

Molten aluminium inhalation in the nose and ethmoid sinus.

Report of an unusual case

P. Arbour

Temple, Texas, U.S.A.

SUMMARY

Accidental nasal inhalation of molten aluminium can occur during the industrial production of aluminium in spite of stringent safety precautions. In this case, believed to be the first reported in the literature, the initial evaluation of damage to the nasal mucosa was underestimated, because, in addition to a large nugget of aluminium in one nasal fossa, smaller fragments had penetrated deep into the middle meatus. These smaller fragments, undetected because of the poor radiopacity of aluminium, were responsible for extensive tissue damage which caused ethmoiditis and secondary maxillary sinusitis.

CASE HISTORY

An employee of an aluminium company was referred, shortly after accidental inhalation of molten aluminium in the nose after an explosion probably from contact of the metal with a trace of moisture on the equipment as it was transferred from an electrolysis bath. A large fragment of solidified aluminium measuring 1.5 x 1 x 0.3 cm was removed from the right nasal fossa (Figure 1). Burn lesions of the septum and the lateral wall extended to a depth of a few centimeters into the nose in spite of almost inexistant lesion of the skin of the vestibule. Plain sinus radiographs showed normal aeration of the maxillary sinus and ethmoid cells as well as absence of any radiopaque foreign body. Initial treatment consisted of internal dressing with 1/2" gauze impregnated with antibiotic steroid ointment, to place the nasal fossa at rest and avoid synechia, and oral antibiotic therapy.

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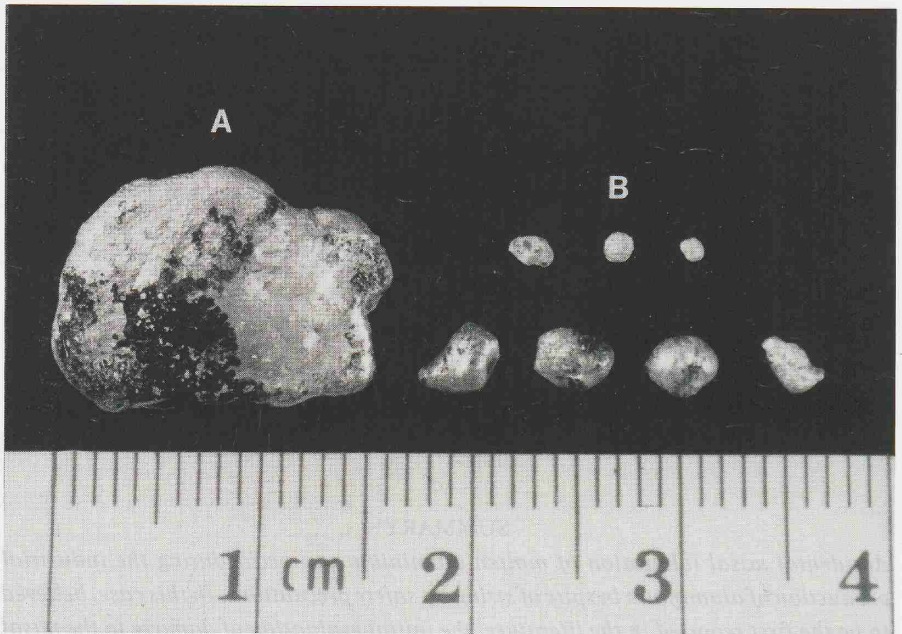


Figure 1. Fragment of aluminium from nasal fossa (A) and fragments from the ethmoid area (B).

The internal dressing was removed after one week. A few days later granulation tissue was observed on the middle turbinate and septum and in the middle meatus. The burn lesion appeared more extensive than originally observed. Less than one week later, right cheek pain and headache were noted with the appearance of significant opacification of the right maxillary sinus and ethmoid cells on plain sinus radiographs. CT scan confirmed thickening of the medial wall of the maxillary sinus and opacity of many of the anterior and middle ethmoid cells, but no radiopaque foreign body was detected. It was believed that burn lesions of the mucosa of the middle meatus had impaired mucociliary flow from the maxillary sinus and ethmoid cells causing secondary infection. Debridement of the middle meatus with transnasal anterior ethmoidectomy and meatotomy of the maxillary sinus with partial middle turbinectomy were performed under general anaesthesia. During the procedure, it was with great surprise that no less than seven small fragments of aluminium were extracted from the non-purulent but reactive mucosa of the middle meatus and ethmoid cells (Figure 1). The septum was protected by Silastic® sheeting and an antibiotic steroid ointment impregnated 1/2" gauze dressing applied. The CT scan films were reviewed with the radiologist after surgery and even in retrospect, no foreign body could be detected due to the poor radiopacity of aluminium as reported by Conradi (1982) and Rogers and Igini (1975). The dressing was removed one week later and

Silastic sheeting after five weeks. Scar tissue and synechia of the middle meatus gradually closed the antral meatotomy and secondary Caldwell-Luc and revision of the ethmoids were done six weeks later to relieve facial pain and headache. Beclomethasone inhalations were used to prevent additional scar formation. One year later the maxillary sinus had obliterated completely and one previously normal posterior ethmoid cell had opacified causing crusting and post-nasal drainage which may require revision ethmoidectomy. Nasal patency was normal with the exception of a small web between the upper part of the septum and the cartilaginous vault of the nose which should easily be corrected by minor revision surgery.

DISCUSSION

A few months before this case, I had seen a similar accident. However, a deviation of the septum had prevented the progression of the molten metal deep in the nose and conservative management had been quite satisfactory. Early exploration of the lateral wall of the nasal fossa is thus recommended to rule out the presence of additional fragments when sinusitis associated with granulation tissue occurs after extraction of non-radiopaque foreign bodies in the nose in spite of antibiotherapy.

REFERENCES

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Pierre Arbour, M.D.
1809 SW H.K. Dodgen Loop
Temple, Texas 76502
U.S.A.