Nasal Polyposis with Osseous Metaplasia: A Case Report

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INTRODUCTION

Osseous metaplasia, the conversion of adult soft tissue into normal bone tissue, has been described in many places in the body, but is rare in the head and neck, particularly in nasal polyps. This poster outlines a case of a 57-year-old female presenting with unilateral nasal obstruction who was found to have sinonasal polyposis with fragments of osseous metaplasia. It summarizes distinctive features in presentation, imaging, and histopathologic examination to add to the existing literature on osseous metaplasia of nasal polyps.

CASE

A 57-year-old female patient presented with unilateral facial pressure and pain after completing a 7-day course of doxycycline prescribed from an outside source for presumed acute bacterial sinusitis. She had no history of previous nasal disease or surgery. Physical examination, including nasal endoscopy, revealed severe right-sided nasal polyps obstructing visualization of the right middle meatus. Of note, there was no significant pathology discovered on examination of the left-sided nasal cavity.

Subsequent Computed Tomography (CT) of the paranasal sinuses exhibited complete opacification of the right frontal sinus and frontoethmoidal recess, complete opacification of the right maxillary sinus with areas of hyperdensity, and opacification of the right anterior and middle ethmoidal air cells with heterogeneous material. It also revealed opacification of the right ostiomeatal complex with soft tissue fullness in the right nasal cavity and right middle meatus. Endoscopic surgery was performed with removal of all pathologic tissue without perioperative complications. Histopathologic examination revealed fragments of sinonasal mucosa with chronic sinusitis and features of sinonasal mucosal polyp with osseous metaplasia.

DISCUSSION

Metaplasia is the transformation of one differentiated cell type into another cell type of different lineage that is not normally present in a specific tissue. Abnormal environmental stimuli can trigger or accelerate metaplasia, as is the case with gastric acid in the setting of esophageal metaplasia in Barrett's esophagus. Osseous metaplasia specifically refers to the formation of normal bone tissue in soft tissue. Ossification has been described in gastrointestinal and uterine polyps often but is much less understood in the sinonasal mucosa.

One thought is that the disease originates from a previous sinonasal surgery with bony remnants left behind serving as a lead point for bony growth to arise from. This idea has been weakened by the fact that most patients in the literature with described osseous metaplasia of mucosal nasal polyps, including our patient, have not had a previous sinus procedure. Thus, the most accepted theory of the pathogenesis of osseous metaplasia is that mesenchymal pluripotent cells present in the tissue respond to an overexpression of bone morphogenetic proteins (BMPs) and transforming growth factor β-1 (TGF-β1) and differentiate into osteoblast progenitor cells. Osteogenic signaling then facilitates the secretion of osteoblasts and bone matrix. Finally, another possibility is that stromal cells dedifferentiate into pluripotential cells prior to transforming into osteoblast progenitor cells.

The differential diagnosis for sinonasal pathology presenting as clustered radiodensities on CT includes mainly hyperostosis, inverted papilloma, longstanding fungal sinusitis, and malignant sinonasal neoplasms. In contrast, sinonasal polyps typically appear hypodense of isodense on CT. Foci of increased attenuation on these CTs are usually due to inspissation or superimposed fungal sinusitis. Atypical CT findings can warrant an enhanced CT or MRI prior to surgical intervention. In our case, further imaging was not performed prior to endoscopic surgery. Histological analysis is required for definitive diagnosis of osseous metaplasia and will reveal stroma containing mature lamellar bone covered by respiratory epithelium.

It is important to highlight osseous metaplasia of nasal polyps is a benign condition. To the best of our knowledge, there have not been cases reported with recurrent disease following surgical removal of nasal polyps exhibiting osseous metaplasia.

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CONCLUSIONS

This case adds to the very limited existing literature on osseous metaplasia occurring in the sinonasal mucosa. This condition rarely occurs, but should be included in the differential diagnoses when clustered radiodensities are seen on CT imaging. Furthermore, as it is rarely diagnosed, the underlying pathophysiology of how this benign condition occurs is not well understood. This case highlights the need for further research into how nasal polyps undergo metaplastic ossification.

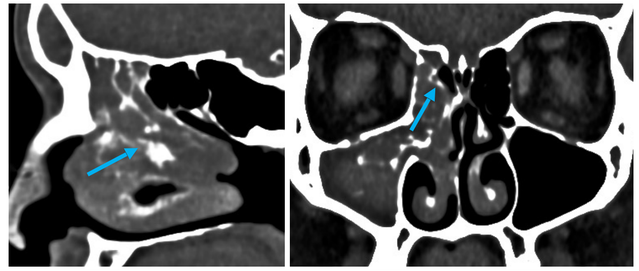

FIGURE 1

Sagittal (left) and coronal (right) computed tomography (CT) imaging showing osseous components (blue arrows) of polyps within the right maxillary and right ethmoidal sinuses.

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