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Research Article

Evaluation of fine needle aspiration cytology in the diagnosis of head and neck masses and its correlation with histopathological findings

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ABSTRACT

Background: A number of masses may develop in the head and neck region and these can also be called swellings, growths, tumors or lumps. Various diseases may affect head and neck region, which present clinically as swellings. Commonly presenting head and neck masses occur within the thyroid, salivary glands and lymph nodes. The evaluation of head and neck mass is a common clinical dilemma and a condition which clinicians routinely encounter. It is evident that their early diagnoses provide the best chance of successful treatment. FNAC is a simple, quick and cost effective method to sample superficial masses found in the head and neck region. An early differentiation of benign from malignant pathology greatly influences the planned treatment. FNAC can be both diagnostic and therapeutic in cystic swellings.
Methods: The present Retro prospective study (Prospective for one year from January 2013 to December 2013 along with five year retrospective from January 2008 to December 2012) was carried out in the Department of Pathology, Pt. J.N.M. Medical College and associated Dr. B.R.A.M. Hospital, Raipur. Cases for prospective study were selected from patients presented with head and neck masses attending the ENT OPD and indoor patients. Two techniques were used to perform FNAC. (Aspiration technique and Non-aspiration technique) After FNAC of head and neck lesions follow up of cases was done for histopathological examination. Final histopathological diagnosis was compared with the FNAC findings to assess the accuracy of cytodiagnosis.
Results: A total of 12,514 FNACs done during six years, 1874 (14.9%) cases were diagnosed as head and neck lesions. Of the total 1874 cases of head and neck lesions, lymph node lesions were the commonest, accounting for 50.8% of cases. Thyroid and salivary gland lesions constituted 32.6% and 10.4% respectively. Analysis of FNAC of thyroid lesions, discordance was found more in malignant (11.8%) as compared to benign lesions, while Discordance was found more in benign lesion (12.4%) as compared to malignant lesion aspirates in lymph node lesions.
Conclusions: FNAC is having a high diagnostic rate to differentiate benign and malignant lesions.

Keywords: Head and neck mass, FNAC, Histopathology, Discordance

INTRODUCTION

A number of masses may develop in the head and neck region and these can also be called swellings, growths, tumors or lumps. Various diseases may affect head and neck region, which present clinically as swellings. Commonly presenting head and neck masses occur within the thyroid, salivary glands and lymph nodes. Less common pathologies presenting as neck swellings are from thyroglossal cysts, branchial cleft cysts, carotid body tumours, cystic hygromas, pharyngeal pouch abnormalities and lumps of skin appendages.[1,2] The most common entities occur repeatedly within the various age groups and can be differentiated with a clear

understanding of embryology and anatomy of the region, and an understanding of the natural history of a specific lesion.[3] The evaluation of head and neck mass is a common clinical dilemma and a condition which clinicians routinely encounter. It is evident that their early diagnoses provide the best chance of successful treatment.[4] At present, the preferred method of obtaining biopsy material from a neck mass is fine needle aspiration cytology technique. It has proven to be an invaluable aid to diagnosis.[4]

FNAC is a simple, quick and cost effective method to sample superficial masses found in the head and neck region. The technique is performed in the outpatient department and causes minimal trauma to the patient and carries virtually no risk of complications. Masses located within the region of head and neck including salivary glands and thyroid masses can be readily diagnosed using this technique.[5] An early differentiation of benign from malignant pathology greatly influences the planned treatment.[2]

Thyroid swelling remains a problem of enormous magnitude all over the world. The prevalence of thyroid swelling ranges from 4% to 10% in the general adult population and from 0.2% to 1.2% in children. In India, thyroid cancer comprises of 1% of all head and neck cancers. The problem in clinical practice is to distinguish reliably the few malignant tumors from the many harmless nodules so that a definitive preoperative tissue diagnosis of the malignancy allows planning of appropriate surgery and relevant patient counseling.[6]

FNAC is considered the gold standard diagnostic test in the evaluation of a thyroid nodule, and other tests like ultrasound and nuclear scan should be used in conjunction with FNAC.[7] In the head and neck area, lesions of the salivary glands frequently are evaluated by this technique; in fact in many centers, this is the first tissue-based procedure applied to establish a diagnosis before any surgical intervention. While use of needles to aspirate palpable lesions of the salivary glands is not new, this technique (coupled with the availability of improved fast stains on air-dried smears) has been refined over the years with the use of very thin needles.

The usefulness of salivary gland FNAC relates to the fact that it is easy to perform, is minimally invasive, smear evaluation is immediate, and the procedure can be repeated several times to obtain more tissue for diagnosis or special studies. When a malignant diagnosis is given, the surgeon and the patient are in a better position to discuss and plan for the next course of action, while the diagnosis of a benign lesion provides immediate relief to the patient, sparing the anxiety of waiting several days for a surgical biopsy diagnosis.[8]

FNAC can be both diagnostic and therapeutic in cystic swellings.[5] In view of above consideration, the present study would be an attempt to assess the importance of cytological study of head and neck masses and correlate with histopathological examination to facilitate the diagnosis and treatment.

METHODS

The present Retro prospective study (Prospective for one year from January 2013 to December 2013 along with five year retrospective from January 2008 to December 2012) was carried out in the Department of Pathology, Pt. J.N.M. Medical College and associated Dr. B.R.A.M. Hospital, Raipur, Chhattisgarh, India. Cases for prospective study were selected from patients presented with head and neck masses attending the ENT OPD and indoor patients. Ethical considerations were met through institutional ethical committee. A written consent was taken from every patient.

The background information of the subject was elucidated as per proforma with special reference to the following:-Presenting complaints with their duration noted in chronological order. Local examination of the swelling was done under the following heads - number, size, site, consistency, tenderness, fixity and over lying skin. Routine laboratory investigations along with the radiological investigations were noted.

The basic equipment needed to perform FNA was simple and relatively inexpensive. Disposable 10ml plastic syringes, 22 to 25 gauge needles, gauze pads, glass slides, alcohol, gloves, Coplin jar for immediate wet fixation of smears, container for collection of fluid from cystic lesion.

Technique

The lesion was palpated carefully and procedure was explained to the patient. The skin was cleaned with an antiseptic and fixed with the thumb and index finger of one hand in a position favourable for needle aspiration. No anesthesia was required. Two techniques were used to perform FNAC. (Aspiration technique and Non-aspiration technique)

The needle was detached from the syringe, vacuum was created, the needle was attached again and contents of the needle were expelled slowly and carefully, over the dry clean grease free glass slides. The aspirates were lightly spread with the help of another glass slide. A few of the smears were immediately wet fixed in 95% ethyl alcohol to ensure fixation and the remaining were air dried. Staining of the wet fixed smears was done with Papanicolaou stain/ Haematoxylin and Eosin and air dried smears were stained with MGG (May Grunwald and Giemsa) stain.

After FNAC of head and neck lesions follow up of cases was done for histopathological examination. The biopsy specimen in 10% formalin solution were received in histopathology section and processed in automated tissue

processor and paraffin blocks were made of the processed tissue. Then 5-6 micron section were cut with the help of microtome and stained with Harris Haematoxyline and Eosin stain.[9,10] Final histopathological diagnosis was compared with the FNAC findings to assess the accuracy of cytodiagnosis. Data was compiled in MS excel and checked for its completeness, correctness and then it was analyzed.

RESULTS

Table 1 shows a total of 12,514 FNACs done during six years, 1874 (14.9%) cases were diagnosed as head and neck lesions.

Table 1: Background information.

Period of study	1st Jan 2008 to 31st Dec 2013 (Six years)
Total no. of FNAC done during this period	12514 (100 %)
No. of FNAC of head and neck lesions	1874 (14.9 % of all cases)

Table 2: Organ wise distribution of head and neck lesions.

	Thyroid		Salivary		Lymph node		Others		Total
	No.	%	No.	%	No.	%	No.	%	
Total cases	611	32.6	195	10.4	952	50.8	116	6.1	1874

Table 2 shows, of the total 1874 cases of head and neck lesions, lymph node lesions were the commonest, accounting for 50.8% of cases. Thyroid and salivary gland lesions constituted 32.6% and 10.4% respectively.

Table 3 shows age wise distribution of patients with benign thyroid lesions. The peak age group between 21-40 years constituted 59.9% of the cases.

Table 3: Age-wise distribution of benign thyroid lesions.

Lesions	0-10 years		11-20 years		21-30 years		31-40 years		41-50 years		51-60 years		>60 years		Total
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Colloid goiter	7	2.1	21	6.5	97	30.1	91	28.7	58	18.0	26	8.1	22	6.8	322
Adenomatous goiter	0	-	4	10.5	10	26.3	9	23.7	8	21.1	05	13.2	02	5.3	38
Thyroiditis	3	3.4	6	6.9	33	37.9	28	32.1	12	13.8	03	3.4	02	2.3	87
Hyperplasia	3	4.1	13	18.1	24	33.3	23	31.9	7	9.7	0	-	02	2.8	72
Follicular neoplasm	0	-	0	-	3	18.7	7	43.8	5	31.2	01	6.2	0	-	16
Hurthle cell neoplasm	0	-	0	-	0	-	0	-	0		02	66.7	01	33.3	03
Benign neoplasm-NOS	0		1	6.2	3	18.8	4	25	4	25	04	25	0	-	16
Total	13	2.3	45	8.1	170	30.7	162	29.2	36	6.5	41	7.4	29	5.2	554

Table 4: Age-wise distribution of malignant thyroid lesions.

Tumors	0-10 years		11-20 years		21-30 years		31-40 years		41-50 years		51-60 years		>60 years		Total
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Papillary arcinoma	0		0		0		0		1	25	2	50	1	25	4
Follicularcarcinoma	0		0		1	4	7	28	9	36	5	20	3	12	25
Medullarycarcinoma	0		0		0		1	33.3	1	33.3	0		1	33.3	3
Anaplasticcarcinoma	0		0		0		0		1	16.7	1	16.7	4	66.6	6
Malignantneoplasm-NOS	0		0		1	5.2	6	31.6	2	10.5	10	52.6	0	-	19
Total	0		0		2	3.5	14	24.6	14	24.6	17	29.8	9	15.8	57

Table 4 shows age wise distribution of patients with malignant thyroid neoplasm. The most common age group sharing the burden of malignant thyroid neoplasm was 4th to 6th decade, comprising of 31 (54.4%) cases.

Table 5 shows age wise distribution of patients with benign salivary gland lesions. The peak age group between 3rd to 5th decade constituted 65.2% of the cases. Pleomorphic adenoma was common in 5th decade.

Table 5: Age-wise distribution of benign salivary glandlesions.

Lesions	0-10 years		11-20 years		21-30 years		31-40 years		41-50 years		51-60 years		>60 years		Total
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Sialadenitis	4	4.9	8	9.9	20	24.7	16	19.7	17	20.9	8	9.9	8	9.9	81
Pleomorphic adenoma	0		9	13.9	15	23.1	9	13.9	18	27.9	9	13.9	5	7.7	65
Warthins tumour	0		0		1	33.3	2	66.7	-		-		-		3
Benign cystic lesion	1	25	1	25	1	25	0		1	25					4
Benign tumour (NOS)	0		2	40	1	20	2	40	-		-		-		5
Total	5	3.2	19	12.0	38	24.1	28	17.7	37	23.4	17	10.8	13	8.2	158

Table 6: Age-wise distribution of malignant salivary gland lesions.

Lesions	0-10 Years		11-20 Years		21-30 Years		31-40 Years		41-50 Years		51-60 Years		>60 Years		Total
Acinic cell carcinoma	-		-		-		2	25	2	25	3	37.5	1	12.5	8
Adenoid cystic carcinoma									1	25	3	75			4
Mucoepidermoid carcinoma							1	16.6	1	16.6	1	16.6	3	50	6
Adeno carcinoma							1	25	1	25			2	50	4
Malignant neoplasm-NOS			1	6.7	2	13.3	2	13.3	3	20	2	13.3	5	33.3	15
TOTAL	0		1	2.7	2	5.4	6	16.2	8	21.6	9	24.3	11	29.7	37

Table 7: Age-wise distribution of benign lymph node lesions.

Lesions	0-10 Years		11-20 Years		21-30 Years		31-40 Years		41-50 Years		51-60 Years		>60 Years		Total
Chronic granulomatous lymphadenitis	13	7.6	46	26.9	49	28.6	38	22.2	12	7.0	9	5.2	4	2.3	171
Tubercular lymphadenitis	19	17.4	20	18.3	29	26.6	27	24.8	8	7.3	3	2.8	3	2.8	109
Reactive lymphadenitis	55	19.2	83	29.0	73	25.6	28	9.7	26	9.0	14	4.9	7	2.4	286
Acute suppurative lymphadenitis	10	22.7	7	15.9	12	27.2	8	18.2	3	6.8	1	2.2	3	6.8	44
Chronic non specific lymphadenitis	8	25	5	15.6	11	34.3	3	9.3	5	15.6	-		-		32
Total	105	16.4	161	25.1	174	27.1	104	16.1	54	8.4	27	4.2	17	2.6	642

Table 8: Age-wise distribution of malignant lymph node lesions.

Lesions	0-10 Years		11-20 Years		21-30 Years		31-40 Years		41-50 Years		51-60 Years		>60 Years		Total
Hodgkins lymphoma	2	6.1	7	21.2	9	27.3	6	18.1	4	12.1	0		5	15.1	33
Non hodgkins lymphoma	5	7.7	14	21.5	17	26.1	16	24.6	6	9.2	3	4.6	4	6.1	65
Metastatic carcinoma	4	1.9	8	3.8	28	13.2	32	15.1	49	23.1	51	24.1	40	18.9	212
Total	11	3.5	29	9.3	54	17.4	54	17.4	59	19.0	54	17.4	49	15.8	310

Table 6 shows age wise distribution of patients with malignant salivary gland lesions. The peak age group between 5th to 7th decade constituted 75.6% of the cases. Table no 7 shows age wise distribution of patients with

benign lymph node lesions. The peak age group between 2nd to 3rd decades constituted 52.2% of the cases. Table 8 shows age wise distribution of patients with malignant lymph node lesions. The peak age group between 3rd to 6th decade constituted 71.2% of the cases. Table 9 shows age wise distribution of patients with benign miscellaneous lesions. The peak age group between 2nd - 3rd decade constituted 56.9% of the cases

Table 9: Age-wise distribution of benign miscellaneous lesions.

Lesions	0-10 years		11-20 years		21-30 years		31-40 years		41-50 years		51-60 years		>60 years		Total
Epidermal inclusion cyst	5	7.5	19	28.3	21	31.3	11	16.4	7	10.4	1	1.5	3	4.5	67
Sebaceaous cyst	-		3	25	5	41.7	1	8.3	1	8.3	2	16.7			12
Dermoid cyst	2	11.1	4	22.2	4	22.2	4	22.2	2	11.1	2	11.1	-		18
Thyroglossal cyst	0		4	100											4
Lipoma	0		1	6.6	4	26.6	5	33.3	2	13.3	1	6.6	1	6.6	15
Total	7	6.0	32	27.6	34	29.3	21	18.1	12	10.3	6	5.2	4	3.4	116

Table 10 shows cytological correlation of thyroid lesions with histopathology of 611 cases of fine needle aspiration cytology of thyroid lesions, in 99 (16.2%) cases tissues were available for histopathology examination.

Table 11 shows analysis of FNAC of thyroid lesions. Histology was available in 99 cases and results were found to be similar in 91 (91.9%) cases. Discordance was found more in malignant (11.8%) as compared to benign lesions.

Table 10: Distribution of thyroid gland lesions (cytological &histopathological).

Cytological Confirmed cases	No. of cases	Tissue available for histopathology
Benign thyroid gland lesions	554	82
Malignant thyroid gland lesions	57	17
Total	611	99

Table 12 shows cytological correlation of salivary gland lesions with histopathology. Of 195 cases of fine needle aspiration cytology of thyroid lesions, in 62 (31.7%) cases tissues were available for histopathology examination.

Table 11: Correlation between cytological and histopathological diagnosis in 99 cases of thyroid gland lesions.

Cytological Diagnosis		Histopathological Diagnosis			
		Concordance		Discordance	
		N	%	N	%
Benign thyroid gland lesions	82	76	92.6	6	7.4
Malignant thyroid gland lesions	17	15	88.2	2	11.8
Total	99	91	91.9	8	7.1

Table 12: Distribution of salivary gland lesions (cytological &histopathological).

Cytologically Confirmed cases	No. of cases	Tissue available for histopathology
Benign salivary gland lesions	158	52
Malignant salivary gland lesions	37	10
Total	195	62

Table 13 shows analysis of FNAC of salivary gland lesions. Histology was available in 62 cases and results were found to be similar in 56 (90.3%) cases. Discordance was found more in malignant (20%) as compared to benign lesion aspirate.

Table 13: Correlation between cytological and histopathological diagnosis in 62 cases of salivary gland lesions.

Cytological diagnosis		Histopathological diagnosis			
		Concordance		Discordance	
		N	%	N	%
Benign salivary gland lesions	52	48	92.3	04	7.6
Malignant salivary gland lesions	10	08	80.0	02	20
Total	62	56	90.3	6	9.7

Table 14 shows cytological correlation of lymph node with histopathology. Of 952 cases of fine needle aspiration cytology of lymph node lesions, in 215 (22.5%) cases tissues were available for histopathology examination.

Table 14: Distribution of lymph node lesions (cytological and histopathological).

Cytologically confirmed cases	No. of cases	Tissue available for histopathology
Benign lymph node lesions	642	73
Malignant lymph node lesions	310	142
Total	952	215

Table 15: Correlation between cytological and histopathological diagnosis in 215 cases of lymph node lesions.

Cytological diagnosis		Histopathological diagnosis			
		Concordance		Discordance	
		N	%	N	%
Benign lymph node lesions	73	64	87.6	09	12.4
Malignant lymph node lesions	142	137	96.4	05	3.6
Total	215	201	93.4	14	6.6

Table 15 shows analysis of FNAC of lymph node lesions. Histology was available in 215 cases and results were found to be similar in 201 (93.4%) cases. Discordance was found more in benign lesions (12.4%) as compared to malignant lesion aspirates.

Table 16: Distribution of miscellaneous lesions (cytological &histopathological)

Cytologically Confirmed cases	No. of cases	Tissue available for histopathology
Epidermal inclusion cyst	67	14
Sebaceaous cyst	12	05
Dermoid cyst	18	03
Thyroglossal cyst	4	04
Lipoma	15	03
Total	116	29

Table 16 shows cytological correlation of miscellaneous lesions with histopathology. Of 116 cases of fine needle aspiration cytology of thyroid lesions, in 29 (25%) cases tissues were available for histopathology examination.

Table 17 shows comparative analysis of cytological and histopathology diagnosis of benign miscellaneous lesions. Of 29 cases, histological diagnosis was found consistent with cytological diagnosis in 24 (82.8%) cases and inconsistent in 05 (17.2%) cases. 3/3 lipoma cases were correctly diagnosed.

Table 17: Comparative analysis of cytological and histopathological diagnosis of benignmiscellaneous lesions.

Cytological diagnosis	No. of cases	Histopathological diagnosis	
		Concordance	Discordance
Epidermal inclusion cyst	14	11 (78.6%)	03 (Sebaceaous Cyst)
Sebaceaous cyst	5	4 (80%)	01 (Epidermal inclusion Cyst)
Dermoid cyst	3	2 (66.7%)	01 (Epidermal inclusion Cyst)
Thyroglossalcyst	4	4 (100%)	
Lipoma	3	3 (100%)	
Total	29	24 (82.8%)	5 (17.2%)

DISCUSSION

In the present study, maximum number of aspirates were obtaining from lymph nodes (50.8%) followed by thyroid gland (32.6%), salivary glands (10.4%) and miscellaneous lesions of head and neck (6.1%). This is in concordance with the findings of Singhal P et al who reported 48.09% (26cases) from lymph node lesions, 28.39% (30 cases) benign from thyroid gland lesions, 16.95% (35 cases) from salivary gland lesions and 6.57% (16 cases) from miscellaneous lesions of head and neck.[11]

Similar observation were made by Umesh Jindal et al and Piyush solanki et al they reported a much higher incidence of miscellaneous lesions 62 cases (17.7%) and 15 cases (15%) respectively. Richa Sharma et al reported maximum number of aspirates from lymph nodes with higher incidence 60.8%.[12-14]

In the present study the peak age group was found 2nd to 4th decade constituting 49.1% of all patients with head and neck lesions and a range of 1 to 79 year. This is in concordance with study of Singhal P et al who observed that head and neck lesions were relatively common in second to forth decade, ranging from 1 to 70 year. Similar observation seen by Md. Mohmudul Haq et al, Uddin MS et al.[11,15,16] However Solanki Piyush et al observed head and neck lesions more common in first to second and forth to fifth decade.[13]

Discordance

Two cytologically diagnosed case of colloid goiter turned out to be papillary carcinoma on histopathology , false negative results was due to (a) acellular or poorly cellular sample as encountered in large cystic papillary carcinoma, in marked desmoplasia and in cases of thick fibrous or calcified capsule. (b) sampling error- in cases of small carcinoma where the needle may not hit the lesion. (c) occasionally thyroid carcinoma may have macro-follicular areas and yield moderate amounts of colloid on FNA. Tilak et al described this features in several follicular variants of papillary carcinoma and in papillary carcinoma with degenerative change.[17] They also stressed the importance of doing multiple aspirations in a thyroid swelling in order to obtain representative material from different areas since the thyroid can be affected by more than one diseases process.

Two cases of cytologically diagnosed as colloid goiter turned out to be follicular adenoma on histopathology. If a micro follicular focus in a nodular goiter is selectively sampled, the smear show a repetitive pattern of microfollicles or rosettes with no colloid and the distinction from follicular neoplasm may be impossible according to Richa sharma et al 2012.[14]

One cytologically diagnosed case of follicular neoplasm was turned out to be follicular variant of papillary carcinoma (False Negative) and one case turned out multinodular goiter in histology. The follicular variant of papillary carcinoma may have well-formed follicles containing colloid, and cystic papillary tumors often contain abundant colloid.

This can cause diagnostic difficulties if smears are poor in cells. Tilak et al stressed the importance of doing multiple aspirations in a thyroid swelling in order to obtain representative material from different area.[17] In this study four cases of papillary carcinoma were diagnosed cytologically and very well confirmed histologically. Richa sharma et al analyzed cytological findings in follicular variant of papillary thyroid carcinoma (histologically proven) cases.[14]

They considered that Adenomatous colloid goiter and follicular adenoma are differential diagnosis of follicular variant of papillary carcinoma due to presence of microfollicles but the presence of numerous colloid balls with multilayered microfollicles (rosettes) are cytological

finding of follicular variant of papillary thyroid carcinoma.

Pleomorphic adenoma was the commonest benign neoplasm (62cases), as observed in other studies also. On cytology pleomorphic adenoma shows a biphasic pattern composed of epithelial / myoepithelial cells and fibro-myxochondroidstroma. The components may be arranged in a wide spectrum of microscopic appearances with a potential for errors in cytological interpretation. It can be a source of confusion with tumors such as basal cell adenoma, adenoid cystic carcinoma and mucoepidermoid carcinoma- low grade on cytology. In presentseries 39 cases were correctly identified on cytology. One case proved to be carcinoma ex-pleomorphic adenoma on subsequent histopathology. Thus the cyto-histological correlation for pleomorphic adenoma was 92.8%.

Carcinoma ex–pleomorphic adenoma is a highly aggressive tumor of no specific type. It is a malignant transformation in a preexisting pleomorphic adenoma. This transformation occurs in 5 to 25% of untreated patients usually after 15-20 years and warning symptoms are present in many cases. Pathologically, the co-existence of a pleomorphic adenoma and a carcinoma has to be identified to establish the diagnosis of carcinoma ex-pleomorphic adenoma. It is difficult to identify both the components on cytology, probably due to lack of representative sample.

The cytological pattern of pleomorphic adenoma may also obscure the presence of a malignant tumor. According to Klijanienko et al, carcinoma ex-pleomorphic adenoma has the highest false negative rate (35.3%) out of all malignant salivary gland tumors. Collective analysis of other studies also revealed that one third of these cases are missed on cytology. Careful clinicocytologic correlation and a representative, meticulous sampling is mandatory.

Adenoid cystic carcinoma was the third most common malignant tumor (4 cases). A major diagnostic problem is its differentiation from pleomorphic adenoma. The hyaline globules of basement membrane or a predominant epithelial pattern can be seen in pleomorphic adenoma as well.

We observed one false positive case. Cellular atypical (20.6%), cystic transformation (7%), and the presence of cylindromatous pattern (5%) as common variations in pleomorphic adenoma those are responsible for majority of misdiagnosis.

The cytological distinction between these two tumors can be made if the smears are adequately cellular so that the distinctive relationship between the epithelial and extracellular matrix can be recognized. The tumor cells in pleomorphic adenoma have a plasmacytoid appearance with abundant cytoplasm as compared to the cells adenoid cystic carcinoma according to Gupta M et al.[18]

One case diagnosed as chronic sialadenitis in cytology was later found to be a pleomorphic adenoma in histopathology. Sampling error is the possible explanation for that particular case. This can be avoided by taking adequate samples and aspiration at multiple sites.

One case of pleomorphic adenoma was diagnosed as mucoepidermoid carcinoma on cytology. Myxoid ground substance of pleomorphic adenoma can be mistaken for epithelial mucus if only pap staining is used. Aspiration of mucoid paucicellular fluid may suggest low grade mucoepidermoid carcinoma or muco-epidermoid carcinoma arising in pleomorphic adenoma. Multiple sampling is important to overcome problems of misdiagnosis due to selective sampling.

Although FNAC does not replace histological examination in the diagnosis of lymphoma, it is still of value in diagnosis, grading/ classification, in the management of lymphoma, and therefore FNAC has been used extensively in cases of NHL and HL. One of the main limitations to FNAC as an independent diagnostic tool for lymphoma has been the inability to sub classify cases for directing appropriate therapy, given the reliance of previous classifications on architectural features.

In present study, one false negative case was of Non-Hodgkin's lymphoma, misdiagnosed as reactive lymphadenitis in FNAC and one case of cytologically diagnosed Hodgkin's lymphoma turned out to be reactive lymphadenitis. One of the study showed that the inability to evaluate the lymph node architectural changes in FNAC, low sensitivity in differentiating reactive hyperplasia from low grade non-Hodgkin's lymphoma or lymphocyte predominant form of Hodgkin's lymphoma and partial involvement of lymph nodes in some cases of lymphoma have been proposed as the main reasons for false negative results according to Rakhshan M.[19]

Cause of misinterpretation may be due to mixed population of lymphoid tissue and some tangible body macrophage. Germinal centers may be very large in some cases of reactive follicular hyperplasia, if aspirate derived from such a large germinal center, the proportion of large cells (centroblasts, dendrite reticulam cells) and numbers of mitoses may be impressive enough to suggest malignant lymphomas. The presence of macrophage with tangible bodies favors reactive hyperplasia but do not rule out lymphoma. The differential diagnosis between prominent follicular hyperplasia and follicular lymphoma of mixed cell type can be very difficult in FNA smears. The accuracy of cytological diagnosis and classification of lymphoma on FNA sample varies between 10-90 % according to Amatya BB.[4]

There are problems in arriving at a definitive diagnosis in certain cases of Tuberculous lymphadenitis, when the aspirate shows a polymorphous picture with occasional epithelioid cells, with an absence of Langhan's giant

cells or caseous necrosis, making it necessary to resort to excisional biopsy for a definitive diagnosis according to Fernandes et al 2009.[20]

Cases of tuberculous lymphadenitis were misdiagnosed as chronic granulomatous lymphadenitis on cytological examination. Probably, the representative sample was not obtained in these cases. This was also observed by other workers. In this study, two false negative results were reached for tubercular by FNAC which may be due to failure of representative aspiration or inadequate aspiration or observer misinterpretation.

CONCLUSION

FNAC is having a high diagnostic rate to differentiate benign and malignant lesions. A careful and diligent search for various cytological features and accurate sampling can help in reducing the number of indeterminate, false positive and false negative diagnosis. To obtain maximum diagnostic accuracy, close cooperation between a trained cytopathologist and an experienced clinician is a must.

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