A Case of Aluminum Casting in the Nasal Cavity and the Paranasal Sinus

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Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

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A 32-year-old man who had aluminum casting foreign bodies in his sinonasal cavities after a molten aluminum explosion at his workplace was referred to our institution for further investigation and surgical removal. The initial computed tomography images demonstrated hyperdense foreign materials in both nasal cavities and the left anterior ethmoid sinus (Figure 1). The nasal cavity showed pale mucosa with exudates and the end of the aluminum casting. The patient underwent emergency operation. As the aluminum foreign body was impacted in the nasal cavity, the thinnest area was rotated and broken by Kelly forceps and bone-cutting scissors. The foreign material in the ethmoid sinus was removed through ethmoidectomy (Figure 2; see Video 1 in the online version of the article). Saddle nose, septal perforation, and nostril stricture were noted 2 months postoperatively. Exemption from review was obtained from the Pusan National University Yangsan Hospital Institutional Review Board.

Discussion

Even though aluminum is the second-most commonly used mineral in the industrial field after iron,¹ molten aluminum inhalation resulting in dwelling in the sinonasal cavity is an extremely rare clinical condition, with only 1 case report in the literature.² At explosion, the molten aluminum entered and solidified in the sinonasal cavities, conforming to the anatomic structure. During this process, chemical and heat-induced injury may occur at the same time and cause severe damage to the mucosal layer of sinonasal cavities. Aluminum is known for its poor radio-opacity,² ³ ⁴ but in this case, the foreign bodies could be easily identified because of their bizarre curvilinear structure. A separated small nodular aluminum casting in the ethmoid air cell had probably entered the ethmoid sinus through the hiatus semilunaris. This unique pattern showed a retrograde sinus drainage pathway into the visible one. Acknowledging the fact that aluminum casting can be found as a sinonasal foreign body may facilitate timely diagnosis and proper surgical intervention.

Figure 1. Facial computed tomography images of aluminum foreign bodies. (A) Axial: foreign body is encapsulating the left middle turbinate. (B) Coronal: foreign bodies are occupying the left ethmoid sinus and middle and inferior meatus.

Figure 2. Intraoperative findings. (A) The curved foreign body encapsulating the left inferior meatus. (B) Isolated foreign body is found on the left anterior ethmoid air cell.

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Jieun Roh, conception of the article, wrote article, revised figures;
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Supplemental Material
Additional supporting information is available in the online version of the article.

References