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DENTAL TRAUMATOLOGY

Case Report

Accidental lodgment of an air gun pellet in the maxillary sinus of a 6-year old girl: a case report

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Abstract – Air gun, although considered a toy, can cause injuries ranging from trivial to very grievous. The type and severity of injuries depend on the type of air gun used, the distance at which it is fired, and the anatomic site at which the pellet hits. An interesting case involving a young girl, who was accidentally hit by an air gun pellet at a village fair, is described. The pellet penetrated the maxillary bone to be lodged in the sinus. The treatment strategy along with literature review on short- and long-term complications of air gun injuries is presented.

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Key words: air gun pellet; maxillary sinus; maxillofacial injury

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Air gun is considered to be a toy for children. However, incidents of air gun injuries, intentional and unintentional, are on the rise. In the US alone, every year more than 30,000 injuries caused by air guns are reported (1). The injury could appear to be trivial but it may sometimes cause severe morbidity or even death (2).

Depending on the type of air gun, the velocity of the projectile, the distance at which it is fired and the anatomic site of penetration are the factors that determine the gravity of injury to the affected person.

The following case report is presented to describe a freak accident that occurred at a village fair, resulting in lodgment of an air gun pellet in the maxillary sinus of a 6-year-old girl. The management strategy and complications of the retained pellet are discussed.

Case report

A 6-year-old girl reported to the dental outpatient department with air gun injury to the left cheek. At the time of presentation, the child had no symptoms of the said injury. The history revealed that the girl had gone to a village fair with her father 1 week ago. They were standing close to a balloon-shooting stall, watching the vendor load pellets in an air gun. The gun incidentally went off and a pellet hit the girl, who was standing at about 3 m distance from the vendor. She experienced severe pain and was taken to a local doctor who referred her to our institute.

Examination revealed a small, healed scar on the left cheek (Fig. 1). The adjoining skin was depigmented. There was no exit mark visible. No sign of fracture or any other abnormality was detected on both extra- and intra-oral examination.

The patient was advised radiographs of paranasal sinuses (PNS) and lateral oblique view of the skull. PNS X-ray revealed a 1 cm × 1-cm irregularly round, radiopaque shadow and a smaller fragment above it in the latero-inferior wall of the left sinus (Fig. 2), and radio opacity of lower half of sinus cavity, suggestive of chronic sinusitis. It appeared that the pellet had hit the girl with high velocity, and the great impact had caused fragmentation of pellet. The lateral oblique view of the skull showed the radiopaque metallic fragments, masking the shadow of the developing tooth bud of the left maxillary second molar (Fig. 3).

The patient was advised removal of the pellet fragments from the sinus. The patient's father was also explained the consequences of leaving the fragments inside, such as developing chronic sinusitis and symptoms of possible lead poisoning in later years.

Fig. 1. Extra-oral view showing the scar on left cheek corresponding the entry point of the air pellet.

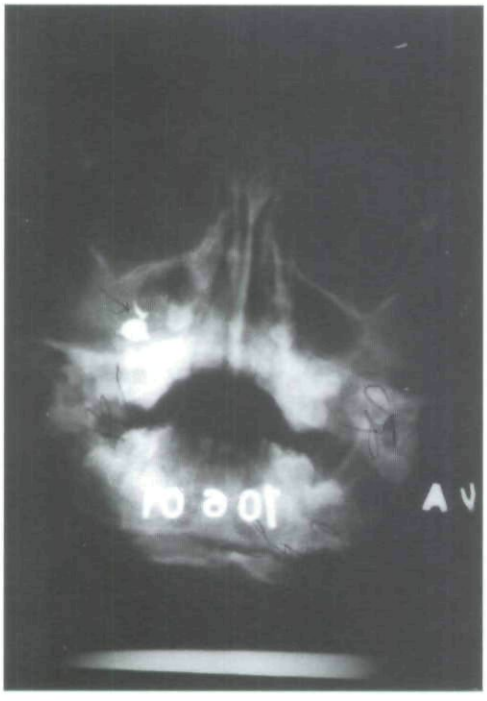

Fig. 2. Postero-anterior view of skull showing an irregularly round, radio opaque object, and a smaller fragment in the sinus with chronic sinusitis.

However, as the patient was symptom-free at that time and they were from outstation, they decided to defer the surgery until they got back home and to perform it there.

Discussion

Air gun injuries, although most of the time accidental and unintentional, could also be a result of assaults.

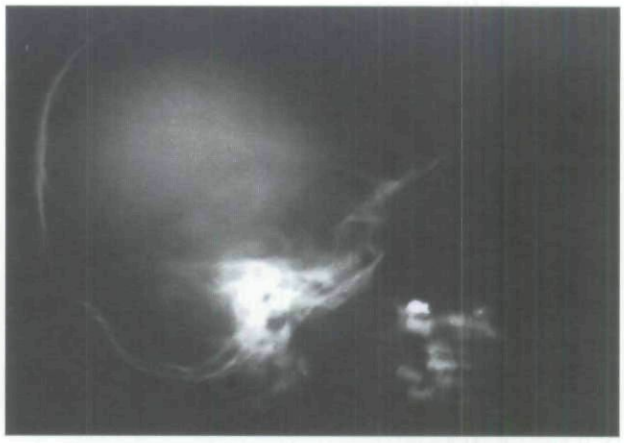

Fig. 3. Lateral oblique view of skull showing the pellet masking the shadow of tooth bud of second maxillary molar.

In rare cases, air gun could be used as a weapon for suicide (3).

Most of air gun pellet injuries occur in children. In a retrospective study on 101 children, it was found that 81% victims were male and the median age was 10.9 years (3). Air gun injuries in children are generally more serious than in adults. The adult skeleton can stop pellet projectiles but the thin bone of children can easily be traversed by the projectile (4) to enter into deeper structures.

The anatomic site of pellet entry determines the type and severity of injury. It may range from minor trauma to serious injuries such as corneal perforation, liver laceration, stomach and intestinal perforation, cardiac perforation, hemopneumothorax, and even death (1). In the head and neck region, air gun can cause injury to the eyeball, with resultant loss of vision, sometimes even requiring exenteration of the eye ball (5). When the pellet enters the cranium, it can cause intra-cranial bleeding, leakage of cerebrospinal fluid (CSF), meningitis, brain abscess, formation of traumatic aneurysm, and carotid-cavernous sinus fistula (5). Injuries in the facial region can result in pellets being lodged in the jawbones or the paranasal sinuses (6).

When easily accessible surgically, such as in the maxillary sinus in the present case, the pellets can easily be removed by either conventional or endoscopic surgery through Caldwel Luc approach, causing minimum complications and hospital stay. But when the pellets become embedded in deeper and vital structures, the surgical procedure can be highly invasive, resulting in significant morbidity and long hospital stay perhaps requiring care in intensive care units.

The projectiles from air gun, besides causing immediate and acute trauma in the affected organ system, can also cause late complications if not removed. In the paranasal sinuses, it may cause

chronic inflammation, rhinorrhea, formation of rhinoliths, and neuralgic type of pain (7). In a case report, cephalgia of over 40-year duration was found to be caused by a retained air gun pellet in the maxillary antrum (8). Besides, the fragments of the pellet can migrate from the site of entry (9). As in the present case the pellet was within the maxillary sinus, migration of pellet was not the imminent threat considered.

Retained pellet can also evoke foreign body reaction (10). If the pellet metal is inert, it may be walled off with fibrous capsule around it (11). Lead from the retained bullet can cause lead poisoning (plumbism), although it is more often reported with gunshot injuries (12, 13). The condition is characterized by non-specific symptoms of anorexia, vomiting, constipation, abdominal pain, and weight loss. Anemia and renal toxicity can also occur. In severe cases, acute encephalopathy with lethargy, stupor, coma, and convulsions may manifest. Chronic exposure to low levels of lead may lead to learning deficits, changes in behavior, short stature, and poor weight gain. The air gun pellets are generally made up of 95% lead, 2.5% tin, and 2.5% antimony (14); therefore, the risk of lead poisoning is real. Bowen & Magauran (15) reported raised serum levels of lead in six cases of ocular injuries caused by air gun pellet.

In the reported case, the embedded pellet in the left maxillary sinus had caused chronic maxillary sinusitis within a week of the injury, evident from the radiopacity of the antrum. The pellet, if left *in situ*, could cause both immediate and late complications as listed above. As the patient was a young girl, the risk of future lead toxicity affecting her physical and mental development was high. Above all, the site of pellet lodgment was easily accessible for surgical removal. Therefore, the patient was advised immediate surgical removal of pellet. The father of the child, however, decided to perform it after returning home for logistic reasons.

Conclusion

Air gun injuries have a wide gamut of clinical presentation from trivial injury to more serious, life-threatening and maiming injuries. Modern air gun muzzle velocity can be as high as that of a conventional gun. Therefore, air gun should be considered a lethal weapon and not a mere toy. Strict regulation and enforcement as well as public education regarding its potential dangers are required so that the injuries can be prevented or at least be minimized.

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