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Original Article

Surgery Section

The Impact of High Surgical Volume on Outcomes From Laparoscopic (Totally Extra Peritoneal) Inguinal Hernia Repair

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ABSTRACT

Purpose: Laparoscopic hernia repair is characterised by a steep learning curve for the surgeon, and proficiency and outcomes are dependent on experience. The aim of this study was to compare laparoscopic totally extra peritoneal (TEP) inguinal hernia repair outcomes conducted by a single surgeon as experience changed over time.

Materials and Methods: Clinical records of 100 consecutive patients who underwent laparoscopic TEP inguinal hernia repair (n=113 hernias) at Kent and Canterbury Hospital by a single laparoscopic surgeon over a four-year period were reviewed for postoperative outcomes. Outcomes were compared with a previous cohort of patients undergoing TEP repair in the preceding three years.

Results: One patient experienced chronic postoperative pain, but there were no recurrences, wound infections, haematomas, or conversions compared to three recurrences, three conversions to open operations, one haematoma, and one episode of postoperative pain in the preceding period.

Conclusions: Laparoscopic TEP inguinal hernia repair can be further improved with surgical proficiency and high surgical volumes.

Keywords: General surgery, Hernia, Laparoscopic surgical procedures

INTRODUCTION

Inguinal hernia repair remains one of the most common elective general surgical procedures worldwide. Surgical techniques for this procedure have evolved over many centuries, the common key principles being reinforcement of the anterior wall of the inguinal canal and repair of the superficial ring or reinforcement of the posterior wall of the inguinal canal with repair of the deep ring [1].

There has been steady uptake of laparoscopic hernia repair since its introduction in 1990 [2], with the most popular approaches to being totally extra peritoneal (TEP) repair and transabdominal pre-peritoneal (TAPP) repair. The commonest open inguinal hernia repair technique is the Lichtenstein tension-free repair. Laparoscopic inguinal hernia repair is thought to have equivalent outcomes to open tension-free mesh repair [3,4]. The National Institute for Health and Clinical Excellence (NICE) has recognised laparoscopic inguinal hernia repair as an appropriate alternative to open repair for over 20 years [5]. In their robust review of the literature, including systematic reviews and randomised controlled trials (RCTs), NICE identified some important benefits of laparoscopic hernia repair over open repair including quicker recovery, less postoperative pain, lower incidence of chronic pain, and fewer complications. Laparoscopic repair is also preferred when there are bilateral or recurrent groin hernias. In particular, a number of studies have revealed superior postoperative recovery for laparoscopic repair [6,7]. The important prerequisites for surgical choice include availability of appropriately trained personnel, careful patient selection, and adequate patient information regarding all available options for hernia management.

However, laparoscopic hernia repair is characterised by a steep learning curve for the surgeon, and initial service set up may be expensive. In addition, the superiority of either TEP or TAPP has not been definitely established, although TEP is thought to be more technically challenging but associated with less risk of intra-abdominal visceral injuries and adhesions.

AIM AND OBJECTIVE

The aim and objective of this study were to compare laparoscopic TEP inguinal hernia repair outcomes conducted by a single surgeon as experience changed over time.

MATERIALS AND METHODS

Study cohort

This was a retrospective study of 100 consecutive patients who underwent laparoscopic TEP inguinal hernia repair at Kent and Canterbury Hospital by a single laparoscopic surgeon between November 2010 and September 2014 (3 years 10 months). All inguinal hernias repaired by other techniques were excluded.

Data on chronic pain, conversion to open procedure, haematoma occurrence, recurrence, length of hospital stay, and other complications were obtained from theatre management systems and clinic/ward records. Results were compared to previous outcomes by the same surgeon (i.e., 100 consecutive laparoscopic TEP inguinal hernia repair patients) conducted prior to 2010.

Laparoscopic (TEP) inguinal hernia repair

Operations were undertaken under general anaesthesia using a three port technique (a 10mm port two finger breadths below the umbilicus for the camera, a suprapubic 5mm port, and a 5mm port between the two). Dissection in TEP is, by definition, exclusively extra peritoneal: the hernia sac is dissected free from the inguinal canal and off the abdominal wall, and an appropriately sized mesh is subsequently placed over the deep inguinal ring and posterior wall of the inguinal canal to treat the hernia.

STATISTICAL ANALYSIS

Differences in outcomes were compared using Fisher's exact test and a p-value of 0.05 was considered statistically significant.

RESULTS

One hundred and thirteen inguinal hernias were treated in 100 consecutive patients during the study period using the laparoscopic (TEP) repair technique. Forty-eight patients had an isolated right inguinal hernia, 39 patients had an isolated left inguinal hernia, and 13 patients had bilateral inguinal hernias. A total of 61 right inguinal hernias and 52 left inguinal hernias were repaired. Eight of the left inguinal hernias were recurrent, while a single right inguinal hernia was recurrent. The surgeon performed an annual average of 28

laparoscopic (TEP) hernia operations over the current study period.

The majority of patients were male (95/100), and the median age of all patients was 62 years. The average operating time was 15 to 20 minutes per hernia. Seventy-nine patients were treated and discharged home on the same day, 20 patients were discharged on the next day (primarily on account of the procedure being undertaken late in the day or delayed recovery from the anaesthetic), and one patient spent three days in hospital due to urinary retention. Outcomes are detailed in [Table/Fig-1]: in addition to acute urinary retention, one patient experienced chronic postoperative pain but there were no recurrences, wound infections, haematomas, or conversions. This is compared to three recurrences, three conversions to open operations, one haematoma, and one episode of postoperative pain in the preceding period.

Outcome	Early cohort (pre-2010)	Current cohort (2010-2014)	p-value
Acute urinary retention	0	1	1.00
Chronic postoperative pain	1	1	1.00
Recurrence	3	0	0.25
Wound infection	0	0	1.00
Haematoma	1	0	1.00
Conversion to open repair	3	0	0.25

[Table/Fig-1]: Outcomes from laparoscopic TEP inguinal hernia repair

DISCUSSION

Here, we show that outcomes from laparoscopic (TEP) inguinal hernia repair improve over time. The learning curve for the beginner surgeon for independent safe laparoscopic (TEP) surgery is estimated to be 40 to 60 procedures [8-10]. Learning is a continuous process, and results are likely to improve with practice, as shown here.

There were improvements in all major outcomes between the two time points studied. Prior to the current study, the investigating surgeon had already logged laparoscopic (TEP) inguinal hernia surgery in 184 patients, suggesting that by approximately 200 procedures his/her proficiency is excellent and complications are fully minimised. Importantly, no recurrences were noted despite the higher proportion of recurrent hernias treated in the current cohort.

Considering the shorter operating time and improved outcomes compared to open surgery, laparoscopic TEP inguinal hernia repair appears to be the operation of choice for inguinal hernia repair. Current evidence suggests that laparoscopic TEP inguinal hernia repair outcomes are similar to those from laparoscopic TAPP repair [11]. In addition, many patients prefer laparoscopic surgery due to the cosmetic, as well as clinical, benefits.

Some studies have reported higher complication rates with laparoscopic vs. open repair and possible better overall outcomes with open hernia repair [12,13]. Our local experience, however, suggests that poor outcomes from laparoscopy can be attributed to surgeons having less experience with laparoscopy and that laparoscopic hernia surgery improves with experience [14]. The precise volume threshold for laparoscopic TEP hernia repair to optimise outcomes is unclear. This study suggests improvements in outcomes are possible beyond about 150 procedures.

LIMITATIONS

This study has a number of limitations. No elective uneventful inguinal hernia repair patient was followed up routinely, which is in accordance with standard national practice. As a result, only early postoperative outcomes or re-admissions were identified. Patients who relocated from our local region and developed a complication were potentially missed.

CONCLUSION

Laparoscopic TEP inguinal hernia repair can be further improved with surgical proficiency and high surgical volumes. A prospective randomised study comparing laparoscopic (TEP) hernia repair with conventional open mesh hernia repair in surgeons conducting large volumes of cases (150 or more operations) is required.

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