

# Trans-antral endoscopic assisted excision of odontogenic maxillary cyst

Mohammad Waheed El-Anwar<sup>1</sup>, Ismail Elnashar<sup>1</sup>, Atef Hussein<sup>1</sup>, and Ahmed Nofal<sup>1</sup>

<sup>1</sup>Zagazig University Faculty of Human Medicine

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## Abstract

Key points: \* Intraoral, sublabial, and transnasal endoscopic approaches are used to manage odontogenic maxillary cysts. \* Transnasal endoscopic approach includes inferior meatal antrostomy, middle meatal antrostomy, and endoscopic medial maxillectomy approach. \* Trans-antral endoscopic assisted excision of odontogenic maxillary cyst approach have the advantage of direct lesion access of the sublabial approach as well as the advantages of better illumination, magnification, and small access of endoscopic approach. \* The trans-antral endoscopic assisted approach co-morbidity seems to be the least comparing to the benefit of complete excision of the cyst within its entire wall in all the cases with minimal injury of the unaffected maxillary sinus mucosa as well as avoidance of injury of any nearby structure if there is defect in the sinus wall.

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- The trans-antral endoscopic assisted approach co-morbidity seems to be the least comparing to the benefit of complete excision of the cyst within its entire wall in all the cases with minimal injury of the unaffected maxillary sinus mucosa as well as avoidance of injury of any nearby structure if there is defect in the sinus wall.

## Introduction

Odontogenic cyst in the maxilla originates from the epithelial remains associated with odontogenesis<sup>1</sup>.

It is either developmental, Inflammatory, or Carcinoma arising in odontogenic cysts<sup>2</sup>. The most common type of odontogenic cysts is periapical (radicular) cysts (65%), followed by dentigerous cysts (24%) and odontogenic keratocysts (5%)<sup>3</sup>.

Many approaches are used to manage odontogenic maxillary cysts; intraoral, sublabial, or transnasal endoscopic approach. Each approach has its supremacy and pitfalls.

The aim of this study was to present our experience in management of maxillary cysts of dental origin by trans-antral endoscopic assisted approach. We discuss the feasibility, results, benefits, and complications of

excision of otontogenic maxillary cyst through a small sublabial incision then a small antral window followed by using 0 degree telescope and endoscopic instruments to completely remove the cyst.

## Patients and Methods

This is retrospective study of cases that were diagnosed as maxillary cysts of dental origin and operated in Otorhinolaryngology, Head and Neck surgery department of University Hospitals from January 2012 till to June 2018. The data included patients' demographic characteristics, indications, surgical information, and complications with follow up period ranging from 2 to 6 years.

The study was approved by institutional review board and informed written consent was signed by all patients.

Diagnosis depended on clinical examination, and computed tomography (CT) axial and coronal cuts of the maxillofacial area. Revision cases and patients who did not complete follow up were excluded from the study.

### Surgical technique:

Under general anesthesia while the patients were supine with head elevated a 2% lidocaine with 1:100,000 epinephrine was injected into the upper sublabial area on the affected side. A small incision about 2 cm, 3 mm above the gingivolabial sulcus was done. Careful dissection was done to expose the anterior wall of the maxillary antrum (avoid injury of the infraorbital nerve). The cutting drill was used to do a small window in the anterior wall of the maxillary sinus in the canine fossa. The 0 degree 4 mm telescope was used in the surgical opening of the maxillary antrum to explore the cyst within the maxillary sinus (figure 1). The endoscopic instruments (dissectors, curette, and forceps) were used to carefully dissection of the cyst with its content and its entire wall from its attachment. Sometimes there were erosions within the walls of the maxillary sinus, so careful dissection had been achieved with help of better illumination and magnification of the endoscope (figure 2). Throughout the procedure avoidance of injury of healthy unaffected maxillary sinus mucosa, complete removal of the entire cyst wall, and ensure hemostasis had been achieved.

In patients with dentigerous cyst (figure 3), the affected tooth was removed with the cyst in all cases while in radicular cyst patients the tooth is preserved. The covering maxillary mucoperiosteum and soft tissue was returned to their original site with wound closure by 3/0 vicryl sutures.

### Postoperative work up:

Patients were discharged after 24 hours. Swelling, cheek pain, nasal obstruction, hemorrhage, teeth loosening and facial parasthesia were evaluated 1 to 7 days after the operation. The patients were followed up weekly for a month then at 6 months intervals. Facial swelling was measured qualitatively 3 days after the surgery. Swelling was recorded as follows: mild (almost unnoticeable swelling in the infraorbital region), moderate (noticeable swelling in the infraorbital region), and heavy (significant swelling in the infraorbital region that extends to the periorbital region)<sup>4</sup>.

## Results

Thirty two patients; 18 males (56.25%) and 14 females (43.75%) were included with age range 12 to 43 years (mean= 25.6± 8.5). They were 14 developmental dentgerous cysts (43.75%) and 18 radicular cysts (56.25%); 20 on the left side (62.5%) and 12 on the right sides (37.5%) (table 1). The presenting symptom was slowly growing cheek swelling in all patients while only 6 patients (18.75%) complained also of facial pain and heaviness.

Complete cyst removal with its entire wall could be achieved in all cases without jeopardizing the maxillary sinus drainage through its natural ostium to the nasal cavity.

Recovery was event-less in all cases. Postoperative pain and facial swelling were mild in all cases and resolved within 7 days. Facial paresthesia, nasal obstruction, and hemorrhage were not detected. No tooth loss, infection or recurrence was reported throughout the follow up period that ranged between 2 and 6 years

(mean=  $4.7 \pm 1.2$ ). Throughout follow up period the teeth vitality was found sound, no nasal or paranasal persistence discharge, and normal nasal endoscopic examination.

In one patient (3%) with infected dentigerous cyst an oroantral fistula was reported 1 week postoperatively. It didn't close spontaneously and it closed primary after curettage of the bone.

## Discussion

Odontogenic maxillary cysts are managed surgically through intraoral, sublabial, or transnasal endoscopic (inferior meatal antrostomy<sup>1</sup>, middle meatal antrostomy<sup>5</sup>, or endoscopic medial maxillectomy<sup>6</sup>) approaches.

The intraoral approach by enucleation, curettage, marsupialization, and tooth extraction is usually associated with potential morbidity; oroantral fistula, chronic rhinosinusitis, reconstruction, dentition affection, teeth extraction, and high recurrence rate<sup>1</sup>.

The sublabial approach by Caldwell-Luc operation offers the advantage of wide operative field, but it is associated with co-morbidity; facial edema, cheek discomfort, dental pain, facial asymmetry, facial paresthesia, maxillary sinusitis, and partial loss of the anterior bony wall<sup>7</sup>.

The endoscopic inferior meatal antrostomy approach is done by resection of anterior edge of the inferior turbinate and opens the bony wall of the inferior meatus to observe the cyst wall which is partially or completely removed<sup>1</sup>.

In the study of Seno et al<sup>1</sup> who used the above approach the cyst wall was completely removed in only 61.5 % of cases and partially resected in 38.5 % of cases which is not only increase the incidence of recurrence rate but also make hazards if the cyst was neoplastic or have a neoplastic changes.

The endoscopic maxillary antrostomy approach is performed by removal of uncinat process and unattached portion of the maxillary cyst is delivered from the lateral and anterior aspect of the sinus then debulked by using microdebrider, curettes and non-cutting instruments. In order to access the inferior portion of the maxillary sinus, an endoscopic maxillary mega-antrostomy is performed<sup>5</sup>.

In the study of Jain and Goyal<sup>5</sup>, they used the above technique which did not offer complete removal of the cyst wall but only marsupialization that carries the hazard of recurrence or missing tissue in neoplastic cyst.

The endoscopic medial maxillectomy approach has been used to achieve complete cyst removal as described by Nakayama et al.<sup>6</sup> however it carries the risk of medial maxillectomy of nasolacrimal duct, orbit injury and empty nose syndrome.

In our trans-antral endoscopic assisted approach we combined the endoscopic advantages (better illumination, magnification, and small approach ) with sublabial approach (wide operative field), while avoiding their disadvantage; endoscopy (indirect approach, may affect the drainage and cilliary function of the sinus) , and sublabial approach by Caldwell-Luc operation (associated co-morbidity).

In this technique we got the advantage of; complete removal of all the cyst wall without any remnants so avoid any chance of recurrence and secure removal of any suspected neoplastic tissue, eschew injury of any nearby structures if there is erosion within the sinus wall, secure heamostasis, and identify and early management of oroantral fistula.

The World Health Organization classified keratocystic odontogenic tumour as a benign cystic neoplasm<sup>6</sup>. Malignant transformation within the dentigerous cysts has been reported<sup>8,9</sup>. Discrimination between keratocystic odontogenic tumors and radicular cysts before surgery is sometimes difficult<sup>10</sup>. All the above justifications beside risk of recurrence make the decision of complete removal of odontogenic cyst is crucial and marsupialization is not satisfactory.

The intraoral approach cannot offer complete removal of the cyst with its wall in all cases as well as it has more co-morbidity.

The inferior meatal antrostomy and wide maxillary antrostomy approaches cannot offer complete removal of the cyst with its entire wall in all cases as the anterior and lateral wall of the maxillary sinus are not feasible accessible endoscopically even with 70<sup>0</sup> telescope in all cases.

Although endoscopic medial maxillectomy approach can offer complete removal of the entire cyst wall however it is associated with much co-morbidity with incidence of injury the nearby structures.

The sublabial Caldwell-Luc operation offers direct access, but it needs more boney removal with no magnification and illumination endoscopic advantages.

Although the trans-antral endoscopic assisted approach was associated with some morbidity as temporary cheek edema, however, this edema was mild and resolved within one week. No permanent parasthesia, sinusitis or teeth loss was reported in our cases.

The trans-antral endoscopic assisted approach co-morbidity seems to be the least (small opening of the anterior maxillary wall) comparing to the benefit of complete excision of the cyst within its entire wall in all the cases with minimal injury of the unaffected maxillary sinus mucosa as well as avoidance of injury of any nearby structure if there is defect in the sinus wall.

## Conclusion

The trans-antral endoscopic assisted excision of odontogenic maxillary cyst approach have the advantage of direct lesion access of the sublabial approach as well as the advantages of better illumination, magnification, and small access of endoscopic approach.

## Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request

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### Figures ligand

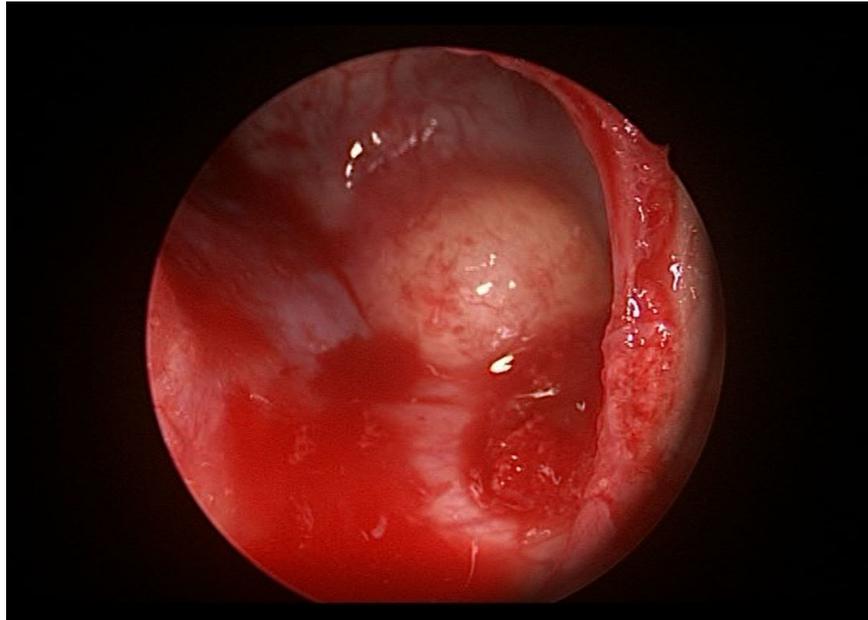
Figure 1: Tran-antral endoscopic view of odontogenic maxillary cyst.

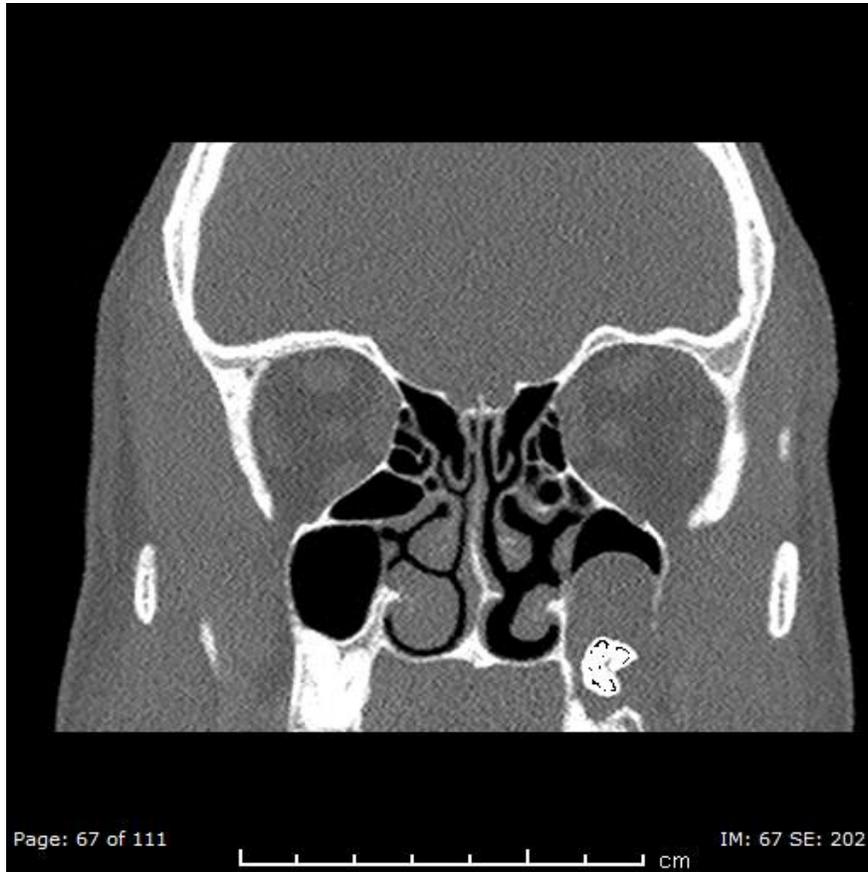
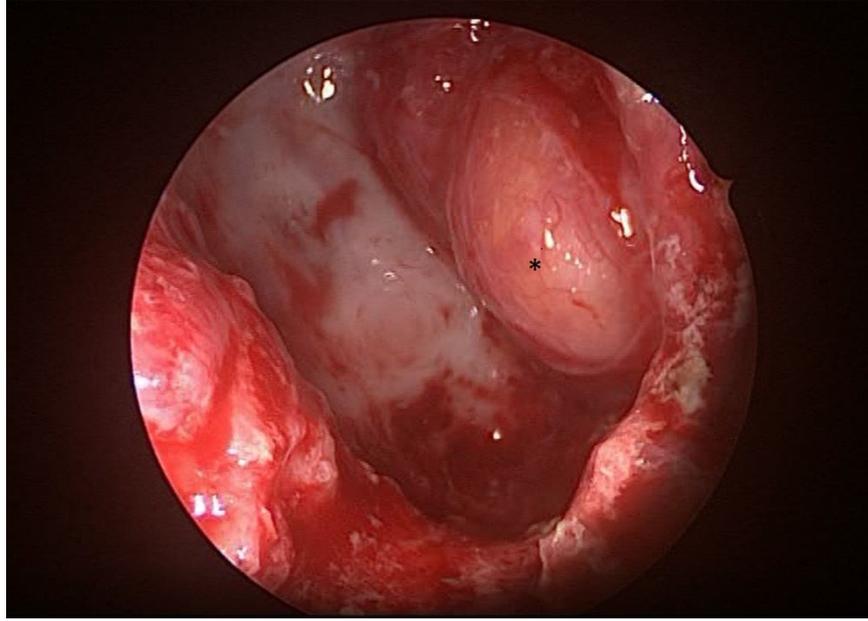
Figure 2: Tran-antral endoscopic view of maxillary sinus after removal or odontogenic maxillary cyst with exposed infratemporal fossa (\*).

Figure 3: CT scan of dentigerous cyst involving the maxillary sinus

Table 1: patients' data

Sex	Males	18(56.25%)
	Females	14(43.75%)
Age	Age	12 to 43 years
Side	Right	12(37.5%)
	Left	20 (62.5%)
Types	dental (radicular) cysts	18 (56.25%)
	Dentigerous cyst	14 (43.75%)





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