
The cost-effectiveness of additional preoperative ultrasonography or sestamibi-SPECT in patients with primary hyperparathyroidism and negative findings on sestamibi scans

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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.

CRD summary

The study investigated the cost-effectiveness of additional preoperative imaging for the treatment of primary hyperparathyroidism in patients with negative dual-phase sestamibi scan results. The authors concluded that additional preoperative ultrasonography appears to be a cost-effective strategy in comparison with single-photon emission computed tomography or bilateral neck exploration. The reporting of details of the effectiveness and cost data was limited. Nonetheless, the authors' conclusions appear to reflect the scope of the analysis.

Type of economic evaluation

Cost-effectiveness analysis

Study objective

The study investigated the cost-effectiveness of additional preoperative imaging for the treatment of primary hyperparathyroidism (pHPT) in patients with negative dual-phase sestamibi scan results.

Interventions

The additional preoperative imaging techniques, i.e. high resolution ultrasonography (US) and single-photon emission computer tomography with technetium-99m sestamibi (sestamibi-SPECT), were compared with bilateral neck exploration (BNE).

Location/setting

USA/hospital.

Methods

Analytical approach:

A decision tree model was constructed to incorporate the costs and clinical data for the interventions being evaluated. The authors stated that the perspective was that of the health care provider.

Effectiveness data:

The effectiveness data were retrieved from literature published between 1995 and 2004. MEDLINE was searched to identify the studies. Studies were excluded if their target indication was not pHPT, or if they were not aimed at SPECT or high-resolution US. A systematic review appears to have been conducted. The main clinical outcome was postoperative normocalcemia. The sensitivities of SPECT and US were derived from the literature.

Monetary benefit and utility valuations:

None.

Measure of benefit:

The measure of benefit was the cure rate.

Cost data:

The cost categories included the cost of diagnosis and surgery. Most of the cost data came from the literature. The cost estimate of BNEC was based on authors' assumptions. Resources used and unit costs were not reported. The costs were adjusted to 2004 dollars using the medical care component of the Consumer Price Index.

Analysis of uncertainty:

One-way sensitivity analyses were conducted on key cost inputs. The ranges of incremental cost-effectiveness ratios (ICERs) were presented graphically to show the results of the sensitivity analyses. In addition, a threshold analysis was conducted.

Results

The US strategy was the most effective with a cure rate of 99.42%, followed by SPECT (99.26%) and BNE (97.69%).

The US strategy was the least costly at a cost of \$6,030.30, followed by SPECT (\$7,131.30) and BNE (\$8,384.00).

BNE was dominated by SPECT, which itself was dominated by the US strategy. Compared with BNE, SPECT resulted in cost-savings of \$79,790 per additional patient treated. Compared with SPECT, US resulted in cost-savings of \$688,125 per additional patient treated.

The results were robust to the one-way sensitivity analyses. The threshold analysis suggested that preoperative imaging strategies continued to dominate unless the cost of BNE was no greater than \$5,400 or the cost of unilateral neck exploration exceeded \$6,500.

Authors' conclusions

The authors concluded that, compared with SPECT or BNE, additional preoperative US would appear to be a cost-effective strategy for pHPT patients with negative dual-phase sestamibi scan results.

CRD commentary

Interventions:

The rationale for conducting preoperative US and sestamibi-SPECT prior to BNE was clear.

Effectiveness/benefits:

The effectiveness data were derived from the literature. The methods of the literature review were described briefly, with further details given in another paper, so it is not possible to assess from this paper whether the best available evidence was likely to have been used.

You should consider if postoperative normocalcemia adequately captures the health outcomes. There was no mention of complications.

Costs:

Given the limited detail on the cost estimates, it is not clear whether all the relevant events were costed. The costs were not broken down and resource use was not reported. This makes the costing less transparent. The price year was reported. Extensive sensitivity analyses on the cost parameters and threshold analyses were conducted. Results of the analyses were reported in full.

Analysis and results:

An appropriate incremental analysis was conducted and the results reported in full. The methods used in the economic evaluation and sensitivity analysis were reported clearly. However, the sensitivity analysis was limited to the cost parameters, although the results may have been sensitive to the values of effectiveness (i.e. probability of cure and sensitivity of scanning).

Concluding remarks:

The reporting of details of the effectiveness and cost data was limited. Nonetheless, the authors' conclusions appear to reflect the scope of the analysis.

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Bibliographic details

Ruda J M, Stack B C, Hollenbeak C S. The cost-effectiveness of additional preoperative ultrasonography or sestamibi-SPECT in patients with primary hyperparathyroidism and negative findings on sestamibi scans. Archives of Otolaryngology Head and Neck Surgery 2006; 132: 46-53

Other publications of related interest

Bergson EJ, Szynter LA, Dubner S, Palestro CJ, Heller KS. Sestamibi scans and intraoperative parathyroid hormone measurement in the treatment of primary hyperparathyroidism. Arch Otolaryngol Head Neck Surg 2004;130:87-91.

Bergson EJ, Heller KS. The clinical significance and anatomic distribution of parathyroid double adenomas. J Am Coll Surg 2004;198:185-9.

Neumann DR, Esselstyn CB Jr, Go RT, Wong CO, Rice TW, Obuchowski NA. Comparison of double-phase 99mTc-sestamibi with 1231-99mTc-sestamibi subtraction SPECT in hyperparathyroidism. Am J Roentgenol 1997;169:167-74.

Ruda JM, Hollenbeak CS, Stack BC. A systematic review of the diagnosis and treatment of primary hyperparathyroidism from 1995-2003. Otolaryngol Head Neck Surg 2005;132:359-72.

Ryan JA Jr, Elsenberg B, Pado KM, Lee F. Efficacy of selective unilateral exploration in hyperparathyroidism based on localization tests. Arch Surg 1997;132:886-91.

Indexing Status

Subject indexing assigned by NLM

MeSH

Cost-Benefit Analysis; Humans; Hyperparathyroidism, Primary /radionuclide imaging /surgery /ultrasonography; Models, Statistical; Parathyroidectomy; Preoperative Care /economics /methods; Radiopharmaceuticals /diagnostic use; Retrospective Studies; Sensitivity and Specificity; Severity of Illness Index; Technetium Tc 99m Sestamibi /diagnostic use; Tomography, Emission-Computed, Single-Photon /economics; United States

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