Systematic review of minimally invasive parathyroidectomy: update and re-appraisal

Authors' objectives
To compare the safety and efficacy outcomes of less or minimally invasive parathyroidectomy techniques against the current benchmark treatment, bilateral open neck exploration (BNE).

Searching
MEDLINE (from January 1984 to August 1998), Current Contents (from week 1, 1993 to week 34, 1998), EMBASE (from January 1974 to August 1998) and the Cochrane Library (from Issue 1, 1966 to Issue 3, 1998) were searched. Update searches were conducted from August 1998 to August 2000. The search terms were listed in the report. There were no language restrictions, although non-English papers that duplicated information in an English language paper were subsequently excluded from the review.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs), non-randomised controlled clinical trials, case series and case reports were considered for the review. Studies of other designs were also considered where appropriate.

Specific interventions included in the review
Less or minimally invasive surgical techniques, specifically: unilateral techniques (with or without pre-operative imaging), video-endoscopic parathyroidectomy (VAP) and radio-guided parathyroidectomy. Studies that compared any of these techniques with conventional BNE for primary hyperparathyroidism (HPT) were eligible for inclusion.

Participants included in the review
Adult patients with primary HPT were included. Studies that included patients with secondary or tertiary HPT, parathyroid carcinoma or multiple endocrine neoplasia types I and II were excluded, unless data for those with primary HPT could be extracted separately. Paediatric patients were excluded. Animal studies were also included but these are not reported here.

Outcomes assessed in the review
The studies had to report at least one of the following outcomes: peri- and post-operative mortality; peri- and post-operative morbidity; V serum calcium and parathyroid hormone levels; peri-operative and early post-operative factors; and convalescence.

How were decisions on the relevance of primary studies made?
One reviewer appears to have made decisions on the inclusion and exclusion of papers.

Assessment of study quality
The quality of all the included papers was assessed according to a hierarchy of evidence (details given in the report). This ordered the papers by study design, but did not assess quality within the study designs. The authors do not state how the papers were assessed for quality, or how many of the reviewers performed the quality assessment.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction. Where possible, the intention-to-treat outcomes were calculated from comparative studies.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative review.

How were differences between studies investigated?
The studies and their findings were grouped by the type of intervention and outcome measure. Differences between the studies were discussed, where applicable, in the text.

Results of the review
Thirty studies were included in the review. There were 20 studies of unilateral neck (cervical) exploration (n=1,209), 7 of VAP (n=386) and 4 of radio-guided parathyroidectomy (n=277). Of these, only one study (for VAP) was an RCT.

Unilateral neck exploration (UNE; no RCTs, 7 studies with concurrent controls, 4 with historical controls and 9 uncontrolled case series).

The limited data available suggest that UNE or scan-directed UNE resulted in a lesser degree of morbidity with equivalent rates of post-operative hypocalcaemia and no mortality, compared with BNE. Operative success was generally higher for UNE or scan-directed UNE than with BNE, and with the advantage of shorter operative time and length of hospital stay. However, there was a significant degree of selection bias in those studies in favour of UNE.

VAP (1 RCT, 2 studies with concurrent controls and 4 uncontrolled case series).

The RCT indicated that fewer patients suffered fever or symptomatic transient hypocalcaemia following VAP compared with BNE. Other complications found in the studies were discussed in the review. The RCT results indicated that the operative success of VAP was comparable to that of BNE, and there was some indication of shorter operative time and post-operative inactivity level. These inconclusive findings were generally supported by those from weaker level evidence. Radio-guided parathyroidectomy (no RCTs, 1 study with concurrent controls, 1 with a mix of concurrent and historical controls, and 2 uncontrolled case series).

Only very limited data were available, although the rates of hypocalcaemia appeared roughly comparable with other techniques. Intention-to-treat operative success was 100% in all studies, but this probably reflects the high level of expertise of the researchers who pioneered this technique, and it may not be generalisable.

Authors' conclusions
Current data suggest that less or minimally invasive parathyroidectomy techniques may prove to be as safe and efficacious as BNE in certain groups, but the evidence is as yet inconclusive. The avoidance of general anaesthesia, extensive neck exploration and a long hospital stay, and an obvious collar scar are probably the main advantages of these techniques.

CRD commentary
This systematic review addressed a clinically relevant question using appropriate and clearly defined inclusion criteria. It was an update of an earlier review (see Other Publications of Related Interest). Due to the lack of research in this field all designs of studies were included. The literature search was probably adequate covering three major databases and having no language restrictions. While the possibility that some studies were missed cannot be ruled out, it is unlikely that an RCT would have been missed. The authors used a hierarchy of evidence approach and also informally rated the quality of the individual studies to inform their review. Details of the included studies were presented well in data extraction tables, summary tables and the text. Given the nature of the studies available, a narrative review was entirely appropriate. The authors' rather general conclusions reflect the evidence identified.

Implications of the review for practice and research
Practice: The authors state that, based on the updated evidence-base, the original ASERNIP-S safety and efficacy classification for less or minimally invasive parathyroidectomy techniques should remain unchanged.
Research: The authors state that more rigorous studies with meaningful comparator groups and larger sample sizes must be conducted.

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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.