CASE REPORT

Recurrent self-inflicted abdominal stab injuries leading to isolated Meckel's diverticulum perforation: A surgical case report and literature-backed review

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ABSTRACT

Meckel's diverticulum (MD) is a frequently silent congenital anomaly of the gastrointestinal tract. While complications such as bleeding and obstruction are more common, traumatic perforation remains extremely rare, particularly from penetrating injuries. To date, isolated perforation of MD following self-inflicted abdominal stab wounds has been reported only sporadically. We present the case of a 39-year-old male with a long-standing history of schizophrenia and epilepsy who arrived at the emergency department following his fifth self-inflicted abdominal stab injury over the past decade. On physical examination, a segment of small bowel was found protruding from a 4 cm periumbilical wound. Emergency exploratory laparotomy revealed extensive intra-abdominal adhesions and an isolated perforation of a Meckel's diverticulum located 60 cm proximal to the ileocecal valve. No other visceral injuries or hemorrhage were detected. The diverticulum was resected using a linear stapler, and serosal defects were repaired. The postoperative course was uneventful, and the patient was discharged on postoperative day five. Isolated MD perforation caused by penetrating abdominal trauma is exceedingly rare and diagnostically challenging. When occurring in psychiatric patients with repetitive self-harm behavior, it presents an even more complex scenario. This case underscores the importance of meticulous intra-abdominal exploration in stab wound patients and contributes novel insight to the limited literature on traumatic MD injuries.

Keywords: Meckel's diverticulum; penetrating trauma; stab wound; self-inflicted injury; psychiatric patient; case report.

INTRODUCTION

Meckel's diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract, affecting approximately 2% of the population.[1] It results from incomplete obliteration of the omphalomesenteric duct during embryogenesis. Although often asymptomatic, MD may occasionally present with complications such as gastrointestinal bleeding, intestinal obstruction, diverticulitis, and, more rarely, perforation.[2,3]

Perforation of MD is typically associated with inflammation, ulceration, or foreign body ingestion. Traumatic perforation, particularly from penetrating abdominal injuries, is exceedingly rare and sparsely documented in the literature.[4,5] The atypical location and mobility of MD along the ileum contribute to diagnostic challenges during trauma evaluation. In most cases, perforation is discovered incidentally during exploratory laparotomy performed for other suspected intra-abdominal injuries.[6]

Self-inflicted abdominal stab wounds represent a distinct subset of trauma care, particularly among patients with psychiatric disorders. Chronic self-harm behavior poses unique diagnostic and therapeutic challenges due to its recurrent nature and variable injury patterns.[7] To our knowledge, only a limited number of reports have described isolated traumatic

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MD perforation in patients with repeated self-inflicted stab wounds.

Herein, we present a unique case of a 39-year-old male with schizophrenia and epilepsy who developed an isolated perforation of Meckel's diverticulum following his fifth self-inflicted abdominal stab wound over a ten-year period. This case aims to contribute to the limited literature on traumatic MD injuries and highlight the importance of comprehensive intraoperative evaluation in patients presenting with penetrating trauma and psychiatric comorbidities.

CASE REPORT

A 39-year-old male with a long-standing history of schizophrenia and epilepsy presented to the emergency department following a self-inflicted stab wound to the abdomen—his fifth such attempt over the past decade. On admission, the patient was alert and hemodynamically stable. Physical examination revealed a single stab wound approximately 2 cm superior to the umbilicus, with visible herniation of a small bowel loop through the abdominal wall.

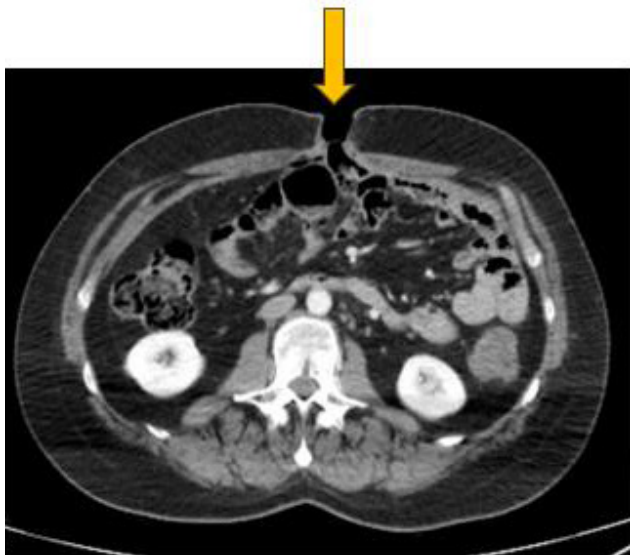

Figure 1. Abdominal computed tomography (CT) showing protrusion of a small bowel loop through the periumbilical stab wound.

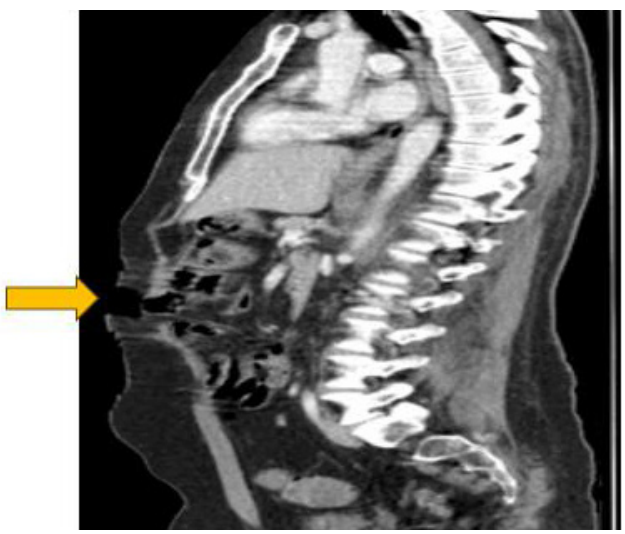

Figure 2. Intraoperative image revealing adhesions and herniated bowel.

Figure 3. Perforated Meckel's diverticulum visible during laparotomy.

Laboratory investigations, including complete blood count and coagulation parameters, were within normal limits. Contrast-enhanced computed tomography (CT) of the abdomen revealed small bowel loops herniating through an anterior abdominal wall defect without evidence of free intraperitoneal air or active hemorrhage (Figs. 1 and 2).

The patient was urgently transferred to the operating room for exploratory laparotomy under general anesthesia. A midline incision incorporating the stab site was made. Upon entering the peritoneal cavity, no hemoperitoneum or fecal contamination was identified. Extensive fibrous adhesions were encountered between small bowel loops, likely secondary to previous abdominal injuries. Careful adhesiolysis was performed (Fig. 3).

During systematic examination of the small intestine, a perforated Meckel's diverticulum was identified approximately 60 cm proximal to the ileocecal valve. The tip of the diverticulum exhibited a clean perforation consistent with direct injury from the stab wound (Fig. 4). There was no evidence of mesenteric injury or adjacent bowel perforation.

A representative intraoperative video recorded during exploration demonstrates the herniated small bowel and the perforated diverticulum prior to resection (Video 1). The diverticulum was subsequently resected using a 60 mm linear stapler (Endo GIA), and the staple line was reinforced with interrupted 3-0 polypropylene sutures to ensure hemostasis and prevent leakage (Fig. 5). Minor serosal injuries in adjacent loops were repaired with 3-0 Vicryl sutures.

The stomach, colon, solid organs, and diaphragm were in-

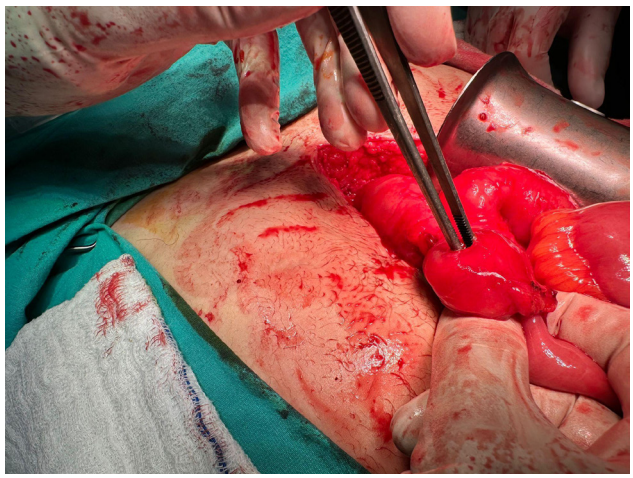

Figure 4. Repair of serosal defects with 3-0 Vicryl sutures.

Figure 5. Resected diverticulum using Endo GIA linear stapler; staple line reinforced with 3-0 polypropylene sutures.

spected and found to be intact. A Jackson-Pratt drain was placed in the rectovesical pouch.

The patient's postoperative course was uneventful. Oral intake was resumed on postoperative day three, and he was discharged in stable condition on day six. Histopathological evaluation confirmed the presence of a perforated Meckel's diverticulum without ectopic mucosa or neoplasia.

The intraoperative findings were recorded, and a supplementary video demonstrating the initial abdominal exploration and identification of the perforated Meckel's diverticulum has been provided as a visual reference.

Written informed consent was obtained from the patient for the publication of this case report and accompanying images and video.

DISCUSSION

Meckel's diverticulum, though common in occurrence, seldom presents with complications such as traumatic perforation. Penetrating abdominal injuries—especially stab wounds—very rarely result in isolated MD perforation. This makes intraoperative identification crucial, as such injuries often lack classical radiological signs such as free air or fluid collections.

Dogjani et al. described one of the few documented cases of combined MD and jejunal injury following abdominal stab trauma, emphasizing the diagnostic challenge posed by such presentations.[1] Arkuszewski et al. further stressed the difficulty in preoperative detection of traumatic MD perforation, particularly due to its variable location and mobility, leading to delayed or incidental findings during surgery.[2] Kamath's analysis of penetrating abdominal trauma indicated that small bowel perforations, including those involving MD, frequently go undetected without overt clinical signs,[3] and Nirmala reported similar observations regarding non-specific nature of imaging and clinical findings in ileal perforations.[4]

Damodar, Reddy, and Smiley all underscored the under-recognition of small bowel injury in patients with stab wounds. Damodar emphasized the clinical challenge of ileal perforations often being misdiagnosed or diagnosed late, while Reddy highlighted the need for meticulous intraoperative assessment in hemodynamically stable trauma patients. Smiley's early work also pointed to the diagnostic ambiguity surrounding gastrointestinal tract injuries, advocating for complete exploration when suspicion persists.[5-7] This notion is particularly applicable in patients with psychiatric disorders who present with self-inflicted injuries—a patient population at risk of recurrent and anatomically unpredictable trauma.

A comparison of similar reported cases of traumatic or self-inflicted Meckel's diverticulum perforation is presented in Table 1.

While self-inflicted abdominal trauma is rare overall, it presents a unique diagnostic and ethical challenge for trauma surgeons. Smiley's historical review of gastrointestinal injuries identified self-inflicted trauma as a distinct, under-reported clinical subgroup requiring more vigilant intraoperative assessment.[8] More recently, Chui et al. demonstrated that self-harm remains a relevant and increasing subset of trauma surgery, often associated with higher rates of isolated inju-

Table 1. Reported cases of Meckel's diverticulum perforation due to trauma or self-inflicted injury

Author(s)	Year	Mechanism of Injury	Meckel's Diverti-culum Involvement	Key Findings
Dogjani et al.[1]	2016	Stab wound	Meckel's diverticu-lum and jejunum	Simultaneous Meckel's diverticulum (MD) and jejunal injury; difficult diagnosis
Arkuszewski et al.[2]	2024	Blunt trauma	Suspected post-traumatic MD in-volvement	MD injury likely mimics diverticuli-tis post-trauma
Kamath[3]	2006	Stab wound	Small bowel; pos-sible MD in-volvement	Small bowel injuries often missed radiologically
Nirmala[4]	2010	Stab wound	Ileal perforation; not specific to MD	Non-specific signs; perforations under-diagnosed
Damodar[5]	2010	Stab wound	Possible Meckel's diverticulum in-volvement	Advocates thorough bowel explo-ration
Reddy[7]	2007	Penetrating trauma	General gastroin-testinal tract (GIT) trauma; no MD detail	Emphasizes in-traoperative detection in stable patients
Smiley[8]	1943	Self-inflicted trauma (historic)	Descriptive case series; MD in-volvement rare	Early recognition of self-inflicted gastrointestinal (GI) trauma
Chui et al.[8]	2023	Self-inflicted penetrating trauma	Isolated MD among multiple cases	Psychiatric associa-tion with high rate of isolated visceral injury

ries to abdominal viscera and requiring individualized surgical strategies.[8]

In our case, the patient had inflicted five stab wounds over ten years, yet this was the only instance in which the weapon directly perforated Meckel's diverticulum. The injury was isolated, with no adjacent bowel, mesenteric, or vascular damage—a pattern scarcely reported in the literature. The surgical finding, supported by intraoperative visuals, highlights the critical importance of systematic bowel inspection even in seemingly low-impact trauma mechanisms.

Given the rarity of isolated MD perforation from penetrating trauma, our case contributes valuable insight into the diverse presentations of abdominal injury and emphasizes the importance of including embryologic remnants such as Meckel's diverticulum in the differential diagnosis, especially in psychiatric populations. Early laparotomy remains the definitive approach to prevent missed injuries and associated complications.

CONCLUSION

Isolated perforation of Meckel's diverticulum due to penetrating trauma is an exceptionally rare occurrence, especially in the context of recurrent self-inflicted abdominal injuries. This case underscores the importance of high clinical suspicion and thorough intraoperative exploration in such presentations. Given the anatomical variability and potential psychiatric comorbidities, early surgical intervention with a multidisciplinary approach remains essential to optimize outcomes and prevent delayed complications.

Informed Consent: Written informed consent was obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: Ö.K., M.K.; Design: B.T., M.A.K.; Supervision: Ö.K., G.G.; Materials: Ö.K., B.T.; Data collection and/or processing: Ö.K., M.A.K.; Analysis and/or interpretation: M.K., G.G.; Literature review: Ö.K., B.T.; Writing: Ö.K.; Critical review: B.T., M.K.

Conflict of Interest: None declared.

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OLGU SUNUMU - *ÖZ*

Tekrarlayan kendine zarar verici karın bölgesi bıçaklanma yaralanmalarına bağlı izole meckel divertikülü perforasyonu: Cerrahi olgu sunumu ve literatür destekli derleme

Meckel divertikülü (MD), gastrointestinal sistemin en yaygın konjenital anomalilerinden biridir, ancak komplikasyonlarla birlikte görülme sıklığı düşüktür. MD perforasyonu genellikle divertikülit, ülserasyon veya yabancı cisim ile ilişkilidir. Travmatik perforasyon, özellikle penetran abdominal yaralanmalar sonucu gelişen izole MD hasarı ise son derece nadirdir. Bu makalede, tekrarlayan kendine zarar verme davranışı gösteren psikiyatrik bir hastada, yalnızca Meckel divertikülüne sınırlı, diğer intraabdominal yapılarda hasar gözlenmeyen bir bıçaklanma yaralanmasına bağlı MD perforasyonu sunulmuştur. Otuzlu yaşlarında erkek hasta, acil servise karın ağrısı ve önceki bıçaklanma girişimlerine benzer yeni bir bıçaklanma travması ile başvurdu. Fizik muayene, hassasiyet ve defans ile uyumlu klinik bulgular gösterdi. Bilgisayarlı tomografi, net bir perforasyon bulgusu içermemekle birlikte bağırsak anslarında segmenter distansiyon ve sıvı izlenimi nedeniyle hasta acil laparotomiye alındı. Operasyon sırasında, ileoçekal valvden yaklaşık 60 cm proksimalde yer alan Meckel divertikülünde tek başına perforasyon saptandı. Diğer intestinal yapılar sağlamdı. Perfore MD segmenti rezeksiyonla çıkarıldı ve histopatolojik inceleme, heterotopik mukoza veya neoplazi içermeyen perfore divertikül tanısını doğruladı. Hastanın postoperatif dönemi sorunsuz geçti ve stabil klinik durumda taburcu edildi. Olgu, hem travmatik MD perforasyonlarının tanısal güçlüklerini hem de psikiyatrik hastalarda abdominal travmaların yönetiminde dikkat edilmesi gereken ayırıcı tanıları vurgulamaktadır. Literatürde çok az sayıda benzer vaka bildirilmiş olup, bu olgu serisi travma cerrahlarının klinik farkındalığını artırmak amacıyla literatür bilgileri ile karşılaştırmalı olarak sunulmuştur.
Anahtar sözcükler: Meckel divertikülü; travmatik perforasyon; penetran karın yaralanması; psikiyatrik hasta; kendine zarar verme; vaka sunumu.

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