Ultrasonic coagulator for thyroidectomy: a systematic review of randomized controlled trials

CRD summary
The review concluded that ultrasonic coagulator had a significant reduction on the operating time of total thyroidectomy and the amount of bleeding in thyroidectomy, without increasing complications and total cost in hospital. Given the generally poor quality and the variation in the included trials, the authors' conclusion should be interpreted with caution.

Authors' objectives
To evaluate the efficacy of ultrasonic coagulator used in open thyroidectomy.

Searching
The following databases were searched up to November 2008: PubMed, EMBASE, the Cochrane Library, Science Citation Index, Chinese Biomedical Database, China Academic Journals Full-Text Database, Chinese Scientific Journals Database, Wanfang, China Online Journals. Search terms were reported. The authors state that proceedings from major relevant conferences were also searched (no further details reported). Researchers and primary authors in the field were contacted to identify additional relevant studies. No language restrictions were applied.

Study selection
Randomised controlled trials (RCTs) that compared ultrasonic coagulator with conventional techniques for open thyroidectomy were eligible for inclusion. Trials were required to report on the following outcomes of interest: operative time in minutes (time from the first incision to the last skin suture), amount of intraoperative bleeding (mL), number of cases of transient hypocalcaemia (by serum calcium levels or numbness in lips and hands), number of cases of transient recurrent nerve paresis (according to voice hoarseness or transient dysphonia), total cost in hospital (euros), and amount of postoperative drainage (mL).

In included trials, the mean age of patients ranged from 34 years to 56 years; the percentage of males ranged from 5.9 to 50% (where reported). The included trials were conducted in Italy, Spain, Mexico, Belgium, Sweden, Finland, Turkey and Greece.

Two reviewers independently selected studies for inclusion in the review.

Assessment of study quality
Two reviewers independently assessed the quality of the included trials using criteria recommended by the Cochrane Handbook (random sequence generation, allocation concealment, blinding of participants, personnel, outcome assessor, and incomplete outcome data). Any disagreements were resolved by consensus with three reviewers.

Data extraction
Two reviewers independently extracted data from the included trials to permit the calculation of mean differences, standardised mean differences (SMDs) and odds ratios (ORs). Any disagreements were resolved by consensus. Authors of the primary trials were contacted where additional information was required.

Methods of synthesis
A fixed-effect model was used to estimate summary weighted mean differences (WMDs), standardised mean differences, or odds ratios, with 95% confidence intervals (CI). If significant heterogeneity was found a random-effects model was used.

Heterogeneity was assessed using the $X^2$ and $I^2$ statistics.

Subgroup analyses were planned to explore clinical differences between the trials.
Results of the review
Eleven RCTs were included in the review (n=1,420 patients). Overall reporting of criteria relating to trial quality was poor. Four trials used appropriate methods of sequence generation. Four trials used envelopes for allocation concealment. Four trials used a single-blind design; one trial used a double-blind design. Two trials reported missing follow-up; one trial did not report follow-up.

Ultrasonic coagulation was associated with a significant reduction in operative time (WMD -22.35 minutes, 95% CI -31.50 to -13.20; I²=94%; eight RCTs) and intraoperative bleeding (WMD -26.57mL, 95% CI -49.03 to -4.12; I²=86%; three RCTs) compared with conventional techniques during open thyroidectomy. There was no significant difference in the amount of postoperative drainage (three RCTs), incidence of transient hypocalcaemia (nine RCTs studies) or incidence of transient recurrent nerve paresis (eight RCTs).

Cost information
Two studies reported total hospital cost. No significant difference was found between ultrasonic coagulator and conventional techniques in open thyroidectomy.

Authors' conclusions
Ultrasonic coagulator had a significant reduction on the operating time of total thyroidectomy and the amount of bleeding in thyroidectomy, without increasing complications and total cost in hospital.

CRD commentary
The review question was supported by clear inclusion criteria. Several databases and other sources were searched without language restriction, and some attempts were made to locate unpublished studies, which minimised the likelihood of publication bias. Steps were taken to minimise reviewer error and bias throughout the review process.

The quality of the included trials was assessed with appropriate criteria; individual results for separate criteria were reported. Limited patient characteristics were reported, which made it difficult to assess generalisability. The substantial heterogeneity found suggests that it may not have been appropriate to pool trials.

Given the heterogeneity and the generally poor quality of the included trials, the authors' conclusion should be interpreted with caution.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that high-quality large-scale placebo-controlled double-blind trials are needed to clarify the effect of ultrasonic coagulator for open thyroidectomy.

Funding
None.

Bibliographic details

PubMedID
20181548

DOI
10.1177/1553350610362084

Original Paper URL
http://sri.sagepub.com/content/17/1/41.abstract

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adult; Aged; Female; Humans; Male; Middle Aged; Randomized Controlled Trials as Topic; Thyroid Diseases /surgery; Thyroid Gland /surgery /ultrasonography; Thyroidectomy /instrumentation; Treatment Outcome; Ultrasonic Therapy; Young Adult

**AccessionNumber**
12010004115

**Date bibliographic record published**
15/09/2010

**Date abstract record published**
11/05/2011

**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.