Case Report

Firecracker-induced gastric perforation: A case report and review of literature

Amandeep Singh[1], Haramritpal Kaur[2], Sonam Singh[3], Ramanjeet Kaur[3], A Karthick[3]

From [1]Associate Professor, [3]Junior Resident, Department of Surgery, [2]Associate Professor, Department of Anaesthesia, GGS Medical College and Hospital, Faridkot, Punjab, India

ABSTRACT

Firecracker-induced injuries are commonly reported as superficial soft-tissue injuries affecting the head, neck, and upper limbs. Deep penetrating injuries due to firecrackers misuse are a less known identity. People usually suffer from firecracker injuries due to misuse or because of their risk-taking behavior. Such cases pose a special challenge to the surgeons due to the type of population, usually young and the social, cultural, legal, and emotional factors involved with the injuries. Judicious decisions and empathy toward patients as well as toward relatives can resolve lots of problems. We are hereby reporting a rare case of gastric perforation in a young 22-year-old male which was caused by a broken piece of steel glass due to the explosion of a firecracker.

Key words: Explosion, Firecracker, Gastric perforation, Steel glass

Firecrackers are utilized all around the world during different cultural and historical festivals. Firecrackers if not utilized with caution may prove to be a major health hazard. Lots of cases of firecracker injuries have been reported all over the world, especially around festival seasons such as Diwali in India, Bastille Day in France, Tihar in Nepal, New year day in China, Independence day, Halloween in the USA, and numerous more [1]. Most of the firecracker injuries are superficial burns and children are the most affected age group [2]. It could be because of the interest in trying different things with sparklers, obliviousness, and ignorance of conceivable dangers.

Firecracker-induced injuries are commonly reported as superficial soft-tissue injuries affecting the head, neck, and upper limbs [3]. Such cases pose a special challenge to the surgeons due to the involvement of the young population and the social, cultural, legal, and emotional factors involved with the nature of injuries. Judicious decision and empathy toward the patient as well as toward relatives can resolve lots of problems. In this case report, a 22-year-old male suffered gastric perforation due to the improper use of firecrackers. This case report again emphasizes the importance of avoidance of adventurous behavior with the firecracker use, the importance of safe use, and awareness of possible hazards of firecrackers.

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CASE REPORT

A 22-year-old male presented in the emergency department of our hospital with a chief complaint of penetrating abdominal trauma. The injury occurred a day after the Diwali festival when the patient attempted to explode firecrackers under steel glass. After the explosion, the steel glass gets broken into pieces and one of the pieces enters the abdominal cavity. In the history, the patient had undergone exploratory laparotomy around 1 year back for the intestinal perforation and a midline scar which could be appreciated on examination (Fig. 1).

At the time of presentation, his hemodynamic vitals were stable and there was a single wound approximately 3×1 cm in size, lying obliquely in the left hypochondriac region. Omentum could be seen coming out of the wound with fresh ooze (Fig. 1). On examination, guarding and rigidity were present.

All routine investigations were within normal limits. X-ray abdomen showed a sharp foreign body in the pelvis (Fig. 2). Exploratory laparotomy was planned in view of these findings.

On exploration, there was a gastric perforation about 2×2 cm in size in the anterior wall near the greater curvature of the stomach. The foreign body was retrieved (Fig. 3) and gastric perforation was sealed using omentum patch. The abdomen was then closed in layers. He was then put on broad-spectrum antibiotics. His post-operative stay in the hospital was uneventful and the patient was discharged in satisfactory condition. The patient was given follow-up in the outpatient

Correspondence to: Dr. Amandeep Singh, Department of Surgery, GGS Medical College and Hospital, Faridkot, Punjab, India. E-mail: amandeep23march@gmail.com

Figure 1: Entry wound of metal due to firecracker blast

Figure 2: X-ray showing metal piece as foreign body

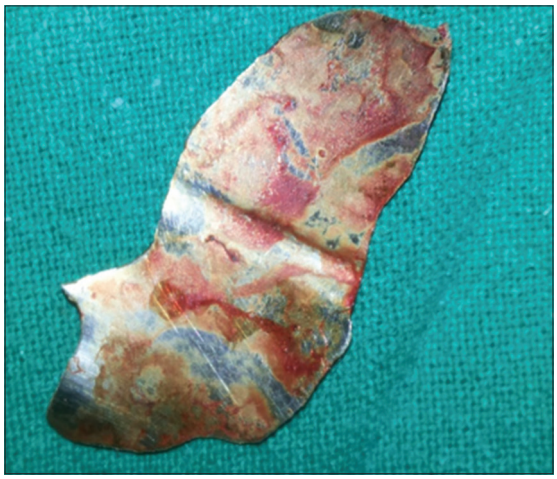

Figure 3: Extracted metal body

department and there were no complications till the writing of this report.

DISCUSSION

Firecrackers are commonly used all over India as an image of festivity, particularly amid Diwali. Various types of firecrackers are available in the market such as sparkles, fountains, grenades, and aerial devices such as rockets and missiles. With the increment in range and simplicity of accessibility of fireworks in the market, number and example of firecracker wounds are likewise extending. The epidemiology as well as the pattern of firecracker injuries differs from place to place. Injuries caused by fountains/anars are the most common ones followed by bombs, chakri/groundspinner, and rockets. Sparkles are the minimum involved.

Firecracker injuries are more commonly seen among males. The individuals who are directly involved in firecracker handling and ignition are generally affected more than the accompanying bystanders. Children are usually more affected by firecracker injuries because of imprudent response to sound and sparkles, immaturity, and the inability of safe handling [4]. Earlier studies suggested that the most common group affected were children below 16 years of age but now it is seen that the majority of the patients fell in the age group of 5–30 years [5-7]. Even firecracker injuries are also reported to be associated with suicidal attempts [8]. In a case study, a young woman presented with severe burns of the oropharynx following insertion of a Roman candle firecracker into her mouth, in an attempted suicide [8]. In another case report, elderly male discharged a firecracker inside his mouth, resulting in the fatal blast and craniofacial injuries [9].

The speed of explosion of firecrackers varies widely from 400 m/s to 1000 m/s. Hence, the pattern of injuries caused can vary from minor superficial skin burns to the deep penetration of explosive metal and even up to gut causing perforation. In the present case, gastric perforation was caused by a piece of steel glass due to the firecracker explosion. Not only the speed and force of impact are responsible for firecracker injuries but they are also implicated for inner ear damage due to noise. It is seen that mean hearing levels at high frequencies (4000 and 8000 Hz) were significantly higher than those at the low and middle frequencies, thus indicating that firecrackers mostly cause high-tone hearing loss [10]. A similar case report has been reported in the literature, with a 7-year-old child while using illegal fireworks presented with a superficial laceration on the belly, intestinal perforation, and extensive hand injuries. Perforation required immediate resection [11]. To the best of our knowledge, this is the first case of gastric perforation in adults caused by steel glass breakdown due to the firecracker explosion.

Although the majority of firecracker injuries are minor, they may be a cause of serious life-threatening injuries and can add on to the morbidity. Some of the poor outcomes of firecracker injuries include ocular injuries causing visual impairment, facial or hand injuries causing deformation/disfigurement. It may even prove lethal sometimes. It is, therefore, important for all to understand potential threats of fireworks and use them safely and under supervision.

As children are generally affected age groups, they should not be permitted to access fireworks and should always be supervised by guardians. They need to be educated about safe and possible threats of fireworks. They should not be allowed to do experiments

such as lightening a bomb in hand or putting a glass bottle/plastic boxes over ignited crackers. Illegal or sub-standardized products should not be allowed to access to the market and ban should be imposed [12]. Instead of individual use of firecrackers, public fireworks can be encouraged. Use of safety warnings should be clearly mentioned over the product to minimize the morbidity and mortality associated with the use of firecrackers.

CONCLUSION

Although such injuries are rare, the medical fraternity should be aware of such presentations of firecracker injury. Society needs to be educated about the possible hazards and safety measures should be ensured while their use.

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