior rectus canal with the Complete Posterior Rectus Sheath (C-PRS) extending up to the pubic bone without formation of an arcuate line, an artificial arcuate was created transversely by a combination of blunt/sharp surgical dissection at the level of to the mid-point of the umbilico-pubic distance in order to gain entry into the requisite preperitoneal space and to get ample room for further definitive dissection. The transverse cleavage in the posterior rectus sheath resulted in the two parts of the posterior rectus sheath, the proximal part representing a new incomplete posterior rectus sheath with a new arcuate line (Figure 1A and 1B and 3A and 3B). The artificial arcuate line was extended laterally as much as required to gain access to the lateral most part of the preperitoneal space for dissection up to the level of the ipsilateral anterior superior iliac spine. The mid-point of the umbilico-pubic distance corresponded approximately to the level of the middle working port in

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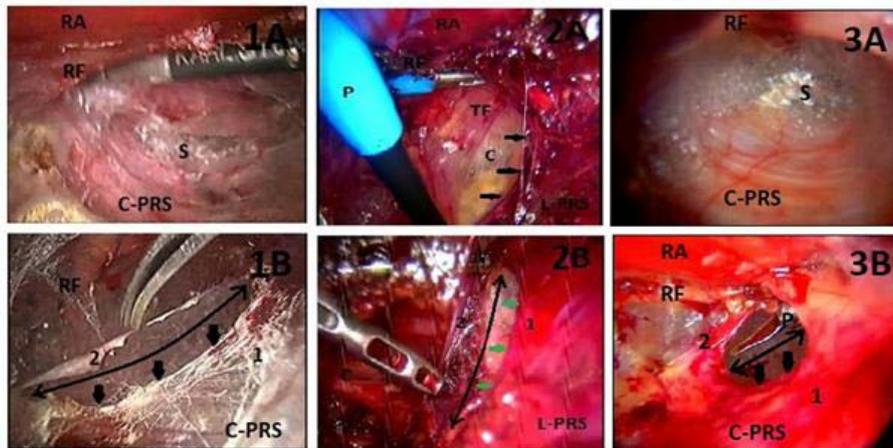


Figure 1: Creation of Artificial Arcuate Line in Long & Complete Posterior Rectus Sheath: (1A) Shows a complete membranous posterior rectus sheath (C-PRS) extending upto the pubic bone without formation of an arcuate line; (2A) Shows a long aponeurotic posterior rectus sheath (L-PRS) extending just short of pubic bone with formation of a very low arcuate line; (3A) Shows a complete aponeurotic posterior rectus sheath (C-PRS) extending upto the pubic bone without formation of an arcuate line; (1B) Shows an artificial arcuate line created surgically in the C-PRS at about the level of middle working port; (2B) Shows an artificial secondary arcuate line created surgically in the L-PRS at about the level of the middle working port; (3B) Shows an artificial arcuate line created surgically in the C-PRS at about the level of middle working port; Double-headed Arrow, indicates transverse rent created surgically in the long and complete posterior rectus sheath; Single-headed Arrows, indicate lower border of the proximal part of the long or complete posterior rectus, representing the artificial arcuate line; RA, rectus abdominis muscle visible partly; RF, rectus fascia covering the rectus abdominis muscle; S, sign of lighthouse faintly visible in the depth of the posterior rectus canal; P, metallic port with scissors.

our study of the TEPP hernioplasties, which was taken as the criteria for the level of the transverse cleavage in the posterior rectus sheath to mimic the classical arcuate line. In presence of a long posterior rectus canal with a long incomplete posterior rectus sheath having a low/very low arcuate line, a secondary arcuate line was created more proximally by the surgical dissection for an optimal entry into the avascular preperitoneal space and its maintenance (Figure 2A and 2B), mimicking a scenario similar to that seen in case of the complete posterior rectus sheath with absent arcuate line (Figure 1A and B). Entry into the preperitoneal space at or just below the middle working port that corresponded approximately to the mid-point of the umbilico-pubic distance, largely maintained the 'effective rectus sheath canal' to within 2 cm, which immensely improved the endoscopic vision and surgeon's ergonomics for the seamless TEPP repair with safety and rapidity. Lateral extension surgically of the artificial arcuate line was carried out as much as required for creation of ample preperitoneal space up to the ipsilateral anterior superior iliac spine as was done in presence of the C-PRS. The author's technique of the transverse cleavage in the long/complete posterior rectus sheath, i.e., surgical creation of the artificial arcuate line, at or just below the level of the middle working port in the 3-midline-port technique of TEPP hernioplasty proved extremely rewarding without failing in all 10 cases of the long posterior rectus sheath and 14 cases of the complete posterior rectus sheath in a series of 68 consecutive TEPP hernioplasties and is strongly recommended.

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