Outcome and cost analysis of laparoscopic or open surgery versus conservative management for multicystic dysplastic kidney


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
Patients with multicystic dysplastic kidney (MCDK) were treated in one of three different ways. One was by open nephrectomy (ON), another by laparoscopic nephrectomy (LN), and the third was to observe the patient (OB) using renal ultrasound (US) to see whether the condition would regress spontaneously, thus allowing the possibility of surgery at a later date. All patients underwent US, dimercaptosuccinic acid or diethylenetriamine pentaacetic acid renography and voiding cystourethrography as routine assessment.

Under the OB protocol, patients were given a hypertension check up and ultrasonography every 3 months before the age of 5 years and every 6 months thereafter. They were given renal scintigraphy every 6 months under the age of 3 years and once a year afterwards.

Under the LN and ON protocols, patients were given a hypertension check up every 6 months before the age of 5 years and annually thereafter. Ultrasonography and scintigraphy were not required in these two groups. If patients underwent LN this could be converted to ON later.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population included patients with MCDK. No specific inclusion or exclusion criteria were reported.

Setting
The setting was secondary care. The economic study was carried out in Japan.

Dates to which data relate
The sample that provided the effectiveness and resource use data were recruited between 1990 and 2002. No price year was given.

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

Link between effectiveness and cost data
The costing was carried out retrospectively on the same patient sample as that used in the effectiveness analysis.
Study sample
The sample size of the cohort was not determined in the planning phase, and power calculations were not performed retrospectively. No details of any sample selection were given. No patients were reported to have been excluded from the cohort. Thirty-two patients with MCDK treated in the authors' setting were included in the study. There were 12 patients in the LN group, 6 in the ON group and 14 in the OB group. The characteristics of the study sample were not described.

Study design
This was a single-centre, retrospective cohort study. The patients were followed up for at least 5 years. Loss to follow-up was not reported, nor was blinding of the outcome assessment.

Analysis of effectiveness
It was not reported whether the analysis was conducted on an intention to treat basis or on treatment completers only. There was no detailed effectiveness evidence. The authors assessed the number of spontaneous regressions, development of hypertension and other intra- or postoperative complications, and also the postoperative cosmetic appearance. They stated that patients’ satisfaction with scar size was important and that they paid particular attention to information on patient satisfaction. The follow-up data were obtained by reviewing outpatient medical records and radiographs, as well as through phone interviews, letters and follow-up visits. The authors did not report whether the patient groups were comparable at analysis.

Effectiveness results
Six (42.9%) of the 14 OB patients regressed spontaneously within 5 years of diagnosis, 4 patients showed a tendency towards regression and 4 showed no tendency. However, 6 patients who had originally been in the OB group were then transferred to LN (4) and ON (2) because of parental wishes; these patients were not classified as OB.

In the remaining 8 cases, a trend toward spontaneous regression was seen in 4 cases (at 9 years, 4 years, 3 years and 6 months, respectively), but there was no change in size in the other 4 cases after observing for 8 years, 4 years, 3 years and 13 months, respectively.

The authors stated that all the patients were well after a mean follow up of 5.7 years, without any impairment of renal function or hypertension.

There were no results comparing the groups in terms of patient satisfaction. All the scars in patients undergoing LN were described as virtually invisible postoperatively.

Clinical conclusions
The authors concluded that the most effective surgical technique for managing MCDK was LN because of greater patient satisfaction with the postoperative scars.

Measure of benefits used in the economic analysis
No summary measure of benefits was produced. Therefore, the authors carried out a cost-consequences analysis.

Direct costs
The costs were not discounted, despite them being calculated over a 5-year period. The quantities and the costs were not analysed separately. The costs of diagnostic investigations (blood tests, urinary tests and radiological investigations), surgery and anaesthesia, days in hospital and follow-up investigations were measured. Only costs related to the treatment of MCDK were included; any other costs for investigations or treatment of anomalies unrelated to MCDK were excluded from the analysis. The quantity of resources was measured by a historical examination of patient records.
from 1996 to 2002. The unit costs were derived from actual data. The resource data were obtained from the hospital charges, while the price data were obtained from the Japanese Ministry of Health and Welfare. No price year was given.

**Statistical analysis of costs**
No statistical analysis of the costs was carried out.

**Indirect Costs**
No indirect costs were included.

**Currency**
Japanese yen (Y).

**Sensitivity analysis**
No sensitivity analysis was carried out.

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

**Cost results**
After 1 year, the total costs per patient were Y266,410 for the OB group, Y591,670 for the LN group and Y498,670 for the ON group.

After 5 years, the total costs per patient were Y666,730 for the OB group, Y597,830 for the LN group and Y504,830 for the ON group.

**Synthesis of costs and benefits**
The costs and benefits were not combined as the study was a cost-consequences analysis.

**Authors' conclusions**
If multicystic dysplastic kidney (MCDK) regresses within 5 years of diagnosis, the overall estimated total cost for the observation group (OB) group is lowest. If observation is more than 5 years, OB turns out to be more expensive than the two surgical options because of the increased cost of investigations over time. Laparoscopic nephrectomy (LN) is preferred over open nephrectomy (ON) for the surgical treatment of MCDK because it is minimally invasive and patient satisfaction with postoperative scars is higher.

**CRD COMMENTARY - Selection of comparators**
The choice of the three treatments for MCDK compared in this study was implicitly justified by the fact that they represented currently available treatments.

**Validity of estimate of measure of effectiveness**
The effectiveness data were derived from a single study, a retrospective cohort study. This study design was not appropriate for the study question, as the patients were not randomly allocated to the different treatments and patients in the different treatment groups were not shown to be comparable. Such factors can alter the validity of treatment comparisons. There were several weaknesses of the analysis. For example, no sample size was determined in the
planning phase of the study and no power calculations were reported. This introduces the possibility that the results may be prone to bias. It was unclear how the study sample had been chosen and, therefore, whether or not it was representative of the study population. The lack of reported blinding during the outcome assessment presented a further potential limitation to the reliability of the findings. There was no systematic information on how the effectiveness of the three treatments was evaluated. In addition, data on the patients who were switched from OB to a surgical option were included in the surgical option. Finally, the authors did not perform statistical analyses to test whether differences between the two groups were statistically significant.

**Validity of estimate of measure of benefit**
The authors did not derive a summary measure of health benefit. The reader is thus referred to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

**Validity of estimate of costs**
The cost section of the paper was briefly described. From the cost perspective adopted (i.e. the hospital), all relevant categories were included in the analysis. The costs and the quantities were not reported separately, which would not enable the analysis to be easily extrapolated to other settings. The resource use quantities were taken from a single study, while the prices were taken from the authors' setting. No other sources were used for resource quantities. No statistical, sensitivity, or any other kind of analysis of the quantities or prices was carried out. Although discounting was not reported, it is recommended for studies with a follow-up period of longer than 2 years. This omission could have affected the authors' conclusions that OB became more expensive after 5 years, as the costs of OB were incurred more in later years. No price year was reported, which will hinder any future reflation exercise. These factors suggest that the cost results should be treated with some caution.

**Other issues**
The authors made appropriate comparisons of their results with the findings from other studies. The issue of generalisability to other settings was not addressed. The authors presented their results selectively in that they did not give any details of the effectiveness outcomes for patients in the different groups, they simply summarised them. Also, evidence on patients who switched to the surgical option after a period under OB was shown as a patient allocated to the surgical option. The lack of discounting throws doubt on the reliability of the cost comparisons. The authors did not report any further limitations of their study.

**Implications of the study**
The authors recommended that MCDK be treated by LN after a short period of observation. They suggested that a definitive length for preoperative observation needs to be established from both clinical and cost perspectives.

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