

# Role of FNAC in Evaluation of Neck Masses

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## Abstract

**Background:** Despite fine needle aspiration cytology (FNAC) has a well recognized role in investigation neck masses, insufficient cellular yield in FNA remain an issue. The aim of this study is to evaluate the effectiveness of FNAC as a primary investigation tool in neck masses.

**Methods:** This is a retrospective study of 47 cases with FNAC performed from February 2008 till June 2009 at Otorhinolaryngology Department, Ampang Hospital. The result were compared with results of 44 patients with neck masses and subjected for excision/incision biopsy as first line investigation of tissue diagnosis during the same period of time.

**Results:** A total of 37 out of 47 patients with FNAC have a conclusive result (78.7% diagnostic yield). Inflammatory lesions (46%) are the common pathology followed by benign lesions (41%) and malignant lesions (13%). Excision/incision biopsy have 100% tissue diagnostic yield with 48% were haematological malignancies followed by reactive lymphadenopathy (27%), tuberculosis lymphadenopathy (16%) and metastatic carcinoma (9%).

**Conclusion:** Despite lower tissue diagnostic yield compared to excision/incision biopsy, FNAC remains a safe and appropriate first line investigation of neck masses.

**Keywords:** Fine needle aspiration cytology; Neck masses

## Introduction

Neck masses are a common referral to Otorhinolaryngology (ORL) department. Etiologies vary from infective causes to malignant origin. Evaluation of a patient with neck mass should always begin with a thorough history, followed by a complete head and neck examination. If the physical examination does not explain the neck mass, a fine-needle aspiration (FNA) of the mass may be performed. If the mass is believed to be a metastatic lesion, a panendoscopy of the aero-digestive tract is subsequently warranted.

FNAC allows the pathologist to assess the cells aspirated from the lesion. However it does not allow evaluation of the morphology. As a result, false-negative and false-positive results can occur. As FNAC is a simple test, associated with minimal trauma and complication, and results can be rapidly available, it remain a valuable diagnostic tool and is a recommended first line investigations of suspected malignancy cases.

## Materials and Method

This is a retrospective study carried out at Otorhinolaryngology (ORL) Department, Ampang Hospital in which data of patients who had FNAC between February 2008 and June 2009 were identified and reviewed. FNAC procedures were done after a thorough physical examination.

Palpable neck masses were aspirated using 23G needle and 20 mL syringe. A negative pressure was applied to the syringe by pulling the syringe plunger and at least two dry specimens and two alcohol fixed specimen were taken. The alcohol fixed smears were immediately submerged in 95% ethyl alcohol. All the slides preparations were made by ORL department's staff before being sent to department of pathology. Alcohol fixed smears were subsequently stained with Haematoxylin and Eosin (H and E) stains.

The data were divided into four large groups which represent the nature of origin of the neck masses. The groups are: a) salivary glands, b) cervical lymph nodes, c) thyroid gland, and d) undetermined origin. The results of the FNAC

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**Table 1.** The Results of First and Second Attempt of FNAC

	Satisfactory and conclusive	Unsatisfactory	Inconclusive
First attempt (n = 47)	31 (66%)	6 (13%)	10 (21%)
Second attempt (n = 6)	6 (13%)	0 (0)	0 (0)

were evaluated into five categories which are: 1) unsatisfactory sample, 2) inconclusive, 3) inflammatory process, 4) benign disorder, and 5) malignant disorder.

Open biopsy of head and neck masses was carried out when FNAC result was unsatisfactory after two attempts or if FNAC result suggested for biopsy as further investigation.

Comparisons were made with patients who presented with neck masses and were subjected for excision or incision biopsies during the same period (February 2008 - June 2009) as a first line investigation. A total of 44 cases fulfilled the criteria, 20 cases were known to have haematological malignancy and in these cases, excision biopsy was done to

**Table 2.** Results of FNAC of Neck Swelling, Showing the Relative Frequencies of Various Pathological Conditions (n = 37)

Diagnosis	No. of cases/ (%)	Action
Lymphadenitis		
Reactive	8 (21%)	Conservative management
Tuberculous	4 (11%)	Referral to respiratory team
Sialadenitis	5 (14%)	Conservative management
Benign lesions		
Salivary Gland	6 (16%)	
Pleomorphic adenoma	-4	-Surgical resection (HPE and FNAC corresponded)
Benign mass	-2	-Conservative management
Others	4 (11%)	Surgical excision (HPE and FNAC corresponded)
Cystic lesions	-4	
Malignant lesions		
Lymph node	3 (8%)	
Thyroid papillary carcinoma	-2	Referral to surgical department
Nasopharyngeal carcinoma	-1	Referred to Oncologist
Others	2 (5%)	
Carcinoma of unknown primary	-1	Radical neck dissection and adjuvant radiotherapy
Rhabdomyosarcoma	-1	Referred to oncologist
Thyroid		
Benign	5 (14%)	
Goitre	-4	Referral to surgical department
Thyroglossal cyst	-1	Conservative management since it's the only function thyroid on thyroid scan

**Table 3.** HPE Results of Patients With Inconclusive or Unsatisfactory Sample of FNAC

FNAC report	HPE results
Inconclusive	
a) cervical lymph node	
1. suspicious cell seen	Hodgkin Lymphoma (n = 3)
2. no atypical cell seen	TB lymphadenitis (n = 1)
b) salivary gland	
3. atypical cell seen	Sialadinitis (n = 1)
Unsatisfactory	
a) cervical lymph node	
4. unsatisfactory sample	TB lymphadenitis (n = 1)
b) undetermined	
5. unsatisfactory sample	Intramuscular lipoma (n = 1)
6. unsatisfactory sample	Pilomatrixoma (n = 1)

exclude recurrence of haematological malignancy.

## Results

A total of 47 cases fulfilled the criteria. The age of the patients ranged from 13 to 72 years with the mean age of 50 - 60 years old. There were 25 male and 22 female patients. Most of the patients are Malay (n = 31) followed by Chinese (n = 13), Indian (n = 2) and others (n = 1).

Majority of aspirates were from cervical lymph node which consists of 20 cases (43%) followed by salivary gland with 12 cases (26%), undetermined origin with 10 cases (21%) and thyroid gland with 5 cases (10%).

On first attempt of FNAC, 31 samples were satisfactory and have conclusive results (66%), shown in Table 1. Out of 16 cases which reported as unsatisfactory or inconclusive, FNAC were re-attempted for second time in 6 cases and all of them gained a satisfactory result. Based on the accumulative data of both first attempt and repeated FNAC, 37 out of 47 cases have satisfactory results (78.7%).

Reactive lymphadenitis was the commonest diagnosis (21%) followed by salivary benign lesion mostly pleomorphic adenoma. Other pathologies include sialadinitis (14%), malignant neoplasm (13%) and tuberculous lymphadenitis (11%). Metastatic carcinoma to lymph nodes was the most common case of malignancy. The results are tabled in Table 2.

Of 10 patients which FNAC were group as inconclusive or unsatisfactory sample, 8 of them were subjected for open

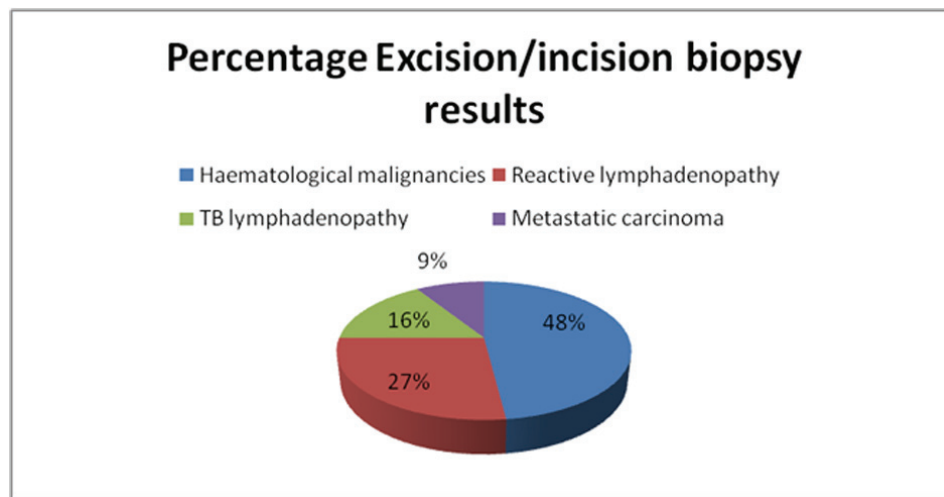
biopsy. Two patients whose initial FNAC were inconclusive declined further investigations that included open biopsy. The results are tabled in Table 3.

During the same period, 44 patients had excision or incision biopsy done as the first line investigations with 20 of them with history of haematological malignancies. Among the 20 patients previously treated for underlying haematological malignancies, 19 were positive for relapse and one case had infective lymphadenitis.

Among the other 24 cases which presented with new findings of palpable cervical lymph nodes; 11 were reported as reactive lymph node, 7 were reported as TB lymphadenitis, 2 were suspected to have haematological malignancy that were later confirmed as B lymphocytic leukemia and non-Hodgkin lymphoma respectively and 4 cases with non-haematological malignancies. Among these 4 patients; 2 cases had Nasopharyngeal Carcinoma (NPC), 1 case with metastatic carcinoma of prostate and 1 case with metastatic carcinoma of unknown primary (Fig. 1).

## Discussion

Our review showed a conclusive diagnostic yield of 78.7% for FNAC in evaluation of neck masses in our centre. This conclusive diagnostic yield includes repeated FNACs after failure of the first attempt FNAC. Our unsatisfactory sample on first attempt of FNAC was 6 out 47 patients (13%) and still below acceptable range unsatisfactory sample as suggested by guidelines of the Papanicolaou Society of Cytopa-



**Figure 1.** Percentage excision/incision biopsy results based on etiology.

thology for fine-needle aspiration procedure and reporting; which is below 15% [1].

In our study, inflammatory lesions which consist of lymphadenitis and sialadenitis were the most common pathology accounting for 46%. This is followed by benign neoplasm (41%) and malignant neoplasm accounted for 13%. Most of the inflammatory lesions were due to reactive lymphadenitis (21%). El-Hag et al showed that reactive/non-specific lymphadenitis was the most common (33%) cause of neck masses among 225 Saudi patients [2]. Tuberculous lymphadenitis was the next most common pathology (21%) followed by malignant neoplasms (13%). Similarly, a study in India found that 84.5% cases to be benign lesions and 15.5% cases of malignant lesions in the evaluation of asymptomatic cervical lymphadenopathy [3]. In contrast, the spectrum of findings is different in the more developed nations. A study from New Zealand (n = 187) showed that malignancy accounted for 50% of cases [4]. Similarly, another study from the west reported 59% to be malignant lesions and 34% to be benign lesions [5]. This shows epidemiological variation between the developed and developing countries. Infections like TB are common in developing countries while malignancies are more common in developed countries. Malaysia is a developing country and the spectrum shows a similar pattern to other developing countries where cervical lymphadenitis to be more common cause of neck masses.

Use of FNAC for evaluating isolated salivary gland masses is generally accepted. However, the results of FNAC should be interpreted taking into account the clinical and investigative findings. Costas et al reported sensitivity and specificity of 84.8% and 93.7%, respectively for FNA of salivary gland (n = 112) [6]. Cohen et al reported a satisfactory specimen was obtained in 89% among 169 patients and compared to histological diagnoses, the positive and negative predictive values of FNA for salivary glands were 84% and

77%, respectively [7]. These results suggested that FNAC alone may not be sufficient to rule out salivary malignancies and that further clinical evaluation, including surgical resection, may be necessary. In our study, all four patient diagnoses of pleomorphic adenoma on FNAC were confirmed after surgical resection. Unfortunately, two patients who were diagnosed with benign lesions did not proceed to surgery.

Despite being inferior to excision biopsy, there are advantages of FNAC. First, the sensitivity and specificity of FNAC is sufficiently high and is considered acceptable. Second, FNAC is cost effective. In the era of economic recession, cost savings is an important consideration. The cost of excision biopsy is much higher especially if a hospital stay is required and time off from work is needed. Furthermore, preoperative evaluations that include blood, radiological and occasional cardiac investigations generally required prior to general anaesthesia will incur additional cost. Third, FNAC also is safer; obviate the risks of anaesthesia, tumour seeding, postoperative complications and scarring. Cosmetic is certainly a very important issue to be considered when dealing with masses in the area of head and neck especially in female patients. Furthermore, results of FNAC are available faster than biopsy.

Generally, FNAC is a safer choice for the initial evaluation masses suspicious of malignancy as the frequency of needle seeding of the tumor cells in FNAC procedure is reported as low as 0.003-0.009% [8]. Hence the risk of tumour seeding in FNAC is almost nonexistent in contrast to excision biopsy which has significant risk of tumour seeding causing distant metastases of cancer itself.

The main limitation with our study was the small sample size. Second the department was newly established and hence the findings may not be comparable to established centres. However, despite this our yield can be considered acceptable and given time, this yield is likely to increase

once the department becomes more established.

### Conclusion

In conclusion, our study shows that FNAC remains an appropriate first line investigation of head and neck masses. FNAC is an economical, fast, and minimally invasive with acceptable sensitivity and few complications compared to open biopsy.

### Grant Support

Nil.

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