Comparison of specimen adequacy in fine-needle aspiration biopsies performed by surgeons and pathologists

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Background: Fine-needle aspiration biopsy (FNAB) may yield different results depending on its operator. We compared the proportions of unsatisfactory aspirates obtained by pathologists vs. surgeons.

Methods: In a retrospective review, all FNAB reports and slides performed between March 2002 and February 2003 were grouped by organ/site and according to whether they were done by a pathologist or a surgeon. The proportions of unsatisfactory aspirates for pathologists and surgeons were compared.

Results: Of 692 FNABs, 390 were performed by pathologists at the FNAC clinic and the remainder by surgeons. Overall, 15.5% of aspirates obtained were unsatisfactory (n=107). Of aspirates obtained by surgeons, 29.5% were unsatisfactory, compared to 4.6 % of those obtained by pathologists ($P<0.001$). Pathologists had significantly lower proportions of unsatisfactory aspirates in all sites. A 33% reduction in the number of lymph node excisional biopsies has been reported subsequent to establishment of the FNAC clinic.

Conclusions: The advantages of a pathologist performing FNAB are that a rapid evaluation can be rendered regarding specimen adequacy and the need for repeating the procedure. In addition, pathologists can direct the distribution of aspirated material for other tests such as culture study, flow cytometry and electron microscopy, as indicated by preliminary evaluation of the smears. These factors significantly lower the proportions of unsatisfactory specimens and improve the diagnostic accuracy of FNAB technique.

Key words: Fine-needle aspiration, biopsy, specimen adequacy, standards

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Fine-needle aspiration biopsy (FNAB) is a rapid and relatively inexpensive technique that has been used extensively in the diagnosis of a large variety of neoplastic and non-neoplastic lesions in many organs. The simplicity of the technique and its relatively minor trauma to the patient, along with the rapid response rate, are some of the important advantages of this technique compared to surgical biopsies.¹

Either a surgeon or a pathologist can perform FNAB of superficial palpable lesions. Radiologists best carry out deep biopsies, which require radiological guidance. The FNAB procedure yields different results depending upon its operator. It has been reported that the FNAB procedure retains higher sensitivity and specificity in the hands of pathologists compared with surgeons. The experience and skills of the operator are also reported as significant factors affecting the outcome of the FNAB procedure.² This paper compares the utility of the FNAB procedure, especially with respect to specimen adequacy, in the hands of pathologists versus surgeons.

Materials and Methods

In March 2002, the fine-needle aspiration cytology (FNAC) clinic was established in the Department of Pathology at King Fahad Hofuf Hospital. Hospital policy gave the surgeon a choice to perform the FNAB procedure himself or to send the patient to the FNAC clinic where the pathologist performs the procedure. Most of the FNABs done by the surgeons were performed using 21 to 23 gauge needles in conjunction with a 10 mL syringe and handle for applying suction. Alcohol-fixed slides were prepared and sent to the lab for Papanicolaou or H&E staining. An average of three slides per patient were prepared. Most of the FNABs done by the pathologists in the FNAC clinic were performed using 23 to 25 gauge needles without applying suction. Smears were air-dried and stained by Diff-Quik stain. The aspirated material in all FNABs performed by the pathologists was immediately checked for adequacy while the patient was still available.

For the purposes of the present study, all FNAB reports and slides done between March 2002 and February 2003

Table 1. Number and proportions of unsatisfactory aspirates, by physician and organ/site.

	Surgeons		Pathologists		P value
	Total (n)	Unsatisfactory n (%)	Total (n)	Unsatisfactory n (%)	
Thyroid	48	17 (35)	74	3 (4)	<0.001
Breast	126	45 (35.7)	128	9 (7)	<0.001
Lymph node	25	16 (64%)	119	6 (5)	<0.001
Other sites	103	11 (10.7)	69	0	<0.01
Total	302	89 (29.5)	390	18 (4.6)	<0.001

were reviewed. Cases were grouped by organ/site and according to who performed the biopsy. The organs/sites grouping included thyroid, breast, lymph nodes and others (salivary glands, soft tissues, deep organs, etc). The designation of unsatisfactory aspirate was based on a review of all slides that were received from the procedure. From any site, an aspirate consisting only of peripheral blood or scanty distinctive cellular elements necessary for diagnosis at a given site was considered unsatisfactory. Inappropriately spread aspirates, which significantly hampered proper assessment of smears, were also considered unsatisfactory. Chi-square tests were used to determine significant differences between surgeons' and pathologists' proportions of unsatisfactory aspirates. The experience of surgeons and pathologists with FNAB was also compared. Lymph node FNABs were further evaluated by comparing the number of diagnostic lymph nodes excisional biopsies performed during the period March 2002 to February 2003 and the previous five years.

Results

Pathologists and surgeons performed a total of 692 FNABs over the study period, with pathologists performing 390 and surgeons the remainder. Overall, 15.5% of aspirates were unsatisfactory (n=107) (Table 1). Of aspirates obtained by surgeons, 29.5% were unsatisfactory, compared with 4.6% of those obtained by pathologists ($P<0.001$).

From breasts, 35.7% of aspirates obtained by surgeons were unsatisfactory, compared to 7% of aspirates obtained by pathologists ($P<0.001$). From lymph nodes, 64% of aspirates obtained by surgeons were unsatisfactory, compared with 5% of those obtained by pathologists ($P<0.001$). From thyroids, 35% of aspirates obtained by surgeons were unsatisfactory, compared with 4 % of aspirates obtained by pathologists ($P<0.001$). From other sites, 10.7% of aspirates obtained by surgeons were unsatisfactory, while all those obtained by pathologists were satisfactory ($P<0.01$).

Most of the lymph node FNABs during the study period by pathologists were satisfactory and of high diagnostic accuracy. This led to a significant reduction (by 33%) in

the number of surgically excised lymph nodes over the study period (n=83) compared with the average number excised per year prior to our study period (n=124) when all FNABs were performed by surgeons only ($P<0.0001$). The surgeons performing the FNAB had been doing the procedure for 3 to 8 years without any formal training in FNAB performance. The pathologists handling the FNAB were trained for it during their postgraduate studies and had 3 to 4 years experience performing the procedure.

Discussions

Fine-needle aspiration biopsy is being used increasingly for diagnosing a variety of benign and malignant conditions. This technique has the advantage over other forms of biopsy of being more reliable, rapid, inexpensive and relatively painless. However, unsatisfactory aspirates form the bulk of the inconclusive FNAB reports. Reports comparing the proportions of unsatisfactory aspirates obtained by clinicians versus pathologists have been very few. Carson et al. reviewed 2199 FNAB reports of superficial lesions and found significant differences between clinicians' and pathologists' proportions of unsatisfactory aspirates in all sites. In their study, the proportion of unsatisfactory aspirates obtained by clinicians and pathologists was 14% and 3%, respectively.

The proportions of unsatisfactory thyroid aspirates in the literature were 8 to 19%.³⁻⁹ Our proportion was 17% (35% by surgeons, 4% by pathologists). The difference observed in our study is much higher than the difference noted in Carson et al's study (9% by clinicians, 2% by pathologists). Eight percent of thyroid aspirates obtained by Frable, a cytopathologist, were unsatisfactory,³ compared with 16% unsatisfactory aspirates obtained by a group of clinicians in another study.⁴

The proportions of unsatisfactory breast aspirates in the literature were 3 to 36%.¹⁰⁻¹⁴ Our proportion was 21% (35.7% by surgeons, 7% by pathologists). Padel et al and Carson et al. observed a difference similar to ours (20.3% by clinicians, 6.9% by pathologists and 28% by clinicians, 1% by pathologists).² Eisenberg et al. reported a 15% proportion

of unsatisfactory breast aspirates performed by a group of surgeons,¹¹ contrasted with 5% unsatisfactory aspirates performed by Frable.¹⁰

In our study, a large difference in the proportion of unsatisfactory lymph node aspirates was observed between surgeons and pathologists (64% for surgeons, 5% for pathologists). This difference is much lower than in the study done by Carson et al (14% clinicians, 4% pathologists).² A demonstrable advantage of satisfactory FNABs is the observation in our study that there was a 33% reduction in the number of excisional biopsies of lymph nodes for diagnostic purposes during the study period in comparison with the previous years when services of the FNAC clinic were not available. This reflects the better diagnostic material available and higher diagnostic accuracy when the pathologist performs the FNAB.

In our study we observed that the FNAB procedure handled by a trained pathologist yields better results than when handled by surgeons. The formal training of the pathologists and their intention to diagnose the case during the procedure and smear examination were the major factors affecting the FNAB procedure outcome. The experience of the operator in the present study did not have a significant effect on specimen adequacy.

In cytopathology, reporting of diagnostic accuracy depends above all on the adequacy of the specimen, and therefore we believe that it is preferable for a well-trained pathologist to perform the procedure. The advantage of a pathologist doing the procedure is that a rapid and immediate evaluation can be rendered on aspirate adequacy and any need for repeating the procedure. In addition, the pathologist can direct the further processing of aspirated material for other tests, such as microbiologic culture, flow cytometry and electron microscopy, as indicated by preliminary evaluation of the smears. Furthermore, if the pathologist has examined and questioned the patient personally, more clinical information than is usually provided on request forms becomes available. All the aforementioned factors ensure the availability of an adequate aspirate, relevant clinical information and optimal processing of the aspirate, which contribute to improving the diagnostic accuracy of FNAB.

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