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Crohn's disease onset associated with a ballistic injury to the abdomen in the patient wounded in the war in Ukraine: a case report

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Abstract

Background The Russo-Ukrainian war is ongoing warfare that is associated with severe injuries among the civil population and military personnel. The aim of this study was to demonstrate a rare case of Crohn's disease manifestation in a combat patient in relation to a ballistic injury to the abdomen in the ongoing war in Ukraine.

Case presentation A male Caucasian Ukrainian patient 34 years of age received a ballistic injury to the abdomen due to artillery shelling. During the next 22 days, the patient underwent bowel resections with anastomosis as well as several relaparotomies for abdomen revision and lavage. On the 23rd day, the patient was diagnosed with gastrointestinal bleeding. An esophagogastroduodenoscopy showed no signs of active bleeding, but longitudinal ulcers with a cobblestone appearance were detected, which is typical for Crohn's disease. Sulfasalazine at a dose of 3.0 g per day was prescribed to the patient. On the 25th day after the injury, the patient was diagnosed with intestinal bleeding and peritonitis, indicating perforation. At relaparotomy, a perforated ulcer 0.5 cm × 0.5 cm with even and well-defined borders was identified in the jejunum located 10 cm from the Treitz ligament. The ulcer was excised, and the intestine defect was sutured, followed by retrograde intubation of the jejunum. Until the 40th day after the injury, the patient underwent conservative treatment. The patient died on the 40th day after the injury due to multiple organ dysfunction syndrome, which was associated with respiratory failure (pneumonia) and severe intoxication.

Conclusion Ballistic injury to the abdomen might be a trigger for the onset of Crohn's disease. Patients with intestinal bleeding and stress ulcers should be evaluated for concomitant gastroenterological disorders, and appropriate clinical investigations and management should be applied.

Keywords Russo-Ukrainian war, Crohn's disease, Ballistic injury to abdomen, Gunshot injury

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Background

The ongoing Russo-Ukrainian war is associated with severe injuries among the civil population and military personnel [1–7]. The frequency of ballistic and gunshot injuries to the abdomen is high, and such a trauma is also represented as a clinical challenge due to specific features of the wound ballistics and the severity of the trauma [8]. As shown previously, the severity of the trauma in both combat soldiers and civilians in Ukraine is associated with the application of high-energy weapons. Ballistic and gunshot injuries to the abdomen are among the most complicated types of trauma in war surgery, because of the highly traumatic impact of penetrating projectile as shown in clinical and basic science studies [2, 4, 8]. According to our clinical observations, the number of gunshot wounds to the abdomen in the overall structure of combat injuries varied from 1.9% to 9.8% during the hybrid period of the Russo-Ukrainian war (2014–2021), whereas such injuries to the abdomen have been within the range of 5.7–7.0% during the invasive period of the abovementioned warfare (started on 24 February 2022) [2, 3, 5, 9]. Coincidence of ballistic or gunshot injury to the abdomen and onset of Crohn's disease is infrequent. Reports showing an association between abdomen trauma and Crohn's disease are controversial, describing mainly cases of civil trauma [10–12]. Post-traumatic stress (PTS) is a significant factor in Crohn's disease onset, but such an onset was not described before in combat patients.

The aim of this case report was to demonstrate a rare case of Crohn's disease manifestation in a combat patient in relation to a gunshot injury to the abdomen in the ongoing war in Ukraine.

Case presentation

A male Caucasian Ukrainian patient 34 years of age received a gunshot injury to the abdomen due to artillery shelling. First aid was provided at the battlefield area followed by evacuation to the forward surgical team at stabilization point (Role 1 of medical aid). The medical evacuation and aid were provided according to the role-based system as described in our previous studies [3, 7]. The forward surgical team performed a laparotomy, showing gunshot injury to the abdomen with the penetrating defect of the small intestine and ascending colon. Fractures of the right iliac crest were also identified, as well as a hemoperitoneum of 800 ml. The forward surgical team performed suturing of the gunshot defect in the small intestine and ascending colon, followed by abdomen packing and forming of laparostomy (the abdominal organs were exposed and protected with a temporary suturing of the skin). The patient was evacuated to the Military Medical Teaching Center of the Northern Region of the Ministry of Defense of Ukraine, which is a Role 4 deployed hospital in Kharkiv city, 4 hours after receiving the injury. The patient underwent a complete examination (routine clinical blood tests) and spiral computed tomography (CT) scan (0.5 mm with thickness axial slice) of the abdomen. The patient did not report a history of any gastrointestinal disorders.

On the 2nd day after admission to the Role 4 hospital, the patient underwent a relaparotomy. On revision, a previously sutured gunshot injury to the small intestine 80 cm from the Treitz ligament was identified without signs of suture failure. Further revision showed signs of necrotic changes in the distal 70 cm of the small intestine, cecum, and ascending colon (brown-bluish color of the colon wall, serous layer of dark color, absence of peristalsis). The resection of the ileocecal colon segment and resection of 70 cm of the distal part of the small bowel was performed, followed by side-to-side ileo-ascending colic anastomosis, abdominal cavity drainage, and nasogastric intubation. Signs of peritonitis (severe abdominal pain, wall tenderness, rise in body temperature up to 37.8 °C) were detected on the 7th postoperative day, and a relaparotomy was performed. During a revision, upon visual inspection, acute stress ulcerations ($n=3$), which measured 4 mm × 4 mm, and two perforations (40 mm and 5 mm) of ileo-ascending colic anastomosis and local peritonitis were identified. Resections of the anastomosis and ileostomy were performed, as well as sanitation of the abdominal cavity followed by wound drainage using an Abdovac kit. Blood product transfusions consisting of two units of 300 ml of packed red blood cells (RBC) and two units of 300 ml fresh frozen plasma were administered.

Because of the perforations of the ulcers in the colon, the patient underwent programmed relaparotomies, which were required. The patient was conscious between the operations. Programmed relaparotomies were performed on the 9th, 12th, and 15th day after the injury for revision and abdominal lavage as well as for re-installation of the Abdovac system. On the 21st day after the injury, a reconstruction of ileostomy was performed owing to insufficient arterial blood supply and signs of ischemia of the tissues. Preoperative CT scan (before the ileostomy reconstruction) showed wall thickening and signs of inflammation of the small intestine, which was not seen when comparing CT scans with those performed on admission (that is, 1st day after the injury) as illustrated in Fig. 1.

On the 23rd day after the injury and 2 days after the ileostomy, signs of intestinal bleeding were detected. An esophagogastroduodenoscopy (EGD) showed no signs of active bleeding, but longitudinal ulcers with a cobblestone appearance were detected, which is typical for

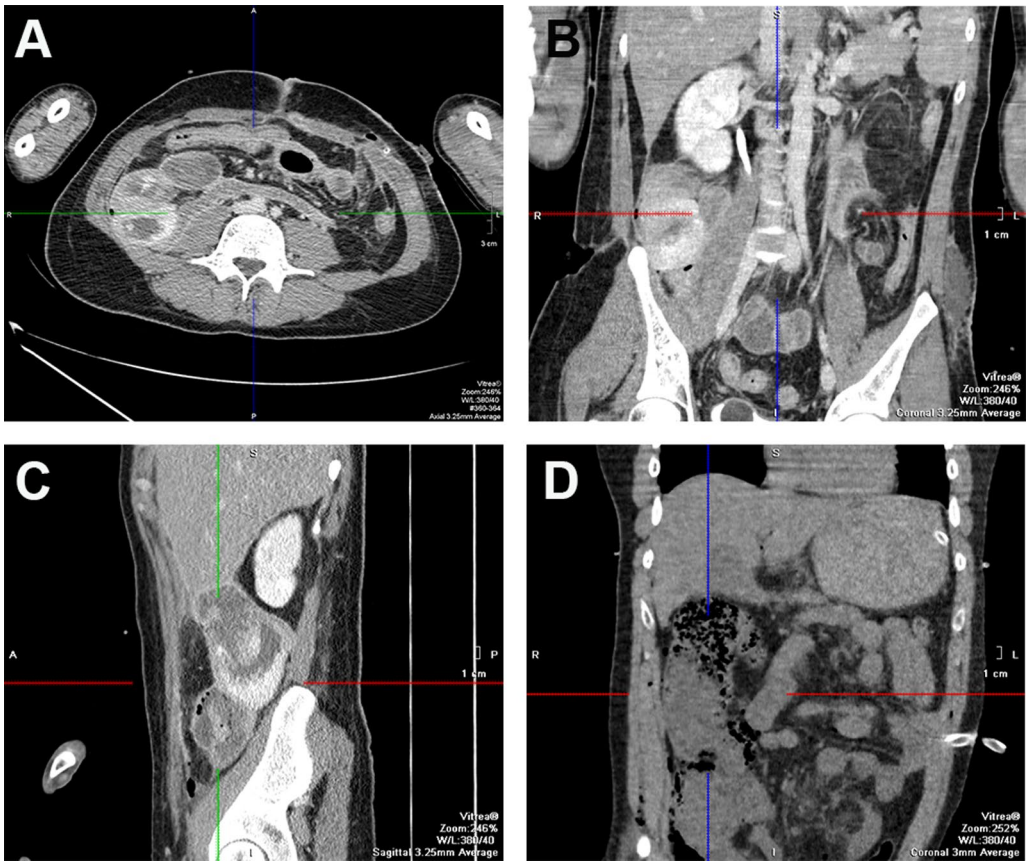

Fig. 1 Contrast-enhanced computed tomography scan of the patient showing gunshot injury to the abdomen with fracture of the right iliac bone and damage to the ascending colon and jejunum. The 1st day after the injury: **A** axial view and **B** coronal view of the abdomen during early postoperative period showing no changes in the jejunum wall. The 21st day after the injury **C** saggital view and **D** coronal view showing segmenet of jejunum with wall thickening and significant accumulation of the contrast in mucosa layer

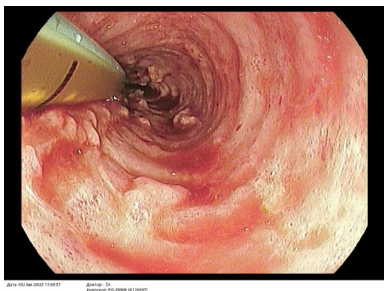

Fig. 2 An macrophotograph of esophagogastroduodenoscopic view of the esophagus showing mucous edema, and longitudinal ulcers with a cobblestone appearance, indicating Crohn's disease

Crohn's disease (Fig. 2). Sulfasalazine at a dose of 3.0 g per day was prescribed to the patient. On the 25th day after the injury, the patient was diagnosed with intestinal bleeding and peritonitis, indicating perforation. During relaparotomy, a perforated ulcer 0.5 cm×0.5 cm with even and well-defined borders was identified in the jejunum located 10 cm from the Treitz ligament. The ulcer was excised, and the intestine defect was sutured, followed by retrograde intubation of the jejunum. The laparostomy was performed, considering the peritonitis and high risk of relapse of intestine bleeding. Histopathology of the excised jejunum specimen showed signs of Crohn's disease (Figs. 3, 4).

Until the 40th day after the injury the patient underwent conservative treatment. The patient died on the 40th day after the injury due to multiple organ dysfunction syndrome, respiratory failure due to pneumonia, and severe intoxication.

Discussion

In this report, we have demonstrated the clinical case of a combat patient who received a gunshot injury by a high-energy weapon (ballistic projectile) to the abdomen and manifested with Crohn's disease. Manifestation

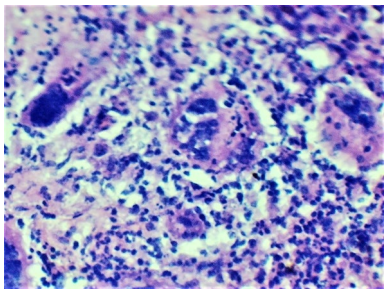

Fig. 3 Microphotograph of the ulcer illustrating small giant-cell granulomas on the ulcer bottom (hematoxylin and eosin, 400X objective)

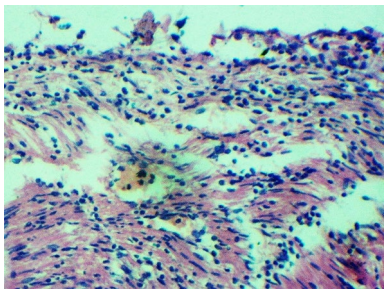

Fig. 4 Microphotograph of the chronic active colitis (hematoxylin and eosin, 400X objective)

of Crohn's disease is rare in relation to abdominal injury [12].

We presented a rare case of Crohn' disease onset in relation to combat injury by high-energy ballistic projectile. To our best knowledge, this is the first report showing manifestation of Crohn's disease in relation to an abdominal ballistic injury. It is worth mentioning that the association of abdominal surgery was also described by other researchers that showed a case of a patient with non-gunshot injury, but with a similar management approach as compared with our case (exploratory laparotomy and bowel resection) [12, 13]. Such a possible relation might be possible due to the direct ballistic impact of the projectile on the organism or associated with post-traumatic stress [8, 10]. The latter is more likely, and, as suggested by Cámara *et al.* [10], post-traumatic stress disorders (PTS) might be associated with exacerbation of Crohn's disease. Other evidence of PTS's role in the risk of Crohn's disease was shown by Taft *et al.*, with a specific reference to the onset or exacerbation of Crohn's disease as compared with other kinds of inflammatory bowel diseases [11].

Because of severe hemorrhage, our patient received blood product transfusion of packed RBS and fresh frozen plasma, which might be considered a possible immunization risk factor for the patient. However, Peters *et al.* showed a protective role of multiple blood transfusions for reduced risk of Crohn's disease [14]. Silvis *et al.* reported protective effect of blood transfusion on risk of postoperative recurrence of Crohn's disease, indicating absence of association between blood product transfusion and risk of Crohn's disease onset [15].

One of the possible obstacles to the fatal outcome for the patient was a possible delay in the evacuation to the appropriate Role (i.e. level of military medical care) of the deployed hospital and delayed application of the highly-specialized medical aid. The time for evacuation is longer in most of the cases owing to Russian strikes on the ground and air sanitary transport, which is a violation of international humanitarian law, resulting in both delayed medical evacuation and longer time for providing medical aid. This humanitarian issue is one the specific features of the Russo-Ukrainian war, affecting normal medical care for civil and combat patients with various kinds of injuries as shown in our previous reports as well as by other researchers [2, 5, 6, 16–18]. Another obstacle, that one should also consider, is the evidence of high-energy weapon strikes on critical infrastructure in Ukraine, including hospitals and other healthcare facilities, resulting in high risk of electric blackouts affecting functioning of hospitals [6, 17]. Insufficient medical planning also might be an obstacle to effective medical provision, including coexistence of such severe conditions such as gunshot (ballistic) injuries and Crohn's disease [2, 4, 19, 20].

According to published reports, post-traumatic stress is associated with exacerbation of bowel inflammation due to elevated concentrations of proinflammatory molecules such as C-reactive protein and tumor necrosis factor [21–23]. According to the patient's history, he did not report any previous signs of Crohn's disease. Considering this, it is likely that the patient had asymptomatic Crohn's disease that was exacerbated by gunshot injury and PTS. Such a hypothesis is in line with the study by Click *et al.*, presenting results from the cohort with asymptomatic Crohn's disease, which was defined by the authors as a "silent" disease [24]. It is worth mentioning that all studies about asymptomatic Crohn's disease are based on the patients' data from civil cohorts or civil case reports, whereas our case is from a combat patient. Gunshot injury, war conditions, and subsequent PTS are much more severe factors as compared with similar trauma or PTS in civil populations, and these parameters might also be independent factors for Crohn's disease onset. However, whether this case was related to asymptomatic Crohn's disease, there were no chances to diagnose it at the early stage before the injury because

military medical check-ups of the individuals going to military service do not include specific Crohn's disease tests.

Conclusion

Gunshot injury to the abdomen might be a trigger for the onset of Crohn's disease. Patients with intestinal bleeding and stress ulcers should be considered to have concomitant gastroenterological disorders, and appropriate clinical investigations and management should be applied.

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Not applicable.

Author contributions
IL—designed the study, acquired data, drafted the manuscript, and performed literature search and analyses; EK—designed the study, drafted the manuscript, and performed literature search and analyses. VM—conceived of and designed the study and collected the data; VN—conceived of and designed the study, collected the data, and prepared the figures; SS—drafted the manuscript; SMC—drafted the manuscript; MG—performed literature search and analyses; AD—performed the analysis, interpreted data, and carried out critical revision, final approval and submission of the manuscript, and supervision. All authors read and approved the final manuscript.

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Availability of data and materials
All data regarding this case report have been reported in the manuscript. Please contact the corresponding author in case of requiring any further information.

Declarations

Ethics approval and consent to participate
This study was approved by the Ethical Committee at the Kharkiv National Medical University (Kharkiv, Ukraine). The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. Written informed consent was obtained from the participant.

Consent for publication
Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests
The authors declare that they have no competing interests.

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References

1. Lurin I, Khoroshun E, Negoduiko V, Makarov V, Shypilov S, Boroday V, *et al*. Retrieval of ferromagnetic fragments from the lung using video-assisted thoracoscopic surgery and magnetic tool: a case report of combat patient injured in the war in Ukraine. Int J Emerg Med. 2023;16(1):51.
2. Gumeniuk K, Lurin IA, Tsema I, Malynovska L, Gorobeiko M, Dinets A. Gunshot injury to the colon by expanding bullets in combat patients wounded in hybrid period of the Russian-Ukrainian war during 2014–2020. BMC Surg. 2023;23(1):23.
3. Kazmirchuk A, Yarmoliuk Y, Lurin I, Gybalo R, Burianov O, Derkach S, *et al*. Ukraine's experience with management of combat casualties using NATO'S four-tier "changing as needed" healthcare system. World J Surg. 2022. https://doi.org/10.1007/s00268-022-06718-3.
4. Golovko S, Gybalo R, Lurin I, Taraban I, Kobirnichenko A, Ganiuk V, *et al*. Penetrating gunshot wounds to the penis: a case report of combat patient injured in the war in Ukraine. Int J Emerg Med. 2023;16(1):5.
5. Gybalo RV, Lurin IA, Safonov V, Dudla DI, Oklei DV, Dinets A. Retained bullet in the neck after gunshot wounds to the chest and arm in combat patient injured in the war in Ukraine: a case report. Int J Surg Case Rep. 2022;99: 107658.
6. Rogovskyi VM, Koval B, Lurin IA, Gumeniuk K, Gorobeiko M, Dinets A. Temporary arterial shunts in combat patient with vascular injuries to extremities wounded in Russian-Ukrainian war: a case report. Int J Surg Case Rep. 2023;102:107839.
7. Tsema IV, Bespalenko AA, Dinets AV, Koval BM, Mishalov VG. Study of damaging factors of contemporary war, leading to the limb loss. Nov Khirurgii. 2018;26(3):321–31.
8. Tsymbaliuk V, Lurin I, Gumeniuk K, Herasymenko O, Furkalo S, Oklei D, *et al*. Modeling of wound ballistics in biological tissues simulators. Med Perspekt. 2023;28(1):37–48.
9. Anatoliyovych IL, Yuriyovych OU, Valentynovych OH. Surgical treatment features of liver gunshot wound with a dumdum bullet (expanding bullet). Int J Emerg Med. 2022;15(1):57.
10. Cámara RJ, Gander ML, Begré S, von Känel R, Group SIBDCS. Post-traumatic stress in Crohn's disease and its association with disease activity. Frontline Gastroenterol. 2011;2(1):2–9.
11. Taft TH, Bedell A, Craven MR, Guadagnoli L, Quinton S, Hanauer SB. Initial assessment of post-traumatic stress in a US cohort of inflammatory bowel disease patients. Inflamm Bowel Dis. 2019;25(9):1577–85.
12. Lucke-Wold BP, Cook P, Shorter N, Bonasso P. Abdominal trauma leading to diagnosis of Crohn's disease. Int J Surg Case Rep. 2016;26:154–5.
13. Seidemann L, Dietrich A. Newly diagnosed Crohn's disease, and hepatocellular and renal cell carcinoma in a bariatric surgery patient-dealing with the complexity of obesity-associated diseases: a case report and review of the literature. J Med Case Rep. 2023;17(1):379.
14. Peters WR, Fry RD, Fleshman JW, Kodner IJ. Multiple blood transfusions reduce the recurrence rate of Crohn's disease. Dis Colon Rectum. 1989;32(9):749–53.
15. Silvis R, Steup WH, Brand A, Zwinderman KA, Lamers CB, Griffioen G, *et al*. Protective effect of blood transfusions on postoperative recurrence of Crohn's disease in parous women. Transfusion. 1994;34(3):242–7.
16. Remondelli MH, Remick KN, Shackelford SA, Gurney JM, Pamplin JC, Polk TM, *et al*. Casualty care implications of large-scale combat operations. J Trauma Acute Care Surg. 2023;95(2S Suppl):S180–4.
17. Barten DG, Tin D, Granholm F, Rusnak D, van Osch F, Ciottone G. Assessing intent: repetitive strikes on Ukrainian health care facilities. Prehosp Disaster Med. 2025;40(2):114–8.
18. Tertyshnyi SV, Lurin I, Khomenko IP, Gumeniuk KV, Shapovalov VY, Nehoduiko VV, *et al*. A new approach for reconstruction of the gunshot defect of the flexor surface of the ungual (distal) phalanx by the proper transverse branch of the digital artery: a case report of combat patient injured in the Russo-Ukrainian war. Scand J Trauma Resusc Emerg Med. 2023;31(1):64.
19. Dinets A, Nykytiuk O, Gorobeiko M, Barabanchyk O, Khrol N. Milestones and pitfalls in strategic planning of healthcare in capital city in transition. Georgian Med News. 2021;315:189–95.
20. Lurin I, Vorovskiy O, Makarov V, Khoroshun E, Nehoduiko V, Ryzhenko A, *et al*. Management of thoracoabdominal gunshot injuries by using minimally invasive surgery at Role 2 deployed field hospitals in Ukraine. BMC Surg. 2024;24(1):183.

21. Kimono DA. Gastrointestinal problems, mechanisms and possible therapeutic directions in Gulf War illness: a mini review. Mil Med Res. 2021;8(1):50.
22. Cámara RJ, Begré S, von Känel R. The effect of stress-relieving interventions on inflammatory bowel disease: quality assessment of 10 therapeutic studies. Z Psychosom Med Psychother. 2010;56(2):116–35.
23. Vermeire S, Van Assche G, Rutgeerts P. C-reactive protein as a marker for inflammatory bowel disease. Inflamm Bowel Dis. 2004;10(5):661–5.
24. Click B, Vargas EJ, Anderson AM, Proksell S, Koutroubakis IE, Ramos Rivers C, *et al*. Silent Crohn's disease: asymptomatic patients with elevated C-reactive protein are at risk for subsequent hospitalization. Inflamm Bowel Dis. 2015;21(10):2254–61.

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