Unilateral Sinus Disease: Not Just Odontogenic! - A Retrospective Study

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Abstract

Introduction: Unilateral sinus disease (USD), and especially unilateral maxillary sinusitis (UMS), is an increasingly common finding in the ear, nose, and throat and maxillofacial practice. The aim of this retrospective study was to describe the clinical features of a series of patients affected by USD and, in particular, UMS due to sinonasal anatomic anomalies and of odontogenic origin. Materials and Methods: A total of 292 patients affected by UMS were reviewed. Medical charts, radiological images, and surgical notes were all reviewed, particularly including data on UMS due to sinonasal anatomic anomalies and on UMS of odontogenic origin. Results: A total of 66 patients have been excluded due to a diagnosis of malignant disease or other benign-defined etiology. Forty-eight patients (21.2%) affected by UMS due to sinonasal anatomic anomalies, whereas 178 (78.8%) patients affected by an odontogenic sinusitis. All patients were surgically treated by functional endoscopic sinus surgery, often in combination with a maxillofacial approach. Discussion: UMS of odontogenic origin represented the greater group of USD. Computed tomography scans are always recommended to define UMS etiology (in particular excluding a malignant origin) and also to plan the most adequate surgical treatment.

Keywords: Functional endoscopic sinus surgery, surgery, treatment, unilateral maxillary sinusitis, unilateral sinus disease

Introduction

Unilateral sinus disease (USD), and in particular unilateral maxillary sinusitis (UMS), is an increasingly common finding in the ear, nose, and throat (ENT) and maxillofacial practice. Bilateral sinusitis is much more frequent than USD.[1] In the past years, USD of odontogenic origin has been reported to be increased, with a reported USD incidence ranging between 10% and 12% of cases up to 50%–75%, according to different authors.[2]

Excluding malignant causes (many authors suggest that every USD must be considered malignant until proven otherwise),[1] USD can occur due to a benign identified etiology (such as antrochoanal polyps, inflammatory polyps, and invasive mycosis) or due to sinonasal anatomic anomalies or odontogenic disease.[1,2] Patients affected usually report unilateral symptoms such as nasal congestion/obstruction, local pain, and anterior or posterior nasal drip.[1,2]

The aim of this study is to evaluate retrospectively the clinical features of a series of patients affected by UMS, at our university setting, particularly focusing on UMS due to sinonasal anatomic anomalies and on UMS of odontogenic origin.

Materials and Methods

This was a retrospective study. The clinical charts of a total of 292 patients affected by UMS between January 1, 2012, and January 30, 2019, and referred to our ENT and maxillofacial departments have been reviewed.

Inclusion criteria were: (i) patients undergoing surgery for UMS between January 1, 2012, and January 30, 2019 (ii) age >18 years old.

Exclusion criteria were: (i) patients undergoing surgery due to a diagnosis of a benign identified etiology (in particular, antrochoanal polyps, inverted papilloma, and invasive mycosis) (ii) lymphoma or a malignant preoperatory histology.

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Medical charts, clinical data, nasal endoscopic, radiological images, and surgical notes were all reviewed, retrospectively. In particular, according to the clinical and radiological features of the maxillofacial computed tomography (CT) scans, UMS was divided into (i) UMS of odontogenic origin and (ii) UMS due to sinonasal anatomic anomalies.

Radiological criteria to define a UMS of odontogenic origin were the presence of periapical radiolucency around the teeth, indicating periodontal disease; the presence of a oroantral fistula; and the presence of dental implants through the maxillary sinus (MS).

Radiological criteria to define a UMS due to sinonasal anatomic anomalies were the presence of septal deviation, concha bullosa, or sinus hypoplasia.

UMS of odontogenic origin was usually treated in combination by the ENT surgeon and by the maxillofacial surgeon. UMS due to sinonasal anatomic anomalies was usually treated by the ENT surgeon only.

ENT treatment consisted of a functional endoscopic sinus surgery (FESS), which included uncinectomy, medial meatal antrostomy, and when necessary an anterior and/or posterior ethmoidectomy. In some cases, FESS was completed by a mini Caldwell-Luc access. In case of UMS, due to sinonasal anatomic anomalies, the treatment also included the anatomical correction (i.e., septoplasty and/or turbinoplasty).

The maxillofacial treatment varied in relation to the odontogenic origin; dental infections originating from the apex of a root protruding into the antral floor were treated with endodontic therapy of the infected tooth and apicectomy with the removal of the pathological periapical tissues. For the enucleation of odontogenic cysts (radicular and dentigerous), a Caldwell-Luc approach was the treatment of choice. UMS developed due to the displacement into the sinus of foreign bodies (i.e., dental roots, endodontic material, and dental implant) required foreign-body removal, often achieved with a combined approach. Surgical approach for UMS due to MS bone grafting or sinus lift procedure required grafting material removal, the concomitant partial removal of the sinus membrane, and closure of residual oroantral communication. Finally, oroantral communications following dental extraction or removal of a dental implant, as well as chronic forms with oroantral fistula, required revision of the surgical site, which included freshening of the wound edges and/or excision of the fistulous tract, mobilizing and advancement of the pedicled buccal fat pad, and closure of the flap in two layers with resorbable sutures.

Follow-up consisted of ENT and/or maxillofacial evaluation for 8–12 months after surgery on average.

The research was conducted in compliance with the Helsinki Declaration (2008). It was performed retrospectively through a systematic hospital case file review and therefore did not affect patient care in any way. However, all participants were informed about the project during consequent visits and provided their participation consent.

**Results**

A total of 292 patients received a diagnosis of UMS; of these, 66 have been excluded due to a diagnosis of malignant disease or benign etiology (in particular, 42 antrochoanal polyps, 13 inverted papilloma, 1 ex-inverted papilloma carcinoma, 3 invasive mycosis, 2 lymphoma, 1 sinus adenocarcinoma, 1 adenoidocystic carcinoma, 1 poorly differentiated carcinoma, and 2 squamous carcinoma).

Therefore, a total of 226 patients have been included; 116 (51.33%) were males and 110 (48.67%) were females, and the mean age was 49.1 years.

The sample was divided into two categories, according to the above-mentioned criteria: (i) UMS of odontogenic origin (178 patients) and (ii) UMS due to sinonasal anatomic anomalies (48 patients).

**Unilateral maxillary sinusitis due to sinonasal anatomic anomalies**

Forty-eight patients (21.2%) affected by UMS due to sinonasal anatomic anomalies were identified. Twenty-one were males (43.8%) and 27 (56.2%) were females. Radiological images disclosed an involvement of the right MS in 25 patients (52.1%) and of the left in 23 (47.9%) patients. In 27 (56.3%) patients, there also was an involvement of the adjacent paranasal sinus. Eighteen (37.5%) patients disclosed factitious sinusitis, reviewing the medical records, 42 (87.5%) patients declared nasosinusoidal symptoms such as unilateral obstruction, rhinorrhea with or without postnasal drip, and headache with pain at the nasosinusoidal trigger points; six patients did not declare nasosinusoidal symptoms, and UMS was found accidentally (one of these due to the occurrence of a meningitis). Symptoms at diagnosis and patients’ preoperative features have been reported in Table 1.

In 47 patients, a specific anatomic etiology was found, whereas in one case, UMS was due to trauma [Table 2].

Surgical treatment included uncinectomy, medial meatal antrostomy, and anterior and/or posterior ethmoidectomy when necessary, by means of nasal scopes (rigid 0°, 30°, and 45° endoscopes) and finally the correction of the anatomic cause. In some cases, histological examination was performed, disclosing nine hyperplastic polypoid sinusitis, one maxillary cyst, and one MS mucocele.

At the follow-up, there were no recurrences for this group.

**Unilateral maxillary sinusitis of odontogenic origin**

One hundred and seventy-eight (78.8%) patients affected by odontogenic sinusitis were identified; 95 were males (53.4%) and 83 were females (46.6%). In 47 patients (45.2%), there was an involvement of the right MS and of the left in 57 patients (54.8%). Reviewing the medical records,
117 (65.7%) patients declared nasosinusal symptoms, and 61 (34.3%) patients presented odontogenic symptoms (such as pyorrhea, swelling of the mouth vestibule, and toothache). Symptoms at diagnosis and patients’ preoperative features are reported in Table 3.

In case of UMS of odontogenic origin, infection due to dental extraction-related complications was the most common etiology (Table 4); the most affected teeth are shown in Table 5.

The preoperative nasal endoscopy, together with intraoperative findings, was shown purulent rhinorrhea in 56.3% of the cases and hyperplastic mucosa/polyposis in 24.2% of the cases.

Surgical treatment included a FESS often in combination with a maxillofacial approach. In particular, FESS only was performed in 22 patients (12.4%) and FESS with maxillofacial approach in 152 patients (85.4%); of these, 35 patients (19.7%) were treated by a Caldwell-Luc approach.

At the follow-up, we noticed four recurrences, registered after 5 months in one case, after 12 months in 2 cases, and after 24 months in the latter; these were all surgically treated.

**DISCUSSION**

UMS can be due to different pathologies, and as already reported, must be considered malignant until proven otherwise. Sometimes, clinical symptoms could already suggest the presence of a malignant etiology (i.e., persistent epistaxis, facial or cheek swelling, and cranial nerve involvement), while radiologically, the presence of bone erosion at CT scan is usually highly suspicious.

In the presented series, we retrospectively investigated 226 cases of UMS surgically treated, due to sinonasal anatomic anomalies or of odontogenic origin, the latter representing the greater group. These data are similar to that of other previous studies, in which the incidence of odontogenic UMS is reported to range between 50% and 75%.

The average age of patients in our study was similar to that reported in the literature, while we noticed a slight male predominance.

Concerning the reported symptoms, 66% of the patients of our series declared sinonasal symptoms, whereas 34% of the patients declared dental symptoms, as reported in the literature. It is also interesting to notice that dental symptoms, such as pain or dental hypersensitivity, do not reliably predict an odontogenic etiology. Hence, rather
Furthermore, oroantral communications due to a dental extraction or due to the removal of a dental implant require revision of the surgical site. Primary closure is indicated and can generally be achieved by surgical techniques such as buccal advancement flaps, palatal island flaps, full- or split-thickness palatal pedicle flaps, or buccal fat pad pedicle flaps.

Most of our cases were treated by a combined maxillofacial and ENT approach (i.e., Caldwell-Luc). In 13% of cases, in which only nasal-sinus surgery was performed, subsequent dental treatment was recommended.

**Conclusion**

USD, and in particular UMS, is an increasingly common finding in the ENT and maxillofacial practice. Excluding malignant causes, USD can occur due to a number of benign identified etiology such as sinonasal anatomic anomalies or odontogenic disease, in particular, as in the presented series. Imaging and maxillofacial CT scans, in particular, are always recommended to define the USD etiology (in particular excluding a malignant origin) and to plan the surgical treatment, which could also include a combined maxillofacial and ENT approach, especially in case of odontogenic UMS, as in the presented series.

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**Conflicts of interest**

There are no conflicts of interest.

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