CASE REPORT

Nasopharyngeal inflammatory pseudotumor mimicking nasopharyngeal malignancy: a case report

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ABSTRACT

Background: Inflammatory pseudotumor (IPT) is a benign idiopathic inflammatory condition. Clinically, it manifests as either a slow-growing tumor with little mass effect or progressively destructive mass that resembles malignancy. Here, we present a case of nasopharyngeal inflammatory pseudotumor mimicking nasopharyngeal malignancy.

Case presentation: A 70-year-old male patient complained of mild right otalgia with decreased hearing; there were no other otological symptoms or cranial nerve neuropathy. Computed tomography (CT) revealed a suspicious soft tissue density in the right fossa of Rosenmüller (pharyngeal recess), while magnetic resonance imaging (MRI) identified a diffuse and homogeneous lesion in the right fossa of Rosenmüller where T1 and T2 images were enhanced and hypointense, respectively. The patient underwent multiple right endonasal endoscopies for nasopharyngeal biopsy under general anesthesia, which showed benign nasopharyngeal tissue with chronic inflammatory cells and seromucous salivary inflammatory glands, without evidence of carcinoma or lymphoma. Consequently, he was administered corticosteroid therapy with good tolerability and response. There was no clinical or radiological evidence of recurrence after a 1-year follow-up.

Conclusion: Diagnosis of IPT is a challenge due to its malignancy-like characteristics. IPT involving the nasopharynx has characteristic MRI findings, which, together with clinical and laboratory presentations, help differentiate IPTs from malignant tumors, especially nasopharyngeal carcinoma. However, to confirm the diagnosis, a tissue biopsy is essential. Treatment of IPT of the skull base is controversial and may involve corticosteroids, radiation therapy, surgical excision, or multimodality depending on pathological subtype, ease and safety of resection, the safety of high-dose corticosteroid use, the surgeon's comfort, and the patient's preference. Other chemotherapeutic agents with or without radiotherapy may be considered in steroid-resistant patients.

Keywords: Inflammatory pseudotumor, magnetic resonance imaging, biopsy, corticosteroid, inflammatory myofibroblastic tumor fossa of Rosenmüller, chronic inflammatory cells nasopharynx and skull base

INTRODUCTION

Inflammatory pseudotumor (IPT) of the nasopharynx and skull base, also known as an inflammatory myofibroblastic tumor, is a benign idiopathic inflammatory condition characterized by a mixture of myofibroblastic spindle cell proliferation and inflammatory infiltration of plasma cells, eosinophils, histiocytes, and lymphocytes.[1,2] IPT was first described in 1973 by Bahadori and Liebow as a nonspecific and non-neoplastic inflammatory process without characteristic systemic causes.[3,4] Previous studies have aimed to define the causes of this etiologically enigmatic condition.[5] IPT is also known as plasma cell granuloma, inflammatory histiocytoma, and inflammatory fibrosarcoma, all of which occur in different locations in the human body (lungs, lymph nodes, trachea, spleen, mesentery, and skin.[2] IPT of the head and neck region most commonly occurs in the orbits, However, IPT occurring as a nasopharyngeal or skull base mass is very rare and usually originate as orbital extension disease, accounting for 5–8% of all orbital masses and 5% of all extrapulmonary cases.[1,3,4]

IPT histopathology appears as an infiltrate with inflammatory and fibrotic characteristics; however, clinically, it manifests either as a slowly progressing tumor with little mass effect or with the degradation of bone structures, resembling malignancy, which often leads to a delay in diagnosis and management.[1,6] Symptoms of IPT are nonspecific because of their various locations and it is clinically difficult to differentiate between IPT and malignancy.[7] Vision disturbances, otalgia, hearing loss, otorrhea, and headache are the most common symptoms of IPT occurring in the most common locations.[1,3] However, any case that resembles malignancy and reveals chronic or acute inflammation on repeated tissue biopsy should be considered as IPT.[8] Apart from the clinical presentation, blood tests, radiographic studies, and biopsies are important to confirm the diagnosis.[2] Large masses mimic malignant lesions in imaging studies; therefore, the role of the radiologist is to differentiate between malignant lesions and inflammatory pseudotumors either by the imaging findings or through imaging-guided biopsy. Tissue biopsy is required to confirm the diagnosis.[9,10]

Treatment of IPT is widely controversial and differs between cases according to multiple factors, its location, size, histopathology type, patient's age, and patient tolerability to corticosteroid. Corticosteroid treatment shows good results in orbital and sinonasal IPTs, whereas a combination of surgical excision, radiation, and steroid treatment has a greater effect on tumors of the temporal bone with bone destruction.[6]

CASE REPORT

A 70-year-old male patient with controlled hypertension presented to our facility with a history of right otitis media for eight months, with no improvement after myringotomy and aspiration performed by an otolaryngologist three

months previously. Aspiration had shown a thick and cloudy fluid in the ear, which on culture had revealed normal ear flora. There were no other otological or rhinological symptoms. On presentation to our department, he complained of mild right otalgia associated with decreased hearing. A systemic review revealed no other symptoms, and hearing in his left ear was within the normal range.

Physical examination revealed a right-sided middle ear effusion. The Weber test was lateralized to the right and the Rinne test was negative on the right, indicating a hearing loss in the right ear. The patient's right ear tympanogram was of type B and he showed a mild conductive hearing loss of 30 dB on audiogram; the contralateral ear was unremarkable. Examination of the nasopharynx using nasopharyngeal scope showed plugging in the fossa of Rosenmüller with an intact mucosal surface. The patient had no palpable neck lymphadenopathy or cranial nerve palsies.

Laboratory tests revealed elevated leucocytes 12.56 and high erythrocyte sedimentation rate (ESR) 54 mm/h and a high C reactive protein (CRP) level 11 mg/L, while all other tests were within normal limits (Table 1).

Computed tomography (CT) revealed that the right Rosenmüller fossa was filled with a soft tissue mass (Figure 1). The patient underwent a superficial biopsy of the right nasopharynx under general anesthesia at another hospital, which revealed normal nasopharyngeal tissue. Subsequently, he returned to our department to seek medical advice. The nasopharyngeal scope showed plugging in the fossa of Rosenmüller with an intact mucosal surface and normal other nasopharyngeal subunits (Figure 2). Magnetic resonance imaging (MRI) confirmed a diffuse and homogeneous mass on right Rosenmüller fossa (Figure 3). Consequently, a superficial biopsy under local anesthesia was performed (Figure 4), which showed normal mucosal epithelium. Furthermore, Positron emission tomography-CT was requested which, showed increased uptake involving the left lateral wall and fossa of Rosenmüller without cervical lymph node uptake (Figure 5). The patient was admitted with a suspected right nasopharyngeal neoplasia. He underwent deep right endonasal endoscopic nasopharynx biopsy and right myringotomy with a ventilation tube under general anesthesia. During the procedure, the nasopharyngeal and choanal mucoperiosteum was detached, enabling a slight mobilization of the tube. Granulomatous tissue was identified as just lateral and superior to the Eustachian tube. The frozen biopsy section tested negative for malignancy. Further deep multiple biopsies were performed for definitive histopathological evaluation. On two different occasions, the transnasal superficial biopsy was performed, which showed benign nasopharyngeal tissue. The deep biopsy confirmed the presence of chronic inflammatory cells and seromucous salivary inflammatory glands and squamous metaplasia and refuted the presence of carcinoma or lymphoma (Figure 6). Fungal stain and acid-fast stain tests were negative except for normal flora. Absolute diagnosis of IPT was made by exclusion. The patient was discharged on oral steroid therapy. He showed good tolerability and response, and his condition was stable, improved, and asymptomatic at the first postoperative follow-up and normal ESR at 3 months. There was no clinical or radiological evidence of recurrence after a 1-year follow-up. He is currently under outpatient supervision; a final MRI is planned after three years.

Table 1 Laboratory test results

Test	Results	Normal Range
WBC(/ µL)	12.65 x 10 ^{3}	3.70 – 9.70
NEUT (%)	70.5%	42.9 – 78.4
LYM (%)	16.7%	8.0 – 41.0
MONO (%)	8.2%	3.3 – 9.2
EOSI (%)	4.0%	0.3 – 6.2
BASO (%)	0.6%	0.3 – 1.3
NEUTRO (/ µL)	8.92 x 10 ^{3}	2.0 – 6.70
RBC (/ µL)	5.15 x 10 ^{6}	4.54 – 5.78
HGB (g/dL)	13.5	13.3 – 17.2
HCT (g/dL)	41%	38.9 – 50.9
MCV (fL)	79.6	81.2 – 94.0
MCH (pg)	26.2	27.1 – 32.5
MCHC (g/dl)	32.9	32.5 – 36.7
RDW-SD (fL)	36.1	39.9 – 52.2
RDW-CV (%)	12.6%	11.5 – 14.1
PLT (/µL)	409.00 10 ^3	179 - 373
MPV (fL)	9.4	9.1 – 12.0
P-LCR	20.8%	19.5 – 41.9
PDW (fL)	10.3	9.8 – 15.2
PCT (%)	0.39%	0.19 – 0.36
ESR (mm/h)	54	Men 04-20
CRP (mg/L)	11	< 1.0

Abbreviations: WBC: White blood cells; NEUT: neutrophils; LYM: Lymphocytes; MONO: Monocytes; EOSI: Eosinophils; BASO: basophils; RBC: Red Blood Cell; HGB: hemoglobin; HCT: hematocrit; MCV: mean corpuscular volume; MCH: mean corpuscular hemoglobin; MCHC: mean corpuscular hemoglobin concentration; RDW-SD: Red blood cell distribution width -standard deviation; RDW-CV: Red blood cell distribution width - coefficient of variation; PLT: platelet count; MPV: Mean platelet volume; P-LCR: platelets large cell ratio; PDW: Platelet Distribution Width; PCT: Plateletcrit; ESR: erythrocyte sedimentation rate; CRP: C-reactive protein

Figure legends

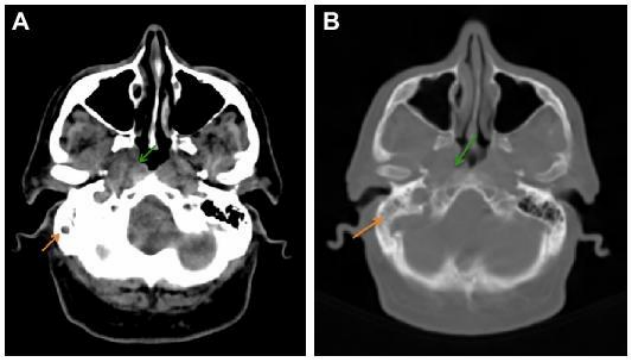

Figure 1 High-resolution computed tomography (CT) revealing a soft-tissue mass filling the right Eustachian tube

A: Soft-tissue window with contrast. Axial cut at the nasopharynx showing ill-defined enhanced mass at the level of right Rosenmüller fossa (green arrow) which appears to be larger compared to the contralateral side.
B: Bone window without contrast. The axial cut shows ill-defined mass at the level of right Rosenmüller fossa (green arrow). There is no obvious bone erosion. Mild opacification of the right mastoid air cell due to otitis media (orange arrow).

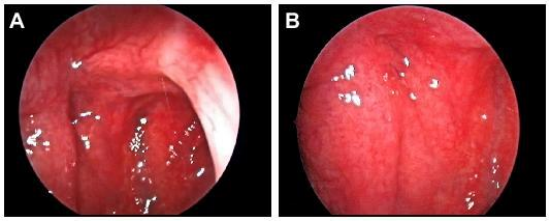

Figure 2 Nasopharyngeal scope showing right little plugging on fossa of Rosenmüller (pharyngeal recess) A, with an intact mucosal surface with normal other nasopharyngeal subunits B.

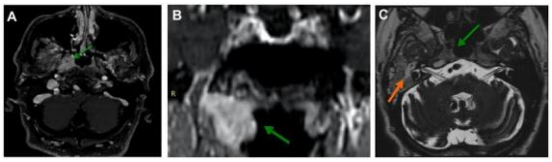

Figure 3 A, Postcontrast T1 axial & coronal magnetic resonance imaging (MRI) demonstrating an ill-defined enhancing lesion (green arrow) occupying the right nasopharyngeal wall B, Axial T2 MRI demonstrating minimal to mild mass effect, hypointensity, and moderate homogeneous enhancement after contrast administration. Intact nasopharyngeal mucosa with no lymphadenopathy. Fluid opacification of the right mastoid air cells owing to Eustachian tube obstruction (orange arrow) (3C)

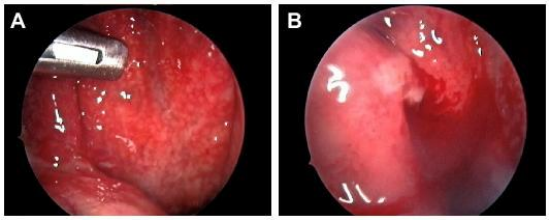

Figure 4 Nasopharyngeal scope showing right little plugging on right pharyngeal recess with intact mucosal surface A , punched superficial biopsy under local B with normal other nasopharyngeal subunits.

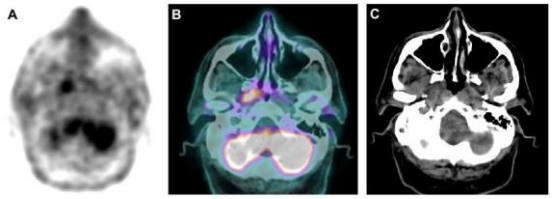

Figure 5 Axial PET/CT. A, B, C images show increased uptake involving the left lateral wall and fossa of Rosenmüller without cervical lymph node uptake). SUVmax: 6.7

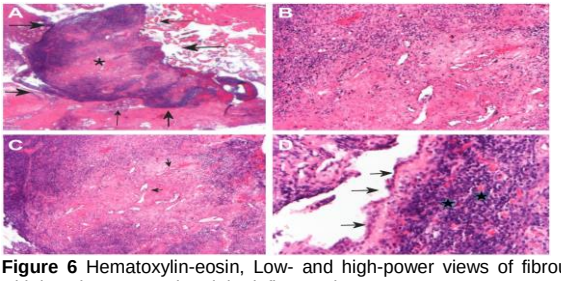

Figure 6 Hematoxylin-eosin, Low- and high-power views of fibrous tissue with lymphocytes and nodular inflammation.
A: Nodular area of inflammation (arrows) with fibrous center (starlet) the central part with fibrosis refers to scarring results of previous inflammation
B, C: show numerous polymorphous inflammatory cell infiltration with a significant reactive fibrovascular component. (mainly lymphocytes and plasma cells, some eosinophils)
D: The lining epithelium (arrows) is cubic, flattened, and has no atypia. Lymphocytes (starlets) are mature and not atypical which excluding lymphoma.

DISCUSSION

IPT is a diagnostic and therapeutic challenge that mainly affects patients in their fourth decade of life[1,4]. IPT of the neck and head are uncommon and mimic malignancy.[11] Malignant extranodal lymphoma is considered to be the most important as a differential, diagnosis.[11,12] Differentiating between IPT, malignancy, and lymphoma is difficult and important as they all have similar clinical and radiographical appearances.[2,8,13] Fever and weight loss are uncommon in skull IPT; however, these patients may experience headaches and/or cranial nerve palsies.[14] The presenting symptoms in our patient could have indicated a neoplasm or chronic infection.[9] A chronic unilateral otitis media with decease hearing and plugging in Rosenmüller fossa in old patients raised suspicion that the malignancy could be more than an infectious disease. A significant exclusion strategy for diagnosis of IPT includes MRI findings apart from clinical and lab tests. Helpful laboratory tests include ESR and CRP, which tend to be elevated in IPT. [1] Diagnosis of IPT should include the use of MRI and CT as both modalities provide important information that is vital to completely define the extent of IPT.[6,10] However, the imaging findings in malignancies and IPT are similar. However, MRI is more commonly used than CT in differentiating IPT from malignancies as it allows for better soft tissue definition.[1] CT generally shows bony erosion related to a mass-like lesion of IPT and frequently shows a soft-tissue mass with moderate enhancement.[14] In our patient, CT revealed that the right Rosenmüller fossa was filled with a soft tissue enhancement mass without bony erosions. In contrast, MRI showed that lesions were markedly enhanced with gadolinium due to their inflammatory nature. Therefore, IPT has an isointense signal on T1-weighted MRI, whereas T2-weighted MRI shows a hypointense signal due to the fibrotic nature of IPT.[10] This hypointense finding on T2-weighted MRI is important to distinguish between IPT and other primary malignancies including chordoma, chondrosarcoma, and invasion from nasopharyngeal carcinoma where T2-weighted MRI shows hyperintensity.[6,15] Although our imaging findings suggested a diagnosis of pseudotumor, they were not sufficient to confirm the diagnosis.[2,3] Tissue biopsy is necessary to confirm the diagnosis of pseudotumor and exclude inflammation, infection, and malignancy.[6,10] In contrast to IPT, tissue biopsies, and culture in cases of malignancy and infection would yield negative results, and the collected sample would show inflammatory changes.[8] In our patient, biopsy showed benign nasopharyngeal tissue with chronic inflammatory cells and seromucous salivary inflammatory glands. The deep biopsy confirmed the presence of chronic inflammation and squamous metaplasia, excluding the presence of carcinoma or lymphoma. Recent studies have shown that endoscopic skull surgery may contribute to improving diagnostic precision while decreases morbidity.[10] Treatment strategies of IPT are widely controversial and differs between cases according to its location, size, histopathology type, bone destruction, and patient tolerability to corticosteroid treatment. Previous studies have shown the effectiveness of therapy, such as high-dose corticosteroids, surgical excision, or radiotherapy, for

IPTs. [12] A literature review showed that radiotherapy is proposed for lymphoid-predominant lesions, whereas high-dose corticosteroids may be a better choice for granulomatous lesions. [12, 14] Desai et al mention in their review that corticosteroids are the first-line strategy to treat IPT.[1] Surgical intervention is another option. However, a study which reports that surgery appears to have a higher success rate than corticosteroids, also mentions that the latter is more commonly used, mainly because the skull base is a high risk for surgical access.[16] Combinations of surgical excision, radiation, and steroid treatment have a greater effect on tumors of the temporal bone tumor with bone destruction.[6] In our case, the patient had an inflammatory cell-predominant lesion without boney erosions that responded to corticosteroid with good tolerability. Prednisone at a dose of 1 mg per kg bodyweight daily for 2 weeks, followed by a tapering dose. Therefore, it is important to review the definitive pathology to avoid unnecessary surgery. Our patient's condition was stable, improved, and asymptomatic at the first postoperative follow-up, and there was no clinical or radiological evidence of recurrence after a 1-year follow-up. Desai *et al* mention that the usual follow-up period is 17 months and 37.3% of patients become asymptomatic during their first follow-up.[1,17]

CONCLUSION

The diagnosis of IPT is a challenge due to its malignancy-like characteristics. Otolaryngologists should include IPTs in the differential diagnosis of masses in the head and neck region. Exclusion strategy for diagnosis of IPT includes MRI findings which, apart from clinical and lab tests, are significant in excluding malignancy, particularly, nasopharyngeal carcinoma, and infection. This case study is the most complete examination of IPT of the sinonasal and ventral skull bases. MRI can help in diagnosis due to the characteristic T2 hypointensity found in IPT. However, to confirm the diagnosis of IPT, a tissue biopsy is essential. Therefore, it is very important to obtain adequate specimens for diagnosis. Finally, the treatment of IPT is widely controversial as it depends on many factors. Treatment options include corticosteroids, radiation therapy, and surgical excision, or a combination of them. The advances in endoscopic approaches to the skull base may contribute to improved diagnostic precision while minimizing the risks and morbidity of the procedure.

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Ethical Approval: The institutional review board of King Fahad Medical City (Riyadh, KSA; Tel: +96612889999, ext: 26913; email: okasule@kfmc.med.sa) waived the need for ethical approval on May 02, 2019 (IRB log number: 20-501E).

Consent for publication: Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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