

## COMPARISON OF SPECIMEN ADEQUACY IN FINE NEEDLE ASPIRATION CYTOLOGY PERFORMED WITH DIFFERENT GAUGE NEEDLES IN PALPABLE EXTERNAL SWELLINGS

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### ABSTRACT

**Background:** Fine Needle Aspiration Cytology (FNAC) of external swellings may yield different specimen adequacy depending on different gauge needles used for aspiration.

**Objective:** To compare the specimen adequacy aspirated by various gauge (21 and 22) needles in external palpable swellings of lymph nodes, thyroid gland, salivary glands, breast and soft tissue.

**Study Design:** Comparative cross sectional study.

**Duration:** Six months (1<sup>st</sup> Jan 2012 to 30<sup>th</sup> June 2012).

**Setting:** Histopathology/Cytology department Combined Military Hospital Peshawar (Pakistan).

**Methodology:** This was a prospective study of 200 cases in which FNAC was performed with either 21 or 22 gauge needles (100 cases with 21 gauge and 100 with 22 gauge needles). Equal number of aspirations were done with 21 and 22 gauge needles from the swellings of thyroid gland, lymph nodes, salivary glands, breast and soft tissue. Results were analyzed for specimen adequacy by using SPSS 17.

**Results:** A total number of 200 cases were recruited in this study, out of which 100 were aspirated with 21 gauge needles and 100 with 22 gauge needles. Specimen adequacy in swellings of thyroid, lymph nodes and salivary glands was better with 22 gauge amounting 90%, 80% and 80% respectively, as compared to yield with 21 gauge needles which was 85%, 70% and 60% respectively. On the other hand in swellings of breast and soft tissue, the specimen adequacy was better with 21 gauge needles giving 98% and 90 % adequate yield respectively as compared to 22 gauge needles which was 70% and 40 % respectively.

**Conclusion:** Needles of smaller gauge (22 gauge) give a better yield in swellings of thyroid, lymph nodes and salivary gland while in swellings of breast and soft tissue sample adequacy is better with larger gauge needle (21 gauge).

**Keywords:** Fine Needle Aspiration Cytology; Needle gauge; Specimen adequacy.

### INTRODUCTION

Fine needle aspiration cytology (FNAC) is a simple and effective technique in investigation and evaluation of external swellings. It can also be used for internal organ swellings including thoracic, abdominal and pelvic organs, if assisted with image guidance. The external swellings in which FNAC is proved very useful and effective are lymph nodes, thyroid, salivary gland, breast and externally palpable soft tissue swellings<sup>1</sup>. The advantages of FNAC include cost effectiveness, quick reporting, bedside diagnosis, minimal physical and psychological trauma, one step procedure leaving a clean plan for surgeon to

perform surgical procedures and participation of patients in management plan. The technique may also serve therapeutic role in cystic swellings by aspirating and draining them.<sup>2</sup>

FNAC is performed with different gauge needles ranging from 21 – 29 gauge. Routinely used needles are of 21, 22 and 23 gauges. Small gauge needles (22,23 gauge) cause less pain and discomfort as compared to the large gauge needles (21 gauge).<sup>3</sup>

There is a need to strike a balance between the discomfort caused to the patient and adequacy of specimen obtained for accurate diagnosis while using different gauge needles for aspiration. This study was carried out to compare the specimen adequacy with 21 and 22 gauge needles in externally palpable swellings of lymph node, thyroid, salivary gland, breast and soft tissue.

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## METHODOLOGY

After getting the informed consent, 200 patients with a palpable external swelling of thyroid gland, lymph nodes, salivary glands, breast or soft tissue were recruited during a period of 6 months (1<sup>st</sup> Jan 2012 to 30<sup>th</sup> June 2012), at Histopathology / Cytopathology department of Combined Military Hospital Peshawar (Pakistan). Children under 10 years of age and patients who refused to participate in the study were excluded. Patients were divided into two groups. Group 'A' comprised 100 cases in which FNAC was done with 21 gauge needles (larger gauge). Group 'B' also comprised 100 cases in which the procedure

was done with 22 gauge needle (smaller gauge). Equal number of aspirations were done with 21 and 22 gauge needles from the swellings of thyroid gland, lymph nodes, salivary glands, breast and soft tissue. To eliminate the operator bias, all procedures were done by a single operator. In all cases 2 x air dried and 2 x wet fixed smears were made. The air dried smears were stained with Haemacolor, while one wet fixed smear was stained with PAP stain and other wet fixed smear with H&E. All the smears were seen and reported by one consultant. Adequacy of specimen was checked in all externally palpable swellings of lymph nodes, thyroid, salivary gland, breast and soft tissue.

**Table-1: Summary of fine needle aspiration cytology results from the study.**

S.No	Site	Diagnosis	Number of cases
01	Thyroid (n=80)	Adenomatous colloid nodule / Goiter	58
		Papillary Carcinoma	04
		Suspicious for follicular Neoplasm	04
		Thyroiditis	04
		Non diagnostic (with 21 gauge needle)	06
		(with 22 gauge needle)	04
02	Lymph node (n=40)	Reactive hyperplasia	16
		Chronic granulomatous inflammation	10
		Lymphoproliferative disorder	02
		Metastatic carcinoma	02
		Non diagnostic (with 21 gauge needle)	06
		(with 22 gauge needle)	04
03	Breast (n = 40)	Benign (C2)	16
		Malignant (C5)	10
		Suspicious for malignancy (C4)	04
		Atypia probably benign (C3)	02
		Non diagnostic (with 21gauge needle)	02
		(with 22 gauge needle)	16
04	Salivary gland (n= 20)	Pleomorphic adenoma	08
		Chronic sialadenitis	04
		Adenoid cystic carcinoma	02
		Non diagnostic (with 21 gauge needle)	04
		(with 22 gauge needle)	02
05	Soft tissue swellings (n = 20)	Lipoma	08
		Neurofibroma	02
		Haematoma	02
		Non diagnostic (with 21 gauge needle)	02
		(with 22 gauge needle)	06
<b>Total</b>			<b>(n=200)</b>

The data was analyzed by using SPSS version 17.

**RESULTS**

A total number of 200 cases were recruited in this study, out of which 100 were aspirated with 21 gauge needle and 100 with 22 gauge needle. Overall cytological diagnosis was made in 80% cases with 21 gauge needle and in 78% cases with 22 gauge needles. Summary of cytological results of the study is given in table 1.

Adequacy of the sample obtained with 21 and 22 gauge needles was different at different sites. Specimen adequacy in swellings of thyroid with 21 gauge needles was 85%, while with 22 gauge needle it was 90%. In lymph node swellings (most of the lymph nodes were cervical lymph nodes), the specimen adequacy with 21 gauge needle was 70% and with 22 gauge needle 80%, respectively. In salivary gland swellings adequate specimen was obtained in 60% cases with 21 gauge needle and 80% with 22 gauge. On the other hand, in swellings of breast and soft tissue the specimen adequacy was better with 21 gauge needle giving 98% and 90 % adequate yield respectively as compared to 22 gauge where adequate yield from breast and soft tissue was 70% and 40 % respectively (Table 2).

**DISCUSSION**

Fine Needle Aspiration Cytology has become a very popular and effective technique in diagnosis of external as well as internal organ swellings. The technique has become further effective with advent of ancillary studies made possible on aspirated material.<sup>4</sup> There has always been an effort to maintain a quality control and strike a balance between the

fineness of the needle used for aspiration causing least discomfort to the patient and adequacy of sample obtained.<sup>5</sup> Different studies give different results with different gauge needles and a consensus needs to be achieved.<sup>6</sup>

In the present study, it was observed that adequacy of material aspirated with 21 and 22 gauge needles was different in swellings of thyroid gland, lymph nodes, salivary glands, breast and soft tissue.

The adequacy of material in swellings of head and neck regions including thyroid, cervical lymph nodes and salivary gland tissue was better with small gauge (22 gauge) needles as compared to large gauge (21 gauge) needles. These results are similar to the results shown by Jandu and Webster, indicating that smaller gauge needles are better for aspiration of head and neck swellings.<sup>7</sup> Another study carried out by Anwar and Ambreen also indicated that small gauge needles are better for doing aspirations of head and neck and provide a better sample adequacy<sup>8</sup>. In their study they used even smaller gauge (23, 24 and 29 gauge) needles and recommended them for better yield in head and neck swellings, however our experience with very small gauge needles is not very satisfactory and we are using 22 gauge needles routinely for head a neck swellings. A better yield in head and neck swellings with relatively small gauge needles may be due to delicate and vascular nature of swellings of head and neck like thyroid, salivary glands and cervical lymph nodes, which may reveal haemorrhagic aspirate with larger gauge needles making the aspirate non diagnostic<sup>9</sup>.

On the other hand our study indicated that

**Table-2: Comparison of specimen adequacy with 21 and 22 gauge needles.**

S.No	Site	21 Gauge Needle (Group A)		22 Gauge Needle (Group B)	
		Adequate	Inadequate	Adequate	Inadequate
01	Thyroid	34 (85%)	06 (15%)	36 (90%)	04 (10%)
02	Lymph nodes	14 (70%)	06 (30%)	16 (80%)	04 (20%)
03	Salivary Gland	06 (60%)	04 (40%)	08 (80%)	02 (02%)
04	Breast	18 (90%)	02 (10%)	14 (70%)	06 (30%)
05	Soft tissue	08 (80%)	02 (20%)	04 (40%)	06 (60%)
	Total (n=200)	(n = 100)		(n = 100)	

aspiration of breast lumps and soft tissue swellings revealed more adequate specimen with larger gauge (21 gauge) needles as compared to the smaller gauge (22 gauge) needles. This result is different from that shown in study done by Malinae and David and Choukimth both of which revealed that even in breast and soft tissue swellings adequacy was better with small gauge needle (22, 23 gauges).<sup>10,11</sup> However another study carried out by Yu showed that the specimen adequacy in breast swellings is better with larger gauge needles<sup>12</sup>. One possible explanation of inadequate yield in breast lumps and soft tissue swellings may be hard nature of these swellings due to more fibrous tissue or desmoplastic reaction making the small gauge needle difficult to cut through the tissue and get the adequate samples from this swellings.<sup>13</sup>

## CONCLUSION

It is concluded from this study that needles of smaller gauge (22 gauge) give a better yield in swellings of thyroid, lymph nodes and salivary gland while in swellings of breast and soft tissue sample adequacy is better with larger gauge needle (21 gauge). In view of the results of present study, it can be recommended that for swellings of thyroid gland, lymph nodes and salivary glands it is preferable to use 22 gauge needles for better specimen adequacy. On the other hand, for swellings of breast and soft tissue, 21 gauge needles may be more effective and may yield a more adequate sample. Moreover, there is a need to compare

21 and 22 gauge needles with further smaller gauge needles regarding specimen adequacy, patient comfort and for health care quality improvement.

## REFERENCES

1. Frable WJ. Needle aspiration biopsy: past, present and future. *Human Pathol.* 1989; 20: 504-17.
2. Amedee RG, Dhurandhar NR. Fine-needle aspiration biopsy. *Laryngoscope* 2001; 111:1551-7.
3. Aslam, M. Comparison of the use of 21G needle with 23G needle for fine needle aspiration of palpable breast masses *The Antiseptic.* 2002; 99 (5): 171-2
4. Smith OD, Ellis PDM, Bearcroft PWP, Berman LH, Grant JW, Jani P. Management of neck lumps - a triage model. *Ann R Coll Surg Engl* 2000; 82: 223-6.
5. Thomas JO, Amanguno AU, Adeyi OA, Adesina AO. Fine needle aspiration in the management of palpable masses in Ibadan, impact on the cost of care. *Cytopathology* 1999; 10:206-10.
6. Peter A. Brennan, Neil Mackenzie, Rachel S. Oeppen, Kulamarva, Gareth J. Thomas, Anne V. Spedding. Prospective randomized clinical trial of the effect of needle size on pain, sample adequacy and accuracy in head and neck fine-needle aspiration cytology. *Wiley Int Sci.* 2007; 29(10): 919-22.
7. Jandu M, Webster K. The role of operator experience in fine needle aspiration cytology of head and neck masses. *Int J Oral Maxillofac Surg* 1999; 28:441-4.
8. Haq AU, Motassim A. A Comparative Study of Various Needle Gauges in Diagnostic Fine Needle Aspiration Cytology. *Int J Pathology*; 2005; 3(1): 2-5.
9. Daltrey IR, Kissin MW. Randomized clinical trial of the effect of needle gauge and local anaesthetic on the pain of breast fine-needle aspiration cytology. *Br J Surg.* 2000;87(6): 777-9.
10. Harigopal M, Chhieng DC. Breast Cytology: current Issues and Future Directions. *Open Breast Cancer J.* 2010; 2 (1): 81-89.
11. Sharanabasav CM, Rangappa PK. Fine needle aspiration cytology of soft tissue tumors with special emphasis on grading of spindle cell sarcomas. *Int J appl Biol Pharmacol Technol.* 2012; 3 (2): 247-60.
12. Yu YH, Wei W, Jiu JL. Diagnostic value of fine-needle aspiration biopsy for breast mass: a systematic review and meta-analysis. *BMC Cancer* 2012; 12 (41): 3-14.
13. Cobb CJ, Raza AS. Obituary: Alas poor FNA of breast-we knew thee well!. *Diagn Cytopathol* 2005; 32(1): 1-4.