Concise parathyroidectomy: the impact of preoperative SPECT 99mTc sestamibi scanning and intraoperative quick parathormone assay

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
Preoperative single photon emission computed tomography (SPECT) 99mTc-sestamibi imaging and intraoperative quick parathormone measurement, for the perioperative management of sporadic primary hyperparathyroidism (PHPTH).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing initial surgical therapy for PHPTH.

Setting
The practice setting was the hospital. The economic study was carried out in Pittsburgh, PA, USA.

Dates to which data relate
The dates of the effectiveness data are unclear. Cost data were expressed in 1997 dollars.

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

Link between effectiveness and cost data
Costing was undertaken prospectively on the same patient sample as that used in the effectiveness study.

Study sample
128 consecutive patients presenting for initial surgical therapy for PHPTH, who were eligible and consented, were enrolled in the study. Power calculations were not used to determine sample size. 61 patients received strategy A (mean age 53.4 (+/- 18.2) years; 26.2% male), 67 patients received strategy B (mean age 59.9 (+/- 12.0) years; 26.9% male). Exclusion criteria included patients with prior parathyroid operation or preoperative evidence for multiple endocrine neoplasia type 1 or type 2A; familial hyperparathyroidism; and familial hypocalciuric hypercalcaemia. All patients had at least six months of follow-up.
Study design
The study was of a prospective, longitudinal cohort design, based at a single centre. The mean follow-up interval was 12.0 (+/- 7.6) months. There was no loss to follow up.

Analysis of effectiveness
The analysis of the clinical study was based on intention to treat. Clinical effectiveness was measured in terms of rate of unilateral exploration, rate of initial operation success and major morbidity. Length of stay and operating times for the two strategies were also compared. Patients were shown to be similar in baseline clinical and demographic characteristics.

Effectiveness results
Rates of unilateral exploration were 41% for strategy A and 62.7% for B, (p=0.014). Initial operation was successful in 58 (95%) patients managed by using palpation method, and in 66 (98.5%) patients managed by using sestamibi scanning and intraoperative quick parathormone measurement. No major morbidity was associated with patients treated with strategy B. One patient on the palpation method group had permanent vocal cord injury. The mean length of stay, in days, of strategy B (1.07 +/- 0.87) was found to be significantly lower than that of strategy A (1.9 +/- 0.94, p<0.00001). No statistically significant difference was found in operating times between the two strategies.

Clinical conclusions
SPECT 99mTc-sestamibi imaging and intraoperative quick parathormone measurement is safe and effective. Limitations associated with the small sample size of the study were acknowledged.

Measure of benefits used in the economic analysis
Effectiveness results were not converted to a single measure of health benefit.

Direct costs
Costs and quantities were reported separately. Costs were measured from the perspective of the hospital and included perioperative cost. This combined mean length of stay with hospital charges, mean operating time with operating room charges, and the cost of perioperative testing. The latter included the cost of outpatient SPECT, intraoperative quick parathormone measurement and postoperative serum calcium level. It is unclear if the cost of subsequent treatment of operative failures was included in the analysis. Costs were presented in 1997 dollars.

Statistical analysis of costs
Statistical analysis was performed using the Pearson chi-squared test. A significance level of 5% was adopted.

Indirect Costs
Indirect costs were not included in the analysis.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
Not applicable.

**Cost results**
The total per patient cost of strategy A was $3,636 and the comparable cost of strategy B was $3,325 (p not significant).

**Synthesis of costs and benefits**
No synthesis of costs and benefits was performed.

**Authors' conclusions**
Routine SPECT 99mTc-sestamibi imaging and intraoperative quick parathormone measurement is as safe, effective and cost-effective as conventional approaches to parathyroidectomy for this particular patient population.

**CRD COMMENTARY - Selection of comparators**
The reason for the choice of comparator is clear. You, the user of this database, should decide if this is a widely used health technology in your own setting.

**Validity of estimate of measure of effectiveness**
The validity of the effectiveness estimates (used as a proxy for health benefit in this study) is uncertain for a number of reasons. Firstly, randomisation techniques were not used to allocate patients, which may have resulted in selection bias. However, the authors found no preoperative differences between the two groups. Secondly, the sample size was small, which limits the interpretation of the results, as the authors acknowledged. Lastly, almost one third of the patients in Strategy B (32.8%) were unable to comply with SPECT sestamibi scanning, because the use of the procedure was not recognised by all insurers during the study period. The effectiveness of this procedure may therefore have been underestimated.

**Validity of estimate of costs**
The selected quantities were reported separately. In particular, the cost of SPECT sestamibi scintigraphy was not reported, although the local cost-effectiveness of this procedure would be dependent upon the expected average cost per scan. No sensitivity analysis was performed to investigate variations in costs.

**Other issues**
The role of individual physician skill in the success rates of the strategies was not considered. The authors provided adequate comparison of their findings with those of other similar studies. The generalisability of the results to other settings or countries was not addressed.

**Implications of the study**
A randomised trial, powered to detect statistically significant differences in key clinical outcomes, would give a more reliable estimate of the cost-effectiveness of SPECT sestamibi scintigraphy for this patient population.

**Source of funding**
None stated.

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