Calcified shell in the maxillary antrum: An interesting imaging characteristic of an antral cyst

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ABSTRACT

The proximity of the maxillary antrum to the maxillary alveolus and teeth leads to many antral lesions being diagnosed by an oral physician. Antral lesions may be intrinsic pathologies arising from the sinus mucosa itself or as a result of extrinsic odontogenic or non-odontogenic lesions arising from the maxillary alveolus or teeth. We present an interesting case of a 41-year-old lady with a maxillary swelling which clinically appeared as a maxillary cyst, radiologically as a calcified shell in the antrum and eventually the histology showed it was a maxillary antral cyst.

1. Introduction

Cysts are common antral lesions, and can be either intrinsic or extrinsic. Since there is a close proximity between the maxillary antrum and the maxillary teeth as well the alveolar ridge, very often such cystic lesions are incidentally imaged on dental radiographs.¹ Clinically such lesions cause swelling and even pain or paraesthesia but radiologically opacification of the sinus or the presence of dome shaped well-circumscribed radiolucency may be seen. Determination of the origin of such lesions is only possible on histologic evaluation. Mucous retention cysts and mucocoeles are the most common intrinsic cystic lesions while radicular or residual cysts, dentigerous cysts, odontogenic keratocysts are the most common odontogenic extrinsic cystic lesions.²

1.1. Case presentation

A 41-year-old hypertensive lady reported with a painful swelling on the right side of the face for 4 months. History also revealed that the swelling had progressively grown in size and she also had nasal fullness/stuffiness, mobility and pain in the maxillary posterior teeth on chewing food.

On clinical examination, a diffuse swelling was seen on the right side of the face, measuring about 4 × 3 cm in size, ovoid in shape and smooth surfaced. The borders were ill defined with mild tenderness elicited on palpation. The same swelling was seen in the right maxillary alveolus in relation to teeth 14–16, 2 × 3 cm in size, ovoid in shape,

extending antero-posteriorly from 14 to 16 obliterating the gingivo-buccal sulcus, hard in consistency and slightly tender on palpation. A clinical differential diagnosis of radicular cyst, dentigerous cyst, maxillary antral cyst and mucocoele of the maxillary sinus were considered.

Panoramic radiograph revealed a localized radiolucent lesion in the right maxillary antrum, borders well defined, ovoid in shape measuring about 5 × 3 cm in size, internal structure radiolucent with radiopaque border, with discontinuity in the floor of the maxillary sinus in 14–17 region. Contrast enhanced CT scan revealed an expansile cystic mass measuring 5x3x2 cm in size with an air-fluid level extending to the hard palate; erosion of the anterior maxillary sinus wall was seen in the right maxilla. Thin calcified bony shell encircling the cyst, remaining aerated sinus cavity and walls of the maxillary sinus with erosion of the antero-medial cortical sinus walls are seen (Fig. 1a–d). 3D reformatted images show perforation of the anterior wall of the maxillary antrum. Antral pseudocyst, surgical ciliated cyst, mucocoele of the maxillary sinus, unicystic ameloblastoma and odontogenic keratocyst were considered in the radiologic differential diagnosis (Fig. 1e).

Fine needle aspiration cytology revealed a purulent serosanguinous fluid suggestive of an infected cyst. The entire mass was surgically resected using transoral and endoscopic approach under local anaesthesia (Fig. 2a and b). Intraoperatively, the mass comprised of a bony hard-calcified wall lined by mucosa containing mucous (Fig. 2c). The bony cavity was filled with autologous platelet rich fibrin (PRF) for healing of the defect (Fig. 2d). Histopathologic examination showed pseudo stratified ciliated squamous epithelium along with mucin confirming the

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Fig. 1. Contrast enhanced CT scan coronal sections (a) and (b) revealed an expansile cystic mass measuring 5x3x2 cm in size with an air-fluid level extending to the hard palate; erosion of the anterior maxillary sinus wall was seen in the right maxilla. Sagittal section (c) and axial section (d) showing thin calcified bony shell encircling the cyst, remaining aerated sinus cavity and walls of the maxillary sinus with erosion of the antero-medial cortical sinus walls are seen. (e) 3D reformatted images show perforation of the anterior wall of the maxillary antrum.

Fig. 2. The bony defect in the maxilla following enucleation (a) and (b), the cystic mass (c) and placement of PRF membrane graft to close the defect (d).

Fig. 3. Histopathologic examination showed pseudo stratified ciliated squamous epithelium along with mucin confirming the diagnosis of maxillary antral cyst. (H&E stained section original magnification 10x).

diagnosis of maxillary antral cyst (Fig. 3). The patient was recalled after 3 months for follow-up and showed good healing, which was also shown on comparison of panoramic radiographs taken preoperatively and 3 months post-operative follow-up (see Fig. 4).

2. Discussion

Cysts of the maxillary antrum can be intrinsic arising from the maxillary sinus mucosa itself or extrinsic when the Schneiderian membrane is breached by lesions arising from elsewhere, especially the oral cavity. Since the antrum is anatomically close to the odontogenic region of the maxillary arch, determining the origin clinically or radiologically is quite challenging.^{1,2}

Our case had a localized, well-defined ovoid, unilocular, hypodense maxillary antral lesion with sclerotic margins which was mostly seen around the maxillary alveolus and filling the antrum. The portion of the lesion within the maxillary sinus was surrounded by a bony shell in addition to perforation of the anterior wall of the antrum. The radiological features are not pathognomonic and a differential diagnosis of both odontogenic and non-odontogenic lesions ought to be considered.

Many odontogenic lesions³ like radicular cyst, dentigerous cyst, odontogenic keratocyst, calcifying cystic odontogenic cyst and unicystic ameloblastomas. Radicular cyst is associated with a non-vital tooth, while a residual cyst is seen in the absence of a tooth, dentigerous cyst and unicystic ameloblastoma are associated with an impacted/unerupted tooth.² Calcifying epithelial odontogenic cyst is associated with calcifications in the internal structure of the lesion and odontogenic keratocyst is more common in the mandible, does not expand the cortex, may or may not be associated with an impacted/unerupted tooth.⁴

Many intrinsic antral lesions can be considered in the differential

Fig. 4. Panoramic radiograph showing the well defined radiolucent lesion in the right maxillary antrum (a) and healing after 3 months post-operative follow-up (b).

diagnoses of cysts which arise from the maxillary antral mucosa like pseudocysts, mucocoele, mucous retention cysts and surgical ciliated antral cysts.⁵ While antral polyps and retention cysts are generally asymptomatic and may present as haziness in the antrum following incidental radiologic examination and are considered as a complication of inflammation of the antral mucosa like chronic sinusitis.⁶ Due to obstruction of mucous glands in the maxillary sinus or accumulation of fluid in the submucosa, there can be formation of mucous or serous retention cysts. On multiplanar images retention cysts appear as smooth, well defined convex soft tissue masses.⁷

3. Conclusion

A case of a cystic lesion in the maxillary antrum enclosed within a calcified bony shell has been presented, which is an unusual presentation of an antral cyst.⁸ We can follow a simple guideline for radiologic diagnosis: if the superior border of any cystic lesion is the inferior wall of the maxillary antrum then lesion is mostly of extrinsic origin, possibly odontogenic but when the lesion is above the floor of the antrum it is more likely to be an intrinsic sinus pathology like a pseudocyst, retention cyst, pseudocoele or a surgical maxillary cyst.

Human rights statements and informed consent

'All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later versions. Informed consent was obtained from the patient for being included in the case report.

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Animal rights statements

'This article does not contain any studies with human or animal subjects performed by any of the authors.'

Declaration of competing interest

All authors, Author Satya Ranjan Misra, Author Neeta Mohanty declare that they have **no** conflict of interest.

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