Fine-needle aspiration in the management of peripheral lymphadenopathy in a developing country

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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.

Health technology
Fine-needle aspiration (FNA) in the investigation of peripheral lymphadenopathy in developing countries, where there are limited funds and facilities. All patients were seen and the needle aspirates were carried out by an attending or resident pathologist. All aspirations were obtained using a 21- or 22-gauge needle with a 5-ml or 10-ml disposable plastic syringe. Aspirated material was placed on standard microscopic slides, thinly smeared, and air-dried or fixed in 95% alcohol for Giemsa and Papanicolaou stains, respectively. The smears were read and cytological diagnosis of all satisfactory smears were classified into: reactive/chronic non-specific inflammation; granulomatous/necrotising inflammation; lymphoma; metastatic tumour; and suspicious for malignancy. Cases showing granulomatous or necrotising inflammation were considered to be tuberculosis (TB). Attempts were made to distinguish between non-Hodgkin's and Hodgkin's lymphoma whenever possible.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Lymph node aspirates taken from patients at a hospital for the diagnosis of palpable masses.

Setting
Hospital. The economic analysis was carried out in Nigeria.

Dates to which data relate
Effectiveness and resource use (turn-round time) data were related to the lymph node aspirates taken from patients between 1995 and 1997. The positive yield for tissue diagnosis of lymph node was taken from a study published in 1995. The price year was not given.

Source of effectiveness data
The evidence for the final outcomes was based on a single study and the authors’ assumptions based on one other study.

Link between effectiveness and cost data
Costing was retrospectively performed, partly on the same patient sample as that used in the effectiveness analysis, and partly on a typical case rather than any specific patient sample.
Study sample
Power calculations were not used to determine the sample size. The study sample consisted of 183 lymph node aspirates obtained from patients aged 1-81 years, with a median age of 32.7 years. The male to female ratio was 1:3.

Study design
This was a retrospective cohort study, carried out in a single centre. The duration of the follow-up appears to have been until establishment of diagnosis (issue of diagnostic report), which was reported to have ranged from less than 24 hours to 3 days. No information was given regarding any loss to follow-up. The FNA results were correlated with those of subsequent histological biopsies, clinical progression, or therapeutic response of disease condition.

Analysis of effectiveness
The principle (intention to treat or treatment completers only) used in the analysis of effectiveness was not specified. The clinical outcome measures were the most common diagnosis, sensitivity and specificity of lymph node FNA in the diagnosis of tuberculosis, overall accuracy of lymph node aspiration, positive yield for cytological diagnosis, and complications.

Effectiveness results
The most common diagnosis was reactive change/non-specific inflammation, constituting 33.4%; tuberculosis and metastatic lesions made up 25.7% and 22.4%, respectively, while lymphoma constituted 16.9% of cases.

The commonly aspirated nodes were cervical. Tuberculosis was the most frequent diagnosis in these nodes and was the most commonly diagnosed infective condition, particularly in those under 20 years of age.

The sensitivity and specificity of lymph node FNA in the diagnosis of tuberculosis were 79.5% and 100%, respectively.

The overall accuracy of lymph node aspiration was 89.5%.

The positive yield for cytological diagnosis was 66.6%.

No significant complication was encountered in any of the aspirated cases.

Clinical conclusions
The overall diagnostic accuracy of 89.5% obtained in this study was within the reported range in the literature. In fact, the accuracy of interpretation of smears improved over the 3-year period. This was due to the increasing experience and expertise acquired and improvement achieved in specimen handling and processing during the period.

Tuberculosis and low-grade lymphocytic lymphoma accounted for the majority of the false negatives, these being interpreted as reactive hyperplasia. Sampling error, especially in nodes with early involvement, probably contributed to the undiagnosed cases of TB. Reports in the literature have highlighted the difficulties in distinguishing cytologically between reactive hyperplasia and low-grade lymphoma.

In this series, a definitive diagnosis of TB was made in 47 cases (25.7%) who were saved unnecessary further surgical biopsy and delayed diagnosis. Appropriate drug therapy was therefore instituted early.

Methods used to derive estimates of effectiveness
Authors’ assumptions based on one other study were used.

Estimates of effectiveness and key assumptions
The positive yield for tissue diagnosis of lymph node in the same study centre was 63%.
Measure of benefits used in the economic analysis
No summary benefit measure was identified in the economic analysis, and only individual clinical outcomes were reported.

Direct costs
Costs were not discounted due to the short time frame of the cost analysis. Some quantities (turn-around time) were reported separately from the costs. Some cost items were not reported separately. Cost analysis covered the costs of the FNA procedure and interpretation for the FNA method and the costs of lymph node biopsy, tissue processing and reporting, follow-up dressing, and possible antibiotic treatment for the surgical excision biopsy method. The perspective adopted in the cost analysis appears to have been that of the patient. The price year was not explicitly reported.

Indirect Costs
Indirect costs were not included.

Currency
Nigerian naira (NGN). A conversion was made to US dollars ($).

Sensitivity analysis
No Sensitivity analysis was carried out.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
The cost of the FNA procedure and interpretation was NGN250 ($3) per patient, and the turn-around time between aspiration and issue of report ranged from less than 24 hours to 3 days. The total cost of tissue diagnosis of lymph node was NGN9,500 ($115). The turn-around time for tissue biopsies was reported to be 2 weeks or more. The cost of FNA was 30 times less than the cost of surgical excision therapy.

Synthesis of costs and benefits
Costs and benefits were not combined.

Authors’ conclusions
This study showed that FNA is a simple, cost-effective procedure that offers a reliable method of diagnosis in distinguishing reactive lymphadenopathy, tuberculosis, and malignant conditions.

CRD COMMENTARY - Selection of comparators
A justification was given for the choice of the comparator, which was deemed to be the usual method adopted in the context in question in the study setting. You, as a database user, should consider whether this is a widely used health technology in your own setting.

Validity of estimate of measure of effectiveness
The internal validity of the effectiveness results cannot be reasonably assured due to the retrospective nature of the study design, and the lack of a proper control group. Insufficient information on the patients included in the study sample was provided for an objective assessment of whether the study sample was representative of the study.
population, although this is likely to be the case.

Validity of estimate of measure of benefit
The authors did not derive a summary measure of health benefit. The economic analysis was therefore of cost-consequences design.

Validity of estimate of costs
The following limitations of the cost analysis hinder the validity of the results: the price year was not specified; cost and resource use profiles were not reported in detail; the costing was conducted retrospectively and not entirely on the same patient sample as that used in the effectiveness analysis; not all cost items were converted into monetary values (such as turn-around time); statistical analysis was not performed on resource use and cost data; the effects of the alternative modalities on indirect costs (productivity loss) were not addressed; and the cost results may not be generalisable outside the study setting. Future analyses would therefore benefit from a more rigorous approach.

Other issues
Given the limitations inherent in the study design and the lack of sensitivity analysis and statistical analysis of the costs, the results need to be interpreted with a good degree of caution. The issue of generalisability to other settings or countries was not addressed, although the authors acknowledged that the results only apply in developing countries (especially the tropics). Appropriate comparisons were made with other studies. The issue of the degree to which the study sample was representative of the study population was not specifically addressed in the authors' comments. The technology is also applicable to a developed country setting such as the UK.

Implications of the study
It is proposed that FNA should be a first-line step in the clinical investigation of lymphadenopathy in the tropics. The process has some limitations, some of which can be reduced by complementing the FNA information with clinical findings and knowledge of common causes of lymphadenopathy in different age groups in the environment.

The authors' approach to the pathological investigation of peripheral lymphadenopathy was outlined in the paper.

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Other publications of related interest

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Subject indexing assigned by NLM

MeSH
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Analysis; Developing Countries; Female; Humans; Infant; Lymph Nodes /pathology; Lymphatic Diseases /pathology; Lymphatic Metastasis /diagnosis /pathology; Lymphoma /diagnosis /pathology; Male; Middle Aged; Nigeria; Sensitivity and Specificity; Tuberculosis /diagnosis /pathology

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