Outcome and cost comparison of laparoscopic transabdominal preperitoneal hernia repair versus open Lichtenstein technique

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Two hernia repair methods, laparoscopic transabdominal preperitoneal (TAPP) repair and tension-free open mesh/Lichtenstein inguinal hernia repair, were compared. Polypropylene mesh was used in both methods to cover the inguinal and the posterior wall.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised male patients with inguinal hernia who had no co-morbidity (absence of any other systemic illness), and had not been operated on before and were suitable for general anaesthesia. Only patients who did not suffer from emergent, bilateral, or recurrent hernia were included in the study.

Setting
The setting was secondary care. The economic analysis was carried out in Turkey.

Dates to which data relate
The authors did not report the dates to which the effectiveness and cost data related. The price year was not reported.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
Although not explicitly reported, it seems that the costing has been carried out prospectively on the same sample of patients as that used in the effectiveness analysis. The sample size was not determined in the planning phase of the study. In addition, no power calculations on the existing sample were performed retrospectively. The method used to select the sample was not reported. The study sample comprised 50 male patients who fulfilled the inclusion and exclusion criteria. Of these, 25 underwent the TAPP method and 25 underwent the open Lichtenstein inguinal method.

Study design
The authors reported that the analysis was based on a prospective single-centred randomised study. However, the method of randomisation was not reported. The mean duration of follow-up was 13.5 months (range: 8 - 28) and no
losses to follow-up were reported.

Analysis of effectiveness

It was not reported whether the analysis was conducted on an intention to treat basis. The primary outcomes used were:

- the mean operation time;
- postoperative pain, measured using a visual analogue scale (VAS) that classified pain on a 10-mm scale;
- postoperative analgesic consumption, measured as the number of 500-mg metamizole sodium pills;
- postoperative complications (e.g. scrotal haematoma, wound infection);
- the duration of hospital stay; and
- the recurrence rate during the follow-up period.

The Mann-Whitney U-test was used for the statistical analysis and p-values less than 0.05 were considered statistically significant. The statistical analysis demonstrated that the two groups were comparable in terms of the baseline characteristics.

Effectiveness results

The mean operation time was not statistically significantly different between the two groups.

Postoperative pain, as described by the patients at 12 and 24 hours after operation, differed significantly in the two groups. At 12 hours it was 54.1 (+/- 13.1) in the open group and 38.9 (+/- 8.2) in the TAPP group. At 24 hours it was 37.2 (+/- 11.4) in the open group and 20.9 (+/- 8.7) in the TAPP group.

At 48 hours and on the 7th day after operation, postoperative pain was not statistically significantly different in the two groups.

The mean consumption of analgesics, although lower in the TAPP group, did not differ significantly between the groups.

In the open group there were two cases with postoperative complications (one with scrotal haematoma and one with superficial wound infection). Both were treated effectively without the need for a second operation.

In the TAPP group two patients were readmitted to the hospital because of pain, swelling and purulent discharge in the inguinal region. One patient was cured after receiving antibiotics, but the second had to be operated on and have the mesh removed.

The duration of postoperative hospitalisation was 2.1 days (range: 1 - 5) in the open group and 1.6 days (range: 1 - 3) in the TAPP group. The difference was statistically significant, (p<0.05).

The recurrence rate was zero for both groups during the follow-up period.

Clinical conclusions

The authors concluded that both methods were equally effective in terms of operation time, postoperative complications and the short-term recurrence rate. The laparoscopic intervention resulted in less pain than the open procedure and increased patient satisfaction. However, the use of antibiotics after operation remains doubtful.

Measure of benefits used in the economic analysis
No summary benefit measure was used in the economic analysis. The study was, in effect, a cost-consequences analysis.

**Direct costs**
The economic analysis focused on hospital costs, namely the cost of the bed, mesh and operating room. No detailed description of either the costs or quantities was provided. The costs were incurred during less than 2 years and discounting was therefore not relevant. The dates to which the costs related were not reported. The price year was also not reported.

**Statistical analysis of costs**
The costs were treated deterministically.

**Indirect Costs**
The indirect costs were not included in the analysis.

**Currency**
The costs were reported in US dollars ($), but the conversion rate from the original currency was not reported.

**Sensitivity analysis**
No sensitivity analysis was performed.

**Estimated benefits used in the economic analysis**
See the 'Effectiveness Results' section.

**Cost results**
The average costs per patient were reported. The mean total cost was $629 per patient in the open group and $1,100 per patient in the TAPP group. The difference was statistically significant, (p=0.001).

**Synthesis of costs and benefits**
The costs and benefits were not combined

**Authors’ conclusions**
Although patient satisfaction was greater in the transabdominal preperitoneal (TAPP) group, the cost-difference between the two techniques was prohibitively high for Turkey.

**CRD COMMENTARY - Selection of comparators**
The authors gave a justification for their choice of the comparators. You should decide if these are widely used health technologies in your own setting.

**Validity of estimate of measure of effectiveness**
The analysis was based on a single-centre randomised study, which was appropriate given the study question. The sample selection method was not reported so we cannot be clear that the study sample was representative of the study population. The method of randomisation was not reported but the patient groups were shown to be comparable at analysis. Appropriate statistical analyses were undertaken to account for potential biases and confounding factors. Since no power calculations were reported, it is unclear if the sample was large enough. Altogether, it was difficult to judge
the internal validity of the study.

**Validity of estimate of measure of benefit**
The authors did not derive a summary measure of benefit. In effect, a cost-consequences analysis was performed.

**Validity of estimate of costs**
Hospital costs were included in the analysis. Although the sources of the costs were not reported, the costs were most probably derived from the authors' setting. The authors only reported the total costs, thus it was impossible to determine whether all the relevant costs were included. The quantities of resources used were also not reported. A sensitivity analysis was not conducted and the price year was not reported. These factors would prevent the analysis from being easily reworked for other settings.

**Other issues**
The authors compared the effectiveness results with those from other studies which, in general, showed that their findings were in agreement with those published in the literature. The issue of generalisability to other settings was not addressed. The authors do not appear to have presented their results selectively. The study enrolled patients with uncomplicated or unilateral hernias and this was reflected in the authors' conclusions. The authors did not report any limitations to their study.

**Implications of the study**
The authors argued that, owing to its prohibitive costs, they had to "limit the use of laparoscopic TAPP procedure to only bilateral or recurrent groin hernias until the expenses of open and laparoscopic interventions begin to equalize". They also suggested that, to avoid unknown complications, more training in laparoscopic techniques is required. They did not recommend further research. However, the discussion indicated areas (e.g. cost analysis) where more information is required.

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