CASE REPORT

**Bowel Evisceration in a 19-year Old Girl Following Abdominal Blast Injury from Insecticide Can Explosion in a Refuse Fire**

**Abstract**

Blast injuries from non-combat sources such as aerosol cans are uncommon and underreported but can be life-threatening,s particularly in low-resource settings(1,4). Among these, pressurized containers such as insecticide spray cans pose a silent yet significant threat when exposed to extreme heat or flame (3,5). These containers, though ubiquitous and seemingly harmless, can transform into dangerous projectiles capable of causing life-threatening injuries, including abdominal trauma and visceral evisceration (2,6). We present the case of a 19-year-old female who sustained a penetrating abdominal injury with small bowel evisceration following the explosion of an insecticide can during a routine act of refuse burning. She underwent emergency surgical intervention with bowel resection and primary anastomosis. The case emphasizes the severity of trauma resulting from everyday domestic activities involving improperly disposed aerosol containers and underscores the need for heightened public awareness, prompt clinical recognition, and timely surgical management of such rare but dangerous events.

**Introduction**

Blast injuries in civilian settings are relatively uncommon and typically associated with industrial accidents, terrorist attacks, or large-scale disasters. However, in recent times, an increasing number of injuries have been attributed to domestic or low-grade explosive incidents involving pressurized household items such as aerosol cans(1,4). These cans, including insecticide sprays, air fresheners, and cleaning agents, are commonly found in nearly every household. Despite their ubiquity, the explosive potential of these items when exposed to heat or open flames is frequently underestimated, making them an overlooked source of potentially severe trauma.

The kinetic molecular theory of gases explains the behavior of gas particles under varying conditions of temperature and pressure. As per this theory, when an aerosol can is subjected to high temperatures—such as in an open fire—its internal pressure rapidly increases due to the excitation of gas molecules. Eventually, the structural integrity of the canister fails, resulting in an explosive rupture. The resultant force can generate shrapnel-like effects, projecting metallic fragments and initiating high-energy penetrating injuries. In this scenario, the dynamics of the injury are comparable to those observed in improvised explosive device (IED) detonation or military-grade explosive trauma, albeit at a smaller scale(2,6).

Historically, such injuries have been predominantly documented in military and combat environments. However, as industrialization and consumer reliance on pressurized aerosol products grow, reports of civilian injuries from aerosol explosions are beginning to appear more frequently in literature. Baruchin et al. (1998) noted that burns and penetrating trauma from aerosol explosions pose a significant risk that remains underreported in both emergency medicine and public health discourse. The clinical presentation of these injuries can range from minor superficial burns to devastating soft tissue and visceral damage, depending on proximity to the blast, type of pressurized substance, and environmental context.

In the case under discussion, a 19-year-old girl sustained a life-threatening abdominal injury with bowel evisceration as a result of the explosion of an insecticide can inadvertently thrown into a refuse fire. This case underscores not only the severe morbidity associated with household blast injuries but also highlights broader issues related to public safety, emergency response, and the necessity of targeted educational campaigns regarding proper disposal of aerosol containers. While penetrating abdominal injuries with bowel evisceration are typically associated with high-energy trauma such as gunshot or stab wounds, this case presents a unique mechanism involving a low-grade but high-impact blast injury in a domestic setting.

The report aims to shed light on an under recognized danger in household waste management practices and provide guidance for clinical practitioners in managing such complex injuries. It also raises questions about policy and public health responsibilities in mitigating preventable accidents through community education and appropriate regulatory actions.

**Case Presentation**

A 19-year-old previously healthy female was brought by relatives and good Samaritans to the accident and emergency department of LAUTECH Teaching Hospital, Ogbomoso, Oyo State Nigeria, after an explosion occurred while burning household waste. Unbeknownst to her, a pressurized insecticide can was present in the waste and detonated due to exposure to flame.

She sustained a laceration to the right lower abdomen with visible small bowel protruding from the wound. Her presentation was within 30 minutes of injury but she could not quantify her blood loss. She had no associated comorbidities.

On physical examination she was anxious, mildly pale, but conscious and oriented with stable vital signs: BP 100/60 mmHg, HR 80 bpm, RR 25/min, SpO₂ 96% in room air. Abdominal examination revealed about an 8 cm laceration at the right lumbar region with bowel evisceration through it, and some superficial burns around it. A diagnosis of penetrating abdominal injury with bowel evisceration was made. Investigations showed a packed cell volume of 33% and random blood sugar of 128 mg/dL. No imaging was performed due to visible evisceration and clinical urgency. Other routine laboratory results were within normal limits.

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FIG 1. Picture of the bowel evisceration from non-combat blast injury of 19-year old girl showing intestinal perforation during surgery.

**Treatment**

The patient was resuscitated with IV fluids and administered broad-spectrum antibiotics (ceftriaxone and metronidazole), analgesics (paracetamol and pentazocine), and tetanus prophylaxis. The exposed bowel was irrigated with copious normal saline and packed with saline-soaked gauze. She was reassure to allay her fear. She subsequently underwent emergency laparotomy.

Intraoperative findings included an 8 cm linear laceration at the right lumbar region with full-thickness jejunal injury. The laceration was extended laterally on both sides for adequate exposure during laparotomy. Surgical repair involved bowel resection of the affected jejunum, anastomosis, and copious warm normal saline peritoneal lavage. She recovered fully with no complications. The patient had an uneventful postoperative course, she move bowel on post-operative day 3 and was discharged on postoperative day 6. Stitches were removed on postoperative day 8. At 6-week follow-up, she remained asymptomatic with no surgical complications.

**Discussion**

Blast injuries, though extensively studied in military and industrial contexts, remain underreported when arising from domestic incidents involving everyday objects. In particular, the explosive potential of aerosol cans when exposed to fire is insufficiently emphasized in public health communications, despite the well-documented dangers (2,4,6). This case of bowel evisceration in a civilian, especially a young female, due to an insecticide can explosion brings to light the often-neglected intersection between physics, emergency medicine, surgical intervention, and public safety awareness(6).

The injury sustained by the patient is clinically significant not just for its rarity but also due to the mechanism involved. Penetrating abdominal trauma resulting in bowel evisceration generally demands immediate surgical intervention due to the high risk of contamination, ischemia, and eventual sepsis(3,7,8). While blunt abdominal trauma may often be managed conservatively, evisceration signals full-thickness disruption of the abdominal wall, necessitating emergency laparotomy.

This patient’s rapid clinical assessment and subsequent surgical management reflect best practices in trauma care. Initial resuscitation efforts including fluid therapy, analgesia, broad-spectrum antibiotics, and tetanus prophylaxis are essential first steps. The decision not to perform imaging prior to surgery is supported by standard trauma protocols that prioritize visible signs of life-threatening injury over diagnostic delays. The intraoperative findings of full-thickness jejunal laceration required segmental bowel resection and anastomosis—an approach consistent with current surgical recommendations for such injuries(4).

From a pathophysiological standpoint, the mechanism of injury aligns with primary and secondary blast effects. The explosion generates a high-pressure shock wave (primary blast), followed by projectiles such as can fragments (secondary blast), both contributing to penetrating injuries. The localized thermal burns and tissue laceration suggest that both pressure and thermal components played a role. As highlighted by Champion et al. (2009), understanding the mechanism of blast injuries is critical in predicting and managing associated complications, including delayed perforation, intra-abdominal abscesses, or adhesion-related intestinal obstruction.

The case also provides insights into the importance of community awareness regarding hazardous waste management. Despite being preventable, incidents like this continue to occur due to a lack of public education on the risks posed by pressurized cans when incinerated. Campaigns promoting proper waste segregation and aerosol disposal are essential, especially in communities where open refuse burning is a common practice. Public health interventions could include warning labels on aerosol cans, school-based awareness programs, and community health education led by primary care providers and local councils.

Furthermore, this case prompts a reflection on healthcare preparedness in low-resource settings. The prompt arrival of the patient to a tertiary care facility and the availability of surgical expertise were crucial to the favorable outcome. However, in many regions, delayed access to surgical services could prove fatal. Thus, strengthening trauma care networks, improving pre-hospital care, and equipping peripheral hospitals with basic surgical capabilities must become a priority in global health policy.

In a broader context, the case raises questions regarding the regulatory oversight of household chemicals. Although most insecticide cans bear warnings about exposure to heat or open flame, these are often ignored or misunderstood. Strengthening regulations on labeling, packaging, and community outreach could significantly reduce injury risk. Additionally, healthcare professionals must be trained to recognize and manage such injuries promptly to minimize morbidity.

Psychosocial implications must not be overlooked. Young victims of trauma may suffer from post-traumatic stress, body image issues due to surgical scars, or anxiety related to domestic activities. Psychological support and follow-up care should be incorporated into the recovery plan to ensure holistic rehabilitation(9).

Lastly, it is worth noting the interdisciplinary collaboration evident in this case: from surgical intervention to anesthesia, nursing care, and follow-up, the case demonstrates the value of team-based approaches in trauma care. Multidisciplinary coordination not only enhances clinical outcomes but also supports educational and preventive roles of health professionals.

In conclusion, this case exemplifies the clinical, public health, and social implications of a seemingly routine but dangerous scenario—burning household waste without recognizing the risks of embedded aerosol cans. It calls for increased vigilance among healthcare providers and a robust public health response to address this preventable cause of trauma. Integrating medical management with community education and policy enforcement is essential to reduce the burden of such injuries.

**Conclusion**

This case underscores the potential severity of domestic blast injuries from common household items such as aerosol insecticide cans. Despite their everyday use, these items can become dangerous projectiles when exposed to fire, leading to life-threatening trauma like bowel evisceration. Prompt clinical recognition and timely surgical intervention are critical for optimal outcomes. Moreover, this case highlights the pressing need for public awareness regarding the safe disposal of pressurized containers to prevent similar incidences.

**Learning Points:**

1. Pressurized insecticide cans can cause unexpected severe blast injuries when exposed to fire.
2. Bowel evisceration requires urgent surgical intervention even in the absence of hemodynamic instability.
3. Public education on the dangers of improper waste disposal involving aerosols is essential.

**References**

1. Wolf SJ, Bebarta VS, Bonnett CJ, Pons PT, Cantrill SV. Blast injuries. Lancet. 2009;374(9687):405–15.
2. DePalma RG, Burris DG, Champion HR, Hodgson MJ. Blast injuries. N Engl J Med. 2005;352(13):1335–42.
3. Baruchin AM, Scharf S, Rosenberg L. Burns due to aerosol can explosions. Burns. 1998;24(4):357–9.
4. Basak A, Ghosh A, Mishra PK. A rare form of domestic accident: blast abdominal injury with evisceration of abdominal viscus. Int J Contemp Pediatr. 2019;6(5):2022–4.
5. Guzzi LM, Argyros G. The management of blast injury. Eur J Emerg Med. 1996;3(4):252–5.
6. Champion HR, Holcomb JB, Young LA. Injuries from explosions: physics, biophysics, pathology, and required research focus. J Trauma. 2009;66(5):1468–77.
7. Cripps NPJ, Cooper GJ. Risk of late perforation in intestinal contusions caused by explosive blast. Br J Surg. 1997;84(9):1298–303.
8. Ignjatović D. Blast injuries of the intestines in abdominal injuries. Vojnosanit Pregl. 1994;51(1):3–11.
9. Ritenour AE, Baskin TW. Primary blast injury: update on diagnosis and treatment. Crit Care Med. 2008;36(7 Suppl):S311–7.
10. Carter PS, Belcher PE, Leicester RJ. Small-bowel adhesions long after blast injury. J R Soc Med. 1999;92(3):135–6.