Evaluation of renal masses detected by excretory urography: cost-effectiveness of sonography versus CT


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
Sonography and computed tomography (CT) for the evaluation of renal masses discovered by excretory urography

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Patients who had a mass detected by urography and who then had sonography or CT for further characterization of the mass, within 3 months of urography.

Setting
The setting was an acute hospital in the USA.

Dates to which data relate
The effectiveness and resource data were collected during the period January 1989 to March 1993. No dates are given for the prices used.

Source of effectiveness data
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 seems that costing was undertaken retrospectively.

Study sample
238 patients who had a mass detected by urography and who then had sonography or CT for further characterization of the mass were selected for study. Patients were excluded:

(a) if they did not undergo further imaging at the study institution,

(b) if they had undergone CT or sonography within 1 year preceding urography, and
(c) if they did not have sonography or CT within 3 months of urography.

This meant that 225 patients were included in the study. There were 170 men and 55 women with a mean age of 67 years (range 31-93 years). Sonography was suggested as the follow-up imaging study in 155 patients (69%), CT in seven (3%) and either CT or sonography in 30 (13%). No specific recommendations were made in the remaining 33 (15%). No power calculation determined sample size.

**Study design**
The study design was a retrospective case-series in a single centre. Neither length of nor loss to follow-up was mentioned.

**Analysis of effectiveness**
The analysis of the clinical study was based on intention to treat. Although it was not explicitly stated, accuracy of tests was taken as the primary outcome.

**Effectiveness results**
Sonography was the initial follow-up imaging study in 176 patients (78%) and CT was the initial study in 49 (22%). When sonography was used as the initial follow-up study, a firm diagnosis was made in 82% of patients, (144/176). Sonographic findings were indeterminate or indicated a complex cystic mass thought to require further evaluation by CT in 18% of patients (32/176). In those having CT as the initial follow-up study, a firm diagnosis was made in 88% (43/49); CT findings were equivocal or indeterminate in 12% of patients (6/49) and sonography was required.

**Clinical conclusions**
Sonography and CT have comparably high firm diagnosis rates as follow-up imaging studies for diagnosing renal masses detected at urography.

**Measure of benefits used in the economic analysis**
Accuracy of tests.

**Direct costs**
Some costs and resources were reported separately. Costs were based on Medicare reimbursement values for (1) renal sonography and (2) CT of the kidneys performed without and with IV contrast material. Only health care costs of the two diagnostic tests were considered. Presumably 1994 prices were used.

**Currency**
US dollars ($).

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

**Estimated benefits used in the economic analysis**
The accuracy of sonography and CT were estimated to be equal.

**Cost results**
For the 176 patients who had sonography initially, the total cost was $18,566. When the cost of the 38 CT examinations
ordered as second studies ($13,300) was added, the total imaging cost was $31,866 (or $181 per patient). Even if all 40 patients who had CT first would have required it even after sonography, the average cost per patient would be $241. This was still less than the $350 had CT been given initially to all patients as the first-line choice. Costs were not discounted.

**Synthesis of costs and benefits**
As outcomes were estimated to be equal, a cost-minimisation approach was taken proving that sonography is the dominant strange.

**Authors' conclusions**
Assuming that sonography and CT have comparably high accuracy, then sonography was the most cost-effective imaging method for the workup of a renal mass detected at urography. The number of sonographic examinations in which findings were indeterminate or positive (for a solid mass) was not sufficiently high to warrant replacement of sonography by CT, regardless of the size and location of the lesion. CT should be reserved for a limited number of specific indications.

**CRD Commentary**
This study took place in only one centre and patients were not randomised to either sonography or CT as their first-line imaging modality. The patient groups may have been different, introducing bias. The CT group was very small and the sample size was not determined by a power calculation. There was no pathologic confirmation of the diagnosis of either of the tests so their relative true accuracy is unknown. Only Medicare charges were used which may not reflect true cost and may not be generalisable to other health care settings.

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