Sinonasal Myospherulosis and Paraffin Retention Cysts Suggested by CT: Report of a Case

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Abstract Sinonasal myospherulosis is a foreign body reaction to lipid material used on nasal packing at the conclusion of paranasal sinus surgery. Rare cases have been sporadically reported. We report a case found in a 79-year-old female 8 months after functional endoscopic sinus surgery during which sinus cavities had been packed with gauze coated with Terra-Cortril (a paraffin-based tetracycline/steroid ointment). The preoperative diagnosis was suggested during CT of the paranasal sinuses by the presence of macroscopic paraffin retention cysts having a characteristic fat density. To our knowledge, our case represents the first report of sinonasal myospherulosis suggested by CT.

Keywords Myospherulosis · Paranasal sinuses · CT · Paraffinoma · Lipogranuloma

Case Report

A 79-year-old female presented with complaints of recurrent acute episodes of sinusitis and productive cough.

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CT (not illustrated) identified diffuse chronic sinusitis especially of the maxillary and sphenoidal cavities. Acute secretions were present in the cavities and the very chronic evolution had produced a thickening of the bony sinus walls.

The patient underwent functional endoscopic sinus surgery (FESS). At the end of the intervention, the sinus cavities were packed for 24 h with gauze coated with Terra-Cortril (a paraffin-based tetracycline/steroid ointment) to improve hemostasis and prevent postoperative infection.

The patient was reevaluated 8 months later for persistent recurrent episodes of sinusitis. She presented with rhinorrhea and with left hemifacial fullness. A new CT (Fig. 1) demonstrated the persistence of mucosal diffuse thickening and the presence of three well circumscribed macroscopic sinonasal (one in the left maxillary cavity and two in the ethmoids) cystic masses having a diameter of nearly 1 cm and a characteristic fat density. The fat density of these structures was comparable to that of subcutaneous or orbital fatty tissue.

The hypothesis of diffuse myospherulosis with macroscopic paraffin retention cysts (giant paraffinomas) was proposed and the patient underwent endoscopic surgery. Endoscopic opening (Fig. 2) of the retention cysts allowed the evacuation of an abundant mucoid brownish material constituted by paraffin and biopsies of the inflamed mucosa revealed a typical histologic “Swiss cheese” aspect which was characteristic of myospherulosis (Fig. 3).

Introduction

The nasal packing placed at the conclusion of sinus surgery to improve hemostasis and decrease the risk of synechiae is often coated with an antibiotic ointment to reduce the incidence of postoperative infection [1, 2]. Most of these

Fig. 1 Axial (a, b) and coronal (c) multiplanar reconstruction (MPR) CT views of the sinus cavities obtained 5 months after functional endoscopic sinus surgery (FESS). Persistent diffuse mucosal thickenings are found. Three well circumscribed and extremely hypodense intracavitary masses of about 1 cm in diameter are also demonstrated, one in the left maxillary cavity and two in the ethmoids (*white arrows*). The fatty density of these masses is comparable to that of fatty subcutaneous or orbital tissue. **d** Corresponding coronal MPR CT view obtained in the preoperative period

Fig. 2 Intraoperative endoscopic views. During surgical opening of the three different sites containing fatty nodules on the CT, a soft and mucoid *brownish* material is exteriorized from a right posterior ethmoid cavity (**a, b**) and from the left maxillary sinus (**c**)

ointments, which contain a lipid-based product (such as lanoline, petroleum, or paraffin) also allow for a less traumatic introduction or placement and removal from the nasal cavity. This packing is classically left for 24 h and, in rare cases, for only a few days. Terra-Cortril (a paraffin-based tetracycline/steroid ointment) is one of the products classically used. This ointment, which can infiltrate surgically disrupted mucosa, may trigger a foreign body reaction within the exposed stroma. The infiltration of histiocytes

around lipid-filled vacuoles produces the typical histologic findings of myospherulosis.

Myospherulosis (also known as spherulocytosis) represents thus a reactive and iatrogenic process caused by the interaction of red blood cells with petrolatum, lanolin, paraffin or with traumatized human tissue in the nose and paranasal sinuses [3].

We report a case diagnosed in a 79-year-old female 8 months after functional endoscopic sinus surgery during

Fig. 3 Histopathologic views. **A** fragment of sinonasal mucosa (**a**) appears infiltrated by numerous optically clear spaces (*white arrows*) corresponding to fatty inclusions (typical “Swiss cheese” pattern) (hematoxylin-eosin, magnification $\times 10$). **B** Characteristic appearance of a typical lipogranuloma (*white star*) constituted by a fatty vacuole surrounded by resorbing macrophages (hematoxylin-eosin, magnification $\times 40$). **C** Characteristic microscopic appearance of spheroid bodies of various sizes found in the *dark brown* material of soft consistency removed from the cavities (magnification $\times 100$)

which sinus cavities had been packed for 24 h with Terra-Cortril (a paraffin-based tetracycline/steroid ointment). The preoperative diagnosis was made during CT of the paranasal sinuses and was suggested by the presence of

macroscopic cysts with a diameter of nearly a centimeter and having a characteristic fat density. To our knowledge, our case represents the first report of sinonasal myospherulosis suggested by CT and confirmed by surgery and histology.

Discussion

Foreign body inclusion cysts that form secondary to petroleum-based ointments or lipogranuloma have been described in the literature of different specialties [1].

The reaction on lipids is similar and independent of the type of substance (paraffin, petroleum jelly, silicone oil, or other). Even the body’s own lipids, for example after a trauma, can induce a granuloma of a foreign body type. This lipophagic granuloma leads to an enzymatic lysis and is completely reabsorbed. Paraffin, however cannot be eliminated because of the lack of a specific lipase [4].

First, dermatologists discovered that paraffin- and petroleum-based ointments injected into the skin to treat rhytids often resulted in a granulomatous reaction. Thus, the use of these substances has been abandoned [5, 6]. Sclerosing lipogranuloma of the penis resulting from injection of high viscosity fluid for the purpose of penile augmentation have also been sporadically reported [7].

In ophthalmology, lipogranulomas have also been reported as a consequence of external dacryocystorhinostomy, a surgical procedure during which granuloma can develop from a reaction to the antibiotic ointment vehicle, classically a petroleum jelly-impregnated gauze placed intranasally [8]. A few cases have also been reported in which sclerosing lipogranuloma of the lids was caused by paraffin-containing ointment plugs of the lacrimal drainage system, by topical ointment application to the conjunctiva or by hydraulic oil injury of the lid skin [6].

Orbital lipogranulomas have also rarely occurred as a potential complication of sinus surgery [1, 6, 9, 10]. In patients in whom no ointment is placed, orbital lipogranuloma may spontaneously be the result of the association of an injury to the lamina papyracea and associated bleeding and hematoma of the orbital cavity secondarily causing necrosis of adipose tissue and accumulation of free extracellular fat. In other patients receiving sinonasal placement of petroleum-based gauze for control of bleeding, the ointment may be pushed in the neighboring soft tissues causing the formation of lipogranuloma. Lipogranulomas that are located in areas outside the orbit are much more rare. The most common area is along the dorsum of the nose.

The myospherulosis is historic and refers to histologic similarities with an African disease described in 1969 in which patients from Kenya had soft tissue lesions caused by foreign material from an injection or scarification.

These lesions were characterized histologically by cystic tissue spaces that contained small spherical bodies. Because of their morphologic characteristics and their location within skeletal muscle, the disease was termed myospherulosis [4, 11].

In reality, myospherulosis (more classically called lipogranuloma or paraffinoma) may occur at any site within soft tissue, bone, or subcutaneous areas associated with injections of petroleum-based hormones and penicillin and has been reported in the eye, upper eyelid, lower lip, tooth extraction site, brain, liver, oral cavity, breast and kidney [3]. As a common denominator, myospherulosis develops from an emulsion between erythrocytes and petroleum or lipid products [11, 12].

In otorhinolaryngology, the term was used in a report of 1977 [13] in which myospherulosis appeared confined to the nose, paranasal sinuses, and middle ear of patients who had undergone a Caldwell-Luc procedure. Their wounds had been packed with petroleum jelly-impregnated gauze associated with an antibiotic (usually tetracycline). The duration of nasal packing is not commonly detailed in the literature but in our practice it is currently maintained for 24 h and for only a few days in a minority of cases.

Rare cases of myospherulosis have more recently been reported after otologic surgery in which antibiotic ointments or petroleum-based gauze had been used in the postoperative mastoid space. Lin et al. [12] recently reported a patient in which CT of the mastoid found an extremely hypodense mass very similar to those presented in our observation. The CT diagnosis was correlated with MRI and the author concluded that T1, T2, and contrast-enhanced MRI can serve to narrow the radiologic differential diagnosis. In our case, the CT aspect appeared sufficiently specific. CT is the most commonly available imaging modality to investigate the sinonasal cavities in our country. Nevertheless, MRI could be reserved for ambiguous cases.

The typical histologic pattern of myospherulosis was described as the “Swiss cheese” appearance in a clinical and histologic study on granulomas after paraffin injections into the cheek for cosmetics reasons [4, 14]. A variety of other terms have also been used in the literature: lipid granuloma or lipogranuloma and paraffinoma or paraffin granuloma, oil granuloma, oleogranuloma, or ointment granuloma. The term sclerosing lipogranulomatosis is used when the entity is associated with a systemic disease, a situation not found in our patient in which the disease seemed to remain a local iatrogenic reaction [4, 14].

Several case reports describe patients who had sinonasal surgery and who subsequently developed severe recurrent symptoms postoperatively [11]. These included problems such as cosmetically deforming eyelid or nasal masses, nasal obstruction, discharge, epistaxis, swelling, headache, facial pain, and fullness. In each case, the etiology was initially

unclear and the only treatment reportedly effective was surgical removal of all spherules and the residual ointment.

Even though lipid-soluble ointments are used extensively for nasal packing, myospherulosis is still a fairly uncommon finding and factors that predispose to the development of the disease in patients are unknown [2, 11]. It is plausible that these patients represent a subset of “lipid sensitive” individuals who, in general, display a greater tendency toward inflammation and are more reactive than others on an immunologic basis [2].

Interesting findings were recently found in a retrospective review of a large series of 28 patients presenting with myospherulosis in a context of previous sinus surgery [2]. These patients were found to be almost three times as likely to have intraoperative adhesions identified at the time of revision sinus surgery as control subjects. The average time interval between the initial surgery and the subsequent revision operation was half as long for the myospherulosis group compared with control subjects, an observation suggesting the rapidity with which obstructing adhesions may develop in patients with myospherulosis.

In our reported case, the development of adhesions was probably the leading cause to explain the unusual development of macroscopic paraffin retention cysts in several sinus cavities. Due to their fat density content, these retention cysts—in association with histologic myospherulosis—were also the key allowing the suggested CT diagnosis.

It was also demonstrated that patients who underwent sinus surgery through an external approach tend to develop a more advanced stage of myospherulosis compared with patients who had an intranasal or endoscopic approach. The reason could be that an external approach results in a larger area of exposed submucosa and blood vessels for the lipid material to incite an inflammatory reaction.

Myospherulosis is thus an iatrogenic rare condition which seems preventable by avoiding the use of antibiotic ointments containing any lipid-based substances for post-surgical packing of the nose, paranasal sinuses, and related structures of the head and neck [2, 11, 12]. The avoidance of lipid-based ointment at the time of revision surgery would seem particularly prudent in patients for whom the diagnosis of myospherulosis has already been established.

Myospherulosis is treated by surgical removal of the foreign material and associated tissue.

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