Original Research Article

FNAC findings of head and neck lesions in our Institute- A 3 year retrospective study

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Abstract

Background: There are several lesions of the head and neck region which are routinely encountered by different clinicians in patients among all age groups and diagnoses varies from benign lesions to malignancies. To identify these lesions, various diagnostic tools such as FNACs are being used which help the clinicians in a great way.**Methods:** This is a retrospective study done from August 2016 to October 2019 in a tertiary care hospital. All cases received in Department of Pathology were included in this study. It included a total of 310 cases. FNAC (including USG guided) were done from palpable masses of head and neck regions preferably from thyroid and breast lumps. Data entry and analysis were done using SPSS version 20.**Results:** A total of 310 patients who underwent FNAC of the head and neck region were included in this study. Maximum number of patients were in the age group of 21 to 30 years i.e. 85(27.42%) . In this study, 273(91.30%) cases were benign and 26(8.70%) cases were malignant lesions with aspirates from lymph nodes being the maximum. In our study, majority of the thyroid lesions 111(92.5%) belong to benign category II.**Conclusion:** It is concluded that FNAC proves to be a first line of investigation in the diagnosis of head and neck swellings. Here, most of the swellings occurred in the head and neck region. Thyroid FNA smears were also reported using the Bethesda system which helped in achieving more precise cytological diagnosis.

Keywords: Head & Neck, FNAC, Cytology.

Introduction

There are several lesions of the head and neck region which are routinely encountered in clinical practice. The initial line of management to diagnose these lesions is fine needle aspiration. FNAC is now a preferred tool for various neck swellings as the procedure is non-traumatic, easily accessible, inexpensive, excellent compliance and avoids the anaesthetic complications and requirement of open surgical biopsy.[1,2] There is no evidence that the tumor spreads through the skin track created by the fine hypodermic needle used in this technique.[3] It causes minimal trauma to the patient and carries virtually no risk of complications.[4] FNAC can be both diagnostic and therapeutic in cystic swellings.[5] Being a minimally invasive technique, it is particularly suitable in sensitive area where incision biopsy is difficult and it avoids need of surgery if the lesions show non- neoplastic, suspected metastatic or recurrent tumor.[6] It is repeatable, reduces the rate of exploratory procedure, and provides an early differentiation of benign from malignant pathology.[7]An early diagnosis and differentiation of such lesions from inflammatory to neoplastic play crucial role on planned treatment.[8]The present study aims to evaluate the pattern of various head and neck lesions on the basis of FNAC in a tertiary care hospital.

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Aims and objectives

1. To study the role of fine needle aspiration cytology and its utility in various head and neck lesions.
2. To study the frequency and incidence of head and neck lesions in our region.

Materials and methods

This is a retrospective study done from August 2016 to October 2019 in a tertiary care hospital. All cases received in Department of Pathology were included in this study. It included a total of 310 cases. FNAC (including USG guided) were done from palpable masses of head and neck regions preferably from thyroid and breast lumps. Data entry and analysis were done using SPSS version 20. The data was represented as frequency and percentage of the numbers. The reporting of thyroid FNAC was done according to 2017 Bethesda system for reporting thyroid cytopathology

Inclusion criteria

1. Patients in all age groups with palpable lumps

Exclusion criteria

1. Non palpable lumps

Results

A total of 310 patients who underwent FNAC of the head and neck region were included in this study. Out of the 310 cases, 193(62.25%) were females and 117(37.74%) were males (F:M ratio of 1.6:1). The age-wise distribution of the 310 patients in this study is

shown at **Table.1.** The age range of the patients in this study was between <10years to >60 years. Maximum number of patients were in the age group of 21 to 30 years i.e. 85(27.42%) followed by 31 to 40 years i.e. 60 (19.35%) and 41 to 50 years i.e 51 (16.45%). Least number of patients were seen in the age group below 10 years i.e. 15(4.84%)

Table 1 : Age and sex distribution of head and neck lesions

Age Group (in yrs)	No. of cases(n)(%)	Females(n)(%)	Males(n)(%)
0-10	15(4.84)	8 (4.14%)	7(5.98%)
11-20	38(12.26)	21(10.89%)	17(14.53%)
21-30	85(27.42)	61(31.60%)	24(20.51%)
31-40	60(19.35)	32(16.58%)	28(23.93%)
41-50	51(16.45)	39(20.21%)	12(10.26%)
51-60	34(10.97)	20(10.36%)	14(11.97%)
>60	27(8.71)	12(6.22%)	15(12.82%)
Total	310(100)	193 (62.25%)	117 (37.74%)

Fig. 1 shows that out of 310 head and neck lesions, majority of the aspirates in this study were from lymph node i.e. 142 (45.81%), followed by thyroid lesions i.e. 120(38.71%) . Skin and soft tissue lesions including scalp accounted for 34(10.96%), cases followed by salivary gland lesions 14(4.52%) cases. From the aspirates of all the head and neck lesions, a total of 299 cases of aspirates were adequate in our study, out of which aspirates from lymph node region were maximum i.e. 138(46.15%) followed by 117 (39.13%) smears from thyroid lesions, 13(4.34%) smears from salivary gland lesions and rest 31 (10.36%) smears from soft tissue and miscellaneous lesions.In this study (table.2.), 273(91.30%) cases were benign and 26(8.70%) cases were malignant lesions with aspirates from lymph nodes being the maximum ie. 115(83.33%) among benign cases and 23(16.67%) cases among malignant.

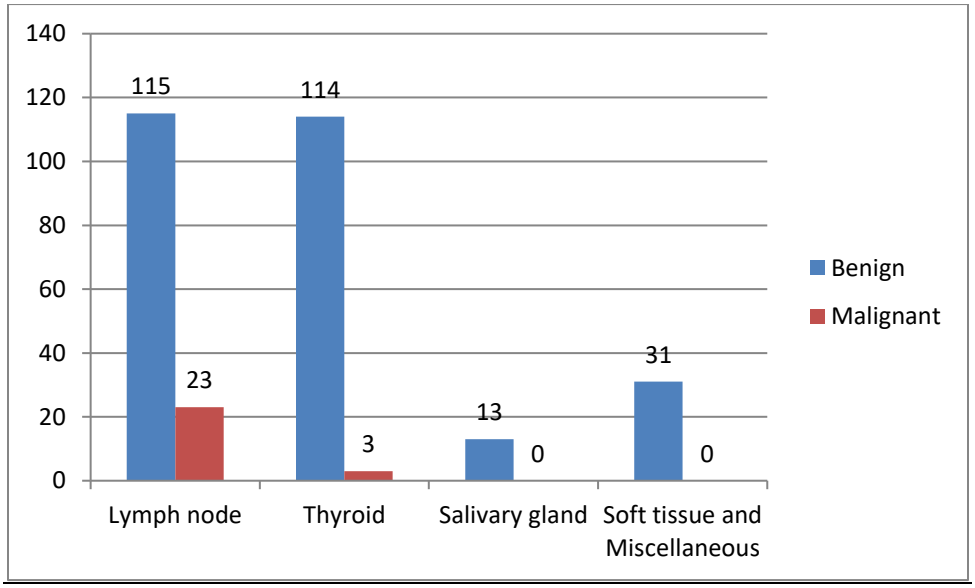

Fig 1:Distribution of benign and malignant lesions in various organs

Table 2. shows the detailed distribution of the cytological diagnosis in these 299 adequate aspirates with their respective percentages. Among 138 cases of lymph node lesions, reactive lymphoid hyperplasia, 81(58.69%) was the predominant cause of lymphadenopathy followed by granulomatous/tubercular lympha-denitis 33(23.91%), malignant 26 (14.1%) and inflammatory lesions 1 (0.72%). In malignant lesions, metastatic deposits was the predominant finding 21(15.22%). 1(0.72%) case of both hodgkin and non hodgkin lymphoma were found respectively. For confirmation of the diagnosis in cases of lymphoma, biopsy and immuno histochemistry was advised.

Out of 117cases of thyroid lesion, most common diagnosis was colloid goitre i.e. 72(61.53%) followed by multinodular goiter in 20 (17.09%) cases. Among the inflammatory lesion, Hashimoto's thyroiditis accounted for 19 (16.24%) cases. In our study malignant lesion of thyroid constituted 3 (2.56%) cases. Among these malignant lesions 2 (1.71%) cases were hurthle cell neoplasm and papillary carcinoma respectively followed by medullary thyroid carcinoma and follicular neoplasm both constituting 1(0.85%) and 1 (0.85%) case respectively. Salivary gland lesions constituted 13(92.86%) cases of head and neck swelling, out of which inflammatory lesion i.e. sialadenitis was the commonest lesion with 5(38.46%) cases of the total followed by benign tumor- pleomorphic adenoma in 4(30.76)% cases, benign cystic lesion in 2(15.38%)cases, benign lymphoepithelial lesion 1(7.69%) case and benign serous salivary acini in 1(7.69%) case.FNAC of soft tissue and miscellaneous lesions constituted 31(100%) benign cases with varied pathological lesions like lipoma 15(48.39%), benign keratinous cyst 6(19.35%), acute suppurative inflammation 2(6.45%), epidermal inclusion cyst 2 (6.45%), benign adnexal neoplasm 2(6.45%) and few others with 1(3.22%) case like granulomatous inflammation, branchial cyst, vascular neoplasm and mucocele respectively.

Table 2:Cytomorphological diagnosis of lesion

Lymph node	No. 138 (46.15%)	Thyroid	No. 117(39.13%)	Salivary gland	No. 13(4.35%)	Soft tissue & Misc	No. 31(10.37%)
Reactive hyperplasia	81 (58.69%)	Colloid goitre	72 (61.53%)	Benign cystic lesion	2 (15.38%)	Acute suppurative inflammation	2 (6.45%)
Granulomatous lymphadenitis (with or without caseation)	33 (23.91%)	MNG	20 (17.09%)	Benign lymphoepithelial lesion	1 (7.69%)	Granulomatous inflammation	1(3.22%)
Kikuchi lymphadenitis	1 (0.72%)	Hashimoto thyroiditis	19 (16.24%)	Sialadenitis	5 (38.46%)	Branchial cyst	1 (3.22%)
HL	1 (0.72%)	Hurthle cell neoplasm	2 (1.71%)	Benign serous salivary acini	1 (7.69%)	Benign keratinous cyst	6 (19.35%)
NHL	1 (0.72%)	PTC	2 (1.71%)	Pleomorphic adenoma	4 (30.76%)	Epidermal inclusion cyst	2 (6.45%)
Metastatic deposit	21 (15.22%)	MTC	1 (0.85%)			Vascular neoplasm	1(3.22%)
		Follicular neoplasm	1 (0.85%)			Benign adnexal neoplasm	2(6.45%)
						Lipoma	15(48.39%)
						Mucocele	1(3.22%)

Figure 2 show distribution of all the 120 thyroid lesions found in our study with accordance to 2017 Bethesda system of reporting. In our study, majority of the thyroid lesions 111(92.5%) belong to benign category II, where as only 3(2.5%) cases were respectively under categories I, IV and VI.

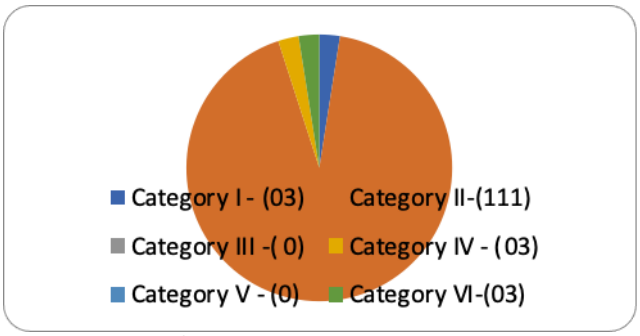

Fig 2: Distribution of thyroid lesions according to 2017 Bethesda system

Discussion

FNAC as a diagnostic technique to evaluate head and neck lesions was first introduced by Martin in 1930, a procedure which has since rapidly gained acceptance due to the easy accessibility of target sites and the minimally invasive nature of this method.[9]Among the most frequently sampled palpable head and neck lesions are lymph nodes, thyroid and major salivary glands along with other rarely encountered lesions like subcutaneous tissue swellings, lumps of skin appendages and oral cavity lesions.[10]In our study, various parameters like age distribution, sex predilection, site wise distribution and nature of the lesion were evaluated and the findings were compared with other studies. In the present study, most of the patients i.e. 85(27.42%) were within the 21–30 years of age group. In a similar study by Surapaneni et al., [11] the most common age group involved was 21–30 years, representing the younger population more involved than the older population. Another study by Khetrapal S et al[12], Chauhan S et al[10] and Singal P et al[13] showed the similar results whereas in a study by Omonisi AE et al [14], the age group of 51–60 years constituted the majority of cases . This may be due to geographic variations.Also, majority of our patients were females (62.25%) with female to male ratio 1.6:1 which is similar to studies done by Sangavi AKB et al[15], Adedeji TO et al[16] and Singal P et al[13] showing F:M ratio 1.7:1, 1.6:1 and 1.5:1 respectively. Some of the other studies like study by Poorey VK et al [17] and Goswami RR et al [18] showed F:M ratio of 1.1:1 and 0.9:1 respectively. Head and neck lesions are the commonly encountered in clinical practice. In the present study, the maximum number of aspirates were obtained from lymph nodes 138(46.15%) followed by thyroid gland 117(39.13%), salivary glands 13(4.34%) and miscellaneous lesions of head and neck 31(10.36%). In another study by Thakur AS[19], maximum number of aspirates were obtained from lymph nodes (50.8%) followed by thyroid gland (32.6%), salivary glands (10.4%) and miscellaneous lesions of head and neck region (6.1%).In a study by Khetrapal S [12], the largest number of aspirates from head and neck lesions were from lymph nodes i.e. 185(64.1%), followed by thyroid lesions 49(16.9%), while the rest of the sites accounted for 55(19%) cases. Other studies from the Indian subcontinent have also shown that the most common sites of FNAC of head and neck lesions were the lymph nodes[10,20] However, in a study carried out at a tertiary centre in Southern India the largest number of FNACs were from the thyroid gland constituting 56.45% of the cases.[21]

Table 3: Showing comparison of distribution of head and neck lesions between present study with other studies

	Lymph node %	Thyroid%	Salivary gland %	Skin and Soft tissue%
Present Study	46.15	39.13	4.34	10.36
Padia B [22]	64.02	18.70	2.87	12.94
Modi M.H.[23]	66.56	21.96	5.90	5.57
Banstola L[24]	55.4	21.49	6.14	1.62
Shekhar H[25]	42.0	18.0	15.5	17.50
Khetrapal S [12]	64.10	16.90	4.10	13.80
Sanghvi AKB[15]	41.0	37.0	5.0	7.0
Kapoor S[26]	43.0	34.0	15.0	8.0
Patel DN [27]	64.0	22.8	4.80	2.0
Thakur AS [19]	50.80	32.60	10.40	6.10

Study done by Sanghvi AKB et al [15] and Shekhar H et al [25] had reactive lymphadenitis as the commonest lesion comparable to our study. Studies done by Sanghvi AKB et al [15] and Khetrapal S et al [12] showed maximum inflammatory diagnosis which is comparable to our study. Metastasis was the commonest malignant lesion in study done by Sanghvi AKB et al [15] and AfnanGul et al [28] which is comparable to our study.

Table 4:Cytomorphological diagnosis in Head and Neck Swellings

	Present Study	Padia B [22]	Shekhar H [25]	Goswami RR [18]	Modi MH [23]	Patel DN [27]
Lymph Node						
Reactive	81(58.69%)	38(42.69%)	32(38.09%)	150(32%)	30(14.78%)	75(47.0%)
Granulomatous	33(23.91%)	17(19.10%)	-	128(27.4%)	-	-
Metastatic	21(15.22%)	7(7.86%)	11(13.09%)	96(20.5%)	58(28.57%)	43(27.0%)
*HL	1(0.72%)	-	-	-	-	-
*NHL	1(0.72%)	-	6(7.14%)	13(2.70%)	-	1(1.0%)
Thyroid						
Colloid Goiter	72(61.53%)	17(65.38%)	11(30.56%)	99(67.30%)	42(62.69%)	-
#MNG	20(17.09%)	-	5(13.88%)	-	-	-
Hashimoto Thyroiditis	19(16.24%)	-	5(13.88%)	9(6.0%)	19(28.36%)	6(10.0%)
Hurthle cell neoplasm	2(1.71%)	1(3.84%)	-	-	-	-
##PTC	2(1.71%)	-	3(8.33%)	8(5.40%)	1(1.49%)	-
Follicular neoplasm(FN)	1(0.85%)	3(11.5%)	1(2.78%)	12(8.20%)	2(2.98%)	1(2.0%)
Salivary Gland						
Sialadenitis	5(38.46%)	1(25.0%)	7(22.58%)	16(25.80%)	8(44.44%)	2(17.0%)
Pleomorphic Adenoma	4(30.76%)	3(75.0%)	9(29.03%)	27(43.50%)	5(27.78%)	8(67.0%)
Skin and Miscellaneous						
Acute suppurative inflammation	2(6.45%)	-	-	3(1.50%)	-	-
Benign Keratinous cyst	6(19.35%)	6(33.33%)	7(20.0%)	78(40.60%)	8(47.06%)	-
Epidermal inclusion cyst	2(6.45%)	2(11.11%)	7(20.0%)	-	-	17(74.0%)
Benign adnexal neoplasm	2(6.45%)	1(5.55%)	-	1(0.52%)	1(5.88%)	-
Lipoma	15(48.39%)	8(44.44%)	17(48.57%)	46(23.90%)	6(35.29%)	5(22.0%)

*HL: Hodgkin Lymphoma **NHL: Non Hodgkin Lymphoma. #MNG: Multinodular Goiter ##PTC: Papillary Thyroid Carcinoma

Among 138(46.15%) cases of lymph node lesions, reactive lymphadenitis was the most common finding in our study followed by, granulomatous lymphadenitis, metastatic carcinomas and lymphomas. Other studies also observed reactive lymphadenitis as the most common diagnosis of lymph node similar to our study.[18,22,23,25,27] In contrast, in a study by Modi MH [23], metastatic deposits was the most frequent finding among lymph nodes.Out of 117(39.13%) case of thyroid lesions, colloid goiter 72(61.53%) was the most common pathological finding in our study followed by multinodular goiter and hashimotos thyroiditis. Similarly, other studies [18,22,23,25,27] also showed maximum incidence of colloid goiter followed by multinodular goiter and hashimoto thyroiditis. Among malignant lesions, papillary carcinoma was the highest in our study which is comparable to study by Modi MH [23] whereas other studies by Shekhar H[25] and Goswami RR[18] showed higher incidence of papillary carcinoma thyroid. Radiation exposure is one of the well known risk factors for PTC.[29] Other risk factors include genetic factors, preexisting nodular disease, and association with genetic syndromes such as familial adenomatous polyposis syndrome.[30]Rima Bakhos et al evaluated in their study that most common pitfalls for false-negative diagnoses consisted of suboptimal material and under diagnosis of papillary carcinoma due to cystic degeneration. The most common pitfall for false-positive cases was over diagnosis of follicular neoplasms. [31]Our study also showed lowest incidence of follicular neoplasm i.e. 1 case (0.85%) as compared to other studies [18,22,23,25,27]. Although reasons for higher percentage of occurrence among these studies are not clear, associated factors may include genetics, poverty and behavioral practices. Shorter life expectancy and earlier exposure to risk factors for carcinogenesis has also been speculated [32].Also, there are some limitation of FNAC in diagnosing follicular neoplasm and similar lesions such as FVPTC (Folllicular variant of Papillary thyroid carcinoma) or cellular Nodular hyperplasia which are difficult to differentiate from each other using FNAC.[33] For this reason, the Bethesda system proposed a flexible framework for reporting thyroid cytopathology, and the general category IV "FN or suspicious for a FN" was provided for follicular adenomas and cytomorphologically similar lesions.[33] It is convenient for preoperative cytological diagnosis and can lead to a definitive diagnostic procedure, usually lobectomy, to identify carcinoma.[34] However, the general category IV includes not only Follicular Adenoma and Follicular Carcinoma but also hyperplastic nodules and FVPTC,[33] therefore more efforts needs to be made to achieve a precise diagnosis.[34]To overcome the limitations of morphology,

the application of ancillary tests such as immunohistochemistry or molecular studies have been encouraged[35] However, these are not always available on aspirates; therefore, cytomorphological approach still seems to be valuable[36]In this study, out of total 310 cases, 120 thyroid lesions were found with accordance to 2017 Bethesda system of reporting. In our study, majority of the thyroid lesions 111(92.5%) belong to benign category II with nodular colloid goiter being the most common entity among all benign lesions consisting of 61.53% while least incidence of 2.5% cases were found under other categories of I, IV and VI of Bethesda system. Similar findings were observed in other studies [37-40]. Hence, TBSRTC is useful for a standardized system of reporting thyroid cytology, bridges the communication gap between cytopathologists and clinicians, and interlaboratory agreement, leading to more consistent management approaches and therapeutic interventions. [41] It makes the cytology report unambiguous, clear, succinct, and clinically relevant. [42]Benign and malignant tumors of the major and minor salivary glands represent about six percent of all head and neck tumors. [43] The paired major glands (parotid, sub maxillary, and sublingual) secrete saliva into the oral cavity through well-defined ductal channels. Less well recognized are the hundreds of minor salivary glands present in the palate, tongue, pharynx, tonsil, nasal cavity, paranasal sinuses, larynx, trachea, lacrimal gland, and ear canal, which perform a similar moistening function. It is estimated that for every 100 tumors in the parotid gland, there will be 13 tumors in the submaxillary gland and 60 in the minor salivary glands. One third of the minor salivary gland tumors are located in the palate, and one fifth are in the tongue, floor of the mouth, and gingiva. The rest are found in the paranasal sinuses, cheeks, lips, nose, airway passages, etc. This varying tumor incidence is best explained by gland volume or mass. Two thirds to four fifths of parotid tumors are benign. Half of submaxillary gland tumors are malignant. The majority (more than 85 percent) of minor salivary gland tumors are malignant. [44]

In our study, out of all salivary gland lesions, there were 5 cases (38.46%) of sialadenitis which were in concordance with findings in other studies also [18,22,23,25] .Also present study showed only 4 cases (30.76%) of pleomorphic adenoma. Similar findings are seen in various studies done by Shekhar H [25] and Modi MH[23] while other studies [18,22,27] showed higher incidence of pleomorphic adenoma in their study. The Milan System for Reporting Salivary Gland Cytopathology (MSRSGC) has a six tier classification providing a standardized terminology and ROM for each category and thus avoiding the ambiguity often seen in FNAC interpretation.[45]. This comprised of six categories including non-diagnostic (category I), non-neoplastic (category II), atypia of undetermined significance (category III), benign neoplasm (category IVa), salivary gland neoplasm of uncertain malignant potential (SUMP) (category IVb), suspicious for malignancy (category V), and malignant (category VI).[46] with ROM of 25%, 10%, 20%, 5%, 35%, 60%, and 90% for each category.[47] A significant feature of this classification is that these categories are well-defined and provide implied risk of malignancy (ROM), thus guide patients for further definitive management[34]. In our study, out of total lesions of salivary gland, only 5 cases(38.46%) were included under Category (II) and 8 cases(61.54%) under Category (IVa). This was similar to study by Gaikwad VP et al [34]In our study soft tissue and miscellaneous lesions occupy the third position among all head and neck lesions. Lipoma is the most common lesion in skin and miscellaneous group 15(48.39%) followed by benign keratinous cyst, epidermal inclusion cyst and benign adnexal neoplasm. Other studies also observed lipoma as the most common diagnosis of skin and miscellaneous group similar to our study[22,23,25]. In contrast, in a study by Goswami RR [18], benign keratinous cyst was the most frequent finding in their study.

Conclusion

It is concluded that FNAC proves to be a first line of investigation in the diagnosis of head and neck swellings. Here, most of the swellings occurred in the head and neck region that were inflammatory in nature and affect females more frequently than males. Thyroid FNA smears were also reported using the Bethesda system which helped in achieving more precise cytological diagnosis along with introduction of TBSRTC for reporting thyroid FNAC Bethesda system has an added advantage of predicting the risk of malignancy which enables the clinician to plan for follow-up or surgery and also know the extent of surgery.

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