

Evaluation of Palpable Head and Neck Swellings with Fine Needle Aspiration Cytology (FNAC): A Clinicopathological Study

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Abstract

Introduction: Head and neck swellings exhibit mystifying diagnostic uncertainty and have diverse pathology ranging from benign inflammatory lesions to neoplasms. Fine needle aspiration cytology (FNAC) is considered as first line diagnostic method with high specificity for the diagnosis of palpable head and neck lesions thus eliminating the need of surgical intervention. The present study was designed to evaluate the efficacy of FNAC as a diagnostic tool for head and neck lesions.

Material and methods: A source of 152 cases with palpable head and neck lesions above 6 years of age attending department of pathology for FNAC were included. All palpable swellings at head and neck region were aspirated for the examination. The outcome of histopathological examination was compared with FNAC findings.

Results: Thyroid gland swellings (42.76%) were common, followed by lymph node swellings (27.63%), salivary gland swellings (16.44%) and soft tissue swellings (13.16%). Out of the swellings, 1.31% are normal, 16.44% are malignant, 31.57% are benign, 21.71% are autoimmune, 25% are inflammatory and 3.94% are inconclusive in FNAC examination. The diagnostic sensitivity, specificity, PPV, NPV and accuracy was 87.4%, 91.1%, 92%, 83% and 90.5% respectively for FNAC.

Conclusion: FNAC is an effective diagnostic modality for head and neck swellings with remarkable diagnostic accuracy and proved to be a remarkable diagnostic adjunct in preoperative assessment of the swellings.

Keywords: Head and neck swellings, FNAC, diagnostic accuracy, malignant lesions

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Introduction

Head and neck region accommodates crucial structures including thyroid gland, salivary glands, various groups of lymph nodes, pharynx, larynx and major neuro vascular structures. Lesions or swellings in this region involve multiple tissues that led to diverse

range of pathological conditions ranging from simple benign to highly malignant, inflammatory and acquired or congenital with complex etiology[1]. Due to its complex anatomical structure, diagnostic approach of

swellings or lesions always leads to difficulties [2].

FNAC is a safe, reliable and affordable diagnostic method for examining various superficial and deep masses in the head and neck region including thyroid gland, and salivary gland lesions [3-5]. FNAC is a useful atraumatic diagnostic modality for the assessment of cervical masses with limitation in terms of its diagnostic accuracy and value in distinction of neoplastic and non-neoplastic lesions [6]. However, FNAC will facilitate the initial diagnostic information that prevent the open biopsy and unnecessary surgeries. Moreover, FNAC is widely used in the management of thyroid and breast tumors globally [7]. In this regard, the present study was aimed to evaluate the efficacy of FNAC as a diagnostic tool for head and neck lesions.

Materials and Methods

The present study was conducted in the department of Pathology at MNR Medical

College and Hospital, Sangareddy from July 2021 to January 2022. A total of 152 cases with palpable head and neck lesions attending department of pathology for FNAC above 6 years of age were included. Cases with intracranial and orbital region lesions and biopsy samples of head and neck lesions received from general surgery department were excluded. Informed consent was obtained from all the participants and study protocol was approved by institutional ethics committee.

All the participants were subjected to detailed clinical examination. Before the procedure, all patients were explained, counselled and motivated about procedure. A standard 5 ml disposable syringe was used to aspirate the tissue under aseptic conditions and repeated the procedure if aspiration was acellular or inconclusive. The outcome of histopathological examination was compared with FNAC findings. The collected data was analysed by using SPSS version 23.0.

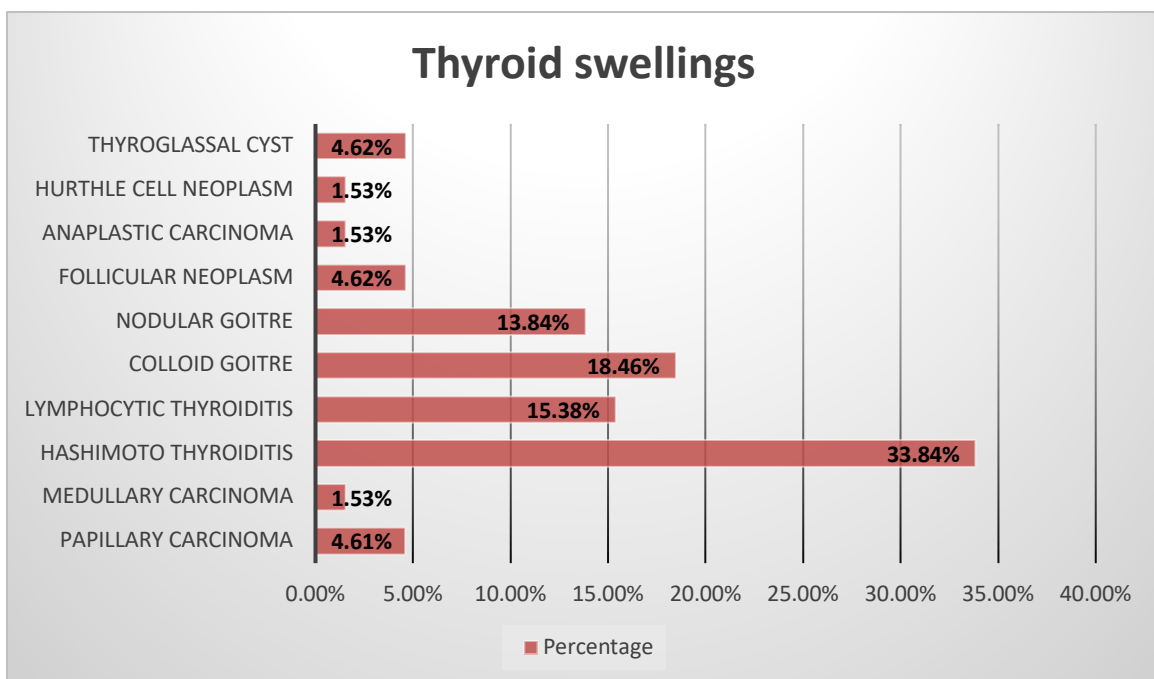
Results

Table 1: Clinico-demographic data of study participants.

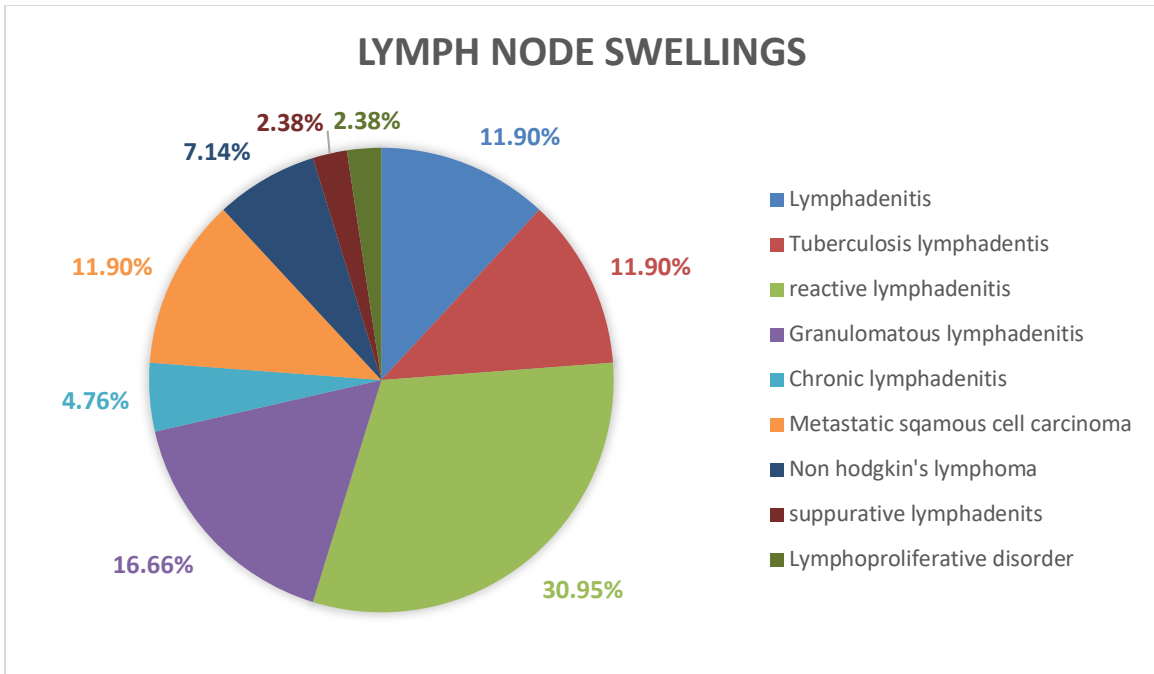
Clinico-demographic data	Total no of participants (n=152)	
	Frequency	Percentage
Age (In years)		
6-10	04	2.63%
11-20	14	9.21%
21-30	42	27.63%
31-40	34	22.36%
41-50	36	23.68%
51-60	17	11.18%
>60 years	05	3.28%
Gender		
Male	47	30.92%
Female	105	69.08%
Categorization of head & neck swellings		
Thyroid swellings	65	42.76%
Lymph node	42	27.63%
Salivary gland	25	16.44%
Soft tissue	20	13.16%

Table 2: Age wise distribution of cases with different types of head and neck swellings.

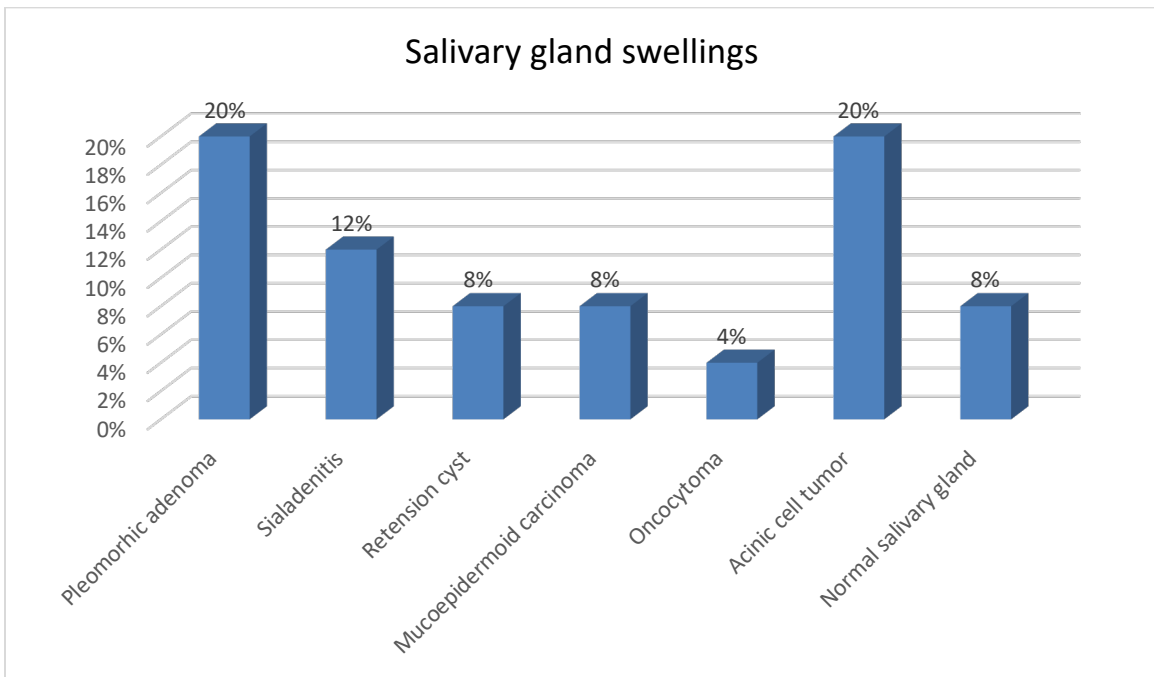
Age (In years)	Thyroid gland swellings (n=65)	Lymph node swellings (n=42)	Salivary gland swellings (n=25)	Soft tissue swellings (n=20)
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
6-10	-	02 (4.76%)	-	-
11-20	06 (9.23%)	06 (14.28%)	01 (4%)	-
21-30	20 (30.76%)	09 (21.42%)	03 (12%)	03 (15%)
31-40	17 (26.15%)	12 (28.57%)	02 (8%)	05 (25%)
41-50	13 (20%)	07 (16.66%)	05 (20%)	08 (40%)
51-60	06 (9.23%)	03 (7.14%)	07 (28%)	03 (15%)
>60 years	03 (4.61%)	03 (7.14%)	07 (28%)	01 (5%)
Total	65 (100%)	42 (100%)	25 (100%)	20 (100%)



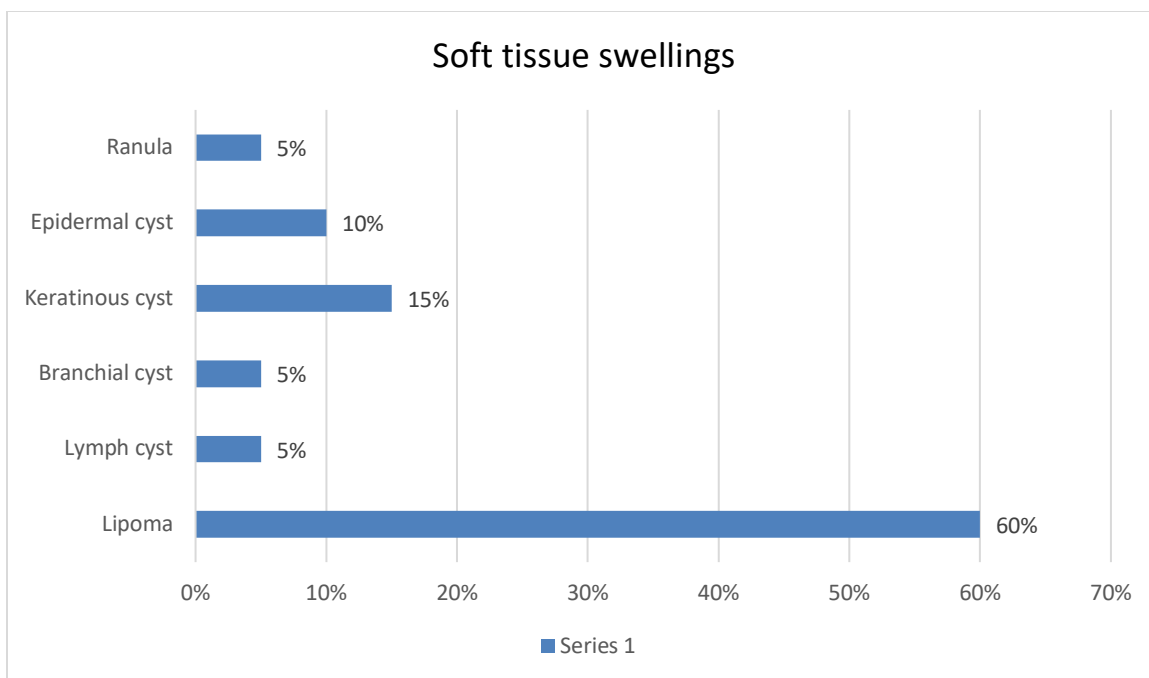
Graph 1: Participant distribution according to thyroid gland swellings (n=65).



Graph 2: Participant distribution according to lymph node swellings (n=42).



Graph 3: Participant distribution according to salivary gland swellings (n=25).



Graph 4: Participant distribution according to soft tissue swellings (n=20).

Table 3: Cytological findings of head and neck swellings

Findings	Total no of participants (n=152)	
	Frequency	Percentage
Cytological findings		
Normal	02	1.31%
Malignant	25	16.44%
Benign	48	31.57%
Autoimmune	33	21.71%
Inflammatory	38	25%
Inconclusive	06	3.94%
Diagnostic accuracy of FNAC findings		
Sensitivity	87.4%	
Specificity	91.4%	
PPV	92%	
NPV	83%	
Accuracy	90.5%	

Discussion

Majority participants were in age group of 21-30 years (27.63%) followed by 41-50 years (23.68%) and 31-40 years (22.36%). Females (60.08%) participants were than the males (30.92%). Thyroid gland swellings (42.76%) are commonly encountered head and neck swellings, followed by lymph node swellings (27.63%), salivary gland swellings

(16.44%) and soft tissue swellings (13.16%) (Table 1). A retrospective study by Rathod GB *et al.*, on 200 FNAC procedures for correlating FNAC findings with relevant clinical findings found thyroid swellings in 52%, lymph node swellings in 28.50%, salivary gland swellings in 11% and soft tissue and miscellaneous swellings in 4% of

the participants with male predominance [8]. A study by Pandey AK *et al.*, reported that out of 1272 aspirations, 53.46% were aspirated from lymph nodes, 24.47% from thyroid gland, 5.82% from parotid gland, 2.83% from submandibular salivary gland and 4.8% were inconclusive [9]. A study by Agrawal N *et al.*, on 100 participants with head and neck swellings found that the lymph node swellings are the common among all and lymphadenitis being prevalent one [10]. A cross sectional study by Afnan G *et al.*, included 300 cases with head and neck swellings found non neoplastic lesions in 67% and neoplastic lesions in 33% cases. Of the 300 cases, lymph node lesions were seen in 60% cases, salivary gland lesions in 10%, soft tissue tumor in 14%, cystic lesions in 14% and inconclusive lesions in 2% [11]. A study by Tobih JE *et al.*, reported that cervical/lymph node lesions (37.4%) were common head and neck lesions, followed by thyroid gland lesions (23.5%), jaw lesions (10.9%), parotid lesions (6.5%) and other random lesions (21.8%) [12]. Thyroid gland swellings are common in participants aged between 21-30 years (30.76%), 31-40 (26.15%) and 41-50 years (20%). Lymph node swellings are more in participant aged between 31-40 years (28.57%), 21-30 (21.42%), 41-50 (16.66%) and 11-20 (14.28%). Salivary gland swellings were high in participants aged between 51-60 (28%), above 60 (28%) and 41-50 (20%). Swelling to soft tissues are found more among 41-50 years (40%), and 31-40 (25%) (Table 2). A study by Patel DN *et al.*, on 250 cases with head and neck lesions with 52% males and 48% females reported that the incidence of lymph node lesions (64%) was common, followed by thyroid lesions (22.8%), salivary gland lesions (4.8%), and soft tissue lesions (2%) [13].

Among the thyroid gland swellings (n=65), Hashimoto thyroiditis was seen commonly in 33.84%, followed by colloid goitre (18.46%),

lymphocytic thyroiditis (15.38%), nodular goitre (13.84%), 4.62% each of thyroglossal cyst, follicular neoplasm and papillary carcinoma and 1.53% each of Hurthle cell neoplasm, anaplastic carcinoma and medullary carcinoma (Graph 1). A study by Pandey AK *et al.*, found commonest thyroid gland lesion was colloid goitre (64.5%) and thyroiditis (18.2%) [9]. A study by Patel DN *et al.*, found that benign thyroid lesions (84%) were common, followed by inflammatory lesions (10%), medullary thyroid carcinoma (2%), anaplastic carcinoma (2%), follicular carcinoma (2%) [13]. Rout K *et al.*, on 76 participants comparing FNAC with histopathology findings reported colloid goiter in 42.2%, colloid goiter in cystic degeneration in 13.2%, Hashimoto's thyroiditis in 10.6%, follicular adenoma in 7.8%, papillary carcinoma in 6.5%, and thyroglossal cyst in 19.7% cases [14-16]. Our study findings showed Hashimoto's thyroiditis as common thyroid lesions in the study participants.

A study by Afnan G *et al.*, reported that among 180 participants with lymph node lesions reactive lymphadenitis was seen in 39%, tubular lymphadenitis in 10%, metastatic deposition of lymph node in 9%, malignant lymphoma in 3% [11]. Inflammatory (nonspecific and tuberculosis) lesions of lymph nodes (72%) were common, followed by metastatic lesions (27%) and lymphoma (1%) (9%) [13]. Ahmad T *et al.*, reported that the tuberculous lymphadenitis (36%) was the commonest diagnosis, followed by reactive/non-specific lymphadenitis (18%) [17]. In the present study, reactive lymphadenitis (30.95%) was the commonly encountered lymph node swelling, followed by granulomatous lymphadenitis (16.66%), 11.90% each of tuberculosis lymphadenitis, metastatic squamous cell carcinoma, and lymphadenitis, non-Hodgkin's lymphoma (7.14%) and chronic lymphadenitis (4.76%) (graph 2).

A study by Afnan G *et al.*, found epidermal cyst (68%) as frequently diagnosed cystic lesion in the head and neck region [11]. The common salivary gland swelling was pleomorphic adenoma and acinic cell tumours i.e., 20% each, followed by sialadenitis (12%), mucoepidermoid carcinoma (8%), retention cyst (8%) and oncocytoma in 4% participants. Normal salivary gland was observed in 8% of the participants (Graph 3). A study by Pandey AK *et al.*, found that 50% of cases had sialadenitis followed by pleomorphed adenoma (13.9%) and retention cyst (13.9%) (9). Another study reported that the pleomorphic adenoma (67%) as common salivary gland lesion, followed by sialadenitis (17%), warthins tumor (8%) and mucoepidermoid carcinoma (8%) [13].

A study by Patel DN *et al.*, found benign cystic lesions as common soft tissue lesion (74%), followed by lipoma (22%) and ameloblastoma (4%) (13). Similarly, present study showed lipoma (60%) as commonly observed soft tissue swelling, followed by keratinous cyst (15%), epidermal cyst (10%), and 5% each of ranula, branchial cyst and lymph cyst (Graph 4).

The cytological examination showed that among the swellings, 1.31% were normal, 16.44% were malignant, 31.57% were benign, 21.71% were autoimmune, 25% were inflammatory and 3.94% were inconclusive. A study by Rathod GB *et al.*, reported malignant lesions in 30 cases and benign lesions in 170 cases [8]. Patel DN *et al.*, reported that out of 250 cases with lesions, 55.2% are inflammatory, 25.6% are benign and 19.2% are malignant in nature [13]. Ahmad T *et al.*, found malignant neck lesions in 14%, benign lesions in 8% and inconclusive in 8% [17].

A study by Manish Kumar *et al.*, found accuracy of FNAC for papillary carcinoma thyroid, pleomorphic adenoma and goiter

was 98.8%, 97.6% and 95.2% respectively [14]. Al-Bahkaly S *et al.*, found sensitivity, specificity, PPV, NPV and accuracy was 55.56%, 88.73%, 65.22%, 84% and 79.59% respectively [15]. The presents study showed better diagnostic outcome with sensitivity, specificity, PPV, NPV and accuracy was 87.4%, 91.1%, 92%, 83% and 90.5% respectively (Table 3).

Cocnclusion

Fine needle aspiration cytology is worthwhile, accessible and safe diagnostic procedure with high sensitivity, specificity, and diagnostic accuracy in the preoperative assessment of head and neck swellings. The present study findings exhibited FNAC as effective diagnostic modality in the diagnosis of head and neck swellings with 90.5% of diagnostic accuracy. However, FANC has limitations in terms of grading the various tumor. Further comparative analysis is required to assess different types of diagnostic tools in the diagnosis of head and neck lesions.

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