

## **FINE NEEDLE CAPILLARY TECHNIQUE: IS ASPIRATION SUCTION NECESSARY? A STUDY OF 30 CASES AT VARIOUS PATHOLOGICAL LESIONS**

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### **Abstract**

**Background:** Fine needle capillary cytology (FNCC) or the non-aspiration technique is now gaining popularity as a diagnostic tool. Little has been published regarding the efficacy of the procedure in which the cellular material is most likely drawn by capillary action rather than by suction.

**Objective:** the aim of this study is to evaluate the value and reliability of (FNCC) technique done at various pathological sites.

**Subjects & Methods:** over 19-month period, 30 patients with various pathological lesions underwent fine needle capillary sampling, some with ultrasonic guidance. Smears were fixed in 95% ethyl alcohol and then stained by H&E stain and examined by the same cytopathologist. The technique was evaluated by an objective scoring system using five criteria. Cytological diagnosis was confirmed histologically.

**Results:** the mean age and sex distributions of all cases were evaluated. The ultimate histopathological diagnosis of all lesions revealed 21 malignant and 9 benign lesions. The average score per site regarding the assessment of (FNC) technique was adequate for diagnosis for all lesions submitted to this technique; the failure rate was zero by this technique.

**Conclusion:** by the application of an objective scoring system, (FNC) technique produces a comparable cellular yield and has similar diagnostic accuracy to (FNAC). On the other hand the former technique is less traumatic, produces less frequent bloody samples, and allows a more sensitive fingertip feeling of the lesion.

Key words: Aspiration cytology, fine needle cytology, fine needle capillary, non-aspiration cytology

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### **Introduction**

Fine needle aspiration cytology is a rapid, reliable, accurate and safe procedure for the diagnosis of superficial and deep-seated mass lesions. Recently, fine needle sampling without aspiration has been introduced in certain centers<sup>1,2</sup>.

Little has been published regarding the efficacy of this latter technique, which depends on the principle of capillary and may thus be called fine needle capillary (FNC) sampling technique.

The objective of this study is to evaluate and assess fine needle capillary sampling technique done at various pathological lesions.

### **Subjects & Methods**

From January 2000 to July 2001, thirty patients with clinico-radiological diagnosis of various pathological lesions at different sites underwent (FNC) sampling technique, some under

ultrasonic guidance, to study, evaluate and assess this technique in the diagnosis of such lesions. All patients were referred to Al-Khadimiya Teaching Hospital; this technique was done at the radiology department using 20-21 gauge needles, the length of which ranged from 3.2 to 16 cm. For both superficial and deep-seated lesions, the technique was done by the same cytopathologist using ultrasound guidance by an expert sonographer whenever needed. Smears were fixed immediately in 95% ethyl alcohol for at least 30 minutes then stained by hematoxylin and eosin (H & E) and examined by the same cytopathologist. Regarding the evaluation and assessment of this technique, five objective (criteria) parameters were applied for each sample and a point scoring system is predetermined as shown in table 1.

In the cytological smears examined there may be regional variation of the examined criterion e.g. cellularity within the same slide and thus the final score given for each criterion will represent the mean score. A score between (0 and 9) points was given to each fine needle capillary specimen

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on the basis of the five criteria tabulated in table 1.

Samples were classified to

1. Unsuitable for cytodiagnosis (0-2 points)
2. Adequate for cytodiagnosis (3-6 points)
3. Diagnostically superior (7-10 points).

The diagnosis was confirmed by histopathology.

Table 1: Methodology of point allocation (criteria and scoring system used)

Criteria	Quantitative description	Point score
1. cellularity (cellular yield)	Minimal or absent	0
	Sufficient for cytodiagnosis	1
	abundant (frequent cell clusters)	2
2. Degree of cellular degeneration and distortion (trauma)	Marked	0
	Moderate: diagnosis possible	1
	Minimal: diagnosis possible	2
3. Background blood or clot	Large amount (diagnosis not possible "obscured")	0
	Moderate amount (diagnosis possible)	1
	Minimal (diagnosis easy "clear background")	2
4. Architecture preservation (maintenance of appropriate cellular arrangement)	Non-diagnostic (minimal or absent)	0
	Some preservation, flat sheets, syncytia or single cell patterns	2
	Excellent (diagnosis obvious)	
5. Finger tip felling assessment	Poor	0
	Excellent	1

### Results

The mean age and sex distribution of thirty cases studied is illustrated in table 2. Table 3 shows the results of FNC sampling of thirty cases from various pathological sites. Table 4 shows the final histopathological diagnosis of the lesions submitted to FNC sampling technique and from this table we can notice that collectively there were 21 malignant lesions and 9 benign lesions. The average or mean score per site regarding the

assessment of this technique was shown in table 5.

Table 2: Age and sex distribution of 30 cases with FNC sampling technique

Sample site	Sex		Mean age
	Female	Male	
Liver	6	7	46±5
Breast	3	0	38±6
Thyroid	3	1	30±4
Kidney	2	3	54±5
Pancreas	1	2	64±5
Retroperitoneal	0	2	50±5

Table 3: Final histopathological diagnosis of all lesions submitted to FNC sampling

Location of lesion	No.	Benign lesion (including cystic lesion)	Malignant lesion
Liver	13	1	12
Breast	3	2	1
Thyroid	4	4	0
Kidney	5	2	3
pancreas	3	0	3
Retroperitoneal	2	0	2
<b>Total</b>	<b>30</b>	<b>9</b>	<b>21</b>

Table 4: Final histopathological diagnosis (biopsy diagnosis) for different lesions examined

Organ	No.	Final diagnosis
Liver	13	3 hepatocellular Ca. 9 metastatic Ca. 1 benign cyst
Breast	3	2 fibroadenoma 1 invasive ductal Ca.
Thyroid	4	multinodular goiter
Kidney	5	3 renal cell Ca. 2 simple renal cyst
Pancreas	3	adenocarcinoma
Retroperitoneal	2	soft tissue sarcoma

Table 5: The mean score per site regarding assessment of FNC technique

Site sampled	No.	Background of slides	Cellularity of samples	Degree of cellular degradation and trauma	Maintenance of cellular arrangement	Finger tip felling	Mean total score per site
Liver	13	0.87	1.02	1.94	0.48	1.0	Adequate
Breast	3	0.95	0.76	1.56	0.51	1.0	Adequate
Thyroid	4	0.48	1.87	1.88	0.43	1.0	Adequate
Kidney	5	0.71	1.54	1.73	0.49	1.0	Adequate
Pancreas	3	0.59	0.98	1.64	0.39	1.0	Adequate
Retroperitoneal	2	0.84	0.45	1.85	0.26	1.0	Adequate

- sufficient material was obtained in 30/30 (100%) of cases
- No inadequate sampling was obtained with the technique
- No evidence of complications was encountered in this technique

Table 5: The mean score per site regarding assessment of FNC technique

Thirty patients with different pathological lesions underwent cytological diagnosis using FNC sampling technique.

Table 2 shows mean age and sex distribution of 30 cases with different pathological lesions. Among these lesions sampled consisted of 13 liver masses (12 malignant, 3 primary hepatocellular carcinoma, 9 metastatic, one benign cystic lesion), 3 breast masses (two benign fibroadenoma, one invasive ductal carcinoma of breast), 4 thyroid lesions (all are of multinodular goiter), 5 kidney lesions (three primary renal cell carcinoma, two simple renal cysts), 3 pancreas (all proved to be adenocarcinoma), 2 retroperitoneal (both of soft tissue sarcoma), as shown in table 4.

Biopsies of all cases were subsequently received; histological results were all compatible with preceding cytological results.

All cytological smears were classified according to five basic criteria tabulated, using a predetermined point scoring system Table 1.

Table 5 shows average point scored for all 30 cases with different pathological lesions for each specific site using five basic cytological criteria.

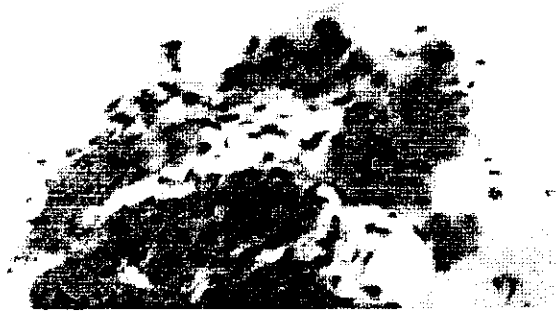


Figure 1: FNCC renal mass, renal cell carcinoma; notice abundant granular cytoplasm. H & E stain X 400.



Figure 2: FNCC renal mass; angiomyolipoma, H & E stain X 200.

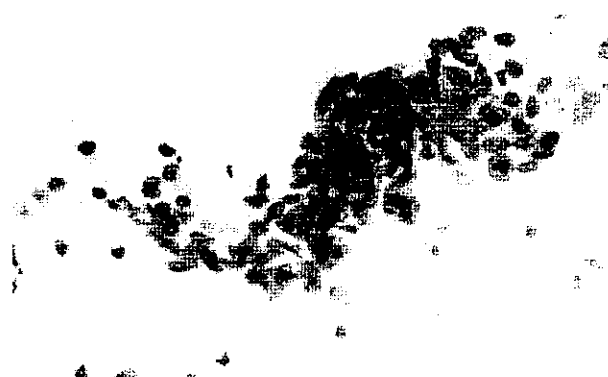


Figure 3: FNCC soft tissue mass, soft tissue sarcoma, H & E stain X 400. Notice adequacy of the sample.

### Discussion

In 1930<sup>3</sup>, Martin and Ellis first presented their results of tumor diagnosis by FNA technique; this report was followed by a second article in 1934<sup>4</sup>. In 1955 Frenzen et al<sup>5</sup> introduced a special aspiration syringe holder, described in detail in 1960 and 1967<sup>6</sup>.

Since 1981, a new modified technique had been introduced, namely fine needle capillary sampling technique (fine needle without aspiration). The same procedure was also practiced by Briffod et al<sup>7</sup>, since that time the technique become has gained popularity in different centers. It has been shown that by the application of an objective scoring system, the fine needle capillary sampling without aspiration produces a comparable cellular yield, and has a similar diagnostic accuracy to classic fine needle aspiration technique<sup>8-10</sup>. Also that FNC sampling technique permits a significant reduction in trauma to the tumoral and surrounding tissues, and that it reduces the amount of blood in the samples, particularly from vascular tumors. In addition, the direct contact with the needle allows a more sensitive fingertip feeling of the consistency of the tumor tissue during sampling.

This technique has certain disadvantages and as follows:

1. Relatively less Cellularity of the sample compared with classical needle aspiration that is in less cellular (fibrotic) lesions it is better to do fine needle aspiration cytology.

2. In cystic lesions, fine needle aspiration is the procedure of choice; it decreases the risk of spillage and loss of fluid contents that occurs from the open-ended needle used in fine needle capillary sampling to prevent direct

communication or contamination with the surrounding environment. Furthermore, fine needle aspiration enables drainage of enough material, in most cases, for biochemical, bacteriological as well as cytological studies. Additionally, fine needle aspiration may be therapeutic in cases of simple benign cystic lesions, which are often completely collapsed by aspiration with or without sclerotherapeutic agents.

3. It gives minimal maintenance of cellular arrangement compared with classic needle aspiration technique.

### **Conclusion**

Each sampling technique has the advantages and disadvantages and to choose one of them, this is personal preference issue that is more suitable for him or herself. If only one needle pass is to be performed, to minimize patient discomfort or to reduce screening times, fine needle aspiration probably has a greater chance of producing a diagnosis than does fine needle capillary sampling technique.

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