Original Article

# Laparoscopic total extra-peritoneal inguinal hernia repairs by a surgeon experienced at laparoscopic cholecystectomy

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## Abstract

**Objective:** To measure standards achieved at total extra peritoneal hernia repair by a surgeon experienced in laparoscopic cholecystectomy, and to compare the results with standards identified by the National Institute for Clinical Excellence.

**Methods:** The outcomes of the first 100 consecutive total extra-peritoneal hernia repair cases by the surgeon were retrieved retrospectively. The surgeries were conducted between January 2006 and July 2007. Data was collected 14 to 17 months post-surgery.

**Results:** All patients were men with a median age of 58 years, ranging from 20 to 91 years. The maximum operating time was 75 minutes, while the minimum was 30 minutes. The conversion rate was 3% (n=3) and the recurrence rate 4% (n=4). Complications experienced included a chronic groin pain and one umbilical port-site haematoma.

**Conclusion:** Though related to a single-surgeon experience, the study highlighted reduced preceptorship due to previous laparoscopic skills that were transferable. Patients should have a choice to opt for either open or laparoscopic inguinal hernia repair.

**Keywords:** Hernia inguinal, Laparoscopy, Surgical mesh, Skill, Surgery, Training. (JPMA 62: 1301; 2012)

## Introduction

Laparoscopic surgery is at the forefront of improving the quality of operative surgery. Dr. Foster has shown that inguinal hernia repair is the fourth commonest operation in the United Kingdom, accounting for 36.3% of day surgery procedures.[1]

Laparoscopic hernia repairs include the total extra-peritoneal (TEP) and the transabdominal preperitoneal (TAPP) repairs. Unlike TAPP, TEP repair require neither the creation of a pneumoperitoneum, nor an entry into the abdominal cavity. Laparoscopic hernia repairs are associated with less post-operative pain and have a faster recovery time.[2] In a recent Cochrane review, TEP was favoured over TAPP due to fewer operative complications.[3]

We hypothesised that TEP repairs by a surgeon experienced in laparoscopic cholecystectomy would have no adverse effect. To ascertain this, the study findings were compared with standards published by National Institute for Clinical Excellence (NICE) Technology Appraisal number 83 of 2004.[4]

## Patients and Methods

The data was collected retrospectively for the study which was an audit of our results. It comprised the first consecutive 100 TEP hernia repairs by a single surgeon. Standard informed consent was obtained from all the patients. The study was carried out at Kent and Canterbury Hospital from January 2006 to July 2007. The data was collected and collated from case notes. Data-collection was done 14 to 17 months after surgery.

Information collected included the patients' age, side and type of hernia. The operative notes specifically confirmed the surgical procedure, conversion to open surgery, mesh fixation, per-operative complications (vascular, bowel, and visceral injuries). The operating time was obtained from the anaesthetists' capnograph. The time was rounded to the closest 5 minutes. The post-operative complications (such as haematoma, pain, and recurrence of hernia) were looked for, and identified in the case notes.

All elective patients fit for general anaesthesia who had an inguinal hernia were considered suitable for TEP. The only exclusion criterion was the presence of an infra-umbilical midline scar.

All operations were performed in day surgery. The procedure was carried out using three midline incisions. An extra-peritoneal space was produced via a sub-umbilical incision using the extra view balloon (Auto Suture®). The space was maintained with carbon dioxide gas insufflation to a

pressure of 12mm Hg. This 10mm sub-umbilical port was used for the laparoscopic camera. The remaining two ports were 5mm each and were used as operating ports. The hernia defects were repaired with a 10x15cm proline mesh (Ethicon®).

The initial 30 patients' operations had no fixation of the proline mesh. The subsequent 70 operations had the mesh anchored to the anterior abdominal wall. The tacks used to fix the mesh (Protac Ethicon®) were applied medial to the inferior epigastric vessels.

Initially, 30 patients were followed up in the clinic at 6 to 10 weeks post-surgery. Thereafter, under policy review, the followup was left to 'as and if required.'

The surgeon concerned had the time three years' experience of undertaking laparoscopic cholecystectomy as a consultant. His exposure to laparoscopic hernia repair was confined to observing and assisting his consultant. He had also attended a course on laparoscopic hernia repair in Guilford, Sussex, UK.

For statistical proposes, events were recorded to work out percentages and frequencies of recurrence, conversion and complications.

## Results

During the study period, 139 patients with inguinal hernia were treated in total. Of these, the case notes of 5 patients were missing, and 34 patients had open repair. Open repair was the result of patients being unfit for general anaesthesia, the surgeon being on leave, or because of a lower abdominal scar. The remaining 100 cases were undertaken laparoscopically using the TEP method. Hernia types were first identified (Figure-1).

Associated pathologies encountered during TEP repair

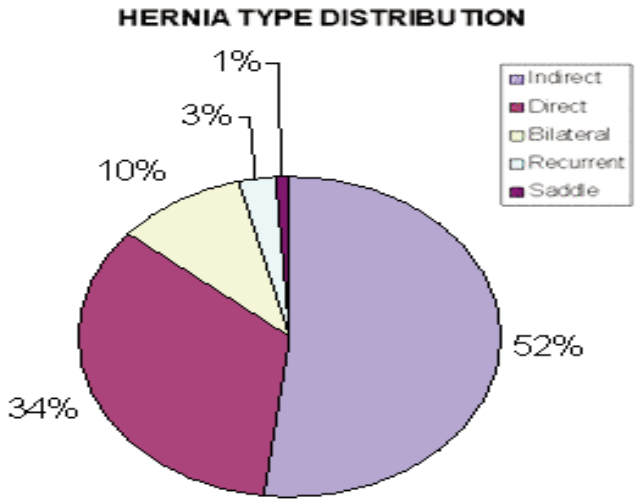


Figure-1: Hernia types and distribution. The pie chart identifies the inguinal hernia case mix the surgeon was exposed to. The majority of the cases were indirect inguinal hernias.

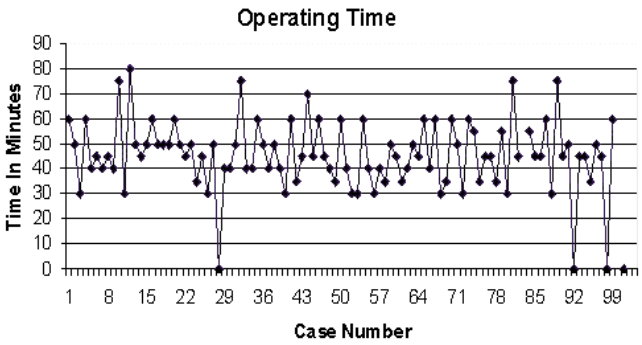


Figure-2: Operating times. The graph shows the individual operating times in chronological order. The operating times ranged between 30 and 80 minutes. The four cases showing zero operating times equate to the unavailability of capnographs.

included a femoral hernia, an umbilical hernia, and three large lipoma of the cord. All but the umbilical hernia were managed laparoscopically. An anal polyp excision was combined with TEP repair in one case.

All (100%) patients were male with a median age of 58 years (range 20 to 91 years). The median operating time was 45 minutes. The maximum operating time for a unilateral TEP repair was 75 minutes and the shortest time was 30 minutes. Two (2%) cases required additional procedures combined. One (1%) required the repositioning of the patient to excise an anal polyp, and took 80 minutes. The second that took 75 minutes had its umbilical port incision extended to repair an umbilical hernia.

Four (4%) patient records had no capnograph readings, preventing analysis (Figure-2). In the remaining 96 (96%) patients, operating times were similar in the first and second halves of the study. That is 10/11 patients taking >60 minutes respectively and 15/20 taking <40 minutes.

As for the outcomes, 3 (3%) patients were converted to open mesh repair. In chronological sequence they were cases numbers 10, 12 and 65. Two resulted from the inability to reduce the hernia. The third had an infra-umbilical midline scar that was missed during case selection. This scar prevented formation of the extra-peritoneal operating space.

There were four (4%) hernias that recurred; two occurring in the first 30 operation and not identified in the initial outpatient followup. They occurred prior to

**Table: Comparison of study findings to published standards.**

| | NICE Standards* | Study Results |
|---|---|---|
| Average Operating Time | 55 - 95 minutes | 45 minutes |
| Conversion | Not stated | 3% |
| Recurrence | 2.3% | 3.9% |
| Persistent Pain | RR of 0.67 | 0.9% |
| Vascular Injuries | 0.3% | 0.0% |
| Serious Complications | 1.1% | 0.0% |

*NICE Technology Assessment 2004.
NICE: National Institute for Clinical Excellence.
RR: Relative risk.

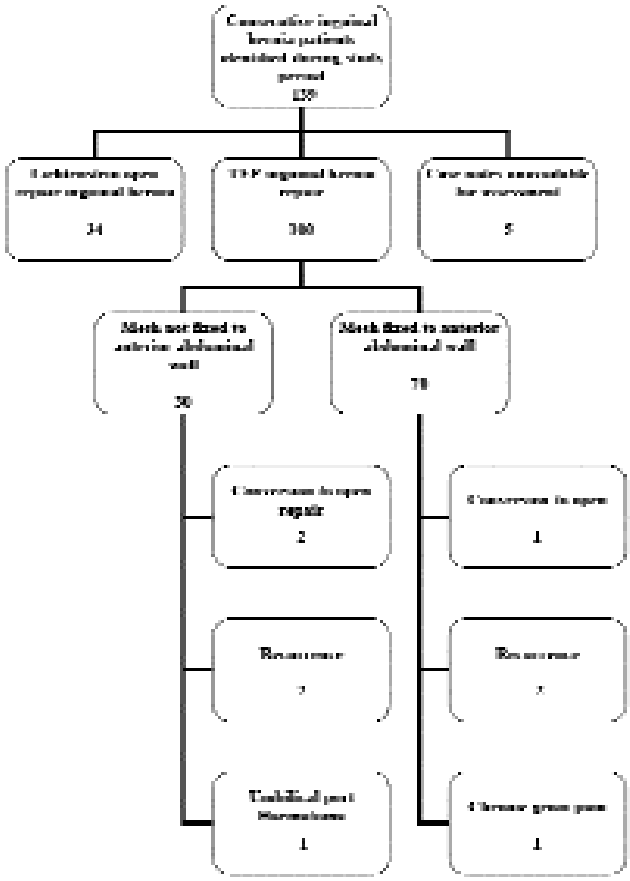

Figure-3: The Consort.

incorporating mesh fixation into our practice. The subsequent 70 cases (with mesh fixation) had a further two recurrences. All recurrences were medial to the mesh and were re-operated and repaired using the Lichtenstein method.

There were no visceral or vascular injuries (spermatic cord, urinary bladder, bowel or femoral vessels).

Of the 2 (2%) post-operative complications identified, one patient developed an umbilical port haematoma that needed evacuation. The second experienced no relief of pre-existing groin pain which had been thought to be due to the hernia.

These findings were compared with published NICE results (Table).

## Discussion

The demographics and hernia type mixes in the study were similar to other studies done earlier.[5-7]

Increasing evidence of safety, decreased recovery time, less pain, and fewer complications support the use of laparoscopic inguinal hernia repair.[7]

Studies involving Objective Structured Assessment of Technical Skills (OSATS) and Hand Motion Analysis (HMA) suggest that surgeons can develop their skills to become competent in laparoscopic surgery regardless of their experience and age.[8]

Practically, the competency assessment metrics for laparoscopic hernia repair include operating time, conversion rate, complications, and early recurrence,[9] and these measures were used in the current study.

Assessing operating time rounded to the closest 5 minutes from the capnograph is pragmatic. By including elements of anaesthetic induction and recovery time, it may exceed figures from other reports. Nevertheless, the operating time median in this study was an acceptable 45 minutes. This compares favourably with 55-95 minutes in NICE guidlines, 58 minutes for the Medical Research Council (MRC)[10] and 50 minutes reported by an earlier study.[11] These three pieces of data also showed an average operating time of 45 minutes for the conventional Lichtenstein operation. Meta-analysis, however, does indicate that laparoscopic hernia repair takes longer than open surgery.[12]

The recurrence rate in this study was 3.9% which is higher than the 2.3% quoted by NICE. This resulted from 2 recurrences in our initial 30 TEP repairs to a recurrence rate of 6.6%.

Following a change of practice to fixing the mesh, there was a fall to 2.8% in the subsequent 70 operations, which is a result that is close to the NICE standard of 2.3%. All recurrences were identified on referral by GP. A study also reported a similar recurrence rate of 2.5%.[8]

Change of practice and perhaps progress along the learning curve may have improved our results. It could be argued that physical followup in clinics may identify further recurrences.

The short learning curve is also identified by an operating time drop. The first 50 cases had a median operating time of 47 minutes that dropped to 45 minutes in the subsequent 50 cases. This was in spite of the additional task of fixing the mesh.

Our conversion rate of 3% could not be compared with NICE as it gave no conversion data. Other comparable studies identify conversion rates of 1.2% and 2.8% to open or TAPP repair.[13,14]

The Cochrane group and European Hernia trialists reviewed laparoscopic hernia repair-related complications. They identified a serious injury rate of 0.3% for visceral and 0.3% for vascular injuries though they did not differentiate between TAPP and TEP repairs. No such serious complications occurred in this study and we feel that this may reflect on the choice of TEP in which the abdominal cavity is not entered into, and on the previous experience of the operator in laparoscopy.

In this group of patients, post-operative complications were also infrequent and compared favourably with published results.[15]

## Conclusion

A surgeon with experience of laparoscopic cholecystectomy can achieve NICE standards for TEP hernia repairs with a relatively short learning curve.

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