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Fine Needle Aspiration Cytology of Spectrum of Sinonasal Lesions with Histopathological Correlation

Dr B. V. Rama Reddy,[1] Dr R. Rajeswari,[2] Dr Basumitra Das,[3]
Dr Ramesh Uppada,[4] Dr T.Sreedhar,[5] Dr N.C.Parankusa,[6]
[1,3], *Associate professor, Dept. of pathology, Rangaraya medical college, Kakinada, Andhra Pradesh, India*
[2,4,5,6] *Assistant professor, Dept. of pathology, Rangaraya medical college, Kakinada, Andhra Pradesh, India.*

Abstract:
Background: *The Sinonasal tract embraces nasal cavities and paranasal sinuses. This area is hearth for various non-neoplastic and neoplastic lesions. Because of its closed and complex architecture diagnosis by Fine Needle Aspiration Cytology (FNAC) was proved to be difficult. So, very few studies have been documented in literature.*
Aim: *The aim of the study is to establish the importance of FNAC as a diagnostic contrivance for the sinonasal lesions with accommodating histopathology .This study also includes to assess the spectrum of lesions occurring in this region.*
Meterial & Methods*: 77 cases with lesions in sinonasal tract were included in the present study. FNAC was performed and slides were stained by Haematoxylin and Eosin (H&E), Papanicolaou and Geimsa stains. The biopsy sections were processed and stained with H&E.*
Results: *FNAC of 77 cases with sinonasal lesions were taken into study. The male to female ratio was 1.8: 1. Out of total cases, 43(58%) showed non neoplastic- lesions & in 32 cases (42%) the lesions were neoplastic. 26 cases of Inflammatory polyps were diagnosed of which we found a single case of mucormycosis and two cases of rhinosporidiosis. Of the neopalstic lesions, squamous papilloma(8cases) comprise majority of benign lesions & squamous cell carcinomas(12 cases)(SCC) comprise greater part of malignant lesions. Two cases of sinonasal undifferentiated carcinoma (SNUC) and olfactory neuroblastoma as well as single cases each of adenoid cystic carcinoma, non-hodgkins lymphoma, plasmacytoma & adenocarcinoma were also included in our study.* ***Conclusion****: FNAC accomplishes the excellent diagnostic modality and effective early diagnosis to enable the surgeon to plan the treatment options with adjuvant clinico-radilogical and histopathological correlation.*
Keywords: *FNAC, Histopathology, Nose , Paranasal sinuses.*

I. Introduction

The nasal cavity and paranasal sinuses including maxillary, ethmoid, sphenoid and frontal together constitute the sinonasal tract. The mucosa is referred to schneiderian mucosa which is the abode for various non-neoplastic and neoplastic lesions (1) They are the site of origin for more complex histological diverse group of tumors which include tumors arising from mucosal epithelium, seromucinous glands, soft tissues, bone, cartilage and neural / neurectodermal structures. Carcinomas of nasal cavity and paranasal sinuses account for 0.2% to 0.8% of all malignant neoplasms, 3% of those occurring in head and neck(2). Sixty percent of sinonasal tumours originate in the maxillary sinus, 20-30% in the nasal cavity, 10-15% in the ethmoid sinus, and 1% in the sphenoid and frontal sinuses (3). Primary tumors include squamous cell carcinoma (SCC), sinonasal undifferentiated carcinoma (SNUC), adenocarcinoma (ACA), olfactory neuroblastoma, salivary gland-type tumors, melanoma, sarcomas and other rare tumors. SCC is the most common malignant neoplasm of the sinonasal tract. The major risk factors for cancer of the sinonasal tract include employment in the wood and furniture industry, exposure to nickel and smoking. Woodworkers are particularly at risk for developing ACA of the ethmoid sinuses, which shows a striking male predominance(75–90%) (4). Presenting signs and symptoms are similar between many tumors and include nasal obstruction, pain, nasal discharge, bleeding and mass lesions. The lymphatic vessels of the paranasal sinuses drain to the nasopharyngeal, retropharyngeal and the lateral pharyngeal lymph nodes, areas that are difficult to examine(5).

FNAC of paranasal sinuses is difficult for its closed structure, so very few studies have been undertaken. The present study is conducted to find the importance of FNAC with adjunct histopathology in diagnosing various lesions occurring in sinonasal tract, so that early treatment can be advocated. Effort has been made to study the various lesions occurring in this region.

II. Material And Methods

Our study was carried out on 77 patients who attended out patient department with complaint related to lesion in sinonasal tract and cases who showed recurrence, irrespective of age and sex. Out of 77 cases, two cases did not show cell yield. So only 75 cases were taken into study. Sinonasal examination was carried out by head lamp and deeper lesions were examined by Rigid Nasal Endoscopy(RNE) (Fig1). Other imaging techniques as X-ray, CT scan and MRI were carried out for various lesions in paranasal sinuses. Most of the patients had normal blood counts with a few cases showed eosinophilia. FNAC was carried out by three methods,

1. Naked eye inspection of nasal masses,
2. Percutaneous approach for FNAC of maxillary lesions,
3. RNE guided FNAC of deep sinonasal masses.

Smears aspirated were immediately fixed in 95% isopropyl alcohol & stained by H&E & Papanicolaou stain. Air dried smears were stained by Geimsa stain. The entire procedure took 10 to 12 minutes. Cytomorphology was assessed in four groups (6).

1. Inadequate
2. Inflammatory
3. Benign
4. Malignant

Some cases of suspicious inflammatory smears were subjected to microbiological examininations. The biopsy specimens were processed by standard methods of tissue processing stained with H&E stain & correlated with cytology smears.

III. Results

FNAC of 75 cases with sinonasal lesions were studied .There was no striking gender predilection with male to female ratio of 1.8: 1. Out of total 75 cases, 43cases (57%) showed non- neoplastic lesions & 32 cases (43%) the lesions were neoplastic. Suppurative lesions were seen in 8 cases, only 1 case turned for histopathology which was confirmed. A single case each of granulomatous inflammation and Rosai Dorfman's disease was included in our study. 26 cases of Inflammatory/allergic polyps(Fig-2) were osbserved of which one case was diagnosed as mucormycosis & confimed by Gram's stain and Pottasium Hydroxide (KOH) preparation(Fig-3). Two cases showed features of rhinosporidiosis(Fig-4). Of the 13 cases of benign lesions, 8 cases were diagnosed as squamous papilloma(Fig-5). FNAC of single case each of mucocele, dentigerous cyst and pleomophic adenoma((Fig-6) were diagnosed and confirmed on biopsy. FNAC of single case each of menigioma(Fig7) and hamartoma were non-confimatory. These lesions were confirmed histopathologically. By FNAC in our study we encountered 19 cases of malignant lesions. Majority of the cases were squamous cell carcinoma (12cases)(Fig8), all the cases were correlated by histopathology. FNAC of two cases each of sinonasal undifferentiated carcinoma and olfactory neuroblastoma(Fig9) were studied with histopathologic correlation. Single case each of adenocarcinoma, adenoid-cystic carcinoma, non-hodgkins lymphoma and plasmacytoma(Fig 10) were also incuded in the study. Most of the malignant lesions were seen to occur in maxillary sinus. These lesions were categorized under different diagnostic categories (Table 1). Specificity, sensitivity, negative predictive value and positive predictive value were 95%, 100%, 96% and 100% respectively.

IV. Discussion

Wide array of sinonasal lesions exhibits interesting cytological and histopathologic features. Non-neoplastic lesions present clinically as polyps can be diagnosed by FNAC and confirmed by histopathology. Most of the sinonasal lesions are inflammatory in nature. Sinonasal malignant tumors comprises nearly 3% of the head and neck tumours(7). In our study there were 43 cases(57%) of non neoplastic lesions and 32 cases(43%) of neoplastic lesions. Among neoplastic lesions, 13 benign and 19 malignant cases were diagnosed. Our study results correlated with study by Khan et al (8).

Most common presenting symptom in sinonasal lesion is nasal obstruction followed by discharge, mass lesion, pressure symptoms and bleeding. Nasal obstruction and bleeding were also common presenting symptoms in the study conducted by Bakari A et al (9). In our study there is no specific gender predilection and all the lesions of sinonasal area spread over all the age ranges which is correlating with the studies of Spearman et al(10) and Nigam et al(11). Prior to the FNAC examination , it is very important to undergo CT or X ray examination, so that good representative yield can be obtained by FNAC as the performer is well aware of exact site(10). In our study we applied three modes of approach for FNAC , but in Helset et al study conducted FNAC by percutaneous as well as by naked eye examination(6). In only two cases we couldn't succeed in getting good yield. Torsea et al utilizes rigid nasal endoscopy in FNAC to collect samples. Usually no major complications were observed with the various modes of approach for FNAC except two patients experienced pain(12). In our

study eleven patients experienced post procedure pain which was relieved with analgesics. Smears can be stained with Haemotoxylin and eosin, May Grunwald Giemsa , Papanicolaou stains and were efficient in giving comprehensive cytomorphological features of cells(13) (14). In our study we employed all the three stains mentioned above with good results. FNAC features of inflammatory along with allergic polyps are not much described in the literature. FNAC of these lesions in our study showed few discrete and small groups of epithelial cells of reactive nature with inflammatory cells in the background. Cytomorphology of antrochoanal polyps is also not described in the literature except for a review by Nigam et al. In our study three cases were diagnosed suspiciously as antrochoanal polyps on aspiration and two were confirmed on histopathology where as one case has not turned up for histopathological examination. Granulomatous inflammation on aspiration showed lymphoid cells, epitheloid histiocytes and multinucleated giant cells. In our study with rigid nasal endoscopic biopsy it was confirmed as granulomatous inflammation, but to specify, we employed Zeil Nelsons which is necessary to confirm as tuberculous infection .

The nasal polyps are polypoid like masses arising from paranasal sinuses and from nasal cavity. Most commonly development of polyps is associated with inflammation and allergy. Inflammatory polyps are associated with chronic infections with predominant mononuclear cell infiltration in the stroma and allergic polyps are due to nasal allergy with predominant stromal eosinophilia. In our study we could get 16 cases of inflammatory, 10 cases of allergic and 3cases of antrochoanal polyps. Antrochoanal polyps are common choanal polyps arises from paranasal sinuses(15). Out of total 26 cases of polyps only 24 cases came for histopathological examination and all were correlated with cytological diagnosis. In our study two cases of rhinosporidiosis and one case of mucormycosis presented as polypoid masses. Aspiration cytology and histopathological findings are correlating. In one case of rhinosporidiosis giant cell reaction was observed which is consistent with study of Makannavar et al(16). Histopathological findings of rhinoscleroma were consistent with the findings of other studies.(17). In our study one case of Rosai – Dorfman disease (sinus histiocytosis with massive lymphadenopathy) with sparse cell yield on FNAC was diagnosed and it was confirmed with histopathology which is also correlating with the study of Foucar et al , Waldron J et al studies(18 & 19).

Of the neoplastic lesions squamous papilloma shows squamous epithelial cells with mild dyplasia, slight nuclear enlargement , but it is difficult to render diagnosis on cytology smears because these dysplastic cells are also seen with squamous cell carcinoma(20). However the squamous cells of papilloma shows similar morphology as that of flat squamous cells with mild nuclear enlargement having increased chromasia and mild dysplasia. In our study 8 cases of sinonasal papillomas were diagnosed on FNAC, but on histopathology 6 cases of squamous papilloma were correlated and two cases have turned out to be squamous cell carcinoma.

Cytomorphology of pleomorphic adenoma shows variable cellularity of single cells, poorly cohesive clusters and sheets with fibrillary chondromyxoid substance in the background admixed with myoepithelial cells along with few metaplastic cells like oncocytic , sebaceous and squamous cells. In our study single case of pleomorphic adenoma was diagnosed cytologically with histopathological correlation which showed foci of squamous metaplasia(21 & 22). Diagnosis of Hamartoma on FNAC was difficult because most cases yield only blood and blood cellular elements. In our case also diagnosis was made on biopsy because of sparse cell yield admixed with blood on aspiration (23).

Dentigerous cyst is rarely encountered in sinonasal region. In our study we could get a single case of dentigerous cyst which was diagnosed on x- ray as cystic lesion in the maxillary sinus. FNAC smears showed few squamous epithelial cells, occasional cyst macrophage against protenaceous material and cell debri in the background and report was given as benign cystic lesion. On biopsy study the diagnosis of dentigerous cyst was confirmed.

Squamous cell carcinomas are the most common malignancies encountered in the sinonasal region (24). We reported 12 cases of squamous cell carcinomas on FNAC and all cases were correlated histologically also. Adenocarcinomas in sinonasal region usually arise from middle turbinate or from ethmoid sinus and from there extends laterally into the orbit and upwards into the anterior cranial fossa. In our case a single case of adenocarcinoma arising in the middle turbinate showed cytomorphological features of round to oval cells arranged in acinar pattern with vascicular nucleus and prominent nucleoli along with discrete cells and inflammatory cells in the background and it was confirmed on histopathology as adenocarcinoma with predominant tubulopapillary architecture (25).

Sinonasal undifferentiated carcinoma(SNUC), is a malignant tumor that arises from the schneiderian membrane and is characterized by an aggressive behavior and poor prognosis(26).The presenting symptoms of SNUC are shared with other tumors include facial pain, nasal obstruction, proptosis, and epistaxis. Prognosis is extremely poor, it is crucial to make the correct diagnosis from the outset so that treatment can be rendered. FNAC can play an important role in the diagnosis. There is very little published information addressing the FNAC features of SNUC. In our study we received two cases, the smear patterns are variable, and exhibit small to intermediate-sized, three-dimensional clusters of tumor cells. The clusters are devoid of intervening stroma, an important feature that helps to distinguish SNUC from sarcomas, salivary gland-type tumors, and others. The

tumor cells may show significant pleomorphism, very high nuclear-to-cytoplasmic ratio, and occasional nuclear moulding. The chromatin is homogeneously distributed, although coarse chromatin can be seen in some tumors. The background is usually necrotic. The differential diagnosis of SNUC is wide and includes the small blue round cell tumors, particularly metastatic small cell carcinoma (neuroendocrine) from the lung, lymphomas, olfactory neuroblastomas, sarcomas, and others.

Adenoid cystic carcinoma is common malignant salivary gland tumor seen in this region arising from seromucinous salivary glands in septum and turbinates (27). A single case presented in our study, with lesion in the nasal septum ,the cytology picture of which showed sheets and clusters of small basaloid – like cells with homogenous basement membrane material seen at the center of cluster, which was confirmed histopathologically.

Olfactory neuroblastoma is malignant neuroectodermal tumor thought to arise from neuroepithelial element in the olfactory mucosa with wide age distribution from 3 to 79 years(28). In the present study we had two cases of 4 and 10 years male children respectively. The FNAC smears showed sheets of small round cells with focal rosette formation and central neurofibrillary material. These tumors should be differentiated from SNUC, large cell lymphoma, melanoma, extramedullary plasmacytoma, embryonal rhabdomyosarcoma .

Of the lymphoreticular malignancies non –hodgkins lymphoma being the commonest occurrence in this region next to squamous cell carcinoma. In the present study we received a single case presented with mass lesion in nasal cavity. FNAC picture showed monotonus sheets of small lymphocytes which was confirmed on histopathology and sent for marker study. Also we received another case, a male patient aged 65 years complained of nasal obstruction with mass lesion. FNAC showed moderately cellular smears with tumor cells resembling mature as well as immature plasma cells which were correlated with histopathology as plasmacytoma. There were no any other bone lesions. The diagnosis was confirmed on clinical, radiological and biochemical correlation(29). Melanomas , sarcomas and metastatic lesions were also encountered in this region . Metastatic tumors account for about 3% of the sinonasal tumors, with renal cell carcinoma being the most common primary tumor(30).

V. Conclusion

Even though FNAC is not frequently undergone in the sinonasal region, it is imperative to note that there are variety of non neoplastic and neoplastic lesions in the sinonasal area which a cytopathologist can encounter. In the present study, a diagnostic accuracy of FNAC in predicting a sinonasal lesion was 93%. Therefore, FNAC can be an excellent diagnostic contrivance in a majority of cases, especially associated with clinico-radiological data and histopathological correlation.

References

[1]. Wenig BM, Pilch BZ. Tumours of upper respiratory tract. In: Fletcher Christopher DM, editor. Diagnostic histopathology of tumours. 2nd ed. London: Harcourt Publishers Ltd; 2000. pp. 87–138.

[2]. Sisson GA, Beck SP (1981). Cancer of the nasal and paranasal sinuses. In Cancer of the Head and Neck, Suen JY,Myers EN, eds., Churchill Livingstone:New York , pp. 242-279

[3]. Robin PE, Powell DJ, Stansbie JM (1979). Carcinoma of the nasal cavity and paranasal sinuses: incidence and presentationof different histological types. Clin Otolaryngol 4: 431-456. 5

[4]. Hayes R, Gerin M, Raatgever J, de Bruyn A, Gerin M. Wood-related occupations, wood dust exposure, and sinonasal cancer. Am J Epidemiol. 1986; **124**: 569–577.

[5]. Stern S, Hanna E. Cancer of the nasal cavity and paranasal sinuses. In: MyersE, SuenJ. Cancer of the head and neck. Philadelphia: Saunders; 1996: 205–233

[6]. Helsel JC, Bardales RH, Mukunyadzi P. Fine Needle Aspiration Biopsy Cytology of Malignant Neoplasms of the Sinonasal Tract., Cancer, 2003 April; 99(2): 105- 112.

[7]. Sharma R, Sharma VK, Madhok R, Agarwal T, Mehrotra A, Kochchar A. Uncommon and atypical sinonasal masses : Diagnostic and therapeutic challenges. Clin Rhinol An Int J 2012 ; 5(3): 114- 117.

[8]. Khan N , Zafar U , Afroz N , Ahmad SS, Hasan A. Masses of nasal cavity, paranasal sinuses and nasopharynx: A Clinicopathological study, Indian Journal of Otolaryngeology and Head and Neck Surgery 2006 (Jul – Sept);58(3): 259-263.

[9]. Bakari A, Afolabi A, Adoga AA, Kodiya AM, Ahmad BA. Clinico- pathological profile of sinonasal masses: an experience in national ear care centre Kaduna, Nigeria, BMC Research Notes 2010; 3:186 DOI:10.1186/1756-0500-3-186.

[10]. Spearman M, Curtin H, Dusenbury D, Janecka JP, Edna L. Computed Tomography – Directed Fine Needle Aspiration of Skull Base Parapharyngeal and Infratemporal Fossa Masses. Skull Base Surgery.1995 July; 4:199- 205.

[11]. Nigam JS, Misra V, Dhingra V, Jain S, Varma K, Singh A. Comparative study of intraoperative cytology, frozen sections and histology of tumour and tumour like lesions of nose and paranasal sinuses. J of Cytol.2013 Jan; 30(1):13-17.

[12]. Castelli M, Gattuso P, Reyes C, Solans EP. Fine needle aspiration biopsy of intraoral and pharyngeal lesions. Acta Cytol.1993 Jul-Aug;37(4):448-50.

[13]. Singh S, Garg N, Gupta S, Marwah N, Kalra R, Singh V, Sen R. Fine needle Aspiration cytology in lesions of oral and maxillofacial region ; Diagnostic pitfalls. J of Cytol.2011 July;28(3):93-97.

[14]. Baykul T, Colok G, Gunhun O. The Value of Aspiration of Cytology in Cystic Lesions of the Maxillofacial Region. Eur J Dent, Jan 2010;4(1):1-5.

[15]. Batasakis JG, Sneige N, Choanal and angiomatous polyps of the sinonasal tract, Ann Otol Rhinol Laryngol 1992;101:623-625

[16]. Makannavar J. H., Chavan S.S., Rhinosporidiosis. A Clinicopathological study of 34 cases. Indian Journal of Pathological study of 34 cases. Indian Journal of Pathology and Microbiology 2001; 44:17-21.

[17]. Tappozada H, Riad W, Michaels L, Gaafar H. Sid Ahmed K. The epithelium and chronic inflammatory cells in sceroma. The Journal of Laryngology and Otology 1981; 95: 1049 – 1057.
[18]. Foucar E, Rosai J, Dorfman RF. sinus histiocytosis with massive lymphaedenopathy. Ear, nose and throat manifestations. Arch otolaryngol 1978, 104:687- 693.
[19]. Waldron J, Van Hasselt CA, Skinner DW, Arnold M. Tuberculosis of the nasopharynx, Clinicopathological features. Clin Otolaryngol 1992, 17:57-59.
[20]. Saleh HA, Clayman L, Masri H. Fine needle aspiration biopsy of intraoral and oropharyngeal mass lesions, Cytojpurnal. 2008;5 – 4.
[21]. Klijanienko J, Vieth P. Fine – needle sampling of salivary gland lesion I. Cytology and histology correlation of 412 cases of pleomorphic adenoma. Diagn Cytopathol 1996; 14: 195-200.
[22]. Vigeur JM, Vicandi B, Jimenez – Hefferman JA, et al. Fine needle aspiration cytology of pleomorphic adenoma. An analysis of 212 cases. Acta Cytol 1997; 41: 786 – 94.
[23]. Dehner LP,Valbuena L, Perez_Atayde A, Reddick RL, Askin FB, Rosai J. Salivary gland analage tumor("congenital pleomorphic adenoma"). A Clinicopathologic, immunohistochemical and ultrastructural study of nine cases. Am J Surg Pathol 1994, 18:25-36
[24]. Ringertz N. Pathology of malignant tumor arising in nasal and paranasal cavities and maxilla. Acta Otolaryngol.(Stockholm) 1938, 27(suppl): 1- 405.
[25]. Franquemont DW, Fechner RE, Mills SE, Histologic Classification of sinonasal intestinal type adenocarcinoma. Am J Surg Pathol 1991; 16: 368-375.
[26]. Frierson HF, Mills SE, Fechner RE, Taxy JB, Levine PA. Sinonasal undifferentiated carcinoma: an aggressive neoplasm derived from the schneiderian epithelium and distinct from olfactory neuroblastoma. Am J Surg Pathol. 1086; **101**:771-779.
[27]. Goepfert H, Luna MA, Lindberg RD, White AK: Malignant salivary gland tumors of the paranasal sinuses and nasal cavity. Arch Otolaryngol 1983; 109:662-668.
[28]. Devaney K, Wenig BM, Abbondanzo SL: Olfactory neuroblastoma and other round cell lesions of the sinonasal region. Mod Pathol 1996; 9:658-663.
[29]. Kapadia SB, Desai U, Cheng VS(1982). Extramedullary plasmacytoma of the head and neck. A clinicopathologicstudy of 20 cases. Medicine (Baltimore) 61:317-329
[30]. Bernstein JM, Montogomery WW, Balogh K:Metastatic tumors to the maxilla, nose, andparanasal sinuses. Laryngoscope 1966; 76:621–650.

Images

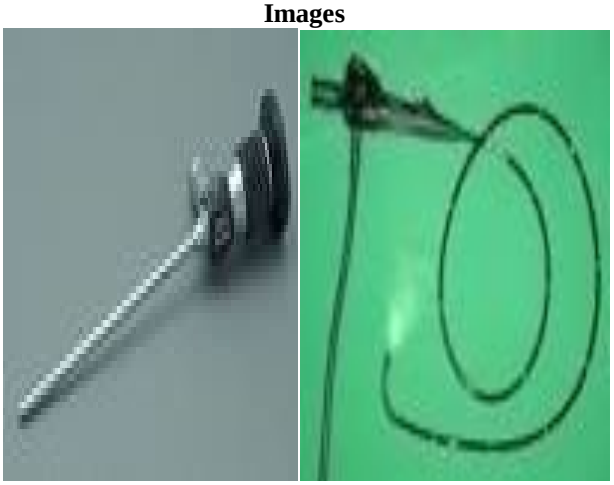

Figure.1: Photograph shows rigid &flexible Nasal Endoscopy.

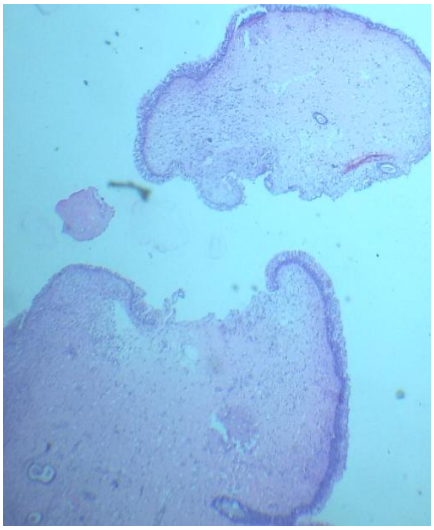

Figure-2: Photomicrograph showing histopathology of edematous polyp(H&E;40X).

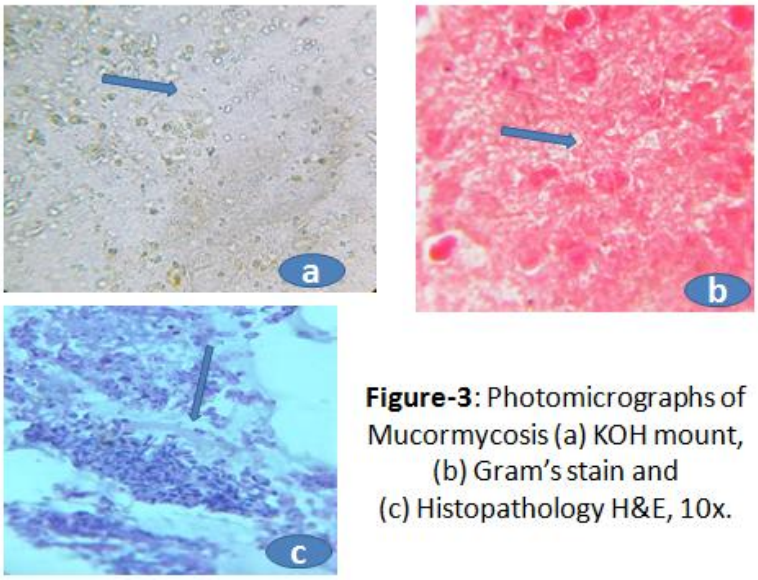

Figure-3: Photomicrographs of Mucormycosis (a) KOH mount, (b) Gram's stain and (c) Histopathology H&E, 10x.

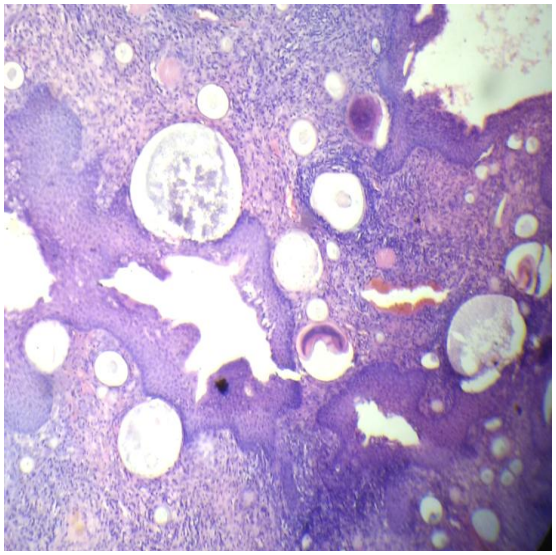

Figure 4. Photomicrograph showing histopathology of Rhinosporidiosis(H&E;100X).

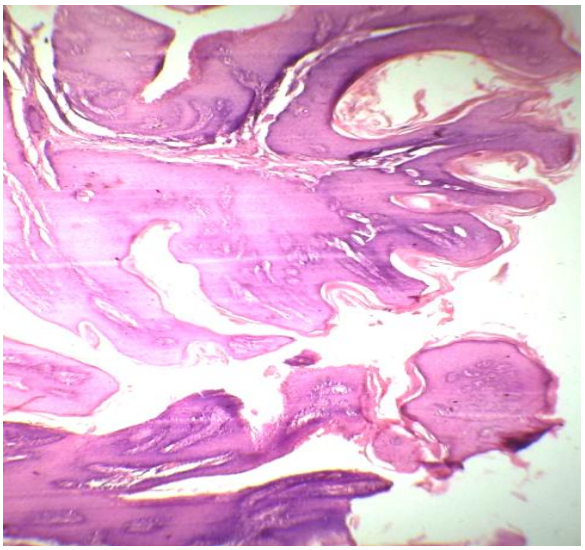

Figure 5: Photomicrograph showing histopathology of sinonasl papilloma(H&E; 40X)

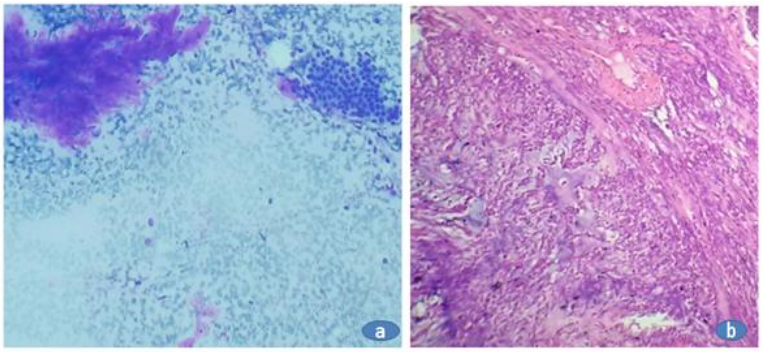

Figure 6:. Photomicrograph showing cytomorphology &histopathology of pleomorphic adenoma(H&E; 40X)

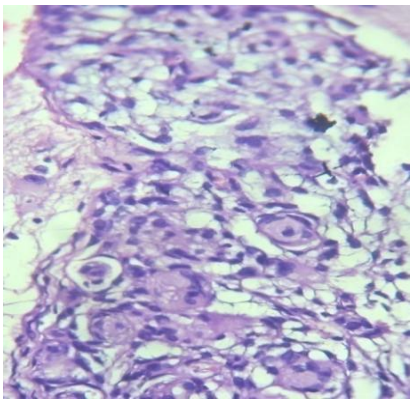

Figure 7: Photomicrograph showing histopathology of transitional meningioma(H&E;40X).

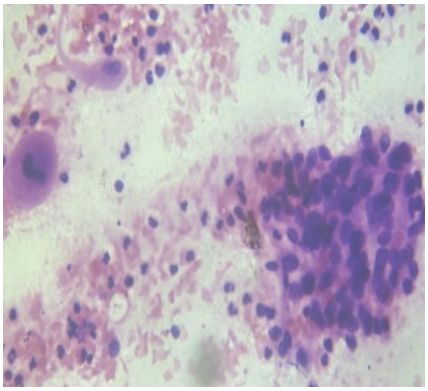

Figure 8 Photomicrograph showing cytomrphology of squamous cell carcinoma (H & E 100X)

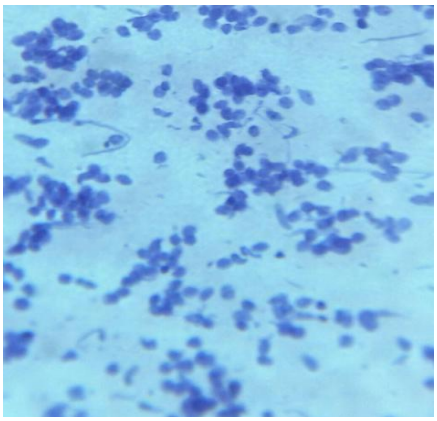

Figure 9: Photomicrograph showing cytomorphology of neuroblastoma(H&E;40X).

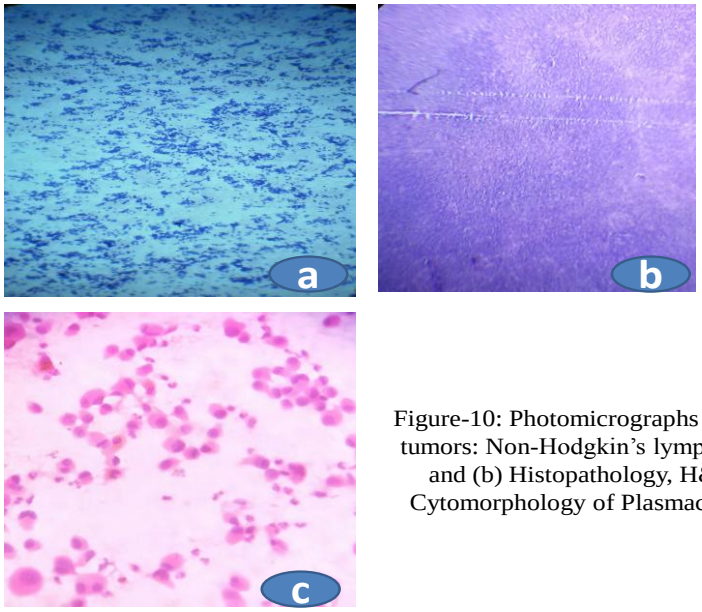

Figure-10: Photomicrographs of hematolymphoid tumors: Non-Hodgkin's lymphoma (a) Cytology and (b) Histopathology, H&E, 10x and (c) Cytomorphology of Plasmacytoma H&E, 10x.

Table -1:

	DIAGNOSIS	**FNAC**	**HISTOPATHOLOGY**	**%**
NON-NEOPLASTIC				57%
	INFLAMMATORY(Suppurative)	8	1	
	GRANULOMATOUS	1	1	
	INFLAMMTORY/ALLERGIC POLYPS	26	24	
	MYCOTIC INFECTIONS (Mucormycosis)	1	-	
	ROSAI DORFANS DISEASE	1	1	
	RHINOSCLEROSIS	1	1	
	RHINOSPORIDIOSIS	2	2	
	ANTERO CHOANAL POLYP	3	2	
NEOPLSTIC-BENIGN				17%
	MUCOCELE	I	1	
	MENINGIOMA	1	1	
	SINONASAL PAPILLOMA (Squamous)	8	6	
	PLEOMORPHIC ADENOMA	1	1	
	HAMARTOMA (Salivary gland analage tumor)	-	1	
	DENTIGEROUS CYST	1	1	
MALIGNANT				25%
	SQUAMOUS CELL CARCINOMA	12	12	
	ADENOCARCINOMA	1	1	
	SINONASAL UNDIFFERENTIATED CARCINOMA	2	1	
	NON-HODGKIN'S LYMPHOMA	1	1	
	PLASMACYTOMA	1	1	
	OLFACTORY- NUROBLASTOMA	2	1	
	INADEQUATE YIELD	2	-	