

Triple optical illusions during laparoscopic TEPP hernioplasty - A case report

Abstract

Optical illusion is well known during laparoscopic cholecystectomy but never reported during laparoscopic hernioplasty. A young male student of 20 years underwent laparoscopic total extraperitoneal preperitoneal (TEPP) hernioplasty for left indirect inguinal hernia. Three transient optical illusions were encountered, namely, secondary vs. primary arcuate line, complete posterior rectus sheath (upper part) vs. classical incomplete posterior rectus sheath, and complete posterior rectus sheath (lower part) vs. transversalis fascia. Timely recognition of optical illusion during TEPP hernioplasty is crucial for judicious dissection to safeguard against technical difficulties and complications.

Keywords: optical illusion, laparoscopic hernioplasty, TEPP/ TEPP, arcuate line, posterior rectus sheath, transversalis fascia

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Abbreviations: TEPP, total extraperitoneal preperitoneal (hernioplasty); PRS, posterior rectus sheath

Introduction

Optical illusion is now a well known phenomenon during the laparoscopic cholecystectomy, with common bile duct, common hepatic duct or right hepatic duct being mistaken for the cystic duct, leading to the bile duct injury.¹ Optical illusion during the laparoscopic inguinal hernioplasty has been never reported in literature to the best of our knowledge, and hence the present report.

Case report

A 20-year old male student with a BMI (body mass index) of 23.2Kg/m² presented with left indirect (funicular) inguinal hernia. Pre-anaesthetic check confirmed ASA grade I of American Society of Anesthesiologists.¹ Within a framework of ethically-approved defined protocol of a doctoral research study,² he was taken up under written informed consent for TEPP hernioplasty. Under general anesthesia, standard 3-midline-port technique through posterior rectus sheath approach was used without a balloon dissection. Controlled direct telescopic dissection was performed under CO₂ insufflation at a pressure of 12mmHg.

At first glance, dissection within posterior rectus canal showed presence of an incomplete posterior rectus sheath (PRS) albeit attenuated with a well-defined arcuate line and presence of membranous transversalis fascia below arcuate line (Figure 1(a-b)). Just after a little further dissection, the misperception was realized and the misidentifications were rectified soon by the application of the 'methods of error reduction', i.e., the well-defined fibrous membrane of pearly white lustre is never a feature of the transversalis fascia but it really represented the lower attenuated part of the complete posterior rectus sheath (PRS) extending upto the pubic bone (Figure 1(c-d)). The arcuate line initially misidentified as the primary arcuate line (*Illusion 1*), and upper part of the complete PRS as the classical incomplete PRS (*Illusion 2*), and the lower part of the complete PRS as the transversalis fascia (*Illusion 3*). Therefore, in absence of a primary terminal arcuate line, an artificial arcuate line as described earlier by the author,³⁻⁵ was surgically created in the complete posterior rectus sheath (Figure 1(f-h)) at the level of the middle port for an ergonomic access to reach the transversalis fascia which was then opened up to enter the preperitoneal space (Figure 1(j-l)) for space creation and preperitoneal placement of a requisite mesh.

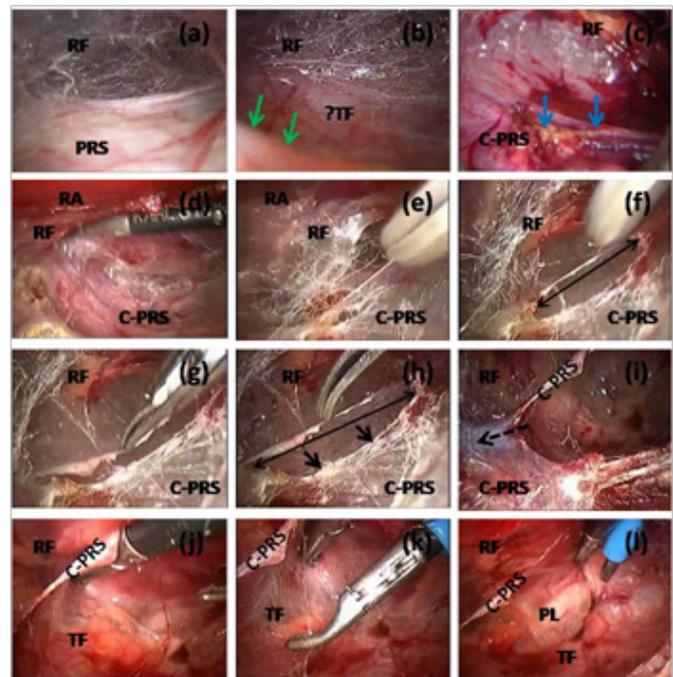


Figure 1 Right Laparoscopic Total Extraperitoneal Preperitoneal Inguinal Hernioplasty through Posterior Rectus Approach in a Patient with Membranous Complete Posterior Rectus Sheath.

(a-d) Telescopic dissection in posterior rectus canal bounded anteriorly by a well-defined Rectus fascia (RF) covering rectus abdominis muscle (RA) and posteriorly by membranous complete posterior rectus sheath (C-PRS) extending upto pubic bone with formation of a secondary arcuate line (Blue Arrows) which was initially misidentified as the primary arcuate line (Green Arrows) and the lower attenuated part of the complete posterior rectus sheath (C-PRS) was misidentified as the transversalis fascia (?TF) but its true fibrous-sheet nature albeit attenuated found a little later rectified the misperception); (e-h) Creation of a transverse opening (Double-headed Black Arrow) in complete posterior rectus sheath at about the level of the middle port and formation of an artificial arcuate line (Black Arrows); thin membranous aponeurotic nature of C-PRS is unmistakable; (i) Lateral extension of artificial arcuate line (Dashed Arrow); tendinous (although attenuated) nature of C-PRS is unmistakable here; (j-l) Dissection underneath the distal part of C-PRS in order to open transversalis fascia (TF) for access to preperitoneal space; PL, pectineal ligament (*Reproduced with permission from Ansari's Thesis*²)

Discussion

No doubt, the total extra-peritoneal preperitoneal (TEPP) hernioplasty for the groin hernias is now a well-recognized technique with proven efficacy, reduced post-operative pain and low failure rate.⁶ However, the operator often finds difficulties in execution of TEPP for no apparent reason/cause, which are almost always attributed to lack of surgical skills or presence of adhesions. In general, TEPP is considered a technically demanding procedure with a steep long learning curve,⁶⁻⁸ leading to its lack of popularity despite the obvious advantages and better results.⁹

It is now increasingly recognized that despite the merits of the laparoscopic hernioplasty, the extra-peritoneal anatomy and dissection in the groin is poorly understood by most practicing surgeons,^{6,9} and a number of anatomic variations have been recently re-emphasized.^{10,11} Improper dissection of pre-peritoneal anatomy is now regarded as the main cause of difficulties during TEPP hernioplasty. However, the root cause of the improper preperitoneal dissection leading to the technical difficulties and complications during the TEPP hernioplasty remained largely elusive despite better understanding of the reportedly complex preperitoneal inguinal anatomy and attainment of substantial surgical experience.¹²

In addition to the case of the optical illusions presented here, the author encountered some more optical illusions in other patients undergoing TEPP hernioplasty the details of which will be documented later in a comprehensive report.

Laparoscopic hernia surgeon should be aware of the phenomenon of optical illusions during the TEPP hernioplasty in order to safeguard against the injudicious dissection and demanding technical difficulties for the seamless execution of the procedure with safety and rapidity.

Conclusion

Optical illusion occurs during TEPP hernioplasty analogous to the optical illusion during laparoscopic cholecystectomy and warrants timely recognition for the seamless execution of TEPP repair with safety and rapidity.

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Conflicts of interest

Author declares their is no conflicts of interest towards the manuscript.

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