

## Unilateral Sinonasal Disease: analysis of the clinical, radiological and pathological features

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### Summary:

**Background:** Unilateral sinonasal disease is commonly encountered during the practice of the otolaryngologists, the etiology include a wide variety of diseases ranging from simple acute inflammation to highly malignant diseases. The clinical, computed tomography and histopathology differs between inflammatory and neoplastic diseases.

**Patients and Methods:** A prospective study carried out at the Otolaryngology department, Baghdad Medical City, Hospital of specialized surgeries between Jan.2007 to Nov.2008. The study involved 114 patients with symptoms and signs of unilateral sinonasal disease, a careful history, complete clinical examination and radiological investigations were done to all patients as well as flexible nasoendoscopic examination. Sinonasal surgery under general or local anaesthesia with histopathological examination of the removed tissues was done to all patients.

**Results:** Chronic rhinosinusitis with or without nasal polyposis is the commonest cause of a unilateral sinonasal disease (33.3%), followed by antrochoanal polyp (20%), mucor mycosis (16.7%), benign tumors (13.1%), allergic fungal sinusitis (9.6%) and then malignant tumors (7.6%) in that order. Male gender and the right side were predominant. Purulent discharge and foul odor were the commonest presenting symptoms under inflammatory conditions, while frequent epistaxis, facial swelling and exophthalmos were the main symptoms in neoplastic diseases. Calcifications were observed on CT scan mainly in patients with allergic fungal sinusitis, while bony erosion and destruction was detected in both malignant tumors as well as mucor mycosis, the pattern and extent of bony destruction is more severe in malignant tumors.

**Conclusion:** Chronic rhinosinusitis with or without nasal polyposis is the commonest cause of unilateral sinonasal disease. History, clinical examination, endoscopic as well as radiological examinations are important to reach the diagnosis. However, histopathological confirmation remains obligatory.

**Keywords:** Unilateral sinonasal disease, unilateral sinus opacity, sinus surgery.

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### Introduction:

Patients complaining from unilateral nasal obstruction, purulent discharge, frequent epistaxis, foul odor; facial pain and swelling were frequently encountered during clinical Rhinology practice. On endoscopic examination, specific pathological findings may not be detected, while others show a deviated septum, hypertrophied turbinate, polypoid changes of the middle meatal area, visible polyps, dirty fungal debris, or mass lesions with or without bleeding tendency. In these patients, radiographic studies often reveal unilateral sinus opacification to varying degrees, and sometimes erosion or destruction of the bony structures can be observed.

Diverse disease processes can lead to unilateral sinus opacification, including acute or chronic rhinosinusitis (CRS), nasal polyposis (NP), allergic or non allergic fungal sinusitis, mucocoeles, and benign or malignant neoplasia (1-7). Retention cysts, cholesterol granulomas, silent sinus syndrome, and periodontal disease are minor causes of unilateral sinus opacification (8-11). Computed tomography (CT) of the paranasal sinuses is now a routine investigative method for patients with sinonasal symptoms that may require surgical intervention (12). The presence of sinus opacification on CT scans that is resistant to medical treatment or a visible mass on endoscopic examination demands further investigations for an accurate diagnosis, such as biopsy or surgery (2).

### Patients and methods:

This was a prospective study carried out between January 2007 to November 2008, at

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the Otolaryngology department, Hospital of Specialized Surgeries, Baghdad Medical City; the study involved 114 patients who underwent surgery for unilateral sinonasal disease under general or local anaesthesia. Patients with symptoms and signs of nasal obstruction, purulent discharge, frequent epistaxis, foul odor, facial pain, cheek swelling and exophthalmos were submitted to the study. Patients with features of acute sinusitis who responded to medical treatment or antral washout and those who had undergone previous sinus surgery were excluded from the study. Thorough history taking and full clinical examination including otorhinolaryngologic, neck, cranial nerves and other systems examination were done as well as flexible nasoendoscopic assessment. Radiological investigations of the paranasal sinuses were done including: plain x-ray (occipitomeatal and lateral views) and CT scans (axial and coronal views) with contrast enhancement. Magnetic resonance imaging was done to selected patients. The pre-operative CT images were graded using Lund-Mackay scoring system (15).

The mucosal abnormalities were graded as 0 (no abnormality), 1 (partial opacification), or 2 (total opacification) for each sinus group. The

ostiomeatal complexes were scored as 0 (not occluded) or 2 (occluded). The scores ranged from 0 to 12 because the patients who participated in this study had unilateral sinus disease. In addition to the extent of the disease, pathologic findings such as calcification in the sinuses, and bony erosion or destruction were evaluated. All the patients underwent surgery under general or local anesthesia; the types of surgeries done include: simple intra-nasal excision, intra-nasal inferior meatal antrostomy, lateral rhinotomy with medial maxillectomy, endoscopic sinus surgery, total maxillectomy and Lynch-Howarth frontoethmoidectomy. The specimens removed from all patients send for histopathological study.

**Results:**

The disease entities were categorized as chronic rhinosinusitis with or without nasal polyposis (CRS±NP), antrochoanal polyp (ACP), allergic fungal sinusitis (AFS), mucor mycosis (MM), benign tumors (BT), including mucocoeles, and malignant tumors (MT). The numbers of patients, mean age, gender ratio, laterality of the disease, Lund-Mackay scores, and involved sinuses for each disease entity are summarized in table 1.

**Table1: Summary of the clinical characteristics, laterality of the disease, Lund-Mackay scores, and involved sinuses of each disease entity.**

	CRS ± NP	ACP	AFS	MM	BT	MT	Total
Number of patients	38 (33.3%)	23 (20%)	11 (9.6%)	19 (16.7)	15 (13.1%)	8 (7.1%)	114
Male : female	22:16	17:6	6:5	11:8	12:3	6:2	74:40
Right : left	27:11	15:8	4:7	13:6	7:8	4:4	70:44
Mean age (year)	34.2	12.8	38.2	42.1	46.3	56.4	
Mean L – M score	9.2	2.4	6.7	6.2	4.8	8.3	6.2
Involved sinuses							
OMU	31 (81.5%)	11 (47.8%)	5 (45.4%)	10 (52.6%)	11 (73.3%)	7 (87.5%)	75 (65.7%)
MS	38 (100%)	23 (100%)	11 (100%)	9 (47.3%)	10 (66.6%)	8 (100%)	99 (86.6%)
AES	22 (57.8%)	5 (21.7%)	7 (63.6%)	8 (42.1%)	9 (60%)	7 (87.5%)	58 (50.8%)
PES	4 (10.5%)	0 (0%)	2 (18.1%)	4 (21%)	8 (53.3%)	7 (87.5%)	25 (21.9%)
FS	9 (32.6%)	0 (0%)	4 (36.3%)	2 (10.5%)	8 (53.3%)	6 (75%)	29 (25.4%)
SS	6 (15.7%)	0 (0%)	2 (18.1%)	2 (10.5%)	0 (0%)	3 (37.5%)	13 (11.4%)

**OMU= ostiomeatal unit; MS=maxillary sinus; AES=anterior ethmoidal sinus; PES=posterior ethmoidal sinus; FS=frontal sinus; SS=sphenoid sinus**

The greatest number of patients had chronic rhinosinusitis with or without nasal polyposis 38 patients (33.3%) , followed by antrochoanal polyp 23 patients (20%) , mucor mycosis 19 patients (16.7%) , benign tumors 15 patients (13.1%) , allergic fungal sinusitis 11 patients (9.6%) and then malignant tumors 8 patients (7.1%) in that order. The mean age was oldest for malignant tumors and youngest for antrochoanal polyp. Generally male gender and the right side were predominant. Chronic rhinosinusitis with or without nasal polyposis had the highest Lund- Mackay scores followed by malignant tumors. Purulent discharge, foul odor were the common presenting symptoms with inflammatory conditions such as CRS±NP, ACP, and AFS. In contrast frequent epistaxis, facial swelling and exophthalmos were the main symptoms for neoplastic diseases and mucor mycosis. Unilateral nasal obstruction was the most common complaint in both groups (Table 2). Facial pain is the third most common complain in both groups.

**Table2: Comparison of presenting symptoms between inflammatory and neoplastic groups**

SYMPTOMS	Inflammatory (n = 72)	Neoplastic & mucormycosis (n = 42)
Nasal obstruction	64 (88.8%)	36 (85.7%)
Purulent discharge	57 (79.1%)	6 (14.2%)
Foul odor	51 (70.8%)	15 (35.7%)
Frequent epistaxis	9 (12.5%)	31 (73.8%)
Facial pain	53 (73.6%)	30 (71.4%)
Facial swelling	3 (4.1%)	20 (47.6%)
Exophthalmus	0 (0%)	14 (33.3)

On pre-operative CT scans images, the maxillary sinus was the most commonly involved (86.6%), followed by the ostiomeatal unit (65.7%), anterior ethmoidal sinus (50.8%) , frontal sinus (25.4%) , posterior ethmoidal sinus (21.9%), and the least involved is the sphenoid sinus (11.4%), in that order. Calcifications within the sinus were observed mainly in patients with allergic fungal sinusitis, and to lesser extent in chronic rhinosinusitis with or without nasal polyposis and benign tumors. Bony erosion or destruction was detected mainly in malignant tumors (100% of cases), followed by mucor mycosis (73% of cases), then benign tumors (40% of cases). For benign tumors, the most common cause of bony erosion was mucocoeles, followed by inverted papilloma. The pathologic diagnoses of tumors are listed in Table 3; the most common pathology was inverted papilloma for benign

tumors and squamous cell carcinoma for malignant tumors.

**Table3: Pathologic diagnoses of the benign and malignant tumors.**

Diagnosis	Number of patients
Benign tumors	15
Inverted papilloma	9
Cavernous hemangioma	1
Fibrous dysplasia	1
Frontoethmoidal mucocele	4
Malignant tumors	8
Squamous cell carcinoma	5
Non Hodgkin lymphoma	1
Malignant melanoma	2

**Discussion:**

Various pathologies can present with unilateral sinus disease. Although a few studies have evaluated the unilateral opacity on CT findings (13, 14), they have mainly investigated maxillary sinus disease. In this study chronic rhinosinusitis with or without nasal polyposis was the most common cause (33.3 %). Similar results were obtained in other studies (1, 13, 14, and 17). A careful history and complete clinical examination, including nasoendoscopy, constitute the first step in approaching the diagnosis. Nasoendoscopy is the only way to examine the nasal cavity accurately. We can detect pathological findings, such as a purulent discharge from the middle meatus, fungal debris, polypoid changes of the uncinate or middle turbinate, polyps, and mass lesions using this instrument. In this study the mean age was youngest with antrochoanal polyp and oldest with malignant tumors. In Jae Yong Lee study (17) the mean age was youngest with antrochoanal polyp also but oldest with fungal polyp. In this study the mean Lund-Mackay score was highest in patients with chronic rhinosinusitis with or without nasal polyposis and lowest with antrochoanal polyp, while it is highest in patients with malignant tumors and lowest in antrochoanal polyp in Jae Yong Lee study (17).Generally, obliteration of the ostiomeatal unit was associated with high Lund-Mackay score. In this study, male gender and the right side were predominant, in Jae Yong Lee study, male gender was also predominant, but in contrast to this study, the left side is predominant. When the disease entities were divided into inflammatory and neoplastic processes, the presenting symptoms of the two groups clearly differed. In the inflammatory group, purulent discharge and foul odor were common, while frequent epistaxis, facial swelling and exophthalmos were more common in the neoplastic group, similar results obtained in Jae Yong Lee study (17). Various studies

have stated that bony destruction is a typical finding in malignant neoplasia (6, 7, 13, 14, and 17). In this study bony destruction was also found in mucor mycosis (73 %) and benign tumors (40 %), in addition to malignant tumors (100 %). The malignant group had more extensive pattern.

#### Conclusion:

Chronic rhinosinusitis with or without nasal polyposis was the most common cause of a persistent unilateral sinonasal disease. Bony erosion or destruction on pre-operative CT scans was associated with malignant tumors as well as mucor mycosis, however the extent and pattern of bony destruction is more severe in malignant tumors. A comprehensive evaluation of the patient age, presenting symptoms, nasoendoscopic examination, and pre-operative CT scanning would help in the diagnosis of a unilateral sinonasal disease. However histopathological confirmation remains obligatory for diagnosis.

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