Paranasal sinus opacification: Imaging patterns in tumours and histological correlation.

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Learning objectives

- To make the reader familiar with the salient imaging characteristics of common benign and malignant tumors of paranasal sinus.
- To emphasize the imaging modalities, protocols and sequences necessary for appropriate characterization of these tumors.
- To delineate the characteristic histopathological findings mandatory for differentiation of indeterminate tumors on imaging.
Background

- Sinusitis and sinonasal polyposis comprise the vast majority of cases with paranasal sinus opacification on routine radiological imaging of head and neck in comparison to sinonasal tumors although they may present quite similarly with nasal blockage, lacrimation, and epistaxis. As a result many of these tumors are advanced at presentation with poor prognostic outcome [1,2].

- Even if imaging is performed in the early stages, a radiologist inexperienced with sinonasal anatomy and tumour features may easily interpret early signs of a malignant tumor as rhinosinusitis or a lesion that does not require follow-up.

- Endoscopic examination is complementary to imaging and mandatory in order to reveal early stage tumors however routine histopathological examination of all the endoscopic samples is discouraged [3].

- Sinonasal tumors comprise only 3% of head and neck tumors and can be benign or malignant. Malignant tumors can be of epithelial (carcinomas) or mesenchymal (sarcomas) origin. Epithelial tumors are the most common and originate from the epithelial lining, accessory salivary glands, neuroendocrine tissue and olfactory epithelium. Mesenchymal tumors derive from the supporting tissue.
Findings and procedure details

- We present the imaging features of some of the cases of paranasal sinus tumors from a case series comprising of 35 cases imaged over a period of 4 years in a tertiary centre.
- All of them underwent a CT scan of paranasal sinuses while some of them also had additional contrast enhanced CT and MRI for further assessment.
- All cases were correlated with histopathology. Of the 35 cases, 20 were benign tumors, 7 were malignant tumors and the rest comprised of antrochoanal polyp (2), sinonasal polyposis (5) and indeterminate granulomatosis (1). Inverted papilloma (5), fibrous dysplasia (4) and osteoma (4) were the common benign tumors in our case series whereas sinonasal carcinoma (2) was the most common malignant tumor. Neurogenic tumors (3), aneurysmal bone cyst (1), juvenile nasopharyngeal angiofibroma (3), chondrogenic osteosarcoma (1), lymphoma (1), neuroendocrine tumor (1), solitary intramedullary plasmacytoma (1) and metastatic deposit(1), were the other lesions we encountered.
- CT is the best modality to evaluate bony changes such as cortical erosion, destruction, remodelling, sclerosis and thickening of bone. Reconstruction with both a bone and soft tissue algorithm, slice thickness of 1 mm, reformatting in three planes and post contrast imaging are important for optimal evaluation of tumor extent.
- The basic MR protocol in imaging sinonasal tumors is unenhanced T1 and T2, post contrast T1 with fat saturation in order to characterize the soft tissue components of the tumour and to evaluate the extent of tumour invasion beyond the bony sinus walls. DWI is valuable in differentiating recurrent tumor from surrounding edema. MR is superior to CT with regard to orbital, dural invasion and perinural spread.
- $^{18}$F fluoro deoxyglucose (FDG)-positron emission tomography (PET)/CT imaging is not recommended for routine diagnosis and staging of head and neck cancer in most guidelines\[4\], however, it has been shown to be useful for imaging of residual and recurrent tumor\[5\], in monitoring treatment response\[4\], to measure tumour volume \[6\], and to select patients who may benefit from oxygenation modifying treatments\[6\].

BENIGN TUMORS:

OSTEOMA:

Os Osteomas are the most common benign sinonasal tumor and are usually incidental findings at paranasal sinus CT. The frontal sinus bone is the most common location,
followed by the ethmoid and maxillary sinus bone. At CT, osteomas may demonstrate both dense cortical bone and groundglass appearance [Fig. 1 (A,B)] and mimic fibrous dysplasia.

**FIBROUS DYSPLASIA:**

Craniofacial involvement may occur both as true craniofacial fibrous dysplasia, considered a form of monostotic fibrous dysplasia (despite multiple cranial bones being affected) or as part of polyostotic fibrous dysplasia. The radiological findings show three patterns: pagetoid, sclerotic and cystic; the pagetoid form [Fig.2 (A,B)], with bone expansion and mixed areas of sclerosis and cystic areas, is the most common. CT usually shows a characteristic ground glass pattern but on MR imaging the metabolically active fibrous tissue may enhance markedly at contrast-enhanced T1 and therefore can be misinterpreted as a malignant tumor.

**INVERTED PAPILLOMA:**

Inverted papillomas (IP) are the second most common benign sinonasal tumor; however they are still rare, accounting for only 0.5-4.0% of primary sinonasal tumors. Unlike nasal polyps, IPs are almost always unilateral lesions, and a common CT feature is advanced unilateral ethmomaxillary sinus opacification that remodels or demineralizes the bone and with medial bulging into the nasal septum.

The site of origin of an IP may be detected as focal hyperostosis on the sinus wall at CT (Fig. 3E,F). Follow-up MR imaging demonstrates the characteristic mucosal infoldings, described as a "convoluted cerebriform pattern" on both T2 and contrast-enhanced T1 sequences, differentiating tumor from the surrounding mucus and thickened mucosal lining.

**INVERTED PAPILLOMA WITH SINONASAL CARCINOMA:**

Sinonasal carcinoma may arise in IPs; it is more prevalent in males, non-keratinising squamous cell carcinoma is the most common (10%) histological variety and tumors originating in frontal sinus or frontal recess are most frequently associated. Malignant degeneration of IP and smoking are associated with increased risk of recurrence after surgical resection.

**JUVENILE NASOPHARYNGEAL ANGIOFIBROMA:**
Juvenile nasopharyngeal angiofibroma (JNA) is a benign, but locally aggressive tumor and arising from testosterone-sensitive cells at the pterygoid plates in the pterygopalatine fossa and therefore these tumors are only seen in adolescence males. From its origin in the pterygopalatine fossa, the tumors grows in all directions, medially through the sphenopalatine foramen into the nasal cavity, laterally through the pterygomaxillary fissure, and cranially to the inferior orbital fissure into the orbital apex and then continues through the superior orbital fissure and into the middle cranial fossa. The characteristic imaging pattern at CT is broadening of the pterygopalatine fossa [Fig. 5 (B,E)] with enlargement of the sphenopalatine foramen medially and the vidian canal posteriorly [Fig. 5 (E)]. At MR imaging, due to the high vascularity, the tumor shows typical flow voids and intense enhancement on T1 after gadolinium injection.

**SCHWANNOMA:**

Sinonasal schwannomas are benign, usually solitary, slow-growing nerve sheath tumors. Although rare, they should be considered in the differential diagnoses. The lesion most commonly arises in the ethmoid and maxillary sinuses, with two cases having been reported in the sphenoid sinus. There are no reported cases of frontal sinus schwannoma. They can arise both from the ophthalmic or maxillary branches of the trigeminal nerve, fila olfactoria beyond the level of olfactory bulb or from autonomic nerves.

At CT, schwannomas are sharply delineated expansile lesions that remodel bone. If large, they can invade vital structures. At MR imaging, they have high signal intensity at T2 and at T1 they are isointense to muscle with a low-signal capsule. After intravenous contrast medium, strong homogeneous enhancement is usually seen [Fig. 6 (B,C,D)]

**ANEURYSMAL BONE CYST:**

Aneurysmal bone cyst may be seen in the maxilla, ethmoid, sphenoid bone and periorbital region. It appears as an expansile, multi-locular "soap bubble" (honey comb) radiolucency, causing expansion of the bony cortex. MR imaging commonly shows cystic spaces with internal septa and septal contrast enhancement. Fluid-fluid levels [Fig-7 (A,B)] of varying intensities is characteristic but should not be considered diagnostic, as this finding might be present in giant cell tumor, telangiectatic osteosarcoma, and chondroblastoma.

**AMELOBLASTOMA:**

Ameloblastomas are locally aggressive benign odontogenic tumors that arise from the mandible, or, less commonly, from the maxilla. They are expansile, radiolucent uni or multilocular with characteristic soap bubble appearance at panoramic radiography or CT. AT MRI they demonstrate a mixed solid and cystic pattern [Fig.8 (A,B)] , with a thick irregular wall, often with vividly enhancing solid components [Fig.8 D]
MALIGNANT TUMORS:

SINONASAL CARCINOMA:

Squamous cell carcinoma is the most common malignant sinonasal tumour (80%), followed by adenocarcinoma and undifferentiated type. Squamous cell carcinomas most often originate from the maxillary sinuses and demonstrate low signal intensity at T2. Intestinal and low grade non-intestinal type adenocarcinomas have a higher tendency to affect ethmoid sinus and nasal cavity, whilst high grade non-intestinal type adenocarcinomas more frequently affect the maxillary sinuses. Undifferentiated sinonasal carcinomas also most frequently arise from the ethmoid sinus and superior nasal cavity.

These tumors are usually large at presentation with aggressive bone destruction [Fig. 9 (C,F)], isointense on T1, variable signal intensity at T2 and show heterogeneous contrast enhancement on post contrast T1 images.

CHONDROSARCOMA:

Chondrosarcoma is the most common sarcoma affecting the paranasal sinuses. At CT, the tumour is seen as a multilobulated, heterogeneous lesion consisting of a chondroid matrix with peripheral and scattered central calcifications. Using MR imaging, the high water content of the chondroid matrix presents with high signal on T2 [Fig. 11(b)] and low signal on T1; calcifications of the chondroid matrix cause signal voids at all sequences. The intra-tumoral septum shows low signal at both T1 and T2 with heterogeneous pattern at post contrast study due to septal enhancement, but the avascular chondroid matrix is unchanged [Fig. 11(c)].

CHONDROGENIC OSTEOSARCOMA:

Fewer than 10% of osteosarcomas arise in the craniofacial bones with most such tumors developing in the mandible and maxilla, osteosarcoma arising from sphenoid sinus is very rare. Most commonly they involve medullary cavity rather than bone surface. Chondrogenic osteosarcoma is a histological subgroup characterized by immature chondroid tissue with lacy osteoid matrix. On CT, most often there is lytic bone destruction with soft tissue infiltration and mineralization of osteoid matrix [Fig. 12A], rarely the bone margin may remain intact (low grade), may show sclerosis (osteogenic) or sunburst (radiating mineralized tumor spicules pattern). On MRI, they are of low to intermediate signal on T1W and high signal on T2W [Fig-12B] images with variable contrast enhancement [ Fig.12 (D,E)].
LYMPHOMA:

Lymphomas in the sinonasal cavities have worse outcome than lymphomas in other regions. Lymphomas can be classified into Hodgkin and non-Hodgkin's type, the latter again subclassified by the group of dominating cells into B, T, NK cell lymphoma. B-cell lymphomas are most common in the maxillary sinus and have a better prognosis than T-cell lymphomas, which more often originate from the nasal septum. Lymphomas may present as chronic indolent tumor mimicking invasive fungal sinusitis.

At CT and MR imaging, lymphomas can present with diffuse tumour infiltration along the walls of the nasal cavity or as large bulky masses on both sides of the sinus wall, with remodelling or erosion of the adjacent bone [Fig. 14(a-d)]. Lymphomas are isodense to muscle at CT, and at MR imaging, the signal is isointense to muscle on T1 and moderate to high on T2. Both at CT and MR imaging, the contrast enhancement of lymphomas can be variable and not discriminated from other malignancies, e.g. squamous cell carcinoma.

NEUROENDOCRINE TUMORS:

Olfactory neuroblastoma (esthesioneuroblastoma) is the the most differentiated histological phenotype of neuroendocrine tumors and, most commonly arises at the superior nasal fossa with bimodal age distribution. At CT and MR imaging ONB may present as a homogeneous, solitary nasal polyp that remodels rather than destroys the bone [Fig. 15( A-F)]. The MR signal is intermediate on both T1 and T2, and after intravenous contrast medium, there is intermediate to high enhancement of the tumour. Sinonasal neuroendocrine carcinoma (SNEC), sinonasal undifferentiated carcinoma (SNUC), and small cell undifferentiated carcinoma (SmCC)[Fig.16 ( A-E)] are the other aggressive phenotypes with bone erosion similar to that of squamous cell carcinoma, and the correct diagnosis can only be done by immunohistologic examination[15].

SOLITARY INTRAMEDULLARY PLASMACYTOMA:

Solitary intramedullary plasmacytoma occurs more commonly in the sphenoid sinus and the maxilla with male preponderance. It is a fairly well defined expansile lesion with contrast enhancement [Fig.17 ( A-E)]. It exhibits low signal intensity on T1-weighted images and high or mixed signal intensity on T2-weighted images with marked contrast enhancement that may simulate meningioma.

SALIVARY GLAND TUMORS:

Adenoid cystic carcinoma (ACC) is the most common salivary gland tumor with its origin usually in the maxillary or ethmoid sinuses. Low-grade ACC may present as an ethmoid
polyp that remodels bone and mimics a simple polyp [Fig. 18] at both CT and MR imaging; high-grade ACC may present as a large irregular mass with bone destruction and irregular density and signal at CT and MR imaging. ACC is well known for its predisposition to perinural spread along the cranial nerves that can proceed into the skull base which is best appreciated at contrast enhanced MR imaging.

MUCOSAL MALIGNANT MELANOMA:

MMM is an aggressive tumour with high rate of recurrence and most commonly arises from nasal septum. At CT, MMM can be seen as a polypoid lesion in the nasal cavity with bony remodelling or erosion [Fig.19 ( A,B)] and usually there is bright post contrast enhancement. At MR imaging, the lesion is homogeneous, and may demonstrate characteristic high T1 and low T2 signals due to presence of melanin and/or hemorrhage.

METASTASIS:

Metastasis is uncommon in paranasal sinus. Renal cell carcinoma is the most frequent tumor to metastasize to the paranasal sinuses whilst maxillary sinus is the most frequently involved. Metastasis may appear as a localized, well-defined radiolucent slow growing lesion, or it may be highly aggressive with cortical destruction [Fig.20 ( E,F)], osteoblastic in breast cancer or mixed lytic or sclerotic in patients with prostate cancer. They may exhibit low signal intensity on T1-weighted images, high signal intensity on T2-weighted images [Fig.20A] with heterogeneous post contrast enhancement [Fig.20 (C,D)].
**Fig. 1:** Axial (A) and coronal (B) CT demonstrate left ethmoid sinus osteoma (arrowhead) with dense peripheral cortical bone surrounding central groundglass density. There is also associated pansinusitis (*).

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**Fig. 2:** Axial (A) & (B) CT sections demonstrate fibrous dysplasia (pagetoid pattern) with expansion and ground glass density involving crista galli (white arrow), left frontal sinus and frontal bone (blue arrow), sphenoid sinus, greater and lesser wing of sphenoid
(green arrow) and ethmoid air cells (black arrow). Previous craniotomy defect is also noted in left frontal and squamous temporal bone (arrowhead).

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**Fig. 3:** Axial (A) and coronal (B) T1W MR images show inverted papilloma as heterogeneously hypointense in signal intensity (*) mass filling the left maxillary sinus. Axial (c) and coronal (D) T2W MR images demonstrate the characteristic convoluted cerebriform appearance (yellow arrow). This is extending into ipsilateral ethmoid sinus (blue arrow), nasal cavity through maxillary ostium (white arrow) and nasopharynx though left choana (black arrow). There is deviation of nasal septum (red arrow) to the right along with widening of the maxillary ostium. Focal osseous conical projection in coronal (E) and axial CT (F) from the postero-lateral wall of left maxillary sinus (green arrow) indicates the site of origin of the tumor.

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Fig. 4: Axial (A) and coronal (B) T2W MR images demonstrate inverted papilloma with convoluted cerebriform appearance (*) arising from postero-lateral wall (black arrow) of left maxillary sinus extending into left ethmoid sinus (blue arrow), left nasal cavity (green arrow) through enlarged maxillary ostium (red arrow) and nasopharynx through left choana (white arrow). Biopsy demonstrate inverted papilloma (white arrowhead) (C) with a focus of squamous cell carcinoma (black arrowhead) (D) within.

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**Fig. 5:** Axial pre contrast (A) and post contrast (B,C) CT demonstrate juvenile nasopharyngeal angiofibroma as an enhancing mass (black arrowhead) in the left pterygopalatine fossa with protrusion into ipsilateral pterygomaxillary fissure (black arrow) and extension into nasal cavity (*) through sphenopalatine foramen (green arrow). Coronal CT (D) demonstrates tumor extension through left pterygomaxillary fissure. Axial (E) CT is showing the left vidian canal which is widened with erosion of its infero-medial wall (black arrow). A normal right vidian canal is also seen (orange arrow). Biopsy (F) demonstrates presence of fibro-collagenous tissue.
Fig. 6: Axial pre contrast fat suppressed T1W (A); axial (B) and coronal (C) post contrast T1W MR images demonstrate brightly enhancing schwannoma involving the right maxillary sinus (*), bilateral ethmoid sinuses and nasal cavities, right sphenoid sinus (red arrow) with extension into right orbit (yellow arrow) abutting the right medial rectus muscle. Post contrast T1W coronal (D) MR image shows an associated vestibular schwannoma (white arrow) with intracanalicular extension (blue arrow). Also noted a small convexity meningioma (black arrow) over the right frontal lobe at axial post contrast T1W MR image (E).
Fig. 7: Axial T2W (A,B) MR images show aneurysmal bone cyst as a cystic, expansile lesion with fluid levels (red arrow) involving bilateral frontal (blue arrow) and ethmoid sinuses (white arrow). There is associated diffuse thickening of surrounding bone (arrowhead).

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Fig. 8: Axial T2W (A) and T1W MR images demonstrate ameloblastoma in left maxillary sinus with central cystic areas containing fluid levels and hemorrhage (yellow arrow). Axial pre contrast T2W (C) and post contrast T1W MR (D) images demonstrate peripheral solid enhancing component (*) which is extending through widened maxillary ostium into left nasal cavity (white arrow) and nasopharynx (black arrow) through the left choana. Thin circumferential non-enhancing mucosal thickening (green arrowhead) noted anterior to the enhancing component. Coronal CT (E) demonstrates diffuse thickening with sclerosis of postero-lateral wall (black arrowhead), irregular erosion (white arrowhead) and scalloping of the infero-medial wall and focal post-operative (Caldwel luc) defect (blue arrowhead) of anterior wall of left maxillary sinus. The left medial orbital wall and roof appears thinned out but intact (green arrow). On biopsy (F) there are small uniform cells (blue arrow) with abundant cement like (red arrow) material.

Fig. 9: Axial (A,C) and coronal pre contrast (D,F) ;axial (B) and coronal post contrast (E) CT sections demonstrate heterogeneously enhancing large squamous cell carcinoma arising from right maxillary sinus (*) infiltrating into right orbit (white arrow) encasing medial and inferior rectus muscles, extending into right nasal cavity and ethmoid sinus with erosion and destruction of hard palate (yellow arrow). There is also erosion of floor of right orbit and lamina papyracea (blue arrow), anterior and lateral walls of right maxillary sinus with infiltration in the infratemporal fossa (white arrowhead) and subcutaneous
tissue over premaxillary region (thin white arrow). The mass is abutting and deviating the nasal septum (red arrow) with areas of erosion within.

Fig. 10: (A) Coronal CT demonstrates ethmoid sinus adenocarcinoma with opacification of the left nasal cavity, anterior ethmoid sinus and frontal recess. The clue to a malignant process is the erosion of the lateral lamella (arrow). (b) Contrast-enhanced coronal CT shows an intracranial component (arrowheads) verified at (c) coronal contrast-enhanced T1-weighted MR imaging. There is no meningeal enhancement due to the dural barrier.

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Fig. 11: (a) Axial CT of a well-delineated chondrosarcoma of the right maxillary and ethmoid sinuses, and nasal cavity (arrowheads). (b) Axial T2-weighted MR imaging shows high signal of the chondroid matrix with sparse, low signal areas of septa and calcifications. (c) Contrast-enhanced T1-weighted MR imaging shows contrast uptake in the septa and low signal in the surrounding matrix.

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Fig. 12: Axial CT scan (A) showing chondrogenic osteosarcoma of sphenoid bone with erosion and destruction of left lateral wall (white arrowhead) of sphenoid sinus including clivus (black arrowhead) and left greater wing of sphenoid (white arrow) with dense lobulated calcification(\(^*\)). At axial T2W MR (B) image the tumor show heterogeneously hyper intense signal intensity. Pre contrast axial T1W fat suppressed (C),post contrast T1W axial (D) and coronal (E) MR images demonstrate bright heterogeneous enhancement (thick white arrow) of the tumor with infiltration into ipsilateral maxillary sinus, nasal cavity, cavernous sinus, medial temporal lobe, orbit and bilateral ethmoid sinuses. On biopsy (F) there is immature chondroid tissue (green arrow) with lacy osteoid (blue arrow) deposition.
Fig. 13: Axial T2W (A) and T1W fat suppressed (B) MR images show non-Hodgkin’s lymphoma as a heterogeneously iso-hypointense tumor involving the sphenoid sinus and posterior ethmoid air cells (white arrow) with bilateral cavernous sinus invasion. Axial (C) post contrast T1W MR image shows bright enhancement of the tumor with cavernous sinus thrombosis bilaterally (black arrow). Coronal post contrast T1W (D) MR image shows perinural extension through bilateral foramen ovale (green arrow). Sagittal post contrast T1W MR image (E) showing intracranial invasion to sella, the pituitary gland not separately visualized from the tumor (red arrow) with thin dural enhancement (yellow arrow). Axial CT section (F) showing irregular bone destruction and erosion of clivus (black arrowhead), planum sphenoidale and anterior clinoid process (white arrowhead) and posterior ethmoid sinus (white arrow).
**Fig. 14:** (a) Axial and (b) coronal CT demonstrate B cell lymphoma as advanced opacification of both maxillary sinuses (white arrowheads). At MR imaging, (c) axial T2 and (d) coronal T1 after gadolinium injection demonstrate a large, bulky tumour on both sides of the maxillary sinus walls. MR imaging shows that the medial part of the right maxillary sinus contains mucus (black arrowheads) and that the epicenter of the tumour masses (asterisk) is close to the lateral sinus wall, which is a common finding in sinonasal B-cell lymphomas.

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**Fig. 15:** (A) Axial CT demonstrates olfactory neuroblastoma as an expansile soft tissue mass remodeling the ethmoid bones (arrows). At MR imaging, (B) axial T2W shows a well-delineated tumor with homogeneous low signal (arrows) and surrounding high signal sinonasal fluid. (C) Axial T1W and (D) sagittal T1W images after intravenous gadolinium delineate the tumor (arrows) from the adjacent dark signal fluid-filled sphenoid sinus (asterisk). The sagittal image demonstrates the close relationship between the tumor and the ethmoid roof. (E) Axial diffusion-weighted imaging with $b = 1000$ and (F) ADC map shows the characteristic low diffusion signal intensities (arrows) of a malignant tumor.

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**Fig. 16:** Small cell carcinoma involving the right ethmoid sinus and nasal cavity (white arrow) is seen as an isointense mass at (A) axial T1W and iso-hyper intense signal intensity mass at (B) coronal T2W MR images. The tumor is sharply differentiated from the surrounding mucosal thickening (*). Coronal T2W MR image (C) demonstrate the tumor (white arrow) extending to sphenoid sinus and right parasellar region (red arrow). Axial (D), sagittal(E) and coronal (F) post contrast MR images demonstrate heterogeneous enhancement of the tumor (white arrow) with intracranial invasion (red arrow) and thin dural enhancement (green arrow).

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**Fig. 17:** Pre (A) and post contrast (B) fat suppressed axial T1W MR images show heterogeneously enhancing solitary intramedullary plasmacytoma filling the left maxillary sinus (white arrow) and extending to ipsilateral nasal cavity. The tumor is sharply demarcated from surrounding non enhancing mucosal thickening (*). DWI (C) and corresponding ADC (D) map showing diffusion restriction (white arrow). Axial (C) and (D) sections demonstrate areas of irregular erosion and thinning (black arrow) of anterior wall of left maxillary sinus.

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Fig. 18: Coronal CT of adenoid cystic carcinoma mimicking the features of a simple polyp filling the left nasal cavity (arrowheads) and slightly remodeling the bones.

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Fig. 19: (a) Coronal CT demonstrates advanced sinonasal opacification with erosion of the right olfactory fossa and lateral lamella (arrow) due to mucosal malignant melanoma. (b) Coronal CT after surgical treatment still shows bilateral advanced opacification and (c) coronal [18F]FDG-PET/CT confirmed residual or recurrent tumour in the right anterior ethmoid sinus (arrow). Notice also physiologic FDG uptake in the brain and in the lateral and inferior eye muscles.

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Fig. 20: Axial T2W MR (A) image demonstrates heterogeneously iso-hypertense metastatic deposit (white arrowhead) from follicular carcinoma of thyroid involving sphenoid and bilateral ethmoid sinuses. Pre contrast fat suppressed axial T1W (B), and post contrast fat suppressed axial (C) and coronal (D) T1W MR images show bright enhancement (black arrowhead) of the tumor. There is compression (blue arrow) of bilateral optic nerves at optic canal with thinning of left retro bulbar optic nerve (red arrow), infiltration of left anterior cavernous sinus (*), intracranial (white arrow) and left orbital (black arrow) extension with encasement of superior and medial rectus muscles. Coronal (E) and axial (F) CT sections show destruction of left lamina papyracea (black arrow), thinning and destruction of cribriform plate (white arrow), erosion of clivus (green arrow) and of left lateral wall of sphenoid sinus.

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Conclusion

- Sinonasal tumors often mimic sinusitis/sinusosal polyposis on imaging. Unusual bony destruction, dehiscence, scalloping or sclerosis on CT and altered signal on MRI should alert the radiologist to the presence of a sinonasal tumor.
- Although sometimes sinonasal tumors can be differentiated on the basis of imaging features alone histopathological examination is mandatory for definitive diagnosis.
- CT and MRI with or without FDG-PET examination thus play an important role in early detection of neoplastic lesions and their staging resulting in improved outcome.
References


