Should we apply suction during fine needle cytology of thyroid lesions: a systematic review and meta-analysis  
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CRD summary  
The review set out to compare the effectiveness of two biopsy sampling methods, fine-needle aspiration cytology (FNAC) and sampling without aspiration (FNS), for diagnosis of thyroid lesions. Only the sample quality was actually compared. The authors concluded that meta-analysis showed no difference, but other data favoured FNS. Considerable methodological limitations, including unreported sample size, make the conclusions unreliable.

Authors' objectives  
To determine whether fine-needle aspiration cytology (FNAC) or fine-needle sampling (FNS) is the most effective biopsy method for diagnosis in thyroid lesions.

Searching  
MEDLINE, EMBASE, the Cochrane Database of Systematic Reviews and the Cochrane Controlled Trials Register were searched. The search terms were reported, but the search dates were not. Reference lists of papers identified by the search were also checked.

Study selection  
Study designs of evaluations included in the review  
Randomised controlled trials or crossover trials were eligible for inclusion in the review. All of the included studies were of a crossover design.

Specific interventions included in the review  
Studies comparing FNAC and FNS for the diagnosis of thyroid lesions were eligible for inclusion. All included studies used double sampling of each thyroid lesion by FNAC and FNS.

Reference standard test against which the new test was compared  
The review did not include any diagnostic accuracy studies that compared the performance of the index test with a reference standard of diagnosis. The review used data from clinical trials to compare the sampling quality achieved by two different methods of biopsy.

Participants included in the review  
The review included studies of participants with thyroid lesions. No further inclusion criteria were specified for the study participants. Details of the participants in the included studies were not reported.

Outcomes assessed in the review  
The outcome measures specified were quality of sample for diagnosis and reliability of the diagnosis made. For each study, a maximum and an average score for the diagnostic quality of the sample were calculated for each sampling method. Four of the five included studies used the same five-item scoring system (maximum score 10) to assess the diagnostic quality of the sample; the scoring system was reported in full in the paper. Since one study did not include data for one of the five scoring items, data for this item were discarded for all studies; the maximum score for the modified system was therefore 8. The fifth study categorised samples as 'diagnostic superior', 'diagnostic' or 'unsuitable' and was not included in the meta-analysis. No data on the reliability of the diagnosis made were presented.

How were decisions on the relevance of primary studies made?  
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.
Assessment of study quality
No formal validity assessment was reported, but aspects of methodological quality were specified in the inclusion criteria; these were concealed randomisation allocation, and blinded assessment of samples by a cytopathologist.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
A pooled odds ratio (OR) for diagnostic quality score, with 95% confidence interval (CI), was generated for four of the five included studies. The method used to generate this pooled estimate was unclear, as was whether it was based on the maximum or average sample quality scores from the included studies.

How were differences between studies investigated?
No formal investigation of between-study heterogeneity was reported. The only difference between the included studies that was discussed was the sample quality scoring system used.

Results of the review
Five studies were included in the review, of which four were included in the meta-analysis. The number of study participants was not reported.

The meta-analysis showed no significant difference in sample quality between the two sampling methods (OR 0.99, 95% CI: 0.88, 1.11).

The study which was not included in the meta-analysis reported that a significantly greater proportion of FNS samples (22 out of 22) were classified as 'diagnostically superior' than was the case for FNAC (4 out of 22) (p=0.003).

Authors’ conclusions
Meta-analysis provides no evidence that one biopsy sampling method is better than the other. Taking into account data not included in the meta-analysis, it appears that FNS may be easier to perform and may produce better samples.

CRD commentary
The stated objective of the study was to compare the diagnostic effectiveness of two methods of biopsy sampling in thyroid lesions. The inclusion criteria were poorly specified. In particular, both the stated objective and the specified outcomes of interest implied that both sample quality and reliability of diagnosis would be assessed; only sample quality was mentioned throughout the rest of the paper. No details of study participants or their numbers were reported, thus the total sample size is unknown and the comparability of the studies is impossible to assess. Reporting of the search strategy was limited and made no mention of attempts to identify unpublished data; the probable completeness of study retrieval is therefore difficult to estimate. No details of the review process were reported, therefore the potential for introduction of error or bias cannot be assessed.

Reporting of the methods used to obtain a pooled estimate of the relative sample quality achieved by the two biopsy methods was very limited. This, combined with the lack of reported detail of the included studies, leaves the appropriateness of pooling and the reliability of the pooled estimate open to question. The authors concluded that their meta-analysis indicates no difference between the two biopsy methods, but went on to add that the one study not included in the meta-analysis indicated that FNS may be superior. This seems an unreasonable weight to place upon one small study, particularly given that one of the four studies included in the meta-analysis showed a significant effect in favour of FNAC; neither this nor any other individual study results were mentioned in the paper. Given the considerable limitations outlined above, the conclusions of this review are unlikely to be reliable.
Implications of the review for practice and research
The authors did not state any implications for practice or further research.

Bibliographic details

PubMedID
17132312

DOI
10.1308/003588406X149147

Indexing Status
Subject indexing assigned by NLM

MeSH
Biopsy, Fine-Needle /methods; Cross-Over Studies; Humans; Randomized Controlled Trials as Topic; Suction; Thyroid Diseases /pathology; Thyroid Gland /pathology

AccessionNumber
12006009360

Date bibliographic record published
31/12/2007

Date abstract record published
31/12/2007

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.