

COMPARISON OF LICHTENSTEIN TO TOTAL EXTRAPERITONEAL HERNIA REPAIR IN TERMS OF CLINICAL AND COST EFFECTIVENESS

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ABSTRACT

The preponderance of open hernia repairs makes use of the tension free mesh methods which include Lichtenstein, Stoppa, Nyhus and Rutkow. Laparoscopic repair is minimally invasive approach and the two main methods are trans-abdominal preperitoneal (TAPP) repair and totally extraperitoneal (TEP) repair. The TEP method accesses the hernia site through the pre-peritoneal plane without ingoing the peritoneal cavity and is now the number one method. Inclusive milieu research showed that Lichtenstein and TEP repairs are at present the methods of preference in their particular open and laparoscopic categories for inguinal hernia repair. So, this review focuses on comparing these two methods in terms of clinical and cost effectiveness. For the purposes of this review, an inclusive online literature search was undertaken during May 2014 using the EBM reviews, EMBASE, MEDLINE and SpringerLink data bases. All published randomized controlled trials after 1995 with sample size of over 100 and which were printed in English language and had compared the effectiveness of laparoscopic inguinal hernia repair with open mesh inguinal hernia repair were eligible for inclusion.

KEY WORDS: Hernia; Peritoneal; Effectiveness.

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INTRODUCTION

If we look at the history as ancient as Egyptian cultures, we see that inguinal hernia repair is now one of the most commonly performed general surgical procedures in practice. The beginning of a laparoscopic technique has sparked a discussion over the dominance of this method against open repair. Since the ancient Egyptian cultures, the surgical history of inguinal hernias has shown the improvement in anatomical indulgent and development of the techniques of general surgery. It is evidenced from a narrative on the famous Ebers papyrus in 1550 BC as 'a bulge of the coverings of his abdomen, an illness which I will treat by heating it to imprison it in his belly,' early inguinal hernia repairs employed elementary techniques. These techniques often involved testicular removal and wounds that were left open to granulate, translating into unacceptably

high mortality rates.¹ Anatomical understanding of inguinal canal anatomy increased through the work of Camper, Scarpa, Cooper, Hasselbach and Hunter.¹ Still, it was not until the late nineteenth century, when Edoardo Bassini proposed his first successful reconstruction of the inguinal floor that surgical techniques started rapidly evolving. Then, in the late twentieth century the tension-free repair, introduced by Irving Lichtenstein, caused a dramatic drop in recurrence rates and became the procedure of choice.² But, the beginning of a laparoscopic technique by Ralf Ger in the early 1990s sparked a new contest over the best method of inguinal hernia repair.¹ Today, inguinal hernia repair is one of the most commonly performed general surgical procedures in the United States, accounting for 10% to 15% of all operations.^{2,3} Inguinal herniorrhaphy accounts for approximately 800,000 cases annually, which amounts to more than 40 billion dollars in healthcare expenditure.⁴ These numbers are largely recognized to the high frequency of the disease, which carries a lifetime threat of about 27% for men and 3% for women.⁵ Bearing in mind the socioeconomic impact of inguinal hernia repair, we discuss the advantages and disadvantages of laparoscopic repair versus open repair.^{6,7} The wide acceptance of LC in the early 1990s was based on several case series rather than randomized

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controlled trials. Community awareness that a minimally invasive procedure could dramatically reduce postoperative pain and improve recuperation made it impractical to conduct trials that might have better refined technique.^{8,9} The most scientific way to come to conclusion over superiority of one method over other is on the basis of evidence-based medication. The best evidences are in the form of randomized controlled trials or meta-analysis.

DISCUSSION

This review is based on a complete online literature search which was undertaken during May 2014 using the EBM reviews, EMBASE, MEDLINE and SpringerLink data bases. All published randomized controlled trials (RCTs) after 1995 with sample size more than 100 and were published in English comparing the effectiveness of laparoscopic inguinal hernia repair with open mesh inguinal hernia repair were eligible for inclusion. From the database material we had identified about thirty possible studies. Studies which reported data on intra operative or post-complications and hernia recurrence as primary outcomes were prioritized. In addition to RCTs, systematic reviews and meta-analysis studies which met the inclusion criteria were also identified. The date of publication of the studies was restricted from, 1995 to present in order to avoid studies which evaluated TEP in its infancy. The sample size had to be over 100, with a minimum follow-up period of 12 months. There were eight studies remaining. Their results were as; Eklund et al,⁹ used a visual analogue scale (VAS) (0-440 mm) showing the TEP group experienced less pain one week postoperative (105 mm) compared to the Lichtenstein group (175 mm). In four of the studies, cumulative pain scores recorded during the first postoperative week were 105 mm in the TEP group and 175 mm in the Lichtenstein group. Neumayer et al,¹⁰ used a VAS (0-150 mm) showing the open group had significantly higher levels of pain shortly after surgery than those in the laparoscopic group by 10.2 mm (95%, CI 4.8-15.6). Colak et al,¹¹ showed the mean VAS was significantly lower with TEP compared to open mesh repair ($p=0.001$). Bringman et al,¹² reported mean VAS was lower in the TEP group than Lichtenstein group after 2 hours ($p=0.009$). Langeveld et al,¹³ showed significantly lower VAS scores for TEP at day 1, 2, 3, week 1, and week 4 (overall $p < 0.001$). Gokalp et al,¹⁴ measured using pain analogue scores and it showed no significant difference. Several papers evaluated postoperative pain showing that in broad-spectrum, pain was lower in patients who underwent TEP compared to Lichtenstein repair.⁴⁻⁸ However, it should be noted that there was no consistent scale for assessing pain across the studies. Since pain discernment and analgesic requirement are uneven and can be prejudiced by cultural and environmental factors, a partiality could

surface when patients are asked to rank their own pain levels. Therefore a more objective method of pain dimension is preferable. Gokalp et al,¹⁴ showed that there was no significant difference in the pain scores between the two groups. This inconsistency could possibly be due to the low power of the study as well as possible differences in anaesthetic pain management between hospitals. Eklund et al,⁹ also reported that patients did not always use the approved analgesic drug after surgery. Though, it is improbable to have exaggerated the results since this was pragmatic in both groups. At 12 weeks follow-up all studies confirmed that the pain difference between patients in the two surgical procedures is eliminated. Of all the outcomes considered, short-term pain is one of the most conclusive in that TEP causes significantly less pain in the recovery phase. This has a direct correlation with return to normal daily work but not obvious in the long-term. Operating time was reported by six of the papers showing times for each TEP operation to be 47 + 12, 50, 54, 62 + 14, 81 + 27 and 55 minutes respectively.⁶⁻¹¹ The Lichtenstein method operating times were 58 + 12, 45, 49, 46 + 11, 59 + 20 and 55 minutes respectively.⁶⁻¹¹ Andersson et al¹⁵, Eklund et al⁹, Gokalp et al¹⁴ and Langeveld et al,¹³ all of them reported data on time to discharge but, none showed any important difference between the TEP group and the open repair group, with neither group needing to stay in hospital for more than 48 hours on the average. Return to work there were six papers which discussed the length of sick leave, showing that the duration of sick leave was shorter in the TEP group when compared with the open repair group. The meta-analysis of the three papers⁹⁻¹¹ which reported adequate data, gave mean difference of 3.4 (95% CI -4.2, -2.7; p -value < 0.001) days in favor of the laparoscopic procedure. Bringman et al,¹² reported it to be 5 days in the TEP group and 7 days in the Lichtenstein group ($p=0.02$).⁷ Similarly Langeveld et al,¹³ reported this to be 1.0 week in the TEP group and was 1.4 week in the Lichtenstein group ($p=0.01$).⁸ Overall complication rates showed no major difference between the two modalities each having overall rate of 6% ($n=625/11080$ TEP and $658/11500$). Recurrence rates in the TEP group ranged from 10.1% to 0% and between 4% and 0% in the Lichtenstein groups.^{5,9,12} The meta-analysis of the data from 6 studies had odds ratio of 2.17 (95%, CI 1.58, 2.98; $p < 0.001$) showing greater recurrence in the Lichtenstein group. There was no evidence of any heterogeneity between studies. All studies show that the method of inguinal hernia repair (TEP and Lichtenstein) has no impact on discharge time. Since both methods are day case procedures, finding any time difference is not clinically important as the outcome is perplexed by hospital routines and the time of day the procedure is done. The duration of sick leave is shorter in the TEP group when compared with the Lichtenstein group. TEP is more advanta-

geous than open repair in the working age group as it urge a significantly faster return to work. This is due to abridged postoperative pain, decreased infection rates and fewer chronic complications. Furthermore open surgery allows for the option of local or regional anesthesia which is crucial for patients unfit for general anesthesia. An example of this is the large proportion of elderly patients who require inguinal hernia repair, in whom Lichtenstein is a more clinically sound choice as return to work is immaterial.

Four out of the eight studies provided economic data regarding the cost of procedure. In this review both direct and indirect costs were considered. Direct cost is the burden of the procedure on the hospital, which includes instruments, operating theatre time, ward cost and complications. Indirect cost includes sick leave, cost of home care and loss of efficiency. According to Andersson et al,¹⁵ the operation time was much longer for TEP which accounted for half of the \$1091 cost difference with the other half being from the instrumentation. The indirect cost difference (+ \$349 for TEP) was also calculated however, not found to be statistically significant ($p=0.21$). Eklund et al⁹ included details of how they calculated cost per minute as well as adjusting for the capital costs in purchase of laparoscopic kit which was either not mentioned or just omitted by others in their calculations.¹² The cost difference after 5 years was \$292 more for TEP which was an indirect cost inclusive of any complications and social costs. Had re-usable equipment been used, the direct hospital cost difference would have been \$ 290 lower giving a difference at 5 years of only \$2. The paper of Langveld et al,¹³ was the most recent published paper included in this review and the only one to find a total cost saving for laparoscopic surgery after adjustment for social and patient costs which was reported as \$ 102 (\$3,096 for TEP, \$3,198 for Lichtenstein).^{8,19-22}

CONCLUSION

From this review the results recommend that there is no perfect reply to whether TEP repair is advantageous than Lichtenstein for primary inguinal hernias when taking all factors into account. But for the patients who are of working age and their revival time is significant as well as recurrent hernias, TEP is advantageous. However, for older patients and those less appropriate for general anesthesia the open Lichtenstein method is preferential. Surgeon predilection and contingent influences will almost certainly continue to read out the approach employed in inguinal hernia repair.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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