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Case Report

Chronic rhinosinusitis unveiling a two decades ethmoid foreign body: A case report

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ABSTRACT

We report a case of a 50-year-old female who presented with rhinosinusitis-like symptoms, which she had been experiencing intermittently for over two decades. Her medical history revealed a nasal surgery performed approximately 22 years ago, after which she continued to experience unresolved symptoms despite multiple treatments. A Computed Tomography (CT) scan of the paranasal sinuses revealed findings with ethmoiditis, prompting the decision for endoscopic sinus surgery to address the underlying pathology. During surgery, a 3 cm gauze was discovered after opening the posterior ethmoid sinus. We highlight an unexpected foreign body inside the ethmoid sinus based on an unidentified picture from the CT scan, which we accidentally discovered during endoscopic surgery. This case underscores the importance of considering a retained foreign body as a potential cause of chronic rhinosinusitis, even many years after the initial surgical intervention. The unexpected identification of the gauze, which was not depicted in the preoperative CT scan, highlights the challenges in diagnosing retained foreign bodies within the complex anatomy of the sinuses. The report discusses the clinical presentation, diagnostic challenges, and management of this unusual case, contributing valuable insights to the literature on chronic rhinosinusitis and retained foreign bodies in the sinonasal region.

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INTRODUCTION

Foreign bodies in the paranasal sinuses are exceedingly rare, with iatrogenic causes accounting for many cases involving retained surgical materials. Most cases reported involve the maxillary sinus due to its anatomical accessibility and frequent involvement in trauma or surgical interventions, such as dental and otolaryngological procedures (Alrasheed et al., 2021; Preda & Sarafoleanu, 2021). The ethmoid sinus, being deeply located and surrounded by critical anatomical structures, is less commonly affected, making cases involving this region particularly notable. Despite advances in imaging techniques, diagnosing retained foreign bodies can be challenging due to their nonspecific clinical presentations, often mimicking chronic rhinosinusitis or recurrent infections (Kapoor, 2024).

Iatrogenic foreign bodies, such as retained surgical gauze, represent a preventable complication that underscores the importance of meticulous surgical practices and thorough postoperative evaluations. Delayed recognition of these retained materials can lead to prolonged morbidity, as they often present with chronic symptoms such as nasal discharge, facial pain, and olfactory disturbances, which are commonly mistaken for idiopathic sinusitis (Liu & Segura, 2020).

Computed tomography (CT) is the gold standard for imaging in such cases, offering detailed visualization of sinus anatomy and the potential presence of foreign bodies. However, as illustrated in this case, certain materials may evade detection, necessitating exploratory surgical approaches for definitive diagnosis and management (Preda & Sarafoleanu, 2021; Şahin et al., 2012). The following case highlights a rare instance of retained gauze in the ethmoid sinus discovered two decades post-surgery, emphasizing the need for heightened awareness and rigorous diagnostic protocols in managing chronic rhinosinusitis.

CASE REPORT

A 50-year-old female patient was referred to our clinic because she suffered a foul odor coming from the right side of her nose. She had been experiencing the condition for approximately six months, and it was getting worse every day. Its condition was accompanied by others, such as yellowish nasal discharge, post-nasal drip, and periorbital pain. She also suffered a nasal blockage on the left side. She revealed that she had undergone nasal surgery twenty-two years prior, but she received no information about the type of surgery. In fact, she constantly experienced the same symptoms as described above shortly after the surgery, yet they subsided when she received medication from an otorhinolaryngologist.

Anterior rhinoscopy revealed a nasal discharge from the middle meatus and a mucosal oedema, predominantly affecting the middle turbinate, in the right nostril. Moreover, The left nasal cavity exhibited an enlarged middle turbinate, extending toward the nasal floor

We chose a head CT scan focusing on the nose and paranasal sinuses to identify anatomical problems (picture 1). It highlighted ethmoiditis expanding to the sphenoid sinus in the right-side nasal cavity and the left-side bullous conchae.

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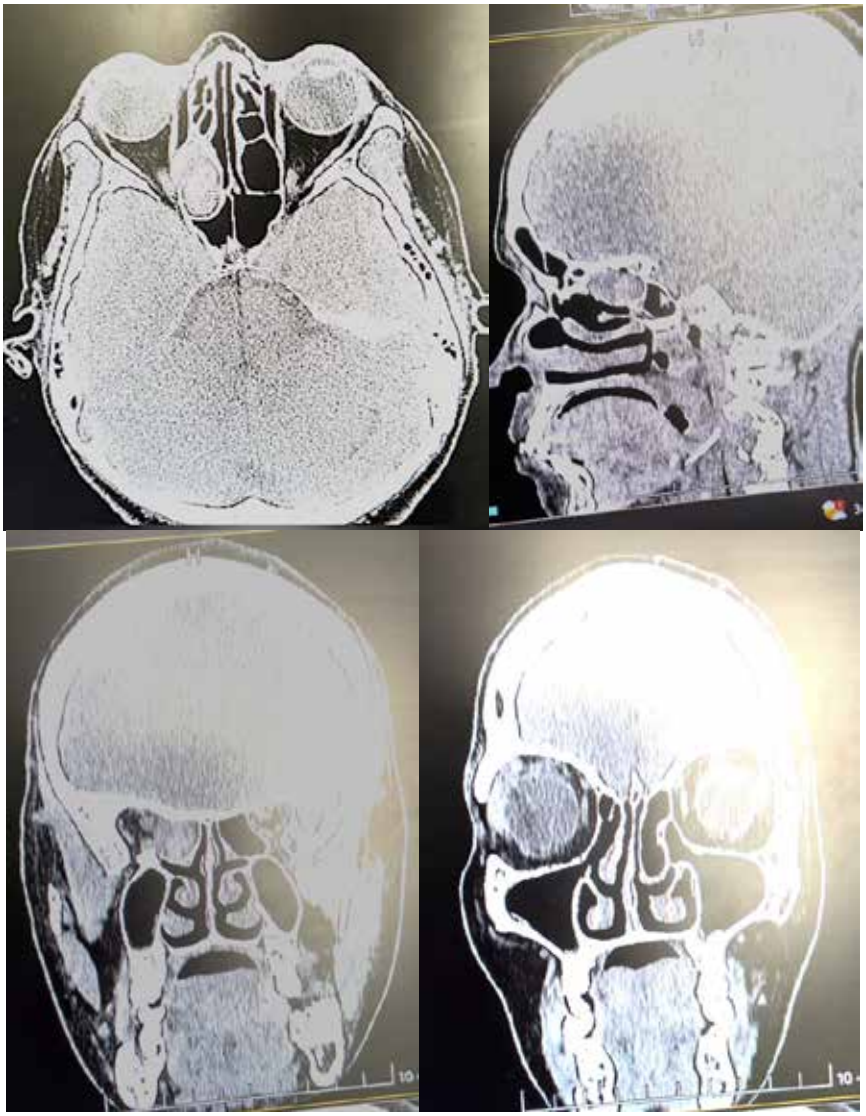

Figure 1. A CT scan of the sinus paranasal shows right-side ethmoiditis and left-side bullous concha

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Picture 2. A 3 cm gauze after evacuated from ethmoid sinus

Under general anesthesia, we carried out a posterior ethmoidectomy with sphenoidotomy. Upon removal of the anterior wall of the ethmoid sinus, we discovered a 3 cm gauze (picture 2) accompanied by a sudden outflow of foul-smelling pus. The gauze was carefully removed, and the sinus was thoroughly irrigated. Additionally, a left-sided middle conchoplasty was performed.

The patient has provided written informed consent to publish this case report and accompanying images. She understands that her identity will remain confidential, and every effort has been made to ensure her privacy. The authors confirm that all ethical guidelines have been followed and appropriate permissions obtained for using clinical data.

DISCUSSION

The ENT clinic frequently encounters patients with foreign bodies in the ear, nose, and throat, and these contribute to emergency cases in the otorhinolaryngology discipline. The ear was the most common site for foreign body impaction in the population, accounting for about 60 percent of cases. About twenty percent of instances occurred in the nose, and the remaining ten percent were due to throat occurrences (Adedeji et al., 2016; Bahranifad et al., 2022).

A paranasal sinus foreign body is classified as a nasal foreign body, and its incidence is extremely low compared to foreign bodies in the nasal cavity. Maxillary sinus foreign bodies contribute more than half of the cases; then, the frontal sinus, ethmoid sinus, and sphenoid sinus appeared to be equal. About 70% of cases result from maxillofacial trauma, with iatrogenic and other causes accounting for the remaining 30%. (Bazzout et al., 2021). Alrasheed et al. summarised several articles that reported the discovery of various materials, including pieces of glass, a ballpoint pen, multiple wood pieces, plastic pieces, and metallic foreign bodies. Some materials, including tooth implants, tooth roots, and surgical burs, were reported in the iatrogenic causes category (Alrasheed et al., 2021; Chemmanchery et al., 2023). Another case report declared gauze in the nasal cavity with a history of past nasal surgery due to nasal polyposis a decade ago (Chowdhary et al., 2020). Our case presents a gauze foreign body in the right posterior ethmoid sinus, which was presented as ethmoiditis with a proven history of nasal surgery, too. It is categorized as an iatrogenic cause due to the negligence shown

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during the surgery by the surgeon and their team beforehand.

Unlike the typical symptoms of a foreign body in the nasal cavity, the signs and symptoms of a foreign body in the paranasal sinus are ambiguous, often leading to physicians being unaware of the condition. Paranasal sinus foreign bodies with signs and symptoms of sinusitis are usually realized by doctors after at least 3 months. Sinusitis is a complication of a foreign nasal or paranasal sinus (Kramer & Manthei, 2024). Complications of foreign bodies in the paranasal sinuses can lead to clinical challenges extending beyond localized discomfort. These complications include chronic inflammation, which disrupts normal mucociliary clearance, impairing the sinus's ability to drain effectively and leading to persistent sinusitis(Kwok et al., 2020; Bazzout et al., 2021). In some cases, the presence of a foreign body can result in a cutaneous fistula, where an abnormal connection forms between the sinus and the skin, allowing pus or fluid to drain externally. Another rare but notable complication is the development of rhinoliths, calcified masses that form around the foreign object, exacerbating symptoms and complicating removal (Mahajan et al., 2019). Foreign bodies containing lead, such as bullets or other metal fragments, can even result in systemic complications like lead poisoning if left untreated. Finally, the prolonged presence of these objects often leads to chronic pain, further decreasing the patient's quality of life and making timely diagnosis and treatment essential to prevent long-term morbidity Manigandan et al., 2023). In our case, the patient had symptoms similar to rhinosinusitis, including yellowish nasal discharge, post-nasal drip, and pain around the eyes. There was also nasal discharge coming out of the middle meatus, and mucosal oedema was visible on examination of the right nasal cavity. This case is in line with the prior study, which found that the signs and symptoms are difficult to identify owing to their similarity to rhinosinusitis.

Diagnosing the ambiguous signs and symptoms of paranasal sinus foreign bodies can be challenging. A comprehensive examination and appropriate investigations should be carried out right away for patients with suspicion of a retained foreign body. To assess nasal mucosa and determine whether sinusitis is present, an endoscopic examination should be performed as soon as possible. To precisely diagnose and locate the foreign material, radiological examinations, such as computed tomography and paranasal sinus radiographs, should be performed (Nagpal et al., 2017; Preda & Sarafoleanu, 2021). Nowadays, a CT scan is the most effective modality for definitively diagnosing foreign bodies in the paranasal sinus. Compared to a plain X-ray, a CT scan is more able to identify a shape, size, and location appropriately, and it can visualize the difference among bone, soft tissue, and liquid via the Hounsfield Unit (HU) scale (Alrasheed et al., 2021; Shah et al., 2022). If it can be demonstrated that the foreign entity is made of non-metallic materials, such as wood, plastic, or glass, magnetic resonance imaging would be the preferred imaging method. Imaging would make it easier for the surgeon to determine the best surgical strategy and assess the foreign body's size, kind, and precise placement (Tilaveridis et al., 2022). In our case, a CT scan could not give a picture of a foreign body in the paranasal sinuses, but it showed right ethmoiditis expanding into the sphenoid sinus. The foreign body was found during the endoscopic sinus surgery after we dismantled the anterior wall of the posterior ethmoid sinus.

The evacuation of a foreign body from the nasal and paranasal sinuses is challenging for a physician to determine the proper approach due to the foreign body's location. The Caldwell-

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Luc (CWL) procedure has become a preferred method among physicians to remove foreign bodies from the maxillary sinus (Alrasheed et al., 2021). On the other hand, the most common method for removing a foreign body from the ethmoid or sphenoid sinuses is an endoscopic approach through the nasal cavity. Since the advent of transnasal endoscopic surgery in the 1980s, numerous reports have documented the successful removal of foreign bodies from adults. Dodson et al. reported a case involving a schizophrenic patient who inserted multiple objects through a molar extraction site, where endoscopic removal required enlarging a skull base defect to retrieve a foreign body that had penetrated the ethmoid roof (Gray et al., 2019; Kapoor, 2024). In our case, we performed a posterior ethmoidectomy and sphenoidotomy using endoscopy. After conducting that procedure, there was about 3 cm of gauze, and pus emerged abruptly with a foul odor.

The ethmoid sinuses are a complicated structure of paranasal sinuses encircled by significant anatomical features. When foreign bodies get inside of them, they cause harm to the surrounding tissues and serve as a breeding ground for infections. Thus they need to be removed even asymptomatic to prevent tissue reactions (Nagpal et al., 2017; Betul Basturk et al., 2019). Although the precise process by which a foreign substance causes sinusitis is still unknown, mucociliary insufficiency and secondary infections are thought to be mainly caused by the foreign body irritating the mucosa over an extended period, both physically and chemically (Shah et al., 2022). When foreign bodies are inserted into the body, a complicated biological reaction known as the foreign body response (FBR) occurs. A sequence of events that start right after implantation and may last for a long time is what defines this reaction. The body initially recognizes the implanted substance as a foreign object, which causes an immediate inflammatory reaction. The recruitment of immune cells, particularly macrophages, to the implantation site is part of this response. Macrophages have two roles in the FBR: they are necessary for removing infections and debris, but if they are not controlled appropriately, they may also lead to chronic inflammation (Liu & Segura, 2020). Sterile inflammation due to foreign body implantation is mediated and dominated by macrophage M2. In contrast, macrophages are polarised into M1 with the search-and-destroy characteristic and M2 with the fix-and-repair characteristic. M2 macrophage domination promotes wound healing by stimulating fibroblast differentiation and collagen deposition to form a fibrous capsule on a foreign body's surface. This condition is called a foreign body reaction that leads to impaired phagocytosis by M1 macrophages. It then allows microorganisms such as Staphylococcus aureus to infect the tissue. The infection triggers pus formation. It is formed by an inflammatory reaction due to bacterial infection and is also caused by neutrophil degradation (van der Veen & Thorne, 2017; Rosman, van Dijl, & Sjollema, 2022). In our case, the pus appeared in the middle meatus after dismantling the anterior wall of the ethmoid posterior cell.

Even in uncomplicated cases, diagnosing certain conditions of the foreign body in the paranasal sinus can be challenging for clinicians. It's crucial to identify the root causes behind chronic sinusitis symptoms, and in cases of unilateral nasal discharge, an intranasal foreign body should be suspected until proven otherwise (Bazzout et al, 2021). Lastly, this case also illustrates the importance of follow-up and patient education post-surgery, emphasizing the need to report persistent or recurrent symptoms early. It is important to ensure that patients understand the signs of potential complications

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postoperatively, and they can lead to earlier intervention and better outcomes.

CONCLUSION

Paranasal sinus foreign bodies are exceedingly rare, while sinusitis is a consequence of such an occurrence. The gold standard of diagnosis was a CT scan, which was agreed upon due to the indefinite signs and symptoms. While CT scanning is the gold standard for diagnosis, it may not always reveal the presence of a foreign body, as demonstrated in this case. It is imperative to evacuate the foreign body, and endoscopy is the preferred method, particularly for the ethmoid sinus foreign body. Endoscopic surgery is crucial in diagnosing and managing such cases, mainly when the foreign body is located in the ethmoid sinus. This case underscores the importance of considering foreign bodies in the differential diagnosis of chronic rhinosinusitis, even when the initial surgery occurred decades earlier.

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