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Review

Totally extraperitoneal laparoscopic hernioplasty versus open extraperitoneal approach for inguinal hernia repair: A meta-analysis of outcomes of our current knowledge



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ABSTRACT

Background: The aim of this article is to explore the clinical effects between open extraperitoneal approaches and totally extraperitoneal laparoscopic hernioplasty (TEP) in the repair of inguinal hernias.

Methods: The electronic databases Pubmed, Medline, Embase, Web of science and the Cochrane Library were used to search for articles from January 1992 to March 2013. The present meta-analysis pooled the effects of outcomes of a total of 1157 patients with 1377 hernias enrolled into 10 randomized controlled trials and 2 comparative studies. The data was analyzed using the statistic software Stata12.0 and IBM SPSS Statistics 19.

Results: Significant advantages of totally extraperitoneal laparoscopic hernioplasty (TEP) compared to the open extraperitoneal approach include a lower incidence of total post-operative complications (Odds Ratio, 0.544; 95% confidence interval, 0.369–0.803), a reduction in urinary problems (0.206[0.064,0.665]), an earlier return to normal activities or work (SMD = -1.798[-3.322,-0.275]), and a shorter length of hospital stay (-1.995 [-2.358,-1.632]). No difference was found in operative time, the incidence of hernia recurrence, chronic pain, intraoperative complications, seromas or hematomas, wound infection and testicular problems between the two techniques. One significant advantage for the open extraperitoneal inguinal hernia repair was a lower incidence of peritoneal tears (46.504 [15.399,140.437]).

Conclusions: Totally extraperitoneal laparoscopic hernioplasty (TEP) and open extraperitoneal mesh repair are equivalent in most of the analyzed outcomes. TEP is associated with shorter hospital stay, quicker return to normal activities or work, lower incidence of

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total postoperative complications and urinary problems, while the open extraperitoneal method has less incidence of peritoneal tears.

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Introduction

Inguinal hernia repair is one of the most common surgical operations in general surgery. Since Lichtenstein¹ described his tension-free hernioplasty in 1989, tension-free hernia repair was quickly accepted by most surgeons as the effective and safe method of hernia repair for its lower recurrence rate, less postoperative pain and easy to learn, various surgical methods were described and invented from that time on. In tension-free hernioplasty, a prosthetic mesh can be placed subaponeurotically or extraperitoneally, either through an open approach or laparoscopically.² With improved understanding of the groin anatomical structure, especially the Fruchauds myopectineal orifice, reinforcing the extraperitoneal space and completely covering the orifice seem to be the most effective and reasonable method for hernia repair currently.³

Many open techniques that combined the benefit of tension-free with the advantages of the extraperitoneal approach have been in use for decades. For instances, Stoppa⁴ developed his technique through a lower midline incision putting a giant prosthesis in the extraperitoneal space with good results. The Kugel and Modified Kugel methods both place the polypropylene mesh in the extraperitoneal space the posterior and anterior approaches respectively.⁵ In addition, the transinguinal preperitoneal technique (TIPP) and the Prolene hernia system (PHS) both are commonly used technique that proved to be successful.⁶

Laparoscopic repairs combine the advantages of minimal access surgery with the open extraperitoneal approach. The transabdominal preperitoneal repair (TAPP) and the totally extraperitoneal repair (TEP) are the two most frequently-used methods. More surgeons prefer the latter for its not entering into the peritoneum.⁷ Many researches have shown that laparoscopic hernia repair may offer less postoperative pain and early return to normal activities compared with open method. However, its potential intraoperative complications, need for general anesthesia and long learning curve have restricted its use to some extent.⁸

To date, clinical comparisons between TEP and open extraperitoneal herniorrhaphy are not very abundant. There is no meta-analysis directly comparing the outcomes of laparoscopic extraperitoneal herniorrhaphy and open extraperitoneal mesh repair. In the present article, different types of open extraperitoneal repairs with prosthetic meshes are combined as they all achieve similar clinical goals.⁶

Materials and methods

Literature search

All randomized controlled trials and prospective case control studies that compared TEP and the open extraperitoneal

procedures for the repair of groin hernias were identified intensively in the electronic databases Pubmed, Embase, Web of Science, Medline, and the Cochrane Library from January 1992 to March 2013. The search strategies used the following major medical terms: “inguinal hernia”, “extraperitoneal”, “laparoscopic”, “OPM”, “Stoppa”, “Kugel”, “PHS”, and “repair/hernioplasty”. The function of “related articles” in the database was used to broaden the search results and all abstracts, comparative studies and citations scanned were reviewed comprehensively. Two comparative studies and 10 randomized controlled trials (RCTs) were ascertained finally.

Selection criteria

To be included in this analysis, studies had to: compare TEP and the open extraperitoneal procedures for the repair of groin hernias; RCT or well-designed comparative study; be published as full-length articles; report on at least one of the following outcomes: (1)operative time, (2)postoperative complications, (3)hospital stay, (4)chronic pain, (5)delay in return to normal activities or work, (6)recurrences, (7)intraoperative complications, (8)conversion, (9)wound infection, (10)hematomas, (11)urinary problems, (12)seroma, (13)testicular/scrotal problems, or (14)peritoneal tears (Table 1). Articles are excluded if they did not compare the two procedures; only reported one method or surgical experience; not a RCT or prospective comparative study; and difficult to extract the appropriate data from its results.

Data extraction

Two independent researchers for eligibility in meta-analysis extracted the following information from each article separately: first author, publication year, study design, country of origin, matching criteria, and outcomes. Any disagreements were resolved by consensus.

Study quality assessment

According to the Cochrane Handbook for Systematic Reviews of Interventions 5.0.2,⁹ the risk of bias of each included trial was assessed by two reviewers independently, which was judged using the following methodologic criterias: sequence generation, allocation concealment, blinding of participants, personnel, and outcome assessors, incomplete outcome data, free of selective outcome reporting, and other bias¹⁰ (Table 2). If any information was not available, authors with access to the raw data was contacted by e-mail.

Statistical analysis

The statistical analysis was carried out with statistic software STATA12.0 and IBM SPSS Statistics 19. For dichotomous data, results for each trial were expressed as relative risks(RRs) or

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