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Missed intranasal wooden foreign bodies on computed tomography

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Abstract

We report a case of post traumatic impacted intranasal wooden foreign body in a 16 year old boy, which was undetected on Computed Tomography in the acute stage. Intranasal wooden foreign body may be missed on CT in the acute stage because of apparent air attenuation of the foreign body and lack of contrast with the surrounding intranasal air. Radiologists need to be aware of the CT imaging appearances of wood in various stages for early detection and management.

Key words: Intranasal; missed; retained; undetected; wooden foreign body

Introduction

A variety of foreign bodies like glass fragments, metal, and wood splinters can be retained in the nasal cavity and paranasal sinuses (PNS) following penetrating injuries of the facio-maxillary region.[1] Intranasal foreign bodies can be retained for years without significant symptoms. We report a case of retained intranasal wooden foreign bodies.

Case Report

A 16-year-old male met with a road traffic accident in which he suffered facial injuries. Computed tomography (CT) scan of PNS showed multiple facial fractures with retained nasal secretions and hematoma. The patient underwent intermaxillary fixation for the facial fractures and was discharged in a stable condition. He presented 8 months later with complaints of right nasal block and foul-smelling nasal discharge. Rigid nasal endoscopy showed medialized inferior turbinate with granulation tissue and adhesions in the right inferior meatus. A repeat CT scan [Figures 1a and b] showed three hyperdense cylindrical foreign bodies (white arrow) in the right inferior meatus, surrounded by hypodense secretions. On review of previous CT [Figure 1c and d], well-marginated cylindrical hypodense lesions [Hounsfield Units (HU) -272], which resembled air density, were noted in the right inferior meatus, surrounded by hypodense secretions (white arrow). On comparison, these corresponded to the hyperdense cylindrical foreign bodies noted in the recent scan. A provisional diagnosis of retained intranasal wooden foreign bodies was made. At surgery, three wooden pieces [Figure 1e] were found in the inferior meatus covered with granulation tissue, which were completely removed. Postoperatively, the patient reported significant resolution of his symptoms and is doing well on follow-up.

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Discussion

Retained nasal foreign bodies are an important cause for chronic unilateral mucopurulent nasal discharge. Inferior meatus and the region anterior to middle turbinate are the common sites for retained foreign bodies.[2] In the acute stage, swelling of the surrounding mucosa can result in impaction and non-visualization of the foreign body. Gradually, due to chronic inflammation, deposition of calcium, magnesium phosphate, and carbonate occurs, resulting in the formation of a rhinolith.[2] Complications associated with sinonasal foreign bodies include epistaxis, orbital cellulitis, and subperiosteal abscess.[2-4]

Figure 1 (A-E): A 16-year-old boy with chronic right-sided mucopurulent nasal discharge and history of facial trauma 8 months back. CT PNS axial and coronal images (A and B) reveal well-defined hyperdense cylindrical foreign bodies (arrow) in the right inferior meatus, surrounded by hypodense secretions. Previous CT PNS axial and coronal images (C and D) acquired after trauma reveal well-marginated cylindrical air attenuation lesions (arrow) at the same site. Surgical specimen (E) shows multiple wooden foreign bodies

Takasaki *et al*. have reported a case of chronic retention of multiple wooden toothpicks in an adult prisoner.[5] They concluded that CT may not adequately distinguish wood from surrounding soft tissues and recommended magnetic resonance imaging for detection of intranasal wooden foreign bodies.

Dry wood is mainly composed of air.[6,7] On CT, in the acute stage, it presents as low-attenuation linear or cylindrical focus surrounded by hypodense inflammatory soft tissue. In the chronic stage, due to mineral deposition, it becomes hyperdense. On MRI, in the acute stage, it appears as T1- and T2-hypointense cylindrical focus with surrounding T2-hyperintense inflammatory tissue.[5-7] In soft tissues and orbit, high contrast with surrounding skeletal muscle and fat helps in the detection of the wooden foreign bodies. In the nasal cavity, a wooden foreign body can be missed in the acute stage on CT due to lack of contrast with intranasal air. However, the presence of well-marginated geometrical shape to the apparent air attenuation structure should arouse suspicion of an intranasal wooden foreign body. In addition, as noted in our case, the HU of the wooden pieces (HU -272) was relatively less compared to that of air (-900 to -1000). Retrospective viewing of the CT images at wider window settings (like bone window and lung window) helped in better differentiation of the wooden foreign bodies from air. Image viewing using a combination of coronal and axial planes, slice thickness of 3 mm, window width (WW) of 3000, and window level (WL) of 500 is recommended for detection of intranasal wooden foreign bodies. Ho *et al*. have noted that a WW of 1000 HU and WL of -500 HU (lung window) is optimal for the detection of wooden foreign bodies on CT.[7]

On the contrary, in the chronic stage, mineralized hyperdense wooden foreign bodies can be easily detected

due to high contrast with the surrounding air. Our case demonstrates the importance of imaging in the detection of intranasal foreign body, especially in the acute setting of facial trauma wherein the excessive swelling of nasal mucosa may impair the clinical visualization of foreign body. In a chronic setting too, granulation tissue may impede the clinical detection of the foreign body.

In the setting of suspected foreign body, we recommend that initially a CT scan should be done to detect any metallic foreign body. These CT images should also be viewed in wide window widths [bone window (WL of around 500 HU, WW of 3000 HU) and lung window (WL of -500 HU, WW of 1500 HU)] to look for non-radiopaque foreign bodies like wooden foreign bodies, which may appear hypodense and of apparent air attenuation on the soft-tissue window settings. However, on wider window settings, they are seen to be less hypodense than air. MRI may be required in certain instances to demonstrate impacted wooden foreign bodies[5,6] The detection of intranasal wooden foreign body in the acute stage and prompt removal can prevent significant morbidity to the patient.

Conclusion

Our case highlights the role of imaging in detecting intranasal wooden foreign bodies in different stages and a possibility of error in diagnosis. Intranasal wooden foreign body may be missed in the acute stage because of apparent air attenuation of the foreign body and lack of contrast with the surrounding intranasal air. Radiologists need to be aware of the CT imaging appearances of wood in various stages for early detection and management.

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