

## Case Report on Abdominal Injury Due To Mobile Battery Blast

Ashwini Kumar Dalal, Bharat Kumar, Sunaina

Department of surgery, Government Medical College, Chandigarh, India.

Corresponding author: Bharat Kumar

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**Abstract:** In the era of good technology which is not lacking from our lives, we encounter with equipment/devices in our routine life, specially automobile batteries, laptops, smartwatches and mobile phone batteries, which transform chemical energy to electrical injury. Today, mobile phone has become popular to everybody since it is convenient. As the use of mobile phone is increasing dramatically all over the world, accidents of burns and even fatal injuries caused by mobile phone explosion have been reported on the internet and in the scientific literature. About 40 cases of exploding batteries on Nokia phone have been reported- all were due to nonoriginal batteries being used[1]. In the literature, there are mainly facial burns, neck and eye injuries due to mobile phone battery explosion. On the other hand, few examples of serious lower limb injury were also present.

**Keywords:** Mobile phone, explosion, Battery

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### I. Introduction

Indiscriminate usage of cellphones makes us vulnerable to the associated risks including accidental burns and blast injuries[2]. Low quality products and user negligence increases the risks[3]. There are nonchargeable batteries (alkaline batteries, nickel, cadmium batteries) and chargeable batteries (Lithium batteries, lead acid batteries). Lithium ion batteries are the types used in almost all smartphones and electronics. Engineers use lithium because it is light and can hold a lot of energy. Batteries can explode when they are charged too much or too fast, shoddy manufacturing of devices, overheating etc. In the literature there is limited information about injuries caused by batteries explosions. In the literature, mainly facial burn cases that cause corneal and orofacial soft tissue injuries, some facial bone fractures, neck, upper trunk and upper extremity injuries, facial nerve palsies, second degree burn injuries on abdomen and shoulder due to mobile phone explosion are seen [4],[5],[6],[7],[8],[3],[9],[2],[10]

### CASE REPORT

A 15 years old male reported to surgical emergency with history of blast of mobile phone battery when he was charging his phone after 3 hours of injury. The mobile battery suddenly exploded and hit his abdomen on right lumbar region. The patient complained of pain abdomen, vomiting and difficulty in passing gas. On physical examination, patient was unwell and in acute distress but patient was conscious, cooperative and oriented. Vitals of the patient were stable. There was chemically dirty wound on right lumbar region extending deep into peritoneal cavity. The wound was around 5 \* 5 cm. In addition, there was tattooing due to chemical injury. On palpation, there was tenderness, rigidity and absent bowel sounds. His other system examination was normal. On investigations, his hemoglobin was 9 mg %, others investigations were normal. Emergency resuscitation was not required. He was taken up for surgical exploration under general anesthesia. Chemically dirty and necrotized tissues were debrided and foreign materials were removed from the region where battery hit the abdomen. On exploratory laparotomy, there was perforation of size 1.5\*1.5 cm in transverse colon with minimal contamination. Primary repair of colonic perforation was done. Post operative period was uneventful. Patient discharged on post operative day 7. In follow up, normal wound healing process were seen without any complication.



**Figure 1.** Nokia cell phone battery after explosion.



**Figure 2.** Primary repair of colonic perforation through exploratory laparotomy.

## **II. Discussion**

Lithium ion batteries are incredibly efficient but have issues with heat. They can overheat in certain circumstances –with a short circuit, for example, if the temperature rises slowly the battery case may melt. If it rises too rapidly, however, it can generate sufficient pressure to create a small explosion. Most batteries produced by manufacturers include protection against a meltdown, vents to release excess heat and temperature –activated shutdown switch. Counterfeit batteries may not include these features. Even authorized batteries can fail, however—if for example, heat vents become blocked. Short-circuit and explosion after metal contact of battery pressed against pocket change for a length of time. A dropped phone can also trigger an explosion, depending on how the device lands.

Davidor reported car battery explosion case causing injury to face and cornea of thirty year old woman [4]. Zieker et al reported a case about corneal injury due to watch battery explosion [5]. Akinbade et al reported orofacial soft tissue injury and mandible-maxillary fractures due to dry cell battery explosion [6]. Fadeyibi et al reported a lethal case about battery explosion which causes burn injuries to the face upper arms, trunk, and thighs of a 10 year –old primary school girl. Inhalation injuries were also present and she was deceased approximately 5 days after admission [8]. A 19 years old Casper College student incurred second degree burns on her abdomen and shoulder and third degree burns on her forearm after catching her bed on fire when her cell phone battery exploded [10]. In our case when patient was charging his phone, the mobile battery suddenly exploded and hit his abdomen and cause perforation of transverse colon. Exploratory laparotomy was done and primary repair of colonic perforation done. In the post-operative follow up, no detachment or infections were seen on wound and stapler were removed at second week.

Battery explosion causing intestinal perforation is a type of injury rarely seen in the literature, because of positions of patients and positions of devices with battery while working or at rest.

## **III. Conclusion**

Timely hospital admission and proper management of the patient can salvage life of patient. This case signifies the need to increase public awareness about the potential risks associated with cellphone use , to adopt safe practices as per recommendations from the manufacturers and to avoid counterfeit products , to avoid such

accidents . One should remove the battery if handset gets wet and let your cell phone dries before you put it back, should not place cell phone in a hot car, should not use plastic cases to protect cell phone , they can overheat it, prefer original and authorized accessories, should not answer a call while it is being charged, never use the cell when it is hooked to the mains. We must be aware that it can also be an instrument of death.

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