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Original Research Article

Histopathological Spectrum of Nasal Polyps of Patients Attending in Tertiary Care Hospital at N.M.C.H. Patna: A Demographic Study

Authors
Dr Sunil Kumar[1*], Dr C P Jaiswal[2], Dr Satyendu Sagar[3]
[1]Assistant Professor, Department of Pathology, Nalanda Medical College, Patna, Bihar, India
[2]Associate Professor; Department of Pathology, Nalanda Medical College, Patna, Bihar, India
[3]Assistant professor, Department of Microbiology, Nalanda Medical College, Patna, Bihar, India
*Corresponding Author
Dr Sunil Kumar
Assistant Professor, Department of Pathology, Nalanda Medical College, Patna, Bihar, India
Emails: *sunilmamta62@gmail.com*

Abstract
Objective: *The aim of present study was undertaken to evaluate the histopathological spectrum of nasal polyps with their demographic pattern in our tertiary care hospital.*
Material and Methods: *A total of 56 patients of different ages, sex and religions with nasal polyps were attending in ENT OPD has been included in the study.*
Result: *Out of 56 patients, 28 patients (50%) belonged to 11 to 30 years of age group. Out of 56 patients, 40 cases (71.43%) were male .followed by 28.57% females. On histopathological evaluation, 23(41.07%) were simple nasal polyps and 33 cases (58.93%) found as neoplastic nasal polyps. Out of 33 neoplastic lesions, 25 cases (76%) were benign and 8 cases (24%) found as malignant nasal polyps.*
Conclusion: *Even fine needle aspiration cytology (FNAC) has very limited value and in most of the cases, could not be recommended due to inaccessible and high risk of brisk hemorrhages. Among all the nasal polyps, allergic nasal polyps were seen as predominant condition, although malignancy, the dreaded condition, found in all the decades of life, especially after 5th decade. The present histopathological study of nasal polyps is justified and the ultimate diagnostic technique for correct diagnosis.*
Keywords: *Nasal polyps, histopathological evaluation, allergy, benign, malignant, FNAC.*

Introduction

Nasal polyps are usually regarded as protrusions of the hypertrophic and edematous mucosa of the nose or paranasal sinuses. Polyps are generally non-neoplastic or benign lesion but many times malignant tumors may project themselves as polypoidal growth of nasal cavity.

Cases of nasal polyps are seen frequently in patients attending ENT OPD Clinic. It is quite impossible to distinguish clinically between simple nasal polyps and neoplastic nasal polyps. As many times, neoplastic nasal polyps mimics as a simple nasal polyp especially in elderly patients. For this reason, it is essential that all the nasal

polyps must be removed from the nasal cavity or nasal sinuses and should be examined histopathologically under the microscope.

The problems of nasal polyps are not new. Polyps occurring in nose was known since the days of Hippocrates's (460 B.C.); but no effort was made to know the histopathology of nasal polyps till about nineteenth century when Billroth (1855) first described the histology of nasal polyp (Ouoted by N C Lyngdoh, et al;2006;) .

Nasal polyps are predominantly a disease of adult; although antro-choanal polyps commonly occur in children and young adults; mostly unilateral and invariably single in number.

Ethmoidal polyps generally occur in middle age onwards either unilateral or bilateral, invariably multiple in numbers.

It may be associated with allergic manifestation. Recently much attention has been paid to an association of nasal polyp in cases of muco-viscidosis (Shwachmegn 1962); deviated nasal septum and (Berkiten et al 2016).

The high incidence of disease contrary to the etiopathological aspects as well as recurrences of the polyp even after its removal, has initiated to undertake the present study with special interest on the histopathological aspect of such conditions.

Materials and Methods

The present study was conducted in the Department of pathology Nalanda Medical College, Patna, with the help of ENT Department during the period of June 2014 to December 2018. A total of 56 patients presenting with nasal polyps, (both simple and neoplastic polyps) were included in the study and has been made as an attempt to evaluate such lesions which came for routine histopathological examinations. The histological evaluation has been done on the basis of cellular changes on light microscopic examination.

All the specimens of nasal polyp for the Histopathological assessment were obtained from the Dept. of ENT. The specimen was carefully labeled as name, age, sex, religion as well as detailed available clinical history of the patient including allergy.

All routine investigation of blood like complete blood count (CBC), BT , CT, PT, APPT, Blood sugar (Fasting and Post Prandial), creatinine, SGPT, viral markers, R/E of urine as well as relevant radiological investigation like X-Ray, CT Scan were done. The material was first examined and recorded about its nature, gross appearance, and appearance on cutting. Tissue fixation, tissue processing, staining of the cut sample, mounting of section were carried as follows:

The tissue was placed in 10% Formalin Solution for 24 hours for fixation. Then the tissue was put for 2 hours in each of the ascending grades of alcohol 50%, 70%, 90% and two separate jars of absolute alchohol .The tissue was kept overnight lastly in absolute alcohol. On next day the tissue was transferred to xylene I and xylene II for cleaning for 1&1/2 hours in each jar. After clearing in xylene I & xylene II, the tissue was transferred to a bath of molten paraffin in an paraffin wax oven. During this process the clearing agent is eliminated from the tissue by diffusion into the surrounding melted wax and the wax diffuses into the tissue replacing the clearing agent. This is carried out in paraffin wax oven at 60-62^0 c for 3-4 hours. After that the impregnated tissue was embedded in liquid paraffin wax with the help of two L-moulds (Leuckhart's Piecs) adjusting accordingly with various sizes of tissue. After the wax was solidified, the L-moulds are removed and the blocks of paraffin wax having tissue were kept in freezer part of freeze for hardening. After hardening of the block, the sections of the tissue in block were cut with the help of rotatory microtome having 2-4 µm thickness. Ribbon of sections was put in a bowl of slightly warm water. The section were transferred on clean slides with tissue adhesives (Mayor's glycerol albumin). Deparaffinization of sections was done on hot plate regulated at melting point of wax. Delicate tissue section after deparaffinization were dried at 45.o degree Celsius for several hours. Deparafinized and dried

thin sections were put in xylene I and xylene II for 10-15 minutes in each. Deparaffinized sections after treating with xylene, were hydrated in descending grades of alcohol from 95% to 70% to 50% for 5 minutes in each then kept in tap water for 5 minutes. Staining of slides was done with haematoxylin and Eosin stain.

Haemoatoxylin component stain the cell nuclei and Eosin component stain the cytoplasmic components of tissue sections. After staining and clearing the slides with the help of xylene, the slides were mounted with DPX and cover slip.

H & E stained slides show as follows:

Nuclei: - Blue-Black
Cytoplasm: - Varying shades of pink.
Muscles fibers: Deep pink red.
RBCs:- Orange red.
Fibrin: - Deep pink

Mounted slides were studied under the low power and high power of microscope. Each case subjected to histopathological examination was based on microscopic findings, The nasal polyps were divided broadly in two groups:

(I) Simple nasal polyps
(II) Neoplastic nasal polyps.

Histopathological study was done with particular references to following points.

(a) Changes in epithelial characters like
  (i) Hyperplasia
  (ii) Metaplasia
  (iii) Neoplasia
  (iv) Denudation

(b) Changes in basement membrane(BM) status like
  (i) Normal BM
  (ii) Thickened BM
  (iii) Absent BM
  (iv) Eroded BM

(C) Stromal changes like
  i. Oedema of stroma
  ii. Inflammatory cell infiltration in stroma.
  iii. Condition of blood vessels and lymph
  iv. vessels
  v. Fibrosis whether absent or present.
  vi. Any invasion of neoplastic components in stroma
  vii. Any other relevant structures / microscopic findings in stroma.

Result

The present work has been taken to study the cases of nasal polyps with particular emphasis on histopathology.

Observation of 56 cases of nasal polyps has been considered in present study.

Table 1(a) shows: Age incidence of all types of nasal polyps in total(n=56)

Age in years	No of Cases of nasal polyps (n=56)	% of Cases.
0-10 years	3	5.37
11-20	14	25%
21-30	14	25%
31-46	10	17.87
41-50	5	8.92
51-60	5	8.92
>60	5	8.92
Total=	56	100

Table1(b) shows : Age incidence of simple and neoplastic nasal polyps(n=56)

Age	Simple No of case(n=23)	Nasal polyp (%)	Benign nasal polyp of case(n=25)	Benign nasal poly %	Malignant nasal polyp of case(n=8)	Malignant nasal polyp %
0-10 yrs	1	1.786	2	3.571	---	--
11-20 yrs	6	10.714	6	10.714	2	3.571
21-30 yrs	8	14.286	8	14.286	--	--
31-40 yrs	4	7.143	4	7.143	1	1.786
41-50 yrs	2	3.571	3	5.357	--	--
51-60yrs	2	3.571	1	1.786	2	3.571
>60	--	--	1	1.786	3	5.357
Total	23	41.07%	25	44.63%	8	14.30%

This study shows maximum incidence was in age group of 11 to 20 &21 to 30 years, followed by 30-40yrs age group.

Youngest patient in the present series was a male patient of 8years old and the oldest patient was male of 78 years age.

Simple nasal polyps and benign nasal polyps was more prevalent in age groups of 21-30yrs. 14.276% in each group although malignant nasal polyp was more prevent in patient of more than 60years of age.

Table 2 shows the sex distribution of nasal polyp (n=56)

SEX	No of cases (n=56)	% of cases
MALE	40	71.43%
FEMALE	16	28.57%
TOTAL=	**56**	100%

Table 3 shows: Incidence of nasal polyps in different religion

RELIGION	No OF Patient (n=56)	% of Patient
HINDU	50	89.28%
MUSLIM	6	10.72%
TOTAL=	**56**	**100%**

Table 4 shows the sex distribution of nasal polyp (n=56)

SEX	No of cases (n=56)	% of cases
MALE	40	71.43%
FEMALE	16	28.57%
TOTAL=	**56**	100%

Table 5 shows the sex distribution in neoplastic (benign & malignant)

Cases (n=33)

Sex	Benign cases (n=25)	% of cases	Malignant cases (n=8)	% of cases
Male	19	76%	5	62.5%
Female	6	24%	3	37.5%
Total	25	100%	8	100%

Observation of histological changes in simple nasal polyps (23 cases)

(a) Epithelial Hyperplasia 14 60.86%
(b) Thickening of Basement Membrance 19 82.60%
(c) Squamous Metaplasa 13 56.52%
(d) Glandular changes
(i) Mucous glands 18 78.26%
(ii) Glandular Hypertrophy 13 56.52%
(iii) Glandular Hypertrohy with increased eosinophils 14 60.86%
(e) Stromal changes:-
(i) Stromal edema 21 91.30%
(ii) Inflammatory cell infiltration 23 100%
(iii) Eosinohilic abundance 14 60.86%
(iv) Vascular granulation tissue 18 78.26%
(v) Reactive fibrosis 19 82.60%

Incidence of different types of nasal polyps were observed under two categories i.e. Simple and Neoplastic nasal polyps.

Table 6 shows: Incidence of simple and neoplastic nasal polyps

Type of Nasal Polyp	No. of Cases	% of Cases
Simple Nasal polyp	23	41.07%
Neoplastic nasal polyp	33	58.93%
Total	56	100%

Simple nasal polyps include different types of non neoplastic inflammatory lesions.

Table 7 shows: Incidence of Benign and malignant nasal polyps among neoplastic nasal polyps

(n= 33)

	No of cases (n=33)	% of cases
Benign polyps	25	76%
Malignant polyps	8	24%
Total=	33	100%

The ratio between benign to malignant nasal polyps was observed 1: 0.31.

Table 8 shows: Incidence of different types of simple nasal polyps (n=23)

	No. of cases(n=23)	% of cases	% of total cases(n=56)
Allergic polyp with CNSI (chronic non specific inflammation)	14	60.86%	25%
CNSI WITH RF(reactive fibrosis)	4	17.39%	7.14%
Chronic granulomatous lesion	2	8.70%	3.57%
Rhinosporidiosis	2	8.70%	3.57%
CNSI WITH RF+FBR(foreign body reaction)	1	4.35%	1.79%
Total	23	100%	41.07%

Fig 1: Chronic Granulomatous lesion: Typical granulomatous reaction with langhan's type giant cell

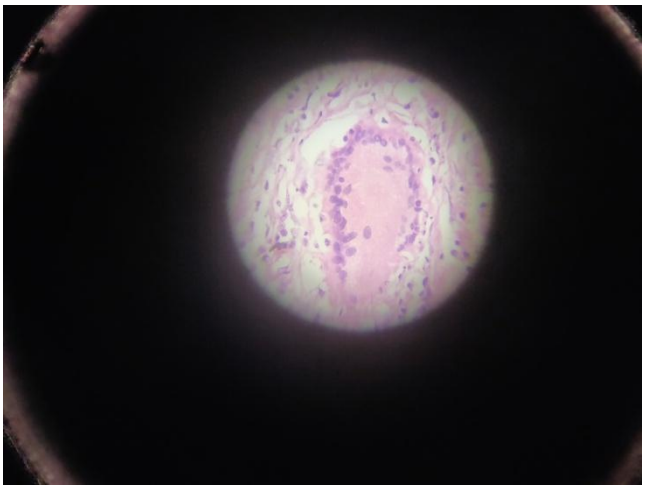
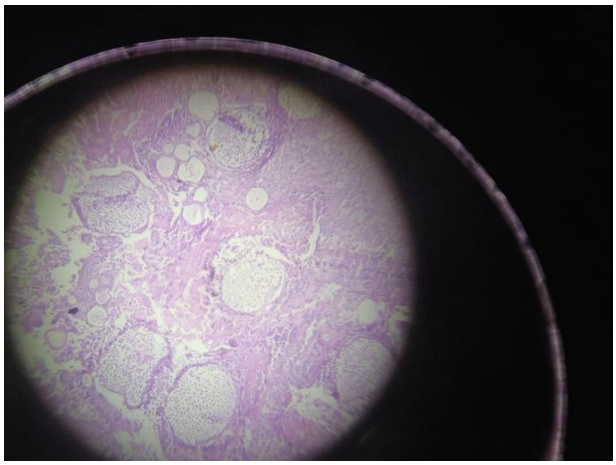


Fig. 2: Rhinosporidiosis : Both endospores and sporangia of Rhinosporidium seeberi within the stroma



In present series there were two cases of Rhinosporidiosis; one case was 14 years old male Muslim patients and other 28 years old Hindu patient. The lesion was unilateral in both the cases. On grossing, the lesions were grayish brown in color with polypoidal appearance. The tissue was covered by lining epithelium of nose showing hyperplasia and hypertrophy. The sporangium of different sizes filled with spores seen; mostly the actively growing type in various developmental stages. The stroma shows blood vessels of different sizes with area of hemorrhages, necrosis as well as infiltration by inflammatory cells and occasional giant cells seen.

Table 9 shows: Incidence of different histological types of benign nasal polyp (n=25).

	No of cases (n=25)	% of benign cases	%of total(n=56)
Granuloma pyogenicum	5	20%	8.92%
Angiofibroma	13	52%	23.22%
Inverted Squamous papilloma	5	20%	8.92%
Haemangioma	2	8%	3.57%
TOTAL=	**25**	**100%**	**44.63%**

Fig.3: Granuloma pyogenicum: Lobulated arrangement of small blood vessels in edematous and fibroblastic stroma

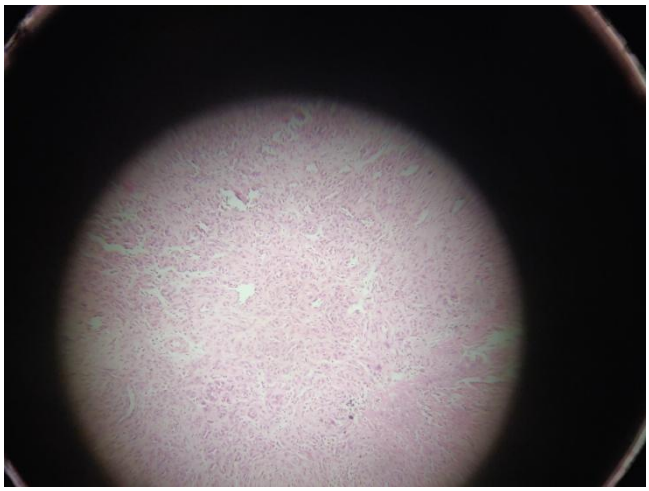


Fig 4: Angiofibroma: Angiomatous proliferation of small blood vessel in stroma

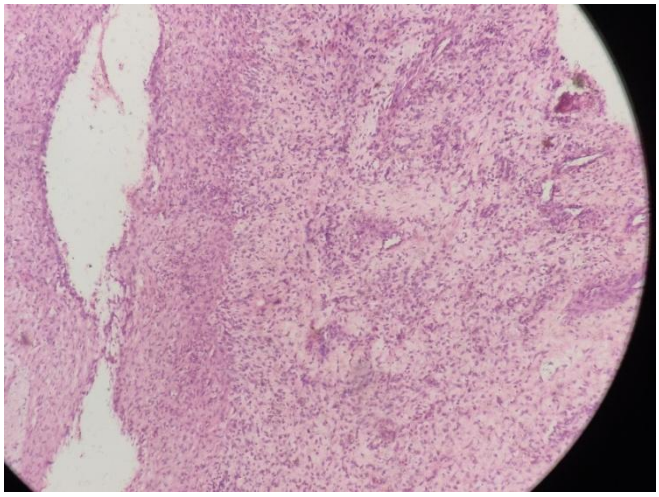


Fig 5: Inverted squamous papilloma: Nests of benign looking squamous epithelial cells in fibrous stroma

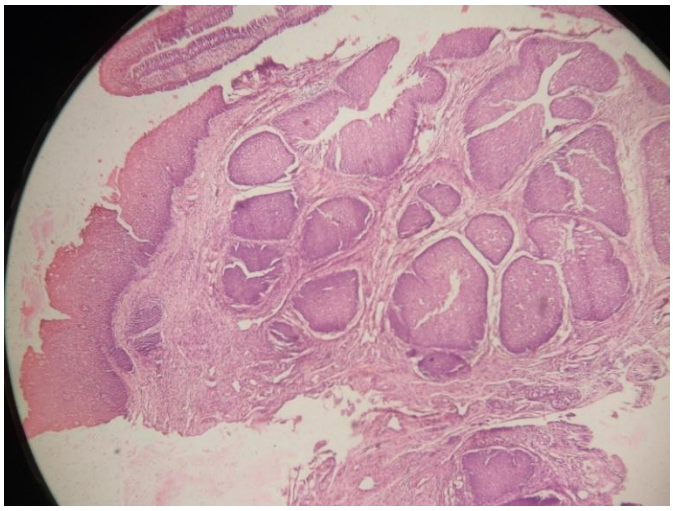


Table 10 shows: Incidence of different histological types of malignant nasal polyp (n=8).

Type of Malignancy	No of Cases	% of Malignant cases(n=8)	% of total cases(n=56)
Neuroblastoma	3	37.5%	5.36%
Squamous cell carcinoma	2	25%	3.57%
Malignant Melanoma	1	12.5%	1.79%
Fibrosarcoma	1	12.5%	1.79%
Undifferentiated carcinoma	1	12.5%	1.79%
Total	8	100%	14.30%

Fig 6 Neuroblastoma: Small round to oval cells with scant cytoplasm in nests

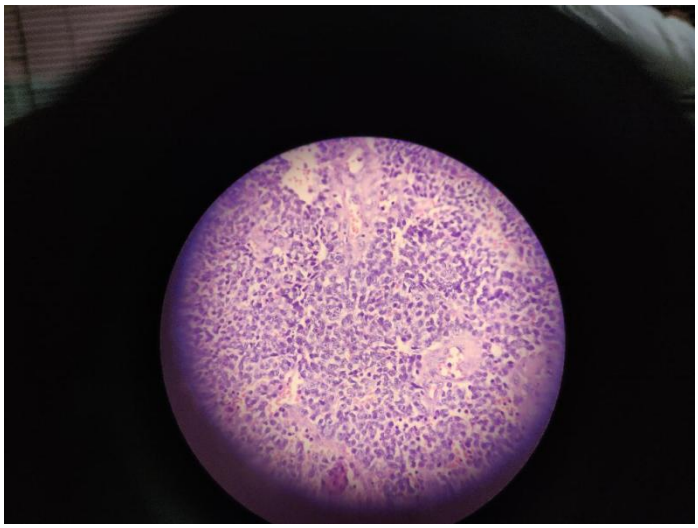


Fig 7: Squamous cell Carcinoma: Sheets of malignant looking squamous epithelial cells in stroma

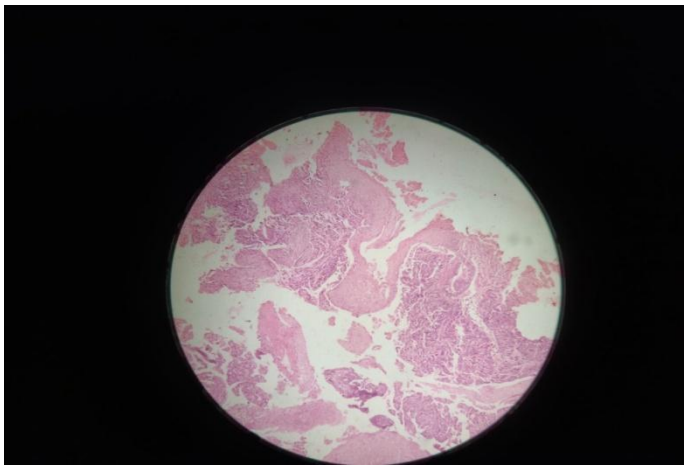
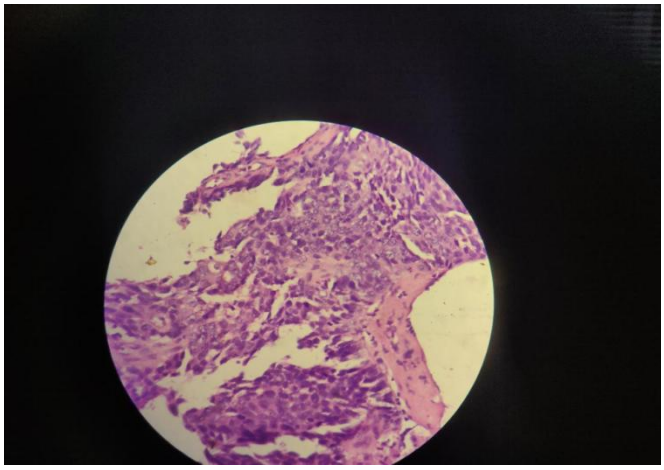


Fig 8: Poorly differentiated carcinoma: Sheets and clusters of poorly differentiated malignant epithelial cells in stroma



In the present study patients were of different occupations and no occupation was found to suggest any relationship with occurrence of nasal polyp.

Fig 9.: Fibrosarcoma: Malignant looking fibroblasts in fascicles.

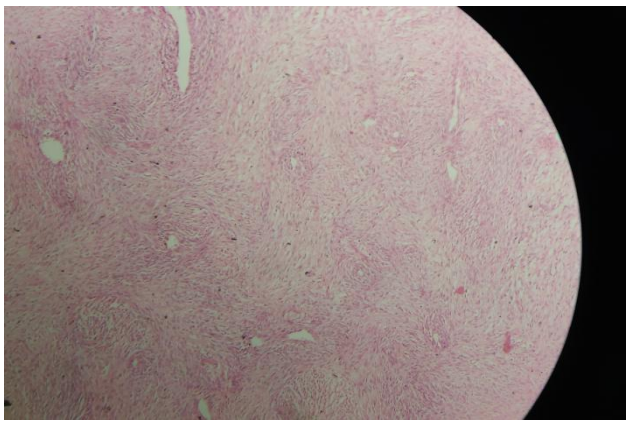
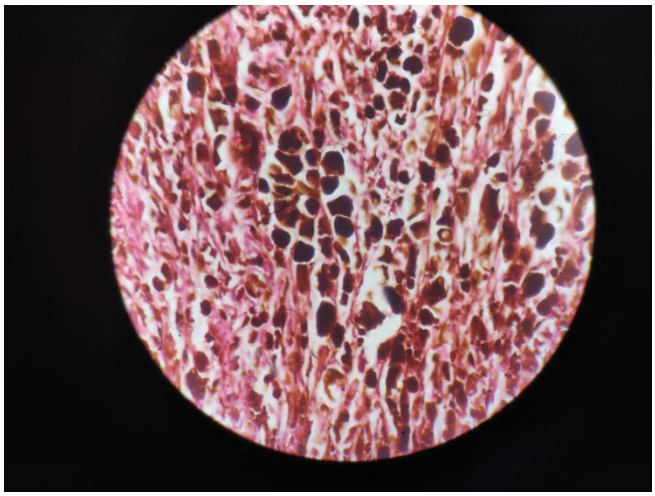


Fig 10 Melanin laden malignant melanocytes in clusters



Discussion

In the present study maximum number of patients of nasal polyps were found in age group of 11-20 year and 21-30 years; comprising of 25% in each category.

Sirola, R; (1966) found the maximum cases incidence in 2nd decade of life.

The sex incidence in present series was (Male:Female 2.5:1) 40 males and 16 females (out of 56 cases).

The religion incidence in present series was found, majority of cases Hindus(89%).The preponderance of nasal polyps in Hindu is slightly more than the proportion of the population ratio of Hindu and Muslim in Bihar. Overall incidence of nasal polyps as obtained for Biopsy in the department of Pathology from the ENT Dept. of NMCH Patna was found 2.2% (2.2cases Per 1,00,000 patients attending ENT OPD).

The incidence of nasal masses especially nasal polyps is approximately 1% to 4%) (Archana Ramole et at 2015).

Histophathological Study

In this present histopathological study of nasal polyps, it has been focused on the changes of (I) epithelial character; (II) Status of Basement membrane; (III) Stromal Changes; (IV) inflammatory cells and eosinophilic infiltration in stroma; (V) Cellular and nuclear changes as well as (VI) glandular changes; to make an attempt for proper diagnosis for the considerable treatment.

In this present study, all the condition of non specific inflammation infiltrated by mixed inflammatory cells as well as abundance of eosinophilic population in stroma suggesting allergic polyps, chronic granulomatous lesion and cases of rhinosporidiosis has been kept under simple nasal polyps comprising of 23 cases (41.07%) out of 56 cases .Out of 23 simple nasal polyps cases, allergic nasal polyps were found is 60.86% having abundance of eosinophilic population in edematous stroma along with mixed inflammatory cell infiltrations as well as in some cases reactive fibrosis also seen in allergic polyps.

Korkis (1959) observed 112 cases of simple nasal polyps and classified then into 4 groups on the basis of individual case history and pre-operative clinical appearances.

(I)	Pure allergy	46.4%
(II)	Pure infection	10.7%
(III)	Combined allergy and infection	10.7%
(IV)	Uncertain probably allergy	32.2%

In present study, all cases having mixed inflammatory infiltration and abundant eosinophilic population in stroma were considered as allergic polyps, which comprises of 60.86% of all simple nassal polyps which almost corresponds to the observation of Korkis F B (1959), (Pure allergy+ combined allergy and infection = 57.1%).

Tondon et al(1971) observed 60% cases showing eosinophilic abundance as compared to other infiltration.

Dandapath A (1993) observed that allergic manifestations with eosinophilic exudates (65.5%) was a prominent feature which almost corresponds to the present study.

Epithelial Hyperplasia was found in all the case of allergic polyps (60.86%).

Squamous metaplasia was found in 56.5% cases out of 23 simple nasal polyps..

Heck W E, et al (1950) observed squamous metaplasia in 35% cases of anto-choanal polyps and 44.5% cases of ethmoidal polyps.

Thickening of basement membrane was observed in 82.60% cases out of 23 simple nasal polyps.

Thickening of basement membrane was seen in all cases of allergic nasal polyps, chronic granulomatous lesion and rhinosporidiosis as well as in one case of chronic non specific inflammation with reactive fibrosis and foreign body reaction.

Stromal edema was seen in 82.60% case out of 23 simple nasal polyps which included all the cases of allergic nasal polyps (i.e. 60.86%) as well as in some cases without allergy.

In present study, plasma cells seen in some cases of allergic polyps which may be considered either as an infective process or superimposition of allergy especially bacterial allergy .

Glandular hypertrophy with increased eosinophilic population was seen in 56.52% cases out of 23 cases of simple nasal polyps ;although glandular hypertrophy with increased eosinophilic population suggestive of allergic polyps were seen in 47.82% cases.

Two cases of rhinosporidiosis seen in present series; both were male patients.

Neoplastic Nasal polyps

In present series of 56 cases of nasal polyps ; 33 cases (58.93%) were found as neoplastic nasal polyps of which 25 cases (44.63%) were benign and 8 cases (14.30%) were malignant nasal polyps.

Maximum number of benign neoplastic nasal polyps seen in 21-30years of age group (14.28% cases); whereas maximum number of malignant nasal polyps were seen in patients of more than 60yrs of age group(5.38%).

Out of 25% cases of benign neoplastic nasal polyps, 19 cases (76%) were male and 6 cases (24%) were founds female patients (M:F=3.2:1)

Mohamad R, et al (2013) also observed the sex incidence higher in males.

On histological study of benign neoplastic nasal polyps, Angiofibroma was found in 52% cases out of 25 cases, followed by granuloma. Pyogenicum (20%) and inverted squamous papilloma 20%. Two cases of Haemangioma (8%) seen.

Among the malignant nasal polyps 5 cases were male and 3 cases were found as female patients (M:F=1.67:1).

Jackson and Jackson (1959) observed that two thirds of all malignant patients of nasal polyps were male and 1/3rd female patients. Among the malignant nasal polyps Neuroblastoma was found in 37.5% cases followed by Squamous cell carcinoma comprising of 25% out of 8 cases of malignant nasal polyps.

Table Shows - Comparison chart showing comparison of malignant lesions of nasal polyps in present study with other workers

S.N.	TYPE	PRESENT STUDY	ARCHANA RAMOLE ET AL (2015)	JACKSON et al 1977	LEWIS AND CASTRO (1972)	HOPKIN et al (1984)
1.	Inverted squamous papilloma with early malignant change.		1 (14.3)			
2.	Squamous cell carcinoma	02(25%)	04(57%)	61(53%)	496(64%)	201(36%)
3.	Undiff.Ca.	1(12.5%)	01(14.3)	11(10%)		92(17%)
4.	Adenoid cystic Ca.			8(7%)		30(5%)
5.	Adenocarcinoma		1(14.3%)	7(6%)	129(17%)	40(7%)
6.	Papillary Adeno Ca.			2(2%)		
7.	Transitional Cell Ca.			2(2%)		50(11%)
8.	Malignant Melanoma	1(12.5%)		7(6%)	34(4%)	39(7%)
9.	Olfactory Neuroblastoma			5(4%)		3(1%)
10.	Neuroblastoma	3(37.5%)		1(1)		
11.	Fibrosarcoma	1(12.5%)		3(3%)		11(2%)
12.	Rhabdomyosarcoma	-	-	-	-	-

13.	Angiosarcoma			1(1%)		
14.	Chondrosarcoma			1(1%)		
15.	Malignant lymphoma			3(3%)	40(5%)	35(6%)
16.	Plasmacystoma			2(2%)	13(2%)	8(1%)
17.	Carcinoma			1(1%)		
18.	Other Sarcoma				23(3%)	16(3%)
19.	Unclassified Tumours	-	-	-	-	-
20.	Other malignant lesions				37(5%)	25(5%)
		8	7	115	772	561

Table Shows Histopathological Diagnosis of non neoplastic and Neoplastic nasal polyps (56 Cases) in present series:

S.L.No	Histopathological Diagnosis	No of Cases	Sex		% of Cases(n=56)
			MALE	FEMALE	
(A)	**Non neoplastic simple nasal polyps**	23			41.07%
I	Inflammatory with allergy	14	12	2	25%
II	Inflammatory without allergy	4	1	3	7.14%
III	Inflammatory with FBR	1	1	-	1.78
IV	Chronic granulomatous lesion	2	-	2	3.57
V	Rhinosporidiosis	2	2	-	3.57
(B)	**Neoplastic nasal polyps**				
	Benign Nasal Polyps	**25**			**(44.65%)**
1.	Haemangioma (Capillary)	2	2	-	3.57
2.	Angiofibroma	13	10	3	23.21
3.	Granuloma Pyogenicum	5	3	2	8.92%
4.	Inverted Squamous Papilloma	5	4	1	8.92%
	Malignant nasal polyp				**14.28%**
1.	Neuroblastoma	3	3	-	5.35
2.	Squamous cell carcinoma	2	1	1	3.51
3.	Malignant Melanoma	1		1	1.78
4.	Fibrosarcoma	1	1	-	1.78
5.	Undiff.Ca	1		1	1.78
	Total	56	40	16	100%

Conclusion

To conclude the present study, nasal polyps as well as polypoidal masses of nasal cavity, found in all the age groups; form a complex lesion from inflammatory to neoplastic (both benign and malignant). Clinical as well as radiological features provide an overlapping, inadequate and only provisional diagnosis. Even fine needle aspiration cytology (FNAC) has very limited value and in most of the cases, could not be recommended due to inaccessible and high risk of brisk hemorrhages. Among all the nasal polyps, allergic nasal polyps were seen as predominant condition, although malignancy, the dreaded condition, found in all the decades of life, especially after 5th decade. The present histopathological study of nasal polyps is justified and the ultimate diagnostic technique for correct diagnosis.

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