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CASE REPORT
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INTRA-ORAL INJURY FOLLOWING CELLPHONE (LITHIUM ION) BATTERY BLAST

Authors: Srishti Khera (1) Gaurav Goldar (2) Hitendra Prakash Singh *(3)

Authors Affiliations: (1) Junior Resident, (2) Senior Resident (3) Professor, Department of Otorhinolaryngology and Head Neck surgery, King George's Medical University, Lucknow, U.P., India

ABSTRACT

INTRODUCTION

Use of mobile phones has become extremely common to people from all walks of life; so have the complications associated with them. An extremely dangerous complication is mobile phone battery blast.

CASE REPORT

This case report presents a case of 12-year-old male child, who suffered oral injury due to battery explosion in his mouth.

DISCUSSION

Intra - oral battery blast injuries are relatively rare. The potential hazards of such low voltage, high energy battery powered equipment can be life threatening. Seeking immediate medical care is of utmost priority. A timely intervention may even circumvent the need for tracheostomy.

CONCLUSION

This case signifies the need to increase public awareness about the potential risks associated with cellphone use, to adapt safe practices as per recommendations from the manufacturers and to avoid counterfeit products to avoid such accidents.

KEYWORDS

Low-voltage electrical injury, blast injury, Maxillofacial trauma

INTRODUCTION

Multiple blast injuries have been reported over years; most of them being caused by fireworks, cooking gas and warfare equipment. However, the incidence of mobile phone battery blast injuries, also known as "BOMBILE" is now showing a rising trend owing to its accessibility and use of low-quality products. They can involve oro-facial region, head and neck, limbs and even gastrointestinal tract. An oro-facial blast injury can cause cosmetic and functional deformities as well as a threat to airway. The degree of damage is variable. In general, caustic agents and longer duration of exposure are associated with greater tissue damage. The management of such injuries could vary from symptomatic treatment to wound debridement to emergency tracheostomy to extensive reconstruction.1-4

CASE SUMMARY

A 12 – year - old boy presented to ENT OPD with complaints of difficulty in swallowing, change in voice and cough with expectoration following explosion of mobile phone battery in patient's mouth. Patient also complained of vomiting,

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which was initially blood stained and later non - bilious. He had no complaints of oral bleeding or difficulty in breathing.

General examination revealed singeing of hair. Intra-oral examination revealed tattooing over posterior half of tongue, hard palate and bilateral buccal mucosa along with edematous uvula and soft palate. Indirect laryngoscopy showed ulceration of supraglottic larynx. There was no evidence of facial injury, ocular injury, CSF leak oral/nasal bleeding or respiratory distress. There was no injury to any other part of the body.

Fig. 1-Image showing hyperemia, depapillation and tattooing of oral mucosa

Fig 2- Image of blasted mobile phone battery, brought by the attendant.

Patient was admitted for observation and managed conservatively with prophylactic antibiotics and anaesthetic gels and recovered within 9 days.

DISCUSSION

Recent years have seen a drastic increase in the use mobile phones. It has multiple downsides, some of which are obvious, like unhealthy sleep cycles and dietary habits, decreased physical activity contributing to obesity, depression etc. One rare but catastrophic and potentially life threatening hazard is the injuries due to mobile battery blasts.5

Mobile phone has lithium ion batteries. Though highly effective, they can overheat leading to "thermal runaway," i.e. an unregulated increase in internal battery temperature. The main line of defense against short circuiting is slip of polypropylene which prevents the electrodes from touching each other. If this polypropylene separator is breached, the electrodes, which are flammable come in contact and get combusted on contact with oxygen. Thus, making it a combination of mechanical (battery pieces), thermal, and chemical injuries. 6

Amongst the oro-facial region, the following injuries can be seen in case of mobile battery blasts -

- **Intra-oral injury:** These are relatively rare. The degree of damage depends on multiple factors such as the alkalinity or acidity of the material, the manner and duration of contact, the extent of tissue penetration and its mechanism of action. The injuries commonly encountered include tattooing and mucosal burns, loss of intra-oral soft tissue, tooth avulsion and subluxation and root and crown fractures.
- **Injury to airway:** Airway compromise can occur as a result of bony and soft tissue disruption. It is also associated with an increased risk of aspiration. These can be life threatening.
- **Facial nerve injury:** Facial nerve injuries can occur at various levels with the degree of severity may vary. Devitalized and non-salvageable segments are commonly seen.

- **Ear injury:** This can include lacerations and avulsions of the pinna, tympanic membrane perforations and even damage to the cochlea and central auditory pathways,
- **Injuries to the eye:** These relatively common and associated with a high incidence of retinal detachment and vitreous hemorrhage.
- **Vascular injuries:** Due to extensive collateralization of face, damage to a single vessel, does not require any specific management. Ligation or clipping of the bleeding vessel to ensure hemostasis is usually sufficient. Although multiple vessels damage is uncommon, it can lead devitalization of entire sub-units of the face. In such situations, extensive debridement and reconstruction is required. 4,7

While dealing with any such case, the first and foremost step is to ensure that the ABCs of trauma management. Blind or fiber-optic guided nasotracheal intubation is often associated with complications, especially in patients with skull base fracture. Better alternatives include tracheostomy and submental intubations. However, these two methods are surgical procedures and associated with complications. Apart from scarring, bleeding and tracheal stenosis can occur in tracheotomy patients. On the other hand, complications of submental intubation include wound infection, hemorrhage, salivary fistula, abscess formation. A less invasive alternative to comparison with tracheostomy or submental intubation is retro – molar intubation using Bonfils scope. It can be used in "can't intubate, can't ventilate" situations, and is also provides more stable hemodynamics as compared to Macintosh laryngoscope. However, it is not widely available. Another alternative is an emergency cricothyroidotomy. But it cannot be used in growing children and special jet ventilators are required. 4,8

Once the ABC of trauma have been dealt with, systemic injuries should be evaluated.

Management of oro-facial blast injury can include- 4

- Initial operating room management
- Management of cranial and ocular injuries
- Debridement of foreign material and necrotic tissue
- Soft tissue closure
- Bone graft reconstruction
- Dental and facial prosthesis
- Psychiatric and social service evaluation

In author's case, the patient did not suffer from extensive or life - threatening injuries. However, keeping in mind the major risks and complications associated with blast injuries, the patient was admitted for observation purpose and managed conservatively.

DECLARATION

Ethics approval was taken from Institutional Ethics Committee. Informed consent for publication was taken from Patient's attendant.

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Corresponding Author:
Dr. Hitendra Prakash Singh
Professor, Department of Otorhinolaryngology and Head Neck surgery, King George's Medical university, Lucknow,
U.P.- 226003
Email ID- drhpsingh77@gmail.com
Phone no.- 9456048923
ORCID ID- https://orcid.org/0000-0003-2690-2494

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