

Laparoscopic versus Open Mesh (Lichtenstein) Repair of Inguinal Hernia: Current Status from Literature Review

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Abstract

The aim of this study was to review studies conducted recently in large centers which compared the laparoscopic approach to open mesh method in the repair of inguinal hernia. Search from literature was conducted using Highwire press and Google search engine. Analyses were made using parameters like type of anesthesia, operation time, hospital stay, early and late complication, pain and narcotic usage, time of return to work, cost effectiveness and patients satisfaction. Result showed that laparoscopic group experienced less pain, returned earlier to work and had more satisfactory outcome even though paid twice as much as the open mesh group. The laparoscopic group also suffered more fatal complications such as visceral injury. Hemorrhage and bladder and intestinal injuries as well as some deaths. In conclusion opinion was divided, some favored laparoscopic while others favored open mesh repair.

Keywords: Laparoscopic versus open mesh inguinal, hernia, Lichtenstein repair.

INTRODUCTION

Laparoscopic surgery is another example of how technology invades medical practice forcing clinicians to adapt to usage of the newly introduced equipment sometimes to a great advantage albeit with its attendant high cost. Eventually the patient, the government and the insurance companies pay for the over zealotness of clinicians. Sometimes this is done at the expense of relegating tested, satisfactory and excellent orthodox practice to the background in favor of what is new. It is for this reason that the necessity for carrying out large scale multicenter randomized studies comparing laparoscopic mesh repair with open mesh repair for the repair of inguinal hernia has become paramount. Analyses of the most recent studies are the subject of this review.

MATERIAL AND METHODS

A literature search was conducted in BMJ, New England Journal of Medicine (NEJM), British Journal of Surgery and Journal of MAS using Highwire press and the search engine of Google. The following search terms were used laparoscopic versus open mesh repair of inguinal hernia. Lichtenstein mesh repair. Criteria for selection of literature for review were number of cases (excluded if less than 100) method of analysis (statistical or nonstatistical) operative procedure only universally accepted procedures were selected and institution where the studies were conducted (only large specialized institutions and studies conducted by MRC, NICE, and EU biomed were included which compared laparoscopic mesh repair with open mesh repair. Large studies like that of Liem et al which compared laparoscopic with

Shouldice and Basini repair and the Scandinavian studies which compared laparoscopic versus shouldice repair were excluded.

CONTENT

In the MRC trial¹ of 1000 cases compared laparoscopic mesh with Lichtenstein mesh repair reported that the laparoscopic group had less pain and more rapid return to work than their counterpart who had open mesh. However there was no recurrence in the open mesh group while 1.9% of patients in the laparoscopic group had recurrence after one year follow-up. There were three major complications in the laparoscopic group including one bladder perforation and trocar injury to the left common iliac artery.

The largest randomized trial was the one conducted by Neunayer et al, 2000 patients. This trial also compared open mesh with laparoscopic mesh repair of inguinal hernia.² Ten percent of laparoscopic group suffered recurrence compared with 4.9% in the open group at a median follow-up period of 2 years. As with the MRC studies fatal complications were more common with the laparoscopic group. There were two deaths in the laparoscopic group one resulting from intestinal perforation and the other from pulmonary embolism on the third post-operative day. Neumayer et al concluded that open technique is superior to the laparoscopic for mesh repair of primary hernia. In their randomized control trial which compared laparoscopic vs open mesh repair of 403 patients with inguinal hernia, Wellwood et al³ found that more patients in the open group (96%) than in the laparoscopic group. 89% were discharged on the same day of operation $x^2 = 6.7; 1 \text{ df}; p = 0.01$. Patients in the open group also suffered less pain on the early

postoperative period as a result of persistent effect of local anesthetic. For every activity considered the median time until return to normal was significantly shorter in the laparoscopic group. The mean cost per patient was 335 pounds costlier in the laparoscopic. They concluded that laparoscopic repair has considerable short-term clinical advantage after discharge compared with open mesh hernioplasty, although it was more expensive.

In another MRC study carried out by Lawrence et al.⁴ data was collected on 104 patients undergoing laparoscopic and open hernia repair on a day care basis in the context of a randomized control trial. They found out that the mean total health service cost of laparoscopic repair was \$1074 vs \$489 for open repair (mean difference in total health service cost \$583; 95% confidence interval CI \$265-\$904). They explained that the difference was largely accounted for the difference in theater cost. They concluded that laparoscopic hernia appears an expensive option in most plausible situation furthermore; many uncertainties still exist about long-term outcome after the procedure and about the condition necessary to maximize cost effectiveness.

In a long-term follow-up of laparoscopic transabdominal preperitoneal (TAPP) mesh repair under general anesthesia compared with open mesh repair under local anesthesia. Douek et al.⁵ reported that long-term complication occurred less frequently in TAPP patients compared with Lichtenstein group, and 4% of TAPP group experienced groin pain and numbness compared with 33% of Lichtenstein group. The symptoms were clinically important in 12 patients in the open surgery group and not in the TAPP group. Recurrence in TAPP and open repair were 2% and 3% respectively.

Paganini et al.⁶ All in their study concluded that TAPP was associated with less postoperative pain but the increase cost was uncompensated by early return to work.

DISCUSSION

In this review only studies that used mesh in the open repair were included in order to eliminate bias. All studies agreed that early postoperative pain was less in the Lichtenstein open mesh repair than with laparoscopic mesh repair but chronic pain and paraesthesia were more the Lichtenstein group. This was explained on the basis that the local anesthesia used in the open mesh group kept the patients pain free the first postoperative day but as the effect wore off pain returned.

Large single and multi-institutional studies stated that complication rate after laparoscopy hernioplasty vary from 1-13% but the complication recorded by each study differ widely and only 1-1.3% in expert specialist centers. Where as many studies reported more long-term complication in the open mesh than in laparoscopic. They also reported life-threatening complications such as bladder perforation, bowel injuries, and vascular injuries in the laparoscopic method. In a number of meta-analyses and systematic reviews on randomized

comparison of laparoscopic versus open repair sponsored by EU Biomed,^{7,8} program included 45 relative comparisons in 41 eligible trials involving over 700 patients. Individual patients data was available in 4165 patients. Meta analysis revealed that laparoscopic repair was associated with reduced recurrence rate when compared with open nonmesh repair but was not different to open mesh repair. This analysis also revealed six visceral injuries four bladder injuries, one bowel injury and three vascular injuries.

All studies unanimously agreed that cost of laparoscopic repair is very much higher than the cost of open mesh repair.²⁻⁵ The MRC studies by Lawrence et al.⁴ specifically stated that the cost per patient for laparoscopic repair was \$1074 as against \$489 for open repair. This is outrageous considering that most open repair are now carried out as day cases. The reason for this escalated cost is the cost of equipment and theater modification to accommodate the equipment and the after care of the equipment after use.

The conclusions arrived at by the various studies are as follows the MRC studies does not recommended laparoscopic approach as the method of choice for hernia repair. Neumayer et al concluded that open mesh repair is superior to laparoscopic repair for primary hernias. Wellwood and his colleague concluded in their studies that laparoscopic hernia repair has considerable advantages over open mesh repair even though more expensive. Douek et al believed that laparoscopic approach is the favored method (Table 1).

The main drawback in laparoscopic hernia are high cost and the serious complications like puncture of the bladder intestine and major blood vessels. These can be offset by thorough and intensive training of residents and the use of reusable instruments in order to bring down cost. Only then can the advantages such as short hospital stay, improved cosmesis, early return to work and patients satisfaction be meaningfully achieved.

CONCLUSION

From the review of laparoscopic versus open mesh repair of inguinal hernia there was no clear consensus on the preference of one method to the other. In advanced countries where people enjoy health insurance and are well to do and also have enough well-trained man power, laparoscopic surgery repair of inguinal hernia could be considered the favored approach. In surgically poor third world countries where people are poor and have no health insurance scheme open mesh repair will continue to be the method of choice.

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Table 1: Summary of results of the various studies reviewed: Laparoscopic versus open mesh hernia repair (TAPP = Total abdominal; laparoscopic repair OM = Open mesh repair)

Parameter	MRC 1999		NEUMAYAR et al 2004		WELLWOOD et al 1998		DOUEK et al 2003		PAGANINI et al 1997	
	TAPP	OM	TAPP	OM	TAPP	OM	TAPP	OM	TAPP	OM
Duration of OPS	Longer	Shorter	Longer	Shorter	Longer	Shorter	Longer	Shorter	Longer	Shorter
Anesthesia	GA	LA	GA	LA	GA	LA	GA	LA	GA	LA
Times of discharge	Early	Same days	Early	Same days	Early	Same days	Early	Same day	Early	Same day
Intraoperative complication	Serious	Minor		Serious	Less	Present	Less			
Postoperative complication	Less	More	Less	More	Less	More	Equal	Equal	Less	More
Time of resumption of duties	Earlier	Early	Earlier	Early	Earlier	Early				
Cost effective	More expensive	Less expensive	More	Less	More	Less	More	Less		
Quality of life	Happy	Happy	Happy	Happy	Happy	Better	OK			
Recurrence rate	Recurr	No recure	More 10.10%	Less 4.9%	More	Less				
Chronic pain	Less	More	Less	More	Less	More	Less	More	Less	More

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