20.04.2016

Diagnostic Algorithm for Unilateral Sinus Disease

By: Abdulrahman A. Al-Humaizi
Rhinology Fellow, F1

Objectives

- Introduction
- Patients and Methods
- Results
- Algorithm
- Literature Review
- Conclusion

Introduction

- Nasal polyp condition is estimated to be present in roughly **1% to 4%** of the population: more commonly among **adults** than in children, and among **males** rather than females. The vast majority of nasal polyps are bilateral and inflammatory in nature.
- Incidence of USD on routine CT PNS was **2.5-23%**
- However, USD is a common challenge faced by rhinologists worldwide.

Introduction

- Some authors suggest that any unilateral nasal mass should always be considered "**neoplastic until proven otherwise**"!

Diagnostic algorithm for unilateral sinus disease: a 15-year retrospective review

Marianella Paz Silva, MD, Jayant M. Pinto, MD, Jacquelynne P. Corey, MD, Ernest E. Mhoon, MD, Fuad M. Baroody, MD and Robert M. Naclerio, MD

Background: Patients presenting with unilateral sinus symptoms or nasal polyps raise concerns about sinister pathology. Yet despite the relatively common occurrence of this presentation, and its potential severity, an organized diagnostic approach to unilateral sinus disease (USD) has never been defined. The purpose of this work was to propose a diagnostic algorithm for managing patients with USD based on prior experience.

Methods: We performed a retrospective review of the medical records of all patients with USD who underwent surgical intervention and had pathological specimens during a 15-year period at an urban academic center. Nasal endoscopy and computed tomography (CT) scan findings, demographic characteristics, presenting symptoms, medical histories, and previous treatments were analyzed.

Results: A total of 191 patients met the inclusion criteria, 153 of whom were initially diagnosed at our center. Among the latter group, 51 (33%) presented with a nasal mass or polyp observed by endoscopy. Inverted papilloma was present in 16% of those cases, and malignant tumors comprised 14%. In contrast, of patients without an obvious nasal polyp (n = 102), 2% had inverted papilloma and 3% had malignancies. Overall, chronic rhinosinusitis was the most common diagnosis both in patients with polyps (67%) and those without nasal polyps (69%).

Conclusion: Although USD is most likely to represent chronic inflammation, there exists a fair likelihood of finding malignant pathology, particularly in cases where patients have a unilateral polyp. Based on this review, we propose a strategy for the management of new presentations of USD.

Key Words:
sinusitis; CT; endoscopy; inverted papilloma; fungus; chronic; unilateral

How to Cite this Article:
Silva MP, Pinto JM, Corey JP, Mhoon EE, Baroody FM, Naclerio RM. Diagnostic algorithm for unilateral sinus disease: a 15-year retrospective review. *Int Forum Allergy Rhinol.* 2015;5:590–596.

Unilateral sinus disease (USD) represents a common concern for otolaryngologists, and it is much more likely than bilateral disease to represent sinister pathology. Indeed, some authors suggest that any unilateral nasal mass should always be considered neoplastic until proven otherwise.[1] Patients usually have unilateral symptoms such as nasal congestion/obstruction, anterior or posterior nasal drainage, purulent discharge, epistaxis, a foul odor, headaches, and facial or cheek swelling.[2] Yet despite being relatively common—Lee[2] argues that unilateral rhinosinusitis occurs in 23% of cases–this condition has not been extensively studied.

To date, several investigators have attempted to describe the general characteristics of USD. Shin[3] studied the demographic characteristics and evolution of 640 cases of chronic rhinosinusitis (CRS) and showed that USD was more common in males (65.8%) than in females. Nasal polyps were present in 11.1% of the USD patients, and the maxillary sinus was the most commonly affected anatomic site in the USD group.[3]

To our knowledge there is no single management strategy for the workup of patients presenting with USD. Here, we review our 15-year experience with USD and suggest a diagnostic algorithm for the evaluation of patients with this presentation.

Section of Otolaryngology–Head and Neck Surgery, The University of Chicago Medicine and Biological Sciences, Chicago, IL

Correspondence to: Robert M. Naclerio, MD, Section of Otolaryngology–Head and Neck Surgery, The University of Chicago Medicine and Biological Sciences, 5841 S. Maryland Avenue, MC 1035, Chicago, IL 60637; e-mail: rnaclerio@surgery.bsd.uchicago.edu

Potential conflict of interest: None provided.

Received: 7 September 2014; Revised: 30 January 2015; Accepted: 8 February 2015
DOI: 10.1002/alr.21526
View this article online at wileyonlinelibrary.com.

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International Forum of Allergy & Rhinology, Vol. 5, No. 7, July 2015

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Patients and Methods

- Retrospective review of the medical records of patients who presented with USD at the University of Chicago Section of Otolaryngology–Head and Neck Surgery and underwent surgical intervention (with pathologic specimens taken) over a 15-year period.
- To identify patients with USD, we reviewed all sinus **CT scans** of patients undergoing sinus surgery and included only subjects who had normal sinuses on 1 side.

Results

- Those diagnosed at the University of Chicago Medical Center were **153** adult patients.
- Ages of 18 and 77 years (mean, 49 years).
- Ninety-seven (63%) were **female**.

Results

TABLE 1. Pathology: new presentations at UCMC*

Final pathology	Total	With polyps	Without polyps
CRS	104 (68)	34 (66.7)	70 (68.6)
Fungal	26 (17)	1 (2)	25 (24.5)
IP	10 (7)	8 (15.7)	2 (2)
Malignant tumors	10 (7)	7 (13.7)	3 (2.9)
Others[a]	3 (2)	1 (2)	2 (2)
Total	153	51	102

*Values are n (%).
[a]Others: 1 encephalocele; 1 foreign body; 1 dentigerous cyst.
CRS = chronic rhinosinusitis; IP = inverted papilloma; UCMC = University of Chicago Medical Center.

Results

TABLE 2. Comparison and *p* values of cases presenting with polyps vs without polyps among different pathologies.

Pathology	With polyps (%) vs without polyps (%)	*p*
CRS	66.7 vs 68.6	0.855
Fungal	2 vs 24.5	0.0002
IP	15.7 vs 2	0.0025
Malignant tumors	13.7 vs 2.9	0.0164

CRS = chronic rhinosinusitis; IP = inverted papilloma.

Results

TABLE 3. Unilateral sinonasal complaints*

Sinonasal complaints	CRS (n = 104)	Fungal (n = 26)	IP (n = 10)	Malignancies (n = 10)	Others (n = 3)[a]
Nasal obstruction	81 (77.8)	20 (76.9)	9 (90)	6 (60)	3 (100)
Postnasal drip	36 (34.6)	10 (38.5)	3 (30)	3 (30)	1 (33.3)
Rhinorrhea	38 (36.5)	8 (30.8)	2 (20)	5 (50	2 (66.6)
Epistaxis	3 (2.8)	1 (3.8)	1 (10)	1 (10)	0
Sinus pressure	61 (58.6)	14 (53.8)	1 (10)	4(40)	1 (33.3)
Headaches	24 (23)	7 (26.9)	3 (30)	3 (30)	0

*Values are n (%).
[a]Others: 1 encephalocele; 1 foreign body; 1 dentigerous cyst.
CRS = chronic rhinosinusitis; IP = inverted papilloma.

Results

TABLE 4. Symptomatic vs asymptomatic patients per group

Final pathology	Total (n)	Asymptomatic[a]	Symptomatic[a]
CRS	104	26 (25)	78 (75)
Fungal	26	4 (15)	22 (85)
IP	10	2 (20)	8 (80)
Malignant tumors	10	2 (20)	8 (80)
Others[b]	3	0 (0)	3 (100)
Total	153	34 (22)	119 (78)

[a]Values are n (%).
[b]Others: 1 encephalocele; 1 foreign body; 1 dentigerous cyst.
CRS = chronic rhinosinusitis; IP = inverted papilloma.

Results

- The 51 subjects who presented **with a unilateral polyp** or mass, **16 (31.4%)** showed evidence of lateral maxillary sinus wall, orbital, or intracranial bone erosion on CT scan or they demonstrated neurologic involvement upon clinical examination, such as severe facial pain, numbness, swelling, or cranial nerve involvement
- Among the 102 patients **without a nasal polyp** or mass, **26 (25.5%)** had the same above findings.
- In the group of patients without polyps, 2 were found to have malignancies. In contrast, among the group with polyps, 6 were found to have malignancies and 1 was diagnosed as having IP

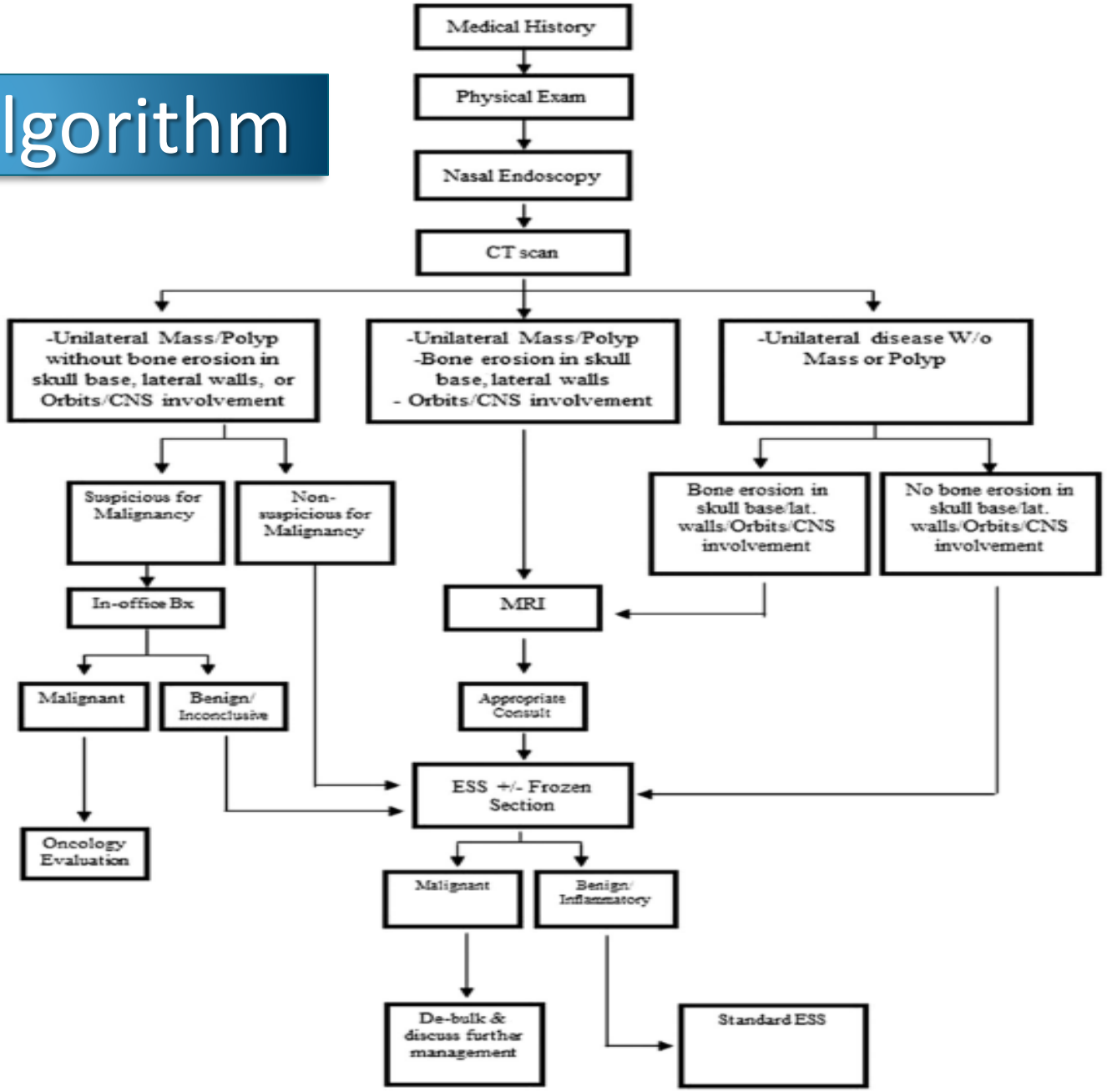
Results

- Numbness was present in **20 (13%)** of the 153 patients, and, of those, **4 (20%)** had **malignant disease** demonstrated in the final pathology

Results

- In our review, we found that analysis of **26 frozen** sections was performed.
  - **18** led to the **correct** diagnosis
  - **1** was **inconclusive**
  - **7** showed a result that was **different** than in the final pathology report
    - 4 cases were diagnosed as chronic inflammation ~ fungal disease on final pathology
    - 1 SCC was interpreted as IP on frozen section
    - 1 adenocarcinoma was interpreted as CRS
    - 1 CRS was interpreted as IP

Diagnostic algorithm



Their Recommendation!

- Do not recommend in-office biopsies their use in standard cases (without evidence of bone erosion on CT or neurologic abnormalities on physical exam). Our reasoning is based on the following:

Their Recommendation!

1. Negative results for malignancy must still be confirmed with an operative biopsy, requiring additional investments of cost and time.
2. Positive results for malignancy will generally necessitate surgical debulking regardless, for symptomatic relief, obviating the need for an in-office biopsy. The only exception to this statement is cases in which there is a clinical suspicion for a malignancy, which would require more radical resection that would not be feasible endoscopically.
3. In our whole series, we performed in-office biopsies in only 1.5% of the patients, and the results did not affect the clinical management.

Literature Review

Literature Review

- Shin studied the demographic characteristics and evolution of 640 cases of chronic rhinosinusitis (CRS) and showed that USD was more common in males (65.8%) than in females. Nasal polyps were present in 11.1% of the USD patients, and the maxillary sinus was the most commonly affected anatomic site in the USD group

Literature Review

- Tritt et al. did a retrospective review of 44 patients identified with unilateral nasal polyps who underwent ESS in order to correlate the clinical presentation with the pathology of the disease; they concluded that:
  - most common symptoms were unilateral sinus congestion (65%), epistaxis (18%) and headaches (12%)
  - Most common symptom for **AFS** was unilateral congestion (93%), followed by epistaxis (7%)
  - **Mucoceles** and human papillomavirus (HPV)-related **papilloma** both presented with congestion without epistaxis in 100% of the cases
  - Patients with **neoplastic** processes presented with epistaxis (45%) and with congestion, headache, seizures, or other symptoms (55%).

Literature Review

- Rudralingam et al. recommended that MRI be ordered every time bone erosion/destruction is found on a CT scan.
- Harvey and Dalgorf stated that both CT and MRI should be done in most cases because the studies are complementary and can offer the physician more information regarding the likely pathology than either one would on its own.

Literature Review

- Harvey and Dalgorf recommended that an in-office biopsy should be performed whenever malignant pathology is suspected. They considered this to be a critical step prior to any therapeutic decisions, but only after a CT scan and MRI have been obtained to avoid biopsy of encephaloceles, aneurysms, or nasal angiofibromas. They also recommend avoiding in-office biopsies for masses located beyond the middle turbinate

Literature Review

Table 3. Summary of Unilateral Paranasal Sinus Disease Studies

	Present study	Ashan [4]	Lee [6]	Rudralingam [1]	Kaplan [7]	Leherndt [8]
Sample size	1256	1118	524	372	N/A	N/A
Unilateral	134 (10.7)	28 (2.5)	121 (23.1)	20 (6.0)	64	43
Inflammatory	55 (72.4)	13 (46.4)	97 (80.2)	14 (70.0)	39 (60.9)	24 (56.0)
Neoplasia	3 (3.9)	12 (42.9)	24 (20.0)	6 (30.0)	7 (11.0)	16 (37.0)

Chien M. Chen, Kee M. Yeow. [Unilateral Paranasal Sinusitis Detected by Routine Sinus Computed Tomography: Analysis of Pathology and Image Findings]. J Radiol Sci June 2011 Vol.36 No.2

Conclusion

- Patients with polyps compared to those without polyps were more likely to have malignancies and IPs and were less likely to have fungal disease.
- It is their view that in-office biopsies are nearly always unnecessary because they do not change subsequent management.
- MRI scans can provide useful information in cases of bony erosion or examination findings consistent with extrasinus extension, but should be used sparingly because, in the majority of cases, they will not alter the approach.

Thank You