

CORRELATION OF FINE NEEDLE ASPIRATION CYTOLOGY AND HISTOPATHOLOGY OF THE NECK SWELLINGS PRESENTING AT NATIONAL ACADEMY OF MEDICAL SCIENCES, KATHMANDU, NEPAL

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ABSTRACT

Introduction

Neck masses are frequently found in clinical practice. A spectrum of pathological lesions ranging from inflammation to benign and highly malignant manifestation is observed. Fine needle aspiration cytology (FNAC) of neck masses is a quick, easy, safe and cheap technique in the diagnosis which has been a well-accepted procedure in diagnosing various swellings. Histopathology is a gold standard technique in diagnosing any swelling which also provide detail architecture, however it also requires OT settings, more manpower, expensive, time consuming, more traumatic and can sometimes become difficult.

Objective

The objective of our study was to evaluate the frequencies of neck swellings and how efficacy FNAC is in diagnosing neck masses by correlating the gold standard histopathological examination.

Methodology

A Hospital based descriptive cross sectional prospective study was conducted in 50 patients with neck swellings presenting in the surgery OPD and admitted patient for some other reasons. FNAC and histopathological examinations were done from those lesions and were compared. The sensitivity, specificity and accuracy rates were calculated. Data entry and analysis was performed using SPSS.

Results

A total of 50 patient were subjected to both FNAC and histopathology examination (HPE). Out of 50 cases, 25 were male and 25 were female. The age ranged from 16 to 82 years. Lymph nodes 22 (44%) was the most common case, followed by thyroid 17 (34%), salivary glands 10 (20%) and soft tissue 1 (2%). Among all Tubercular lymphadenitis (18%) followed by papillary carcinoma of thyroid (14%), metastatic carcinoma of lymph node, NHL, and pleomorphic adenoma 10% each. The sensitivity of FNAC in diagnosing neck masses is 90.08%, specificity is of 98.53%, and diagnostic accuracy is of 87.64%.

Conclusion

FNAC is a simple, fast, inexpensive, and minimally invasive technique which can be used as the first line investigation in diagnosing neck swellings.

KEY WORDS

FNAC, HPE, lymph nodes, neck mass

INTRODUCTION

A lump is the most common clinical condition found in the neck. The common neck lumps are lymphadenopathies, thyroid swellings, metastatic carcinoma, and salivary gland swellings.¹

In 1930 Martin introduced Fine needle aspiration cytology, since then it has become one of the popular diagnostic tools of palpable lumps.² It is a easy, fast and inexpensive method used for sampling superficial masses of the neck and is commonly performed in the outpatient clinic. It causes least trauma to the patient and carries negligible risk of complications.^{3,4} It is performed under local anesthesia and is usually helpful if a neck lump is suspected to be malignant. The evidence of spread of tumor via the track caused by the fine hypodermic needle used is lacking.⁵ It can be both diagnostic as well as therapeutic in a cystic swelling.⁶ It does not provide the detail architecture as histology but can provide cells from whole lesion from many aspirations.⁷ Histopathology is the gold standard technique for diagnosing any swellings which also provide detailed architecture. However it requires expertise, operation theatre and comprises more complications. It cannot be performed in OPD, is more expensive and requires more manpower.

The aim of this study is to assess the spectrum of neck masses and to determine the accuracy of FNAC in detection of various lesions in National Academy of Medical Sciences, Bir Hospital.

METHODOLOGY

This study was conducted at Bir Hospital, Kathmandu as a Hospital based descriptive cross sectional study. The study was conducted from March to September 2014. First 50 cases of neck swellings presented in surgical OPD or admitted in the hospital for various reasons were selected as a sample size (50 cases taken because of time limit, and also similar study conducted in surgery department of Postgraduate Medical Institute, Lady Reading Hospital Peshawar by Tariq Ahmad et al).

Both sexes above 15 years of age, with a neck swelling were included in the study. Any patient diagnosed previously by histopathology was excluded from the study.

FNAC and histopathology was done for all the patients after getting their consent and without monetary burden by approval from respective authorities. The pathology department performed the FNAC and biopsy specimen was obtained from surgery department in operation theatre and sent for histopathological examination.

FNAC was performed by 23 gauge needle and Papanicolaou and Giemsa stains were used for staining. Likewise, the biopsies were fixed in 10% formalin, sections made and were stained with hematoxylin and eosin. Then histo-cytological

comparison was done. In relation to histopathological study the sensitivity, specificity and accuracy rate of FNAC was measured.

Interim analysis of data was performed upon completion of the study. The data was entered into the computer using SPSS 22.0. It was rechecked by reading from the computer and checking the original source. Statistical Analysis was done by using chi-square test for categorical correlations and independent t-test for continuous variables

RESULTS

A total of 50 patients were included in the study. The maximum number of patients were in the age group of 15-40 (n=27). Both males and females were equal in number in the study. Lymphnodes (n=22) were highest in number to occur among the neck swellings. Others include thyroid (n=17), salivary glands (n=10), soft tissues (n=1).

Table 1: Common neck Masses, by Relative Frequency (n=50)

Diagnosis	Frequency	Percentage
TB lymphadenitis	9	18
Papillary carcinoma	7	14
Metastatic carcinoma of LN	5	10
Non-Hodgkin's Lymphoma	5	10
Pleomorphic adenoma	5	10
Chronic sialadenitis	3	6
Colloid goiter	3	6
Follicular adenoma	3	6
Non-specific lymphadenitis	3	6
Mucoepidermoid carcinoma	1	2
Medullary carcinoma	1	2
Hashimoto's thyroiditis	1	2
Non-specific thyroiditis	1	2
Warthin's tumor	1	2
Nodular goiter	1	2
Lipoma	1	2

As per Table 1 Tubercular lymphadenitis is the most common of the neck swellings (18%) followed by papillary carcinoma of thyroid (14%), metastatic carcinoma of LN, NHL, Pleomorphic adenoma 5% each and so on.

Table 2 : Cyto-histological correlations

FNAC reports(n)	Histopathology reports(n)	Accuracy rate
TB lymphadenitis (n=6), inconclusive (n=3)	TB lymphadenitis (n=9)	66.7%
Non-specific lymphadenitis (n=4)	Non-specific lymphadenitis (n=3) Non-Hodgkin's Lymphoma (n=1)	75% (1 FP for NHL)
Non-Hodgkin's Lymphoma (n=4)	Non-Hodgkin's Lymphoma (n=5)	80%
Metastatic carcinoma of LN(n=3) Inconclusive (n=2)	Metastatic carcinoma of LN(n=5)	60%
Nodular goitre(n=1)	Nodular goitre(n=1)	100%
Colloid goitre(n=2)	colloid goitre(n=2)	100%
Benign cyst of thyroid(n=1)	Cystic Colloid goitre with (n=1)	100%
Non-specific thyroiditis(n=2)	Non-specific thyroiditis (n=1) Follicular denoma(n=1)	50%
Hashimoto's thyroiditis(n=1)	Hashimoto's thyroiditis(n=1)	100%
Follicular neoplasm(n=2)	Follicular adenoma(n=2)	100%
Papillary carcinoma(n=7)	Papillary carcinoma(n=7)	100%
Medullary carcinoma(n=1)	Medullary carcinoma(n=1)	100%
Chronic sialadenitis(n=3)	Chronic sialadenitis(n=3)	100%
Benign cyst of salivary gland(n=1)	Warthin's tumor(n=1)	0%
Pleomorphic adenoma(n=5)	Pleomorphic adenoma(n=5)	100%
Mucoepidermoid carcinoma(n=1)	Mucoepidermoid carcinoma(n=1)	100%
Lipoma(n=1)	Lipoma(n=1)	100%

As per table 2 the accuracy rate of Lymph node for nonspecific lymphadenitis (75%) is the highest and for metastatic carcinoma (60%) is the lowest. Except for nonspecific throididtis (accuracy rate 50%) all the cases of thyroids have 100% accrcacy rates. Accuracy rate is 100% for all the diseases of salivary glands except warthin's tumour which was wrongly diagnosed as benign cystic lesion, accuracy rate being 0%. Only one lesion of soft tissue, lipoma of 100% accuracy rate.

Table3: Sensitivity, Specificity and Accuracy rate of FNAC in Neck lesions

Organ	FNAC/HPE	Sensitivity	Specificity	Accuracy Rate
Lymph Node	16/22	76.2%	94.12%	70.4%
Thyroid	16/17	94.12%	100%	92.86%
Salivary gland	9/10	90%	100%	87.5%
Soft tissue	1/1	100%	100%	100%
Total	42/50	90.08%	98.53%	87.64%

As per table 3 Lymph node has the lowest sensitivity, specificity and accuracy rate, 76.2% , 94.12% and 70.4% respectively. The total sensitivity, specificity and accuracy rate of FNAC is 90.08%, 98.53% and 87.6% respectively.

DISCUSSION

Fine needle aspiration cytology has become an important and widely accepted technique in investigating the swellings from the thyroid gland, salivary glands and neck nodes. It is quick, safe, well tolerated and inexpensive, with negligible complications.⁸

In the present study of 50 patients the median age of occurrence was 39 years with the age ranging from 16 years to 82 years. Male and female were equal in number (n=25) . Lymph node was the most common cause of neck swelling 44 % (n=22) followed by thyroid 34% (n=17), salivary gland 20% (n=10) and soft tissue 2% (n=1). In a similar study conducted by Poorey VK, Tyagi et. al in 2014⁹ in 152 cases 58.10% were of lymphnodes, 19.55% were thyroid swellings, 9.49% were of salivary gland masses and 12.85% were of soft tissue and miscellaneous. This corresponds to somewhat similar trend of the occurrence of the swellings.

The most common pathology in our study was Tubercular lymphadenitis constituting 18% of cases which was followed by papillary carcinoma of thyroid constituting 14% of cases

and metastatic carcinoma of LN, NHL, and pleomorphic adenoma of salivary gland found in 10% of cases each.

Tubercular lymphadenitis was the most common findings of the cervical lymphadenopathy (n=9) followed by NHL and metastatic carcinoma (n=5) each and lastly was nonspecific lymphadenitis (n=3). Out of the total tubercular lymphadenitis (n=9) only 6 could be correctly diagnosed by FNAC and 3 of the result were inconclusive with accuracy rate of 66.7%. The cause of the low accuracy rate of the TB lymphadenitis is because of the inadequate aspirate of the specimen which showed inconclusive results. Literature shows that the accuracy rate of FNAC in tubercular lymphadenitis is 90-100%.¹⁰ one case NHL was wrongly diagnosed as non-specific lymphadenitis. Out of 5 cases of metastatic carcinoma 2 were inconclusive with accuracy rate being 60%.

Out of the total thyroid cases papillary carcinoma of thyroid is the most common findings (n=7) followed by follicular adenoma and colloid goiter with 3 cases each. One case of thyroid follicular adenoma was wrongly diagnosed as non-specific thyroiditis. 1 case of colloid goiter was diagnosed as cystic lesion. It may be impossible to differentiate cellular colloid goitre from follicular lesion, and it is also not possible to differentiate a follicular adenoma from a carcinoma, as it requires examining the whole lesion to determine capsular and vascular invasion for diagnosis.¹¹ FNAC could not distinguish follicular adenoma from follicular carcinoma so the diagnosis of follicular neoplasm was made (n=2). Except for nonspecific thyroiditis (accuracy rate 50%) all the cases have 100% accuracy rates. In this study, in diagnosing the thyroid gland disorders, the highest degree of sensitivity (94.12%) shows that FNAC can be considered as a first line investigation of such swellings.

The most common cause of salivary gland swelling is pleomorphic adenoma (n=5) followed by chronic sialadenitis (n=3) with only one case of malignancy diagnosed as mucoepidermoid carcinoma. In a study conducted by Gills MS et al.¹² in 2001 in Pakistan the most common benign salivary gland tumour was pleomorphic adenoma (84.5%) and the most common malignant neoplasm was mucoepidermoid carcinoma (56.9%). Accuracy rate is 100% for all the salivary gland diseases except warthin's tumour which was wrongly diagnosed as benign cystic lesion, accuracy rate being 0%. The accuracy rate ranged from 80.4 to 98%.¹³

Lipoma was the only lesion from the soft tissue and miscellaneous group, with 100% accuracy rate.

The p value for the FNAC Vs HPE for all the sites including the lymph node, thyroid gland, salivary gland is <0.05 which is statistically significant that is there is strong evidence of relationship between the FNAC and the HPE findings of the neck swellings.

The sensitivity, specificity and accuracy rate of FNAC in diagnosis of lymphadenopathy is 76.2%, 94.12%, and 70.4% respectively. For the thyroid swelling the sensitivity, specificity and accuracy rate of FNAC is 94.12%, 100%, and 92.86% respectively. The sensitivity, specificity and accuracy rate of FNAC in diagnosis of salivary gland swellings is 90%, 100%, and 87.5% respectively. Whereas the sensitivity, specificity and accuracy rate of FNAC in diagnosis of soft tissue, lipoma (n=1) are all 100%.

The comparison of the result of present study including sensitivity, specificity and accuracy rate of FNAC of the neck swellings with other workers [Table 4], shows similar results.

Table 4: Comparison of other studies with our study

Study	Sensitivity	Specificity	Accuracy rate
Present study	90.08%	98.53%	87.64%
Podoshin et al. ¹⁴	87%		85.4%
Young et al. ¹⁵			94.5%
Amedee and Dhurandahar ¹⁶			95%
El Hag et al. ¹⁷	95%	100%	98%
Thomsen and associates ¹⁸			93%
Mobley et al. ¹⁹	96.6%	97.7%	94.4%
Tadon et al. ²⁰	89.6%	96.5%	93%
Chauhan et al. ²¹	93.1%	100%	98.4%
Tilak et al. ²²	90.9%	93.2%	92.7%

CONCLUSION

Fine Needle Aspiration Cytology is a simple, can be performed under local anesthesia and quick results are obtained. It serves as an alternative to histopathological examination and can be used as a primary diagnostic tool in diagnosing the neck swellings. There was a good accuracy rate between the cytological and histological findings. It has high sensitivity rate, however there are few drawbacks because of the inconclusive results misleading diagnosis of various cystic lesions of neck. Thus, in the diagnosis of neck swellings FNAC can be regarded as a first line of investigation.

RECOMMENDATIONS

Fine needle aspiration cytology can be used as an initial diagnostic tool for the evaluation of neck masses in addition to clinical examination. Further study with larger sample size should be carried out in our community to verify the conclusion derived in this study.

LIMITATION OF THE STUDY

The study was carried out in short period of time; hence large sample size could not be collected. Possibilities of the sampling bias as the first 50 cases were taken from various departments.

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CONFLICT OF INTEREST

None

REFERENCE

- Lumley JSP. Physical signs. 18thed. Oxford Butterworth Heinemann; 1997
- Martin H, Ellis EB. Biopsy of needle puncture and aspiration. *Ann Surg*1930;92:169-81.
- Celeste NP, Williams JF. Fine needle aspiration biopsy of the head and neck. USA, Butterworth Heinemann; 1996.p 1–13.
- Gamba PG, Messineo A, Antonello LM, et al. A simple exam to screen superficial masses, FNAC. *Med Pediatr Oncol* 1995; 24:97–9.
- Russel RCG, William NS, Bulstrode CJK: Bailey and Love's short practice of surgery. 24th ed. London: Arnold; 2004
- Afridi S, Malik K, Waheed I. Role of fine needle aspiration biopsy and cytology in breast lumps. *J Coll Physicians Surg Pak*1995;5:75–7
- Kirk RM, Ribbans WJ. *Clinical Surgery in General*. 4thed. Edinburgh. Elsevier; 2004
- Gharib H, Goellner JR. Fine-needle aspiration biopsy of the thyroid: an appraisal. *Ann Intern Med* 1993;118:282–9
- Poorey VK, Tyagi A. accuracy of Fine needle aspiration cytology in head and neck masses *Indian J Otolaryngol Head Neck Surg*. 2014 Jun;66(2):182-6
- Gupta AK, Nayar M, Chandra M. Critical appraisal of fine needle aspiration cytology in tuberculous lymphadenitis. *Acta cytol* 1992; 36(3): 391-94.
- Lioe TF, Elliott H, Allen DC, Spence RAJ. A 3 year audit of thyroid fine needle aspirates. *Cytopathology* 1998;9: 188–92
- Gill MS, Muzaffar S, Soomro IN, Kayani N, Hussainy AS, Pervez S, et al. Morphological pattern of salivary gland tumours. *JPMA The Journal of the Pakistan Medical Association*. 2001;51(10):343-6
- Fernandes GC, Pandit AA. Diagnosis of salivary gland tumours by FNAC. *Bombay Hosp J* 2000; 42(1): 1-5.
- Podoshin L, Gertner R, Fradis M. Accuracy of fine needle aspiration biopsy in neck masses. *Laryngoscope* 1984; 94: 1370-1371.
- Young JE, Archibald SD, Shier KJ. Needle aspiration cytologic biopsy in Head and Neck masses. *The Am J surg* 1981; 142: 484-89.
- Amedee R.G., Dhurandhar NR. Fine needle aspiration biopsy. *The Laryngoscope* 2001; 111: 1551–57.
- El Hag IA, Chiedozi LC et al. fine needle aspiration cytology of head and neck masses; *Acta Cytologica*, 2003;47:387–392
- Thomsen J, Andreassen J.C. Fine needle aspiration biopsy of tumours of head and neck. *J Laryngol Otol* 1973; 87: 1211-16
- Chauhan S, Darad D, Dholakia A. Fine needle aspiration cytology of needle lesion-an experience at Tertiary care Hospital in Central Gujarat. *NJMR*. 2012; 2: 255-9.
- Tilak V, Dhaded AV, Jain R. Fine needle aspiration cytology of head and neck masses. *Indian J Pathol Microbiol*. 2002; 45(1): 23-9. 6