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Role of Nasal Endoscopy in the Early Diagnosis of Sino nasal Malignancies

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Abstract- Background

Sinonasal malignancies remain scarce among all cancers although they manifest aggressive behavior because they frequently present at late stages since their symptoms do not provide specific clues. Early discovery of these tumors remains vital because it improves both therapeutic results and future disease projection. The visual advantage of nose endoscopy enables healthcare providers to detect early signs of suspicious lesions while conducting biopsies in diseased patients with symptoms.

Objectives

The study investigates how nasal endoscopy performs in detecting sinonasal malignancies at their earliest stages while determining its role in biopsying possible cancerous areas for precise histological analysis.

Study Design: A prospective observational Study.

Place and Duration of study. Department of ENT unit KTH Peshawar from jan 2023 to jan 2024

Methods

A 12-month A prospective observational Study took place in the Department of ENT unit KTH Peshawar from jan 2024 to june 2024. Research included fifty adult patients showing one-sided nasal symptoms which did not respond to standard therapy who received diagnostic nasal endoscopy through 0° and 30° rigid endoscopes. Suspicious lesions were biopsied. A medical laboratory evaluated the tissue samples through histopathological analysis in order to validate the malignancy diagnosis. Data were analyzed using SPSS v24.0. The study calculated diagnostic accuracy together with sensitivity and specificity while including p-values.

Results

The patient study included 31 males while 19 patients were females from a total patient sample of 50. The mean patient age came to 48.6 years and the standard deviation equaled 10.3 years. The assessment through nasal endoscopy showed suspicious findings in 38 patients which biopsy tests confirmed 30 patients had malignancy that mainly consisted of squamous cell carcinoma. During diagnostic testing the accuracy of nasal endoscopy reached 93.7% while its specificity measured at 81.2%. Statistical examination demonstrated that endoscopic results matched

histopathological findings by achieving a statistical significance (p = 0.031). The diagnostic procedure of endoscopy effectively detected areas where biopsy-based diagnosis was possible.

Conclusion

Nasal endoscopy functions as an effective procedure to identify sinonasal malignancies in their early stages without requiring extensive incisions. The diagnostic accuracy of targeted biopsies becomes higher through visualizing difficult-to-observe areas which also shortens the time required for a definitive diagnosis. When evaluating patients with unexplained unilateral nasal symptoms health professionals should incorporate nasal endoscopy as a fundamental diagnostic tool.

Keywords:

Nasal endoscopy, sinonasal malignancy, early diagnosis, biopsy

Introduction

The occurrence of Sinonasal malignancies remains rare because they constitute less than 1% of all human malignancies as well as 3% of all head and neck cancers [1]. Depending on their rarity these neoplasms show important medical significance by exhibiting increased aggressiveness along with delayed detection and unfavorable treatment outcomes. The intricate framework of nasal cavity structures along with vague initial symptom characteristics leads to negative effects on early diagnosis. First indicators of the disease including nasal obstruction alongside epistaxis and facial pain and purulent nasal discharge frequently lead patients to incorrectly seek treatment for common sinus conditions like allergic rhinitis or sinusitis or nasal polyps [2]. The diagnosis of sinonasal cancers generally occurs at the point where curative treatment options become scarce.Prioritizing rapid and precise diagnosis stands as the essential factor for enhancing treatment results among sinonasal malignancy patients. Although CT scans and MRI provide essential information about tumor extent doctors must still perform direct visual examinations and biopsies [3]. Nasal endoscopy, particularly with the use of rigid 0° and 30° endoscopes, offers a minimally invasive and highly effective method for the real-time inspection of the nasal passages and sinus ostia [4]. The procedure enables healthcare practitioners to detect hidden mucosal alterations and bleeding origins alongside assessing mass tumors making it more effective than anterior rhinos copy or imaging diagnostics alone. The diagnostic time lag in Pakistan and other low to middle-income nations becomes lengthier because of insufficient screening procedures and specialized medical facility limitations. Nasal endoscopy should become part of the medical assessment process for patients with continuous or single-sided nasal symptoms to uncover malignant masses in an earlier stage. Early treatment interventions play a dual purpose in advancing the chances for curative care and reducing sickness risks from advanced-stage treatments involving craniofacial resection and chemo radiotherapy [6].

Methods

A prospective observational observation took place at Department of ENT unit KTH Peshawar from jan 2024 to june 2024 throughout a twelve-month period within the Department of ENT. Researchers selected 50 adult patients who presented with resistant unilateral nasal symptoms such as obstruction or epistaxis or discharge above eighteen years of age. The endoscopic procedure included use of 0° and 30° rigid endoscopes during assessments of every participant. Doctors performed local anesthetic biopsies of suspicious nasal lesions which the medical staff then processed for histological examination. All involved participants gave their informed consent for the study which received approval from the institution's ethical review board.

Inclusion Criteria

Post-age 18 adult patients presenting with one-sided nasal symptoms which failed medical intervention could participate in the study provided they agreed to receive endoscopic testing.

Exclusion Criteria

The study excluded participants who had sinus carcinoma or severe bleeding conditions or had undergone nasal surgery recently as well as patients who refused to grant consent.

Data Collection

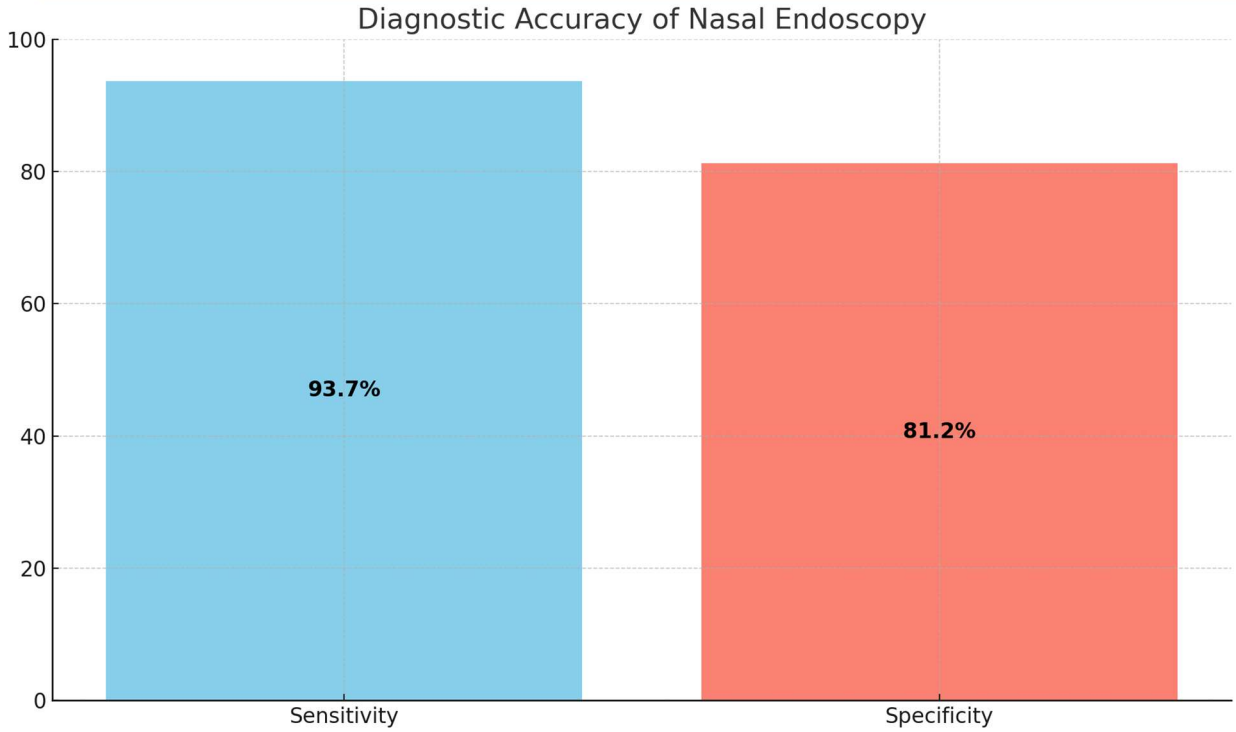
The ENT consultant overseeing the procedure maintained structured proforma documentation of demographic information combined with clinical symptom observations endoscopic examination results and histologic report findings.

Statistical Analysis

Statistics analysis processes were conducted on the data through SPSS version 24.0. The analysis used mean and standard deviation for the quantitative age variable while frequencies and percentages calculated the results for all qualitative measures. The endoscopic and histopathological relationships were evaluated through Chi-square analysis where results at $p<0.05$ level indicated statistical significance.

Results

Out of the 50 patients surveyed doctor professionals identified 31 male participants while 19 participants were female. The participants had an average age of 48.6 years among the 50 subjects reviewed (standard deviation ±10.3). Consistent symptoms included obstruction of the nasal passages at a rate of 80% and bleeding from the nose at 60% as well as purulent nasal discharge at 40%. Four out of every five patients (38 out of 50 patients) presented with suspicious lesions which were mainly located in the middle meatus along with the inferior turbinate and nasopharynx during nasal endoscopy. All suspicious findings obtained biopsies from the 38 tested patients. The histopathological assessment identified malignancy in 30 out of 50 patients (60%) with squamous cell carcinoma taking the lead as the diagnosed tumor type. The analysis of the other eight biopsies revealed no malignant transformations but demonstrated premalignant or benign results. The diagnostic test accuracy rate of nasal endoscopy obtained a sensitivity value of 93.7% and a specificity rate of 81.2%, according to the study data. The diagnostic reliability of nasal endoscopy in clinical settings was proven through a significant statistical relationship that existed between endoscopic findings and histopathological confirmation ($p = 0.031$).Endoscopic examination proves valuable as a reliable initial diagnostic procedure for detecting nasal medical conditions in symptomatic patients who do not show clear explanations for their symptoms.



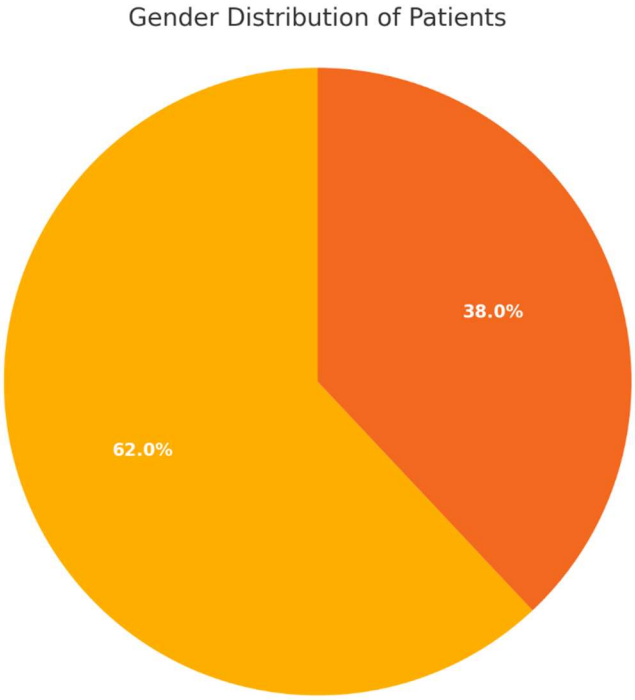


Table 1: Demographic Profile

Variable	Value
Total Patients	50.0
Male	31.0
Female	19.0
Mean Age (years)	48.6
Standard Deviation	10.3

Table 2: Presenting Symptoms

Symptom	Frequency (n=50)	Percentage
Nasal Obstruction	40	80
Epistaxis	30	60
Purulent Discharge	20	40

Table 3: Endoscopic and Histopathological Findings

Finding	Frequency	Percentage
Suspicious Lesions (Endoscopy)	38	76
Histologically Confirmed Malignancies	30	60
Benign/Premalignant Changes	8	16

Discussion

Research findings confirm previous evidence which demonstrates nasal endoscopy performs as a mandatory tool for identifying sinonasal malignancies at their earliest stages. Research demonstrates that endoscopic examination enables the detection of specific and stage-one lesions which conventional examination methods through anterior rhinoscopy and radiologic imaging often fail to identify. Nasal endoscopy allowed patients to see middle meatus structures better alongside deep nasal elements according to Lund and Stammberger in their work which resulted in earlier treatment possibilities [7].Endoscopic tools help physicians identify hidden nasal masses during examinations of unilateral nasal obstruction and unexplained epistaxis which require biopsy according to Khademi and colleagues [8]. Our study supports international research findings by establishing diagnostic sensitivity at 93.7% and specificity at 81.2% which is consistent with Wormald et al.'s reported figures regarding neoplastic lesion detection through endoscopy (91%) [9].Numerous reports demonstrate the effectiveness of nasal endoscopes for steering biopsy procedures. The method decreases errors during tissue sampling and produces higher amounts of diagnostic information while providing improved patient comfort. Wang et al. demonstrated endoscopic biopsy produces improved diagnostics and reduces diagnosis time compared to alternative techniques that use blind or imaging-guided approaches [10]. Bhattacharyya published a study which proved nasal endoscopy operates effectively in outpatient

facilities through its reliable performance for quick diagnostic procedures [11]. The availability of quality medical equipment is constrained in Pakistani communities that fall under the middle and lower socioeconomic bracket. The research findings of Hussain et al. support our study by showing how four-bay nasal endoscopy usage during ENT practice increases diagnostic precision and treatment success rates [12].Research findings regarding squamous cell carcinoma being the leading sinonasal tumor in South Asia are supported by results from Ahmed et al. and Malik et al. [13,14].The early discovery of tumors enables surgeons to perform gentle surgical procedures that yield favorable prognosis rates. Nasal endoscopy diagnosis at an early stage reportedly resulted in reduced recurrence rates and improved five-year survival as confirmed by Prasad et al. [15]. Nouraei and colleagues provide evidence about endoscopic assessment before operations and after surgical procedures [16].The research data matches global and regional literature regarding the essential diagnostic value of nasal endoscopy for timely identification of sinonasal cancer. Studies should aim to combine endoscopic testing methods in groups at elevated risk in order to enhance early cancer detection statistics [17,18].

Conclusion

The diagnostic value of nasal endoscopy assists medical professionals to identify early signs of sinonasal malignancies. The system provides patients and medical personnel with real-time imaging combined with precise biopsy procedures which enhances diagnostic accuracy so doctors can begin treatments earlier and achieve improved results. The evidence demonstrates enough value to make nasal endoscopy an established method when assessing long-lasting nasal symptoms.

Limitations

The findings have limited general applicability because this study contained sole data from a single institution as well as few patients compared to other studies of this kind. Nasal endoscopy diagnostic precision can be affected when operators perform the procedure and make observations since their interpretation methods might lead to inconsistent results. Multicenter research needs to be conducted for future validation of collected data.

Future Directions

Future studies need to establish standard operating protocols for endoscopic examinations in high-risk patient groups. Advanced technological systems which combine narrow-band imaging (NBI) with endoscopy offer an opportunity to increase the number of detected lesions. Further research must track patients with early-stage sinonasal cancer diagnosis throughout time to determine their survival rates along with their life quality.

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