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## Cost-effectiveness analysis regarding postoperative administration of vitamin-D and calcium after thyroidectomy to prevent hypocalcaemia

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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 examined cost-effectiveness of routine postoperative administration of vitamin D or metabolites and calcium to reduce the incidence of hypocalcaemia after total thyroidectomy. The authors concluded that both supplementation strategies were cost-effective compared to no intervention and should be recommended as routine prophylactic treatments for this patient population. The analysis used a clear and transparent cost-effectiveness analysis. The authors' conclusions appear robust.

### Type of economic evaluation

Cost-effectiveness analysis

### Study objective

The study examined the cost-effectiveness of routine postoperative administration of vitamin D or metabolites and calcium to reduce the incidence of hypocalcaemia after total thyroidectomy.

### Interventions

Three strategies were compared for prophylaxis of hypocalcaemia: no supplementation; routine oral supplementation with calcitriol plus calcium treatment; and routine oral supplementation with exclusive calcium treatment.

### Location/setting

Colombia/secondary care.

### Methods

#### Analytical approach:

The analysis was based on a decision tree model with a one-month time horizon. The authors stated they adopted the perspective of a health management organisation.

#### Effectiveness data:

Clinical inputs were taken from a previously published systematic review that included 706 patients: 346 in the vitamin D plus calcium group; 288 in the oral calcium group; and 72 in the control group (no treatment). The systematic review included only randomised clinical trials. Odds ratios were calculated for the comparison between the two prophylactic groups as compared to no treatment. The primary endpoint was presence or absence of symptomatic postoperative hypocalcaemia.

#### Monetary benefit and utility valuations:

Not considered.

#### Measure of benefit:

The summary benefit measure was defined as the proportion of patients without symptomatic postoperative hypocalcaemia.

#### Cost data:

The economic analysis included costs of medications (calcitriol, calcium carbonate, calcium gluconate) and medical services (emergency department visits, serum calcium measurement, hospitalisation). Costs born during both the acute

and chronic phases were considered. Data on quantities of resources used were taken from a cohort of 13 patients who had presented postoperative hypocalcaemia at a first-level institution. Additional data were taken from published sources. Unit costs were obtained from the Colombian Social Security Institute's billing manual for integrated care and the Colombian Manual of Pharmaceutical Products. Costs were in US dollars (\$). The price year was 2008.

#### **Analysis of uncertainty:**

One-way sensitivity analyses were carried out on the probability of postoperative hypocalcaemia and treatment costs. A probabilistic sensitivity analysis was performed using a Monte Carlo simulation with 10,000 iterations and including random distributions for probabilities of hypocalcaemia, length of stay and costs. Cost-effectiveness acceptability curves were constructed.

#### **Results**

In the deterministic model, total per patient costs and effectiveness rate (patients without symptomatic postoperative hypocalcaemia) were \$49.68 and 53% with no treatment, \$43.94 and 67.4% with oral calcium alone and \$51.8 and 92.3% with vitamin D plus calcium. Incremental analysis showed that no treatment was dominated as oral calcium alone was more effective and less expensive. Incremental costs per hypocalcaemia episode avoided with vitamin D plus calcium were \$0.05 over no treatment and \$0.32 over calcium alone.

Base case findings held in most deterministic sensitivity analyses. The probability of vitamin D or metabolites and calcium strategy being dominant was 100% with a \$2 willingness to pay for a unit of benefit.

#### **Authors' conclusions**

The authors concluded that both supplementation strategies were cost-effective compared to no intervention and should be recommended as routine prophylactic treatments for this patient population.

#### **CRD commentary**

##### **Interventions:**

The rationale for selection of comparators was clear. These prophylactic interventions appeared to have been selected appropriately as the available strategies for this specific patient population.

##### **Effectiveness/benefits:**

All clinical inputs for the model were taken from a published study that was based on a systematic review of the literature and appeared to include only clinical trials; the design of these studies should ensure high internal validity. Overall, a relatively large number of patients was involved in the review. Other details of methods used to pool data from the primary studies were not reported. The benefit measure was disease-specific and might not be comparable with benefits of other health care interventions. It represented an intermediate outcome of the prophylactic strategies which was appropriate given the short-term horizon of the analysis. The authors acknowledged that use of quality of life scores would have provided more interesting results.

##### **Costs:**

The authors stated that the perspective was that of an health management organisation and cost categories were representative of the payer. Sources of unit costs were relevant to the Colombian setting. Quantities of resource use were taken from a small sample of patients. Resource use and unit costs were presented separately and the economic analysis was generally transparent. The price year was reported and this enabled reflation exercises. Costs were varied in the sensitivity analysis.

##### **Analysis and results:**

The study results were reported clearly. Average and incremental cost-effectiveness ratios were calculated to synthesise costs and benefits of the alternative strategies. Deterministic and probabilistic sensitivity analyses were used appropriately to deal with the issue of uncertainty. The methods and results of these sensitivity analyses were presented clearly. The authors stated that inclusion of quality of life would probably lead to even better results for the prophylactic options. Study results should be considered specific to the Colombian setting and could not be transferred to other settings.

##### **Concluding remarks:**

The analysis used a clear and transparent cost-effectiveness analysis. The authors' conclusions appear robust.

### **Bibliographic details**

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### **Indexing Status**

Subject indexing assigned by NLM

### **MeSH**

Calcitriol /administration & dosage /economics /therapeutic use; Calcium /blood; Calcium Carbonate /administration & dosage /economics /therapeutic use; Calcium Gluconate /administration & dosage /economics /therapeutic use; Colombia; Cost-Benefit Analysis; Decision Trees; Drug Costs; Emergencies /economics; Humans; Hypocalcemia /economics /epidemiology /etiology /prevention & control; Length of Stay /economics /statistics & numerical data; Postoperative Care /economics; Postoperative Complications /drug therapy /etiology /prevention & control; Probability; Tetany /epidemiology /etiology /prevention & control; Thyroidectomy

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