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
Three options for the treatment of ureteropelvic junction (UPJ) obstruction were examined. These were laparoscopic pyeloplasty, Acucise endopyelotomy and open pyeloplasty. No health technology was explicitly stated as the comparator.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised all adult patients undergoing surgical correction of UPJ obstruction at Vanderbilt University Medical Center between December 1999 and August 2001.

Setting
The setting was secondary care. The economic study was carried out at the Vanderbilt University Medical Center, USA.

Dates to which data relate
The effectiveness and resource used data were collected between December 1999 and August 2001. The cost data referred to the same period.

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

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that used in the effectiveness study. It was unclear whether the costing was prospective or retrospective.

Study sample
The sample size was not determined in the planning phase of the study to assure a certain power. In addition, power calculations were not performed retrospectively. The sample was made up of all patients in the study population. It appears that the patients chose, or at least had some involvement in choosing, the type of surgical procedure that would be conducted on them. The study sample appears to have been appropriate for the clinical study question. The study involved 17 laparoscopic pyeloplasty patients (all operated on by the same surgeon), 9 patients treated with Acucise...
endopyelotomy (8 of whom were operated on by the surgeon who performed the laparoscopic pyeloplasty procedures), and 7 patients who underwent open pyeloplasty procedures (operated on by four different surgeons).

**Study design**
This appears to have been a prospective cohort study that was carried out in a single centre. The mean follow-up was 11 months (range: 1 - 23 months) in the laparoscopic pyeloplasty group, 9.9 months (range: 1 - 29) in the Acucise endopyelotomy group and 5.4 months (range: 1 - 16) in the open pyeloplasty group.

One of the patients in the laparoscopic pyeloplasty group had severe periureteral fibrosis from a prior endopyelotomy and Acucise procedure. It was reported that this patient underwent a Davis intubated ureterotomy and was excluded from further analysis. Thus, the results in the laparoscopic pyeloplasty group relate to 16 patients. It should also be noted that cost data were not available for 2 patients from the Acucise endopyelotomy group, as they were either treated as outpatients or with a 23-hour observation.

**Analysis of effectiveness**
The analysis of effectiveness was conducted on the basis of treatment completers only. The health outcomes used were:

- the success rate,
- the mean operating time,
- the mean estimated blood loss (EBL),
- the mean time to oral intake,
- the mean amount of analgesia required, and
- the mean length of hospital stay.

The authors stated that the three patient groups were compared on demographic variables. They did not report any similarities or differences between the groups.

**Effectiveness results**
The success rate was 94% in the laparoscopic pyeloplasty group, 56% in the Acucise endopyelotomy group and 86% in the open pyeloplasty group. Comparisons of the success rates were made between the laparoscopic pyeloplasty group and the Acucise endopyelotomy group, (p=0.04), the laparoscopic pyeloplasty group and the open pyeloplasty group, (p=0.57), and the Acucise endopyelotomy group and the open pyeloplasty group, (p=0.18).

The mean operating times were 3.3 hours in the laparoscopic pyeloplasty group, 1.7 hours in the Acucise endopyelotomy group and 3.4 hours in the open pyeloplasty group. Comparisons were made between the laparoscopic pyeloplasty group and the Acucise endopyelotomy group, (p<0.001), the laparoscopic pyeloplasty group and the open pyeloplasty group, (p=0.97), and the Acucise endopyelotomy group and the open pyeloplasty group, (p<0.001).

The mean EBL was 86 mL in the laparoscopic pyeloplasty group, 51 mL in the Acucise endopyelotomy group and 114 mL in the open pyeloplasty group. Comparisons were made between the laparoscopic pyeloplasty group and the Acucise endopyelotomy group, (p=0.20), the laparoscopic pyeloplasty group and the open pyeloplasty group, (p=0.66), and the Acucise endopyelotomy group and the open pyeloplasty group, (p=0.13).

The mean time to oral intake was 16 hours in the laparoscopic pyeloplasty group, 7.9 hours in the Acucise endopyelotomy group and 22 hours in the open pyeloplasty group. Comparisons were made between the laparoscopic pyeloplasty group and the Acucise endopyelotomy group, (p=0.008), the laparoscopic pyeloplasty group and the open pyeloplasty group, (p=0.55), and the Acucise endopyelotomy group and the open pyeloplasty group, (p=0.06).
The mean analgesia use was 27.2 mg morphine equivalent in the laparoscopic pyeloplasty group, 22.4 mg morphine equivalent in the Acucise endopyelotomy group and 124.2 mg morphine equivalent in the open pyeloplasty group. Comparisons were made between the laparoscopic pyeloplasty group and the Acucise endopyelotomy group, (p=0.84), the laparoscopic pyeloplasty group and the open pyeloplasty group, (p=0.02), and the Acucise endopyelotomy group and the open pyeloplasty group, (p=0.02).

The mean length of hospital stay was 1.4 days in the laparoscopic pyeloplasty group, 1.3 days in the Acucise endopyelotomy group and 3.0 days in the open pyeloplasty group. Comparisons were made between the laparoscopic pyeloplasty group and the Acucise endopyelotomy group, (p=0.97), the laparoscopic pyeloplasty group and the open pyeloplasty group, (p=0.03), and the Acucise endopyelotomy group and the open pyeloplasty group, (p=0.02).

**Clinical conclusions**

The authors reported that laparoscopic pyeloplasty achieves a success rate equal to that of open pyeloplasty, while providing a recovery similar to that obtained with Acucise endopyelotomy.

**Measure of benefits used in the economic analysis**

No summary measure of benefit was used in the economic analysis. In effect, a cost-consequences analysis was performed.

**Direct costs**

The resource costs and quantities were not reported separately. The costs included in the analysis were the hospital costs. The authors reported that they collected costs for the operating room supplies, anaesthesia, recovery room, operating room time, total operating room, and total hospital stay. The direct cost data were obtained from the Vanderbilt University Medical Center Patient Database. A model was not employed to extrapolate to a longer timeframe or to another setting. The authors reported that the dollar amounts reported in the paper reflect the actual cost to the institution and were not charges billed to the patient. Discounting was not relevant because the study took place during less than a 2-year period. The study reported the mean costs. The price data referred to the time between December 1999 and August 2001.

**Statistical analysis of costs**

Statistical analyses of the costs or resources were not reported.

**Indirect Costs**

The indirect costs were not reported.

**Currency**

US dollars ($).

**Sensitivity analysis**

Sensitivity analyses were not reported.

**Estimated benefits used in the economic analysis**

See the 'Effectiveness Results' section.

**Cost results**

The total operating room costs were $5,003 in the laparoscopic pyeloplasty group, $4,619 in the Acucise
endopyelotomy group and $3,979 in the open pyeloplasty group. Comparisons were made between the laparoscopic pyeloplasty group and the Acucise endopyelotomy group, (p=0.84), the laparoscopic pyeloplasty group and the open pyeloplasty group, (p=0.02), and the Acucise endopyelotomy group and the open pyeloplasty group, (p=0.58).

The total hospital costs were $6,938 in the laparoscopic pyeloplasty group, $6,788 in the Acucise endopyelotomy group and $6,966 in the open pyeloplasty group. Comparisons were made between the laparoscopic pyeloplasty group and the Acucise endopyelotomy group, (p=0.99), the laparoscopic pyeloplasty group and the open pyeloplasty group, (p=1.0), and the Acucise endopyelotomy group and the open pyeloplasty group, (p=0.99).

The total treatment costs, including the costs of secondary treatment in the event of a failed primary procedure, were $7,345 in the laparoscopic pyeloplasty group, $9,853 in the Acucise endopyelotomy group $7,916 in the open pyeloplasty group. P-values were not reported.

Synthesis of costs and benefits
Not applicable.

Authors' conclusions
Laparoscopic pyeloplasty provides operating times, total hospital costs and success rates equivalent to those of open surgery. The authors stated that patients treated laparoscopically benefit from the minimally invasive approach, with reduced morbidity and a recovery time similar to that seen with endoscopic treatments for ureteropelvic junction (UPJ) obstruction.

CRD COMMENTARY - Selection of comparators
No health technology was explicitly stated as the comparator. It was reported that open pyeloplasty has been considered the "gold" standard and that laparoscopic pyeloplasty is the treatment of choice for UPJ obstruction in some centres. You should decide if the comparators represent current practice in your own setting.

Validity of estimate of measure of effectiveness
This study was of a cohort design which, although appropriate for the study question, does not in itself provide sufficient evidence on which to recommend changes in clinical practice. The study sample included the whole study population and thus can be considered to have been representative of that population. However, full details of the characteristics of the study population were not reported in this paper. The original paper did not report whether or not the patient groups were comparable at analysis. The analysis of effectiveness appears to have been handled credibly.

Validity of estimate of measure of benefit
The authors did not derive a summary measure of health benefit. The study was, in effect, a cost-consequences analysis.

Validity of estimate of costs
It would appear that all the relevant categories of cost were included in the analysis. Full details of the costing were not reported, so it is not possible to comment on whether or not all the relevant costs within each cost category were included in the analysis. The unit costs were not reported separately from the resource quantities. Resource use was not reported. No analyses of the prices were carried out. Charges were not used to proxy prices.

Other issues
The authors appear to have made appropriate comparisons of their results with the findings from other studies. However, the issue of generalisability to other settings was not addressed. The authors do not appear to have presented their results selectively, but their conclusions assumed that the small population studied was representative of the whole population with UPJ obstruction. In considering the limitations of their study, the authors acknowledged the small size
of the Acucise endopyelotomy and open pyeloplasty groups, but observed that the findings from this study were similar to those reported in the literature.

**Implications of the study**
Although not directly related to the three technologies studied, the authors recommended that any patient with equivocal diuretic renography should undergo Whitaker evaluation for confirmation of the diagnosis of obstruction. Further, they recommended that patients with persistent flank pain despite a nondiagnostic diuretic renogram and Whitaker test should be considered to have pain of an entirely different etiology.

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