Anterior, posterior, or laparoscopic approach for the management of adrenal diseases?
Linos D A, Stylopoulos N, Boukis M, Souvatzoglou A, Raptis S, Papadimitriou J

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
Anterior, posterior and laparoscopic adrenalectomy for the management of adrenal diseases.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Male and female patients who underwent surgical resection of the tumour via the anterior, posterior or laparoscopic approach. No further details were given.

Setting
Hospital. The economic study was carried out in Greece.

Dates to which data relate
The main effectiveness data were derived from a single study conducted between 1984 and 1995. Resource and cost data were obtained from 1984-1995 sources. The price year was not stated.

Source of effectiveness data
The estimates for operating time, morbidity, length of postoperative stay, intra-operative complications, postoperative pain and recurrence rate were derived from a single study.

Link between effectiveness and cost data
The costing was retrospectively undertaken on a patient who would have been operated on by either of the two procedures.

Study sample
One hundred and sixty-five patients who underwent surgical resection of the tumour via either anterior, posterior or laparoscopic procedures were included in the analysis: 86 underwent anterior adrenalectomy (49 women, mean age: 46.4 years, range: 14 - 78 years), 61 underwent posterior adrenalectomy (43 women, mean age: 43.8 years, range: 14 - 74 years) and 18 underwent laparoscopic adrenalectomy (10 women, mean age: 48.7 years, range: 28 - 66 years). Power calculations to determine the sample size were not undertaken.
Study design
Non-randomised trial with historical controls. The duration of the follow-up was from 3 months to 10 years. The loss to follow-up was not stated.

Analysis of effectiveness
The analysis of effectiveness was based on treatment completers only. The primary health outcomes were operating time, morbidity, length of post-operative stay, nitre-operative complications, postoperative pain (patient-controlled analgesia) and recurrence rate.

Effectiveness results
The mean operating time for unilateral adrenalectomy was 155.3 minutes (range: 75 - 315), 108.6 minutes (range: 60 - 195) and 116.1 minutes (range: 75 - 180) for the anterior (p=0.4), the posterior (p=0.0002) and the laparoscopic approach, respectively. The corresponding figures for bilateral adrenalectomy were 165 minutes for the anterior approach and 178 minutes for the posterior approach, (p=0.1). The morbidity was 13.9%, 9.8% and 0% for the anterior, posterior and laparoscopic approach, respectively. The mean length of postoperative hospitalisation was 8, 4.5 and 2.2 days for the anterior, posterior and laparoscopic approach (p=0.02), respectively. There were no intra-operative deaths. Patient-controlled analgesia was used for a mean of 1.08 days (range: 0 - 1.5) for the anterior approach, 2.3 days (range: 1 - 4) for the posterior approach and 3.4 days (range: 1 - 9) for the laparoscopic approach. None of the followed patients experienced recurrence of their adrenal diseases.

Clinical conclusions
The laparoscopic approach for the management of adrenal diseases was shown to be the safest and least painful operation with shorter in-hospital stay and the best cosmetic and long-term results. The posterior approach was the fastest of all and a better overall operation than the anterior approach which should be reserved only for the removal of very large adrenal tumours and when concomitant intra-abdominal procedures, which cannot be handled laparoscopically, are anticipated.

Measure of benefits used in the economic analysis
No summary benefit measure was used in the analysis and as such the benefits are considered to be the same as the outcome measures.

Direct costs
The expected hospital charges for anterior, posterior and laparoscopic procedures (including components such as operating room occupancy, room, drugs and instruments) were included in the analysis. The quantities were reported separately from the prices. Discounting was not relevant due to the short period of analysis. The quantity/cost boundary adopted was the hospital. The price year was not stated.

Statistical analysis of costs
Not undertaken.

Indirect Costs
Not considered.

Currency
US dollars ($). The conversion rate was not stated.
Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
The mean operating time for unilateral adrenalectomy was 155.3 minutes (range: 75 - 315), 108.6 minutes (range: 60 - 195) and 116.1 minutes (range: 75 - 180) for the anterior (p=0.4), the posterior (p=0.0002) and the laparoscopic approach, respectively. The corresponding figures for bilateral adrenalectomy were 165 for the anterior approach and 178 minutes for the posterior approach, (p=0.1). The morbidity was 13.9%, 9.8% and 0% for the anterior, posterior and laparoscopic approach, respectively. The mean length of postoperative hospitalisation was 8, 4.5 and 2.2 days for the anterior, posterior and laparoscopic approach (p=0.02), respectively. There were no intra-operative deaths. Patient-controlled analgesia was used for a mean of 1.08 days (range: 0 - 1.5) for the anterior approach, 2.3 days (range: 1 - 4) for the posterior approach and 3.4 days (range: 1 - 9) for the laparoscopic approach. None of the followed patients experienced recurrence of their adrenal diseases.

Cost results
The average expected cost for uncomplicated laparoscopic adrenalectomy was $2,920 compared with $2,724 for open adrenalectomy. The mean pharmacy costs were $263 for uncomplicated laparoscopic adrenalectomy compared with $526 for open adrenalectomy. The hospitalisation costs for uncomplicated laparoscopic adrenalectomy were $330 versus $549 for open adrenalectomy. The total instrument cost for uncomplicated laparoscopic adrenalectomy was $746 compared with $530 for open adrenalectomy.

Synthesis of costs and benefits
Costs and benefits were not combined.

Authors’ conclusions
The laparoscopic approach is very attractive because of the significantly less postoperative pain (resulting in lower pharmacy cost), the minimal incisions, the early return to work (resulting in lower hospitalisation costs) and the lack of postoperative complications.

CRD COMMENTARY - Selection of comparators
The reason for the choice of comparator is clear. Initially the anterior approach has been used for almost every adrenal tumour. During the latter half of the past decade, the use of posteriorly performed operations increased because of observed advantages of this technique. Since October 1993, laparoscopic adrenalectomy has been performed and this technique replaced other surgical approaches for almost every adrenal pathology (except for very large tumours). You, as a user of this database, should consider whether these are widely used health technologies in your own setting.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis and as such the authors conducted a cost and outcomes analysis. The data have not been used selectively but a full economic evaluation using one benefit measure would be required to ensure greater validity.

Validity of estimate of costs
Resource quantities were reported separately from the prices. Adequate details of the methods of quantity/cost estimation were given. However, no statistical analysis was conducted and the totals were derived from the "mean" values for patient groups. As the study was retrospective, the costs need to be treated with a degree of caution.

Other issues
The authors’ conclusions are likely to be justified given the uncertainties in the data. The issue of generalisability to other settings/countries was not addressed. However, appropriate comparisons were made with other studies in terms of their results. As the period of follow-up ranged from 3 months to 10 years it is difficult to assess the comparability of each procedure in the long run.

**Implications of the study**
As the authors noted, further retrospective (or preferably prospective if now ethical) detailed cost analysis is required to confirm these preliminary results.

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