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Electrical Shock : An Uncommon Etiology Of Colonic Perforation

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ABSTRACT

Electrical injuries can cause deep tissue damage with life-threatening complications, yet gastrointestinal perforation remains extremely rare. We present an unusual case of colonic perforation following high-voltage electrocution. A 32-year-old male sustained a high-voltage electrical shock while climbing an electric fence. He presented with diffuse abdominal pain and burn injuries at the wrist and knee. Imaging showed pneumoperitoneum. Exploratory laparotomy revealed a transverse colon laceration and an ileal perforation. Surgical repair with colostomy and wrist aponeurotomy were successfully performed. The patient recovered well with no postoperative complications. This case underscores the importance of maintaining high suspicion for internal visceral injuries in electrical trauma patients, regardless of superficial burn severity. Early diagnosis and prompt surgical intervention are key to favorable outcomes.

Keywords: electrical shock, gastrointestinal perforation, emergency surgery, case report

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INTRODUCTION

Electrical injuries are a well-known cause of cutaneous burns, cardiac arrhythmias, and musculoskeletal damage. However, visceral injuries—particularly gastrointestinal perforations—are exceedingly rare and often underdiagnosed. We report the case of a young adult who presented with both colonic and ileal perforations following high-voltage electrocution, illustrating the importance of maintaining a high index of suspicion even in the absence of extensive external burns.

A 32-year-old male with no prior medical history was admitted to the emergency department six hours after sustaining an electrical shock while attempting to scale an electrified fence. According to the patient and witnesses, the shock was strong enough to throw him backward. He experienced brief loss of consciousness followed by localized pain in the right wrist and right knee. In the following hours, he developed increasing abdominal discomfort and distension, prompting hospital evaluation.

On examination, he was conscious, hemodynamically stable (BP 125/80 mmHg, HR 88 bpm), afebrile, and had oxygen saturation of 98% on room air. Second-degree burns were noted at the right wrist and knee, consistent with the electrical entry and exit points (Figure 1). Abdominal examination revealed diffuse tenderness, marked guarding, and decreased bowel sounds, suggesting peritonitis.



Figure 1: A: the right wrist was the entry point. B: the right knee was the exit point

An ECG revealed QTc interval prolongation. Laboratory investigations showed elevated creatine phosphokinase (CPK: 1100 IU/L), C-reactive protein (CRP: 100 mg/L), and lactate dehydrogenase (LDH: 450 IU/L). Leukocytosis was present without neutropenia. A focused abdominal CT scan demonstrated free intraperitoneal air and fluid collections in the paracolic gutters, the Douglas pouch, and the inguinal fossae, highly suggestive of gastrointestinal perforation (Figure 2).

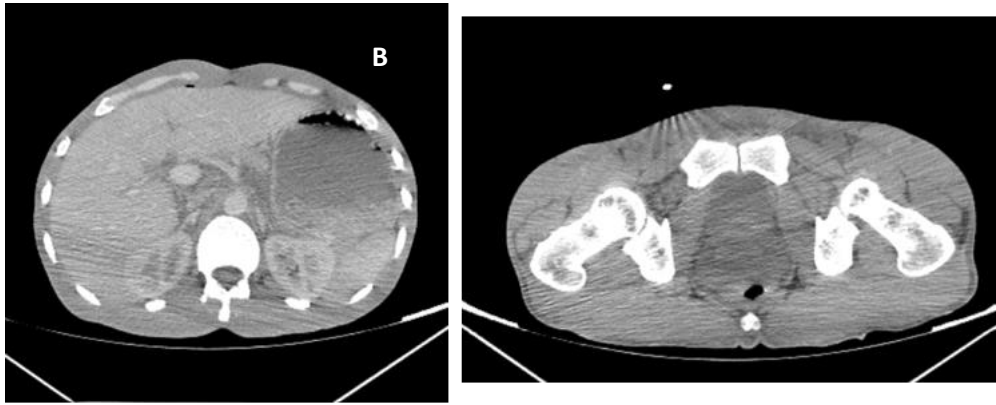


Figure 2. A: pneumoperitoneum bullae B: intraperitoneal effusion in the pouch of douglas

Given these findings, an emergency midline laparotomy was performed. Intraoperative exploration revealed a 1 cm perforation of the terminal ileum and a 5 cm transverse colon laceration with necrotic margins (Figure 3). No other organ involvement was noted. The ileal perforation was resected, and primary anastomosis was performed. The colonic laceration was sutured after debridement and protected by a lateral sigmoid colostomy to avoid septic complications. Furthermore, due to circumferential deep burns and edema of the wrist, a decompressive aponeurotomy was carried out to relieve potential compartment syndrome.

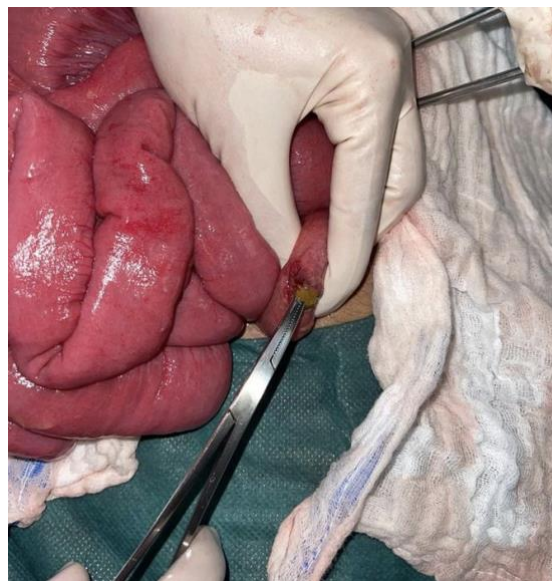


Figure 3. Perforation of the ileum

The patient was transferred to the surgical ICU postoperatively. He received fluid resuscitation, broad-spectrum antibiotics, and supportive care. His postoperative course was favorable, with resumption of intestinal transit on postoperative day 4. The surgical wounds healed uneventfully, and he was discharged on day 10 with a plan for colostomy closure after 6 to 8 weeks.

Electrical trauma remains a major cause of morbidity worldwide, particularly in occupational and accidental contexts. High-voltage shocks (>1000 V) can cause both thermal and electrical

tissue damage, with potential effects on any organ system depending on the current pathway [1]. Most reported complications involve cutaneous burns, cardiac arrhythmias, and rhabdomyolysis [2]. However, deeper structures such as muscles, vessels, nerves, and even hollow organs can be affected—often without dramatic external signs [3].

The gastrointestinal tract is rarely injured by electrical current. The pathogenesis involves two principal mechanisms: direct thermal injury resulting from tissue resistance to current, and ischemic necrosis due to vascular damage [4]. The small bowel is more commonly affected due to its mobility and central location. Colonic involvement, as seen in our case, is exceptional. In most reported cases, the diagnosis of visceral perforation is delayed, often after clinical deterioration [5,6].

In a review by Marques *et al.*, the authors emphasized that gastrointestinal perforations following electrocution often occur with minimal or absent skin burns, making clinical suspicion crucial [5]. Ahmad *et al.* also described similar cases where imaging played a key role in early diagnosis [6]. Our case aligns with this literature, showing the importance of CT scanning in trauma protocols, particularly when abdominal pain is present.

The decision to perform a protective colostomy was based on the extent of colonic injury, the presence of peritonitis, and the risk of anastomotic failure in a contaminated field. Several authors advocate for staged procedures in such cases to reduce the risk of postoperative sepsis [7].

This case highlights three key learning points. First, gastrointestinal perforation is a possible but rare complication of electrical injury and should be suspected in any patient presenting with abdominal pain, even with minor burns. Second, early imaging with CT scanning is essential to guide timely surgical intervention. Third, a multidisciplinary approach involving emergency physicians, surgeons, intensivists, and burn specialists optimizes outcomes in such complex cases.

With the rise of urban electrification and unprotected access to high-voltage sources, clinicians must remain vigilant for unusual presentations of electrocution. Prompt recognition and management of internal injuries can significantly improve prognosis.

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Authors' Contributions

All authors participated in the clinical management and contributed to manuscript preparation. All authors reviewed and approved the final version.

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Data Availability

All relevant data are available from the corresponding author upon reasonable request.

Declarations

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