RESEARCH PAPER

Traumatic duodenal perforation in a professional kickboxer followed by early postoperative ventral hernia: a two-centre case report from Abu Dhabi to Almaty and a rationale for biomarker-guided, biologically augmented hernioplasty

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Abstract

Background. Blunt abdominal trauma in combat sports is uncommon but, when the force vector compresses the upper abdomen against the spine, the duodenum is exposed. Retroperitoneal perforation presents late, demands midline laparotomy, and leaves a fascia that is repeatedly tested by early return to training. The result, in young athletes, is a high probability of postoperative ventral hernia (PVH) within the first year.

Case presentation. A 38-year-old male professional kickboxer (Kazakhstan national team) sustained a second-part duodenal perforation during a competitive bout in Abu Dhabi in November 2025. CT abdomen with intravenous and oral contrast showed a large right-sided retroperitoneal collection, multiple air locules and a small contrast leak at the duodeno-jejunal junction. He underwent emergency diagnostic laparoscopy that was converted to open laparotomy, with primary repair of the perforation and three-drain abdominal lavage. C-reactive protein peaked above 350 mg/L and procalcitonin reached 96.5 ng/mL, both falling below threshold by day 20, when he was discharged. Five months later a 10 × 10 cm ventral hernia developed over the midline scar (fascial defect 7 × 5 cm) and was repaired at the A.N. Syzganov National Scientific Centre of Surgery in Almaty using local-tissue “edge-to-edge” plasty reinforced by a synthetic Ultra-Pro polypropylene mesh and Redon drainage. The early postoperative course was uneventful.

Conclusions. The case shows two missed opportunities of contemporary practice in this patient population. The Abu Dhabi laparotomy was closed without any preoperative or intraoperative measure of the patient’s capacity to lay down durable scar tissue, and the Almaty hernia repair selected a synthetic prosthesis on anatomical grounds alone, without biological augmentation. Both decisions sit upstream of an ongoing dissertation programme at the Kazakh-Russian Medical University, in which type I collagen turnover (P1NP, CTX-I) stratifies patients into mesh, mesh plus platelet-rich plasma

(PRP), and PRP-only fascial-repair pathways. We discuss how the same case, managed under that protocol, would have changed at three points along the timeline.

Keywords: Duodenal perforation; Blunt abdominal trauma; Combat sports; Postoperative ventral hernia; Type I collagen biomarkers; P1NP; CTX-I; Platelet-rich plasma; Hernioplasty; Kazakhstan.

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Background

Blunt duodenal injury after sports trauma is rare. Series of solid-organ and visceral injury in combat athletes are dominated by splenic and hepatic lacerations [1, 2]; isolated duodenal perforation accounts for fewer than 5 % of blunt abdominal trauma overall and a smaller fraction still in non-motor-vehicle mechanisms [3]. The reason it occurs at all in kickboxing or mixed martial arts is mechanical: a focused round-house kick or knee strike to the upper abdomen compresses the second and third parts of the duodenum against the lumbar spine, transmitting energy to a viscus whose retroperitoneal position normally protects it [4]. Symptoms are slow to develop, peritonism may be absent at first contact, and the diagnosis is routinely made hours or days after the injury — often on a delayed CT showing pneumoretroperitoneum or a small contrast leak rather than free intraperitoneal air [5, 6].

Once duodenal perforation is identified, surgical management is straightforward in concept but difficult to execute. Primary repair, with or without omental patching and wide drainage, suffices for small defects within the first 24 hours; larger or older injuries may need duodenal exclusion, gastro-jejunostomy or pancreaticoduodenectomy [3, 7]. Whichever technique is chosen, exposure is usually obtained through a midline laparotomy. That midline incision is the second clinical event of interest in this case, because it sets the stage for postoperative ventral hernia (PVH).

PVH after midline laparotomy occurs in 10–20 % of unselected patients at two years and rises to 30–40 % when the index operation was performed in emergency conditions, in the presence of peritoneal contamination, or in patients with abnormal collagen metabolism [8, 9]. None of those risk factors is typically modifiable at the time of the trauma laparotomy. What is modifiable, in principle, is the choice of fascial-closure technique and the addition of biological augmentation either at the index operation or at the subsequent hernia repair. The biological substrate of the abdominal wall is a tightly cross-linked composite of type I and type III collagen [10]; patients with reduced type I synthesis or excess matrix degradation form weaker scars and are over-represented in PVH cohorts [11]. Two circulating biomarkers — procollagen type I N-terminal propeptide (P1NP, a marker of synthesis) and C-terminal telopeptide of type I collagen (CTX-I, a marker of degradation) — are recommended by the IOF/IFCC as reference indices of collagen turnover [12] and have started to enter the surgical literature as a way to predict fascial healing capacity before incision.

Against this background, the present case captures both halves of the problem in one patient: a young, otherwise healthy elite athlete who needed an emergency midline laparotomy

abroad and developed a clinically significant ventral hernia within five months. The case is reported because the management of each operation, while entirely defensible by the current standard of care, illustrates exactly the gap that an ongoing dissertation programme at our institution is designed to close. We describe the trauma admission, the index operation, the latent interval, the hernia repair, and the lessons that arise when the same timeline is replayed under a biomarker-guided, PRP-augmented protocol.

Case presentation

Patient and history

The patient is a 38-year-old man (date of birth: 21 March 1988; weight: 76.9 kg; height: 193 cm) with no significant past medical history, apart from a remote varicocele repair in 2004. He is a member of the Kazakhstan national kickboxing team and trains six days per week. He has no known drug allergies, does not smoke, and consumes alcohol only socially. Tuberculosis, viral hepatitis and venereal disease screening were negative. Family history is unremarkable for connective-tissue disorders or hernial disease. Written informed consent for publication of clinical details, intraoperative photographs and de-identified imaging was obtained from the patient before manuscript preparation.

Episode 1 — Mediclinic Airport Road Hospital, Abu Dhabi (United Arab Emirates), November–December 2025

Presentation and initial assessment

The patient was struck in the upper abdomen during a competitive kickboxing bout at approximately 10:00 on 25 November 2025. He continued the fight and walked off the mat, but developed worsening epigastric pain over the following hours and was brought to Mediclinic Airport Road Hospital at 22:42 the same evening. On arrival, he was alert, oriented, in evident discomfort, with severe upper abdominal tenderness and epigastric rigidity. Heart rate was around 76 bpm, blood pressure 129/79 mmHg, respiratory rate 18–22/min, and SpO_2 98–99% on room air. A nasogastric tube was inserted in the emergency department, and gastric decompression was started. He was admitted directly to the intensive care unit for close observation.

Investigations

Initial laboratory tests were broadly within normal range (CRP 5.3 mg/L, white-cell count 11.16×10^9/L, neutrophils 10.07, creatinine 106 μmol/L, ALT 27 U/L, AST 29 U/L); urinalysis showed positive ketones and bilirubin without significant haematuria. CT of the abdomen and pelvis with intravenous and oral contrast on 25 November 2025 (Fig. 1A) revealed a large right-sided retroperitoneal collection containing multiple air locules, a distended stomach and proximal duodenum, and a mild ileal wall reaction. Oral contrast reached the third part of the duodenum without frank extravasation. The radiologist advised urgent surgical consultation and continuation of nasogastric decompression. Chest radiograph showed clear lung fields and no pneumoperitoneum.

Over the next 72 hours, despite NPO, hourly nasogastric aspiration (a total of 1.5 L was drained on the first day), broad-spectrum cover with piperacillin–tazobactam, somatostatin support, full proton-pump inhibition and parenteral analgesia, the patient remained moderately tender, with serial inflammatory markers escalating sharply (Table 1; Fig. 4): CRP rose from 5 mg/L to >330 mg/L,

procalcitonin rose from 4 ng/mL to 96.5 ng/mL, and the white-cell count peaked at 19.19 × 10^9/L with a left shift and 88 % neutrophils. Pancreatic enzymes climbed in parallel (amylase 151 U/L). A repeat CT on 29 November 2025 with oral contrast confirmed passage of contrast from the stomach into the duodenum and reaching the proximal jejunum, with a small contrast leak in the right mid abdomen consistent with the duodeno-jejunal junction. The decision to proceed with emergency operative exploration was made the same day following a multidisciplinary discussion with the patient and the Embassy of Kazakhstan, with an explanation provided in Russian.

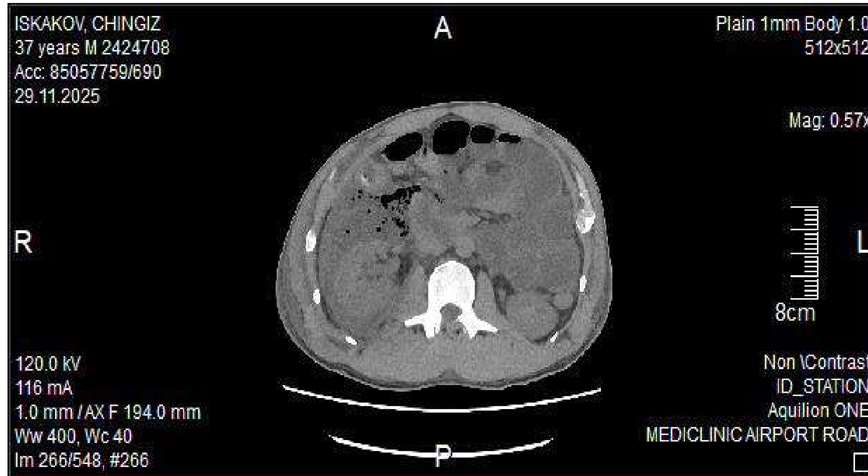

Figure 1A. Axial unenhanced CT (Mediclinic Airport Road Hospital, 25 November 2025), 5 mm reconstruction. The right retroperitoneum is markedly thickened with multiple discrete locules of free air tracking along the right paracolic gutter, in keeping with viscus perforation; the duodenum and proximal small bowel are dilated and gas-filled.

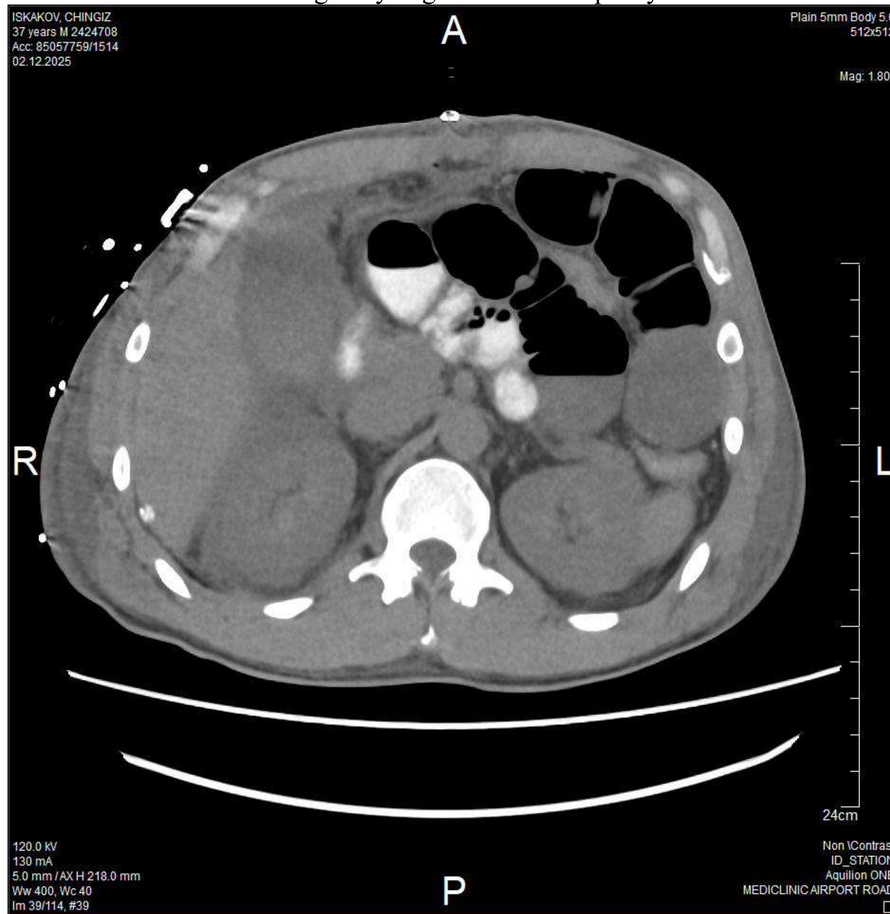

Figure 1B. Axial unenhanced CT (Mediclinic Airport Road Hospital, 2 December 2025), three days after diagnostic laparoscopy converted to open laparotomy with duodenal repair and three-drain abdominal lavage. Multiple dilated bowel loops with air–fluid levels reflect post-operative paralytic ileus; the previously noted retroperitoneal collection has substantially regressed.

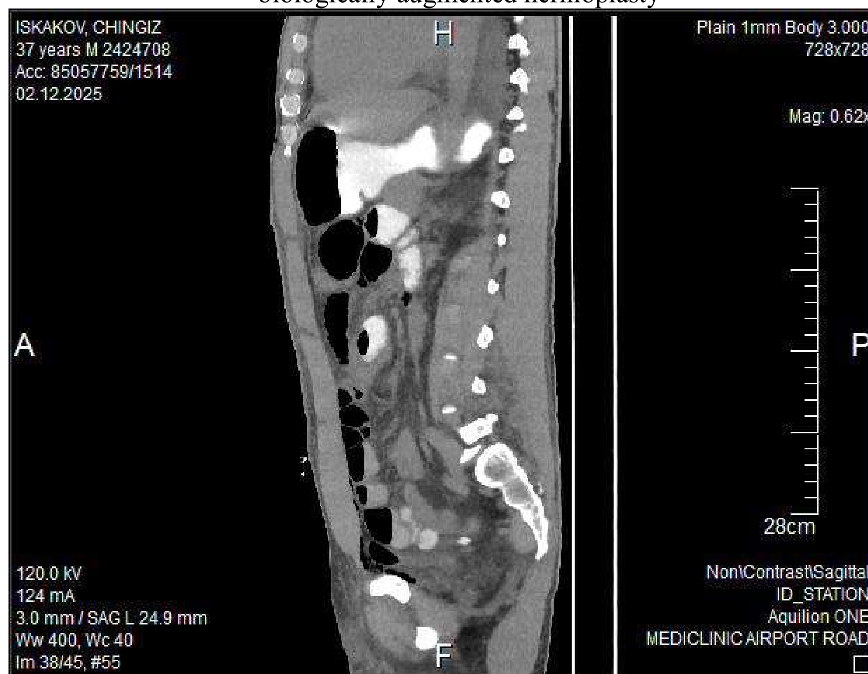

Figure 2. Sagittal reconstruction of the same post-operative CT (2 December 2025) showing dilated bowel loops in the central abdomen, the abdominal-wall closure intact, and the right-sided drain in situ along the para-spinal gutter.

Operation (29–30 November 2025)

Under general anaesthesia the patient was placed supine. Diagnostic laparoscopy was performed first; turbid fluid and a localised retroperitoneal bulge in the right upper quadrant were identified, and the procedure was promptly converted to open laparotomy through a midline incision. Intraoperative findings included a 1.5 cm perforation of the second part of the duodenum, with a contained right retroperitoneal collection extending into the right paracolic gutter and the right iliac fossa. Primary single-layer repair of the perforation was performed with absorbable 3-0 sutures and reinforced with an omental patch. The retroperitoneum was opened, the collection was evacuated, and the abdominal cavity was lavaged with several litres of warm saline. Three drains were placed: one in the right subphrenic/hepatic space, one in the pelvis, and one at the site of perforation in the retroperitoneal region. The fascia was closed with continuous slowly absorbable monofilament suture using a small-bite technique; subcutaneous tissue and skin were approximated in standard fashion. Total operating time was approximately 180 minutes. The lead surgeon was Dr Ahmad Mohamad Ajawi (Specialist General Surgery, Mediclinic Airport Road Hospital).

Postoperative course (Days 1–20)

The patient returned to the ICU intubated and was extubated within 12 hours. He developed mild bilateral pleural effusion with mild posterior lower-lobe collapse, and a paralytic ileus, both of which resolved with chest physiotherapy, incentive spirometry, ambulation and enteral free-water trials. Total parenteral nutrition was initiated on Day 2 and continued until tolerance of oral pureed diet on approximately Day 9. Antibiotic therapy was de-escalated as inflammatory markers

improved. Drain output, character and culture were monitored daily. The right subphrenic drain produced 30–50 mL serous-sanguinous fluid per day and was removed on the fifth postoperative day; the pelvic drain produced larger volumes (140 mL per day at peak), gradually clearing, and was removed on the seventh postoperative day. The retroperitoneal drain at the site of perforation produced 25–55 mL of progressively yellow-clear discharge per day and was kept in situ at discharge.

The trajectory of inflammatory markers across the entire 20-day admission is shown in Table 1 and Fig. 4. CRP fell from a peak of 350 mg/L on the day of surgery to 75 mg/L by Day 14 and to 11.9 mg/L by the day of discharge. Procalcitonin fell from 96.5 ng/mL through 32.9 ng/mL on Day 5 to 4.09 ng/mL on Day 7. White-cell count and lymphocyte ratios returned to normal by the second week. Repeat CT on 2 December 2025 (Fig. 1B and Fig. 2) showed resolution of the previously noted active leakage within the jejunum and significant improvement in the right retroperitoneal collection, with multiple small post-operative air foci and post-operative ileus involving the jejunal loops, all judged to be consistent with normal early postoperative changes.

By the third week, the patient was tolerating a soft mechanical diet, opening his bowels regularly, afebrile, ambulating independently and reporting only mild, dull abdominal pain at the incision. He was declared fit for international flight (in a wheelchair, with the retroperitoneal drain still in place) and discharged on 14 December 2025 (postoperative day 20). Discharge recommendations included a pureed and soft mechanical diet for one further week, drain removal at the home-country surgical OPD based on drain output, no heavy exercise or lifting for 3 months, and follow-up in the country of residence. Discharge medication consisted of paracetamol 1 g three times daily, pantoprazole 40 mg once daily before breakfast, and levofloxacin 500 mg once daily for seven days.

Table 1. Inflammatory marker dynamics, drain output and clinical milestones across the 20-day Mediclinic Airport Road admission. Reference intervals are shown in square brackets in the column headings. Em-dashes indicate that the test was not performed on the corresponding day.

Date (Day post-op)	CRP (mg/L) [<5]	PCT (ng/mL) [<0.05]	WBC (×10⁹/L) [4–10]	Albumin (g/L) [35–52]	Drain output (mL/24 h)	Clinical milestone
25 Nov (D0)	5.3	—	11.16	—	—	Trauma; ICU admission
27 Nov (D2)	—	96.5	—	24.7	—	Sepsis evolving
28 Nov (D3)	330	95	—	—	NGT 200 mL	Decision for surgery
29 Nov (D4)	350	—	—	—	—	Diagnostic laparoscopy → laparotomy
30 Nov (D5)	295	32.9	19.19	17.9	—	ICU; CRP plateau
1 Dec (D6)	200	—	11.24	—	Subphr. 50	Drain output decreasing

Date (Day post-op)	CRP (mg/L) [<5]	PCT (ng/mL) [<0.05]	WBC ($\times10^9$/L) [4–10]	Albumin (g/L) [35–52]	Drain output (mL/24 h)	Clinical milestone
3 Dec (D8)	218	—	—	—	Pelvic 140	CT — leak resolved
8 Dec (D13)	218→164	4.09	14.0	—	Retroperit. 55	Pureed diet
10 Dec (D15)	118	—	14.0	—	Retroperit. 35	Soft diet, ambulating
11 Dec (D16)	75	—	—	—	Retroperit. 25	Sub-phrenic drain out
14 Dec (D20)	11.9	<0.5	8.28	≈30	Retroperit. 25	Discharged to flight home

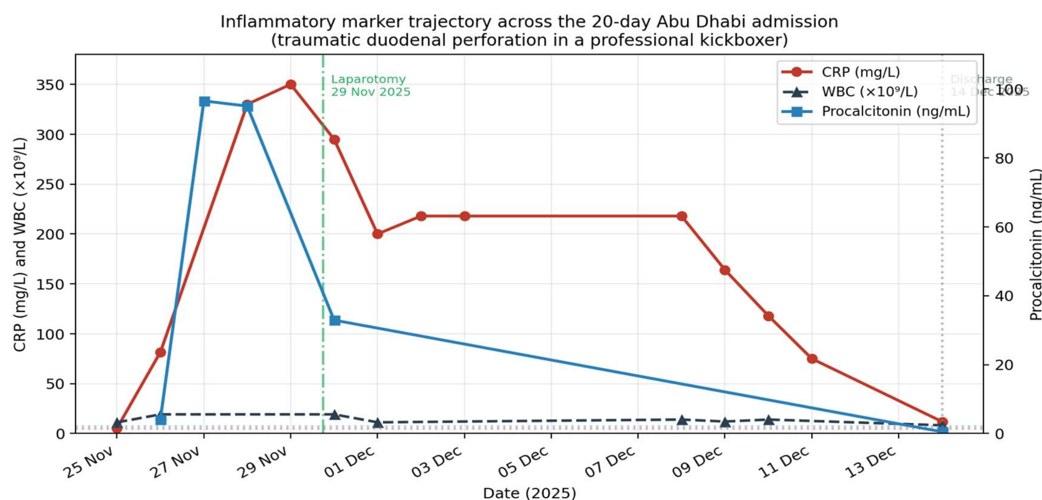

Figure 4. Inflammatory marker trajectory across the 20-day Mediclinic Airport Road admission. CRP (red, left axis), white-cell count (dark, left axis) and procalcitonin (blue, right axis); reference upper limits shown as dotted lines. The vertical green line marks the day of laparotomy. Both CRP and procalcitonin peak in the 48 hours immediately preceding source control and fall sharply once sepsis is treated.

Inter-episode interval (December 2025 – February 2026)

The patient flew home to Almaty within 48 hours of discharge. The remaining retroperitoneal drain was removed at his local surgical outpatient clinic in late December 2025 once daily output fell below 5 mL. He was declared physically inactive for three months. Reluctantly, in his own account, he resumed light training (skipping rope, shadow-boxing without contact) towards the end of January 2026 and progressed to bag-work and partial sparring during February. Approximately two months before his next admission — i.e. in mid-February 2026 — he first noticed a soft, reducible bulge above the old midline scar after a heavier training session. Over the subsequent two months the bulge enlarged and became mildly painful, particularly with Valsalva manoeuvres and with kicking technique. He was reviewed at the sports medicine dispensary, surgical consultation was advised, and he presented voluntarily to the National Scientific Centre of Surgery named after A.N. Syzganov in Almaty for elective hernia repair.

Episode 2 — A.N. Syzganov National Scientific Centre of Surgery, Almaty (Republic of Kazakhstan), April 2026

Presentation and preoperative work-up

Admission was on 22 April 2026 at 10:12 to the Department of Hepato-Pancreato-Biliary Surgery and Liver Transplantation. The presenting complaint was a hernia-like protrusion over the old midline post-operative scar. On clinical examination, he was in fair general condition, normosthenic, well-nourished, alert and oriented. Vital signs were unremarkable (BP 120/80 mmHg, T 36.6 °C, HR 72/min, RR 20/min, vesicular breathing throughout, no rales, regular heart sounds with clear tones). The abdomen was soft and non-tender on palpation, with no symptoms of peritoneal irritation; bowel motion and gas passage were normal. Locally, over the old midline post-operative scar, a 10 × 10 cm hernia-like protrusion was visible and palpable; it was easily reducible into the abdominal cavity, with no signs of strangulation. Routine preoperative work-up included full blood count (haemoglobin 167 g/L, white-cell count 4.8 × 10^9/L, platelets 235 × 10^9/L), basic metabolic panel (creatinine 100.5 μmol/L, glucose 5.4 mmol/L), liver function (ALT 71 U/L, AST 19.6 U/L, total bilirubin 5.2 μmol/L), coagulation (PT 13.94 s, PTI 96.5 %, INR 1.1), negative HIV, HBV, HCV and syphilis screen, blood group O Rh-positive, normal urinalysis, normal arterial blood gas, normal ECG (sinus rhythm, 51 bpm), and abdominal ultrasound showing diffuse parenchymal changes of the liver and pancreas without focal lesions. Specialist consultations were obtained from ENT (deviated nasal septum noted, no surgical contraindication), dentistry (oral cavity sanated), and cardiology (no contraindication to surgery). The anaesthetic risk was scored ASA II.

Operation (24 April 2026, code 53.90, “removal of other types of hernias”)

Under endotracheal anaesthesia and after standard four-fold povidone preparation of the operative field, an incision was made directly over the hernial protrusion. Subcutaneous fat was dissected to expose a hernia sac measuring 8.0 × 5.0 cm. The fascial defect (the “hernia gates”) was 7.0 × 5.0 cm. A strand of greater omentum was found adherent to the parietal peritoneum but viable; sharp and blunt dissection released it and it was returned to the abdominal cavity. The edges of the hernia gates were excised back to clean aponeurosis, the aponeurotic edges were dissected, and the defect was closed with local-tissue “edge-to-edge” plasty reinforced by an additional fixation of a synthetic Ultra-Pro polypropylene mesh. Haemostasis was meticulous and dry. A Redon drain was placed in the subcutaneous fat compartment. The wound was closed in layers with absorbable interrupted sutures and skin sutures; an antiseptic-impregnated dressing was applied (Fig. 3). The lead surgeon was Dr Tilieuov Serik Turebaevich; the operating team also included Dr Serikuly Yerbol; the head of department, Dr Belgibayev Yernur Bakytzhanovich, was present for the procedure. Estimated intra-operative blood loss was minimal.

Postoperative course (Days 1–3) and discharge

The early postoperative course was unremarkable. Daily Redon drain output was approximately 100 mL of serous-sanguinous fluid. The patient was afebrile, mobilised on the first postoperative day, tolerated a Diet No. 5 soft regimen from the second day, and reported only mild peri-incisional pain controlled by oral

paracetamol and ketoprofen. Wound inspection at each dressing change showed healthy, well-perfused tissue without erythema or discharge. Postoperative laboratory tests on Day 1 and Day 3 were within normal range, with mild physiological changes (haemoglobin 171 → 166 g/L, white-cell count 8.8 → 7.31 × 10^9/L, normal coagulation, normal renal and hepatic function). On 27 April 2026 (Day 3 post-op) he was discharged in satisfactory condition for outpatient follow-up by his local surgeon, with the Redon drain still in situ. Discharge recommendations comprised: daily wound dressing changes by the local surgeon; restriction of physical activity and use of an abdominal binder for six months; Diet No. 5 (low-fat, low-spice) for three months; daily wound dressing with betadine or povidone; suture removal at the place of residence 14 days after the operation. A photograph of the operative wound and the Redon drain on the day of discharge is shown in Fig. 3.

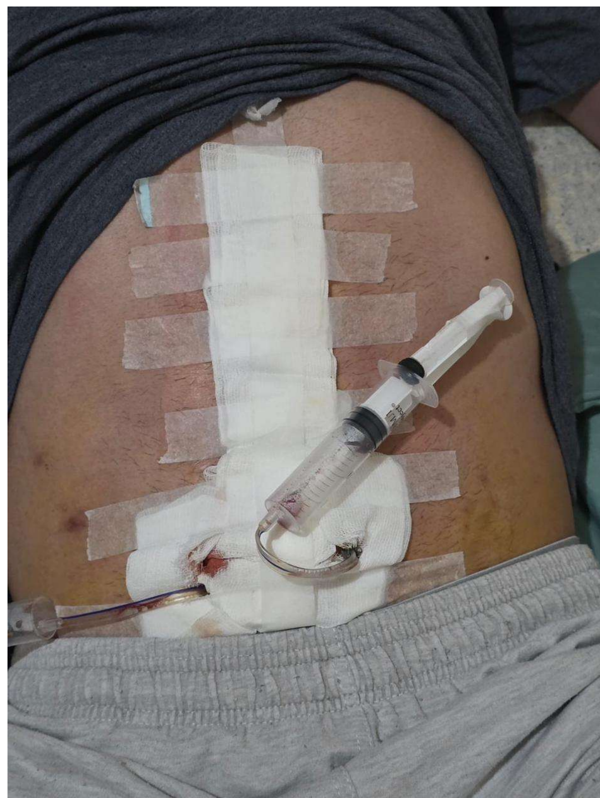

Figure 3. Postoperative wound and Redon drain on 2 May 2026 (Day 8 after open hernioplasty at the A.N. Syzganov NSCS). The midline incision is dry and clean under a sterile dressing; the drain syringe is held vertically for measurement of 24-hour output. Patient identifiers have been removed; written consent for publication of this image was obtained.

Table 2. Side-by-side comparison of the two operations the patient underwent, five months apart, in two different countries and healthcare systems.

Parameter	Operation 1 — Abu Dhabi (29 Nov 2025)	Operation 2 — Almaty (24 Apr 2026)
Setting	Emergency, ICU patient, septic	Elective, fully optimised, ASA II
Indication	Duodenal perforation with retroperitoneal sepsis	Postoperative ventral hernia (K43.9), 10 × 10 cm

Parameter	Operation 1 — Abu Dhabi (29 Nov 2025)	Operation 2 — Almaty (24 Apr 2026)
Approach	Diagnostic laparoscopy → midline laparotomy	Open, incision over hernial protrusion
Key intra-operative finding	1.5 cm perforation of duodenum (D2); right retroperitoneal collection	Hernia sac 8.0 × 5.0 cm; defect 7.0 × 5.0 cm; viable adherent omentum
Reconstruction	Primary single-layer repair + omental patch	Local-tissue “edge-to-edge” aponeurotic plasty
Prosthesis	None (acute injury)	Synthetic Ultra-Pro polypropylene mesh, additional fixation
Drainage	Three drains (subphrenic, pelvic, retroperitoneal)	Single Redon drain, subcutaneous
Anaesthesia	General, endotracheal	General, endotracheal
Approx. operative time	≈ 180 min	≈ 75 min
Estimated blood loss	Moderate (peritoneal lavage)	Minimal
Length of hospital stay	20 days (with international flight clearance)	5 days (Day 0–Day 3 post-op)
Lead surgeon	Dr A. M. Ajawi (Mediclinic Airport Road, Abu Dhabi)	Dr S. T. Tilieuov (NSCS A.N. Syzganov, Almaty)
Postoperative complications	Mild bilateral pleural effusion; paralytic ileus (resolved)	None at discharge
Biomarker stratification	Not performed	Not performed
Biological augmentation (PRP)	Not used	Not used

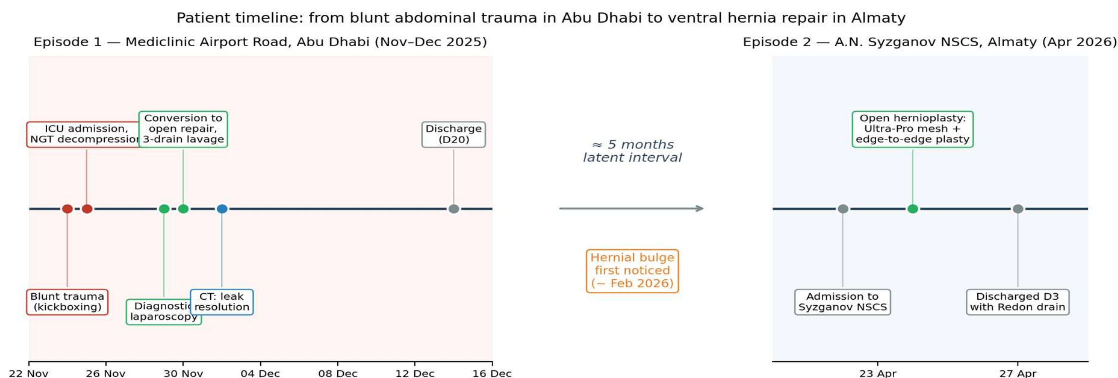

Figure 5. Patient timeline. Episode 1 (left, red shaded): trauma, ICU admission and emergency surgery in Abu Dhabi; Episode 2 (right, blue shaded): elective ventral hernia repair in Almaty. The five-month latent interval between the two operations corresponds to the maturation period of the original midline scar and to the patient's graded return to combat-sport training.

Discussion

Three things make this case worth reporting. The first is the rarity of the index injury. Blunt duodenal perforation accounts for less than 5 % of blunt abdominal trauma in published series, and the kickboxing mechanism is rarely highlighted in the surgical literature [3, 4]. The second is the speed at which a young, otherwise fit elite athlete went from injury to multi-system inflammation. CRP rose from a near-normal 5 mg/L to 350 mg/L within 96 hours, procalcitonin entered the high-sepsis range within 48 hours, and at the time of laparotomy,

the retroperitoneum already contained a frankly turbid collection. The clinical lesson, beyond confirming what abdominal-trauma textbooks already say [5, 7], is that a stable haemodynamic profile in the first 24 hours after a focused upper-abdominal kick says little about what the duodenum is doing. The third — and the reason for choosing this specific case for publication — is the development of a clinically significant ventral hernia within five months of the index laparotomy, in a patient with no conventional risk factors apart from the emergency setting itself.

PVH after midline laparotomy is a known complication; reports place it at 10–20 % at two years for elective surgery and 30–40 % for emergency surgery in the presence of contamination, obesity, diabetes or steroid use [8, 9]. Our patient is a 38-year-old man with a body-mass index of 20.7 kg/m², no diabetes, no steroid use, and no recognised connective-tissue disorder. The single conventional risk factor present was the emergency setting of the index operation. Why the hernia developed so quickly, then, is in the territory of biological — not surgical — variability. Two strands of evidence point towards collagen metabolism as the explanation. First, fascial biopsies from PVH patients show altered type I to type III collagen ratios compared with controls [10, 11]. Second, polymorphisms of COL1A1, COL3A1 and several MMP genes are over-represented in PVH cohorts [13]. Direct measurement of collagen in the abdominal wall requires a tissue sample and is impractical at the trauma bedside. P1NP and CTX-I are circulating surrogates of synthesis and degradation respectively, are quantifiable on a standard immunoassay platform, and are recommended as international reference biomarkers of collagen turnover [12].

The corresponding doctoral dissertation programme at the Kazakh-Russian Medical University (“Prevention of postoperative ventral hernias”) pursues exactly that line of reasoning. The protocol stratifies patients into three groups using preoperative P1NP and CTX-I and assigns each group a different fascial-repair strategy. Group 1 (low collagen index) and Group 2 (intermediate) receive lightweight polypropylene mesh hernioplasty supplemented by subaponeurotic injection of leukocyte-rich platelet-rich plasma (LR-PRP) at four sites along the fascial edges. Group 3 (high collagen index) is repaired with primary fascial closure plus the same subaponeurotic LR-PRP injection, without prosthetic mesh. The biological rationale is straightforward: PRP delivers a bolus of growth factors (PDGF, TGF-β1, VEGF, IGF-1) that drive fibroblast recruitment and collagen neosynthesis [14, 15], and matching mesh use to the patient’s native fascial quality avoids both under- and over-treatment. An interim analysis of 106 patients at our institution reported a 0.94% recurrence rate at a median follow-up of 9.4 months and a low complication profile [Moshkal et al., manuscript under review at BMC Surgery].

Replaying the present case under that protocol would have changed three decisions (Table 3). At decision point A, the trauma laparotomy in Abu Dhabi, the fascial closure technique would have been unchanged, but a 5 mL serum sample at the same venepuncture used for sepsis work-up would have anchored the patient’s baseline collagen turnover for later use. At decision point B, the latent interval, a single repeat P1NP at four weeks would have either reassured the patient and his sports physician or flagged a high-risk fascial-healing profile that justifies prolonged binder use, structured ultrasound surveillance, and a more conservative return-to-

sport progression — none of which is currently routine. At decision point C, the elective hernia repair in Almaty, a high preoperative collagen index in this young athlete would likely have placed him in Group 3, allowing primary aponeurotic closure with subaponeurotic LR-PRP rather than a synthetic Ultra-Pro mesh. Sparing him a permanent prosthetic foreign body matters at his age and occupation, given the literature on chronic mesh-related pain and late mesh-related complications in active patients [16].

Table 3. How the four decision points in this case would have been handled under the biomarker-guided, PRP-augmented hernioplasty protocol that is the subject of the corresponding doctoral dissertation at the Kazakh-Russian Medical University.

Decision point	What was done	What the protocol would do
A — Index trauma laparotomy (Abu Dhabi, Nov 2025)	Continuous slowly-absorbable monofilament suture in small-bites technique; no preoperative collagen sample (acutely septic patient).	Same fascial closure technique. Capture a 5 mL serum sample at the same venepuncture used for sepsis screening for retrospective P1NP/CTX-I assay; record the value to triage early follow-up imaging at 3 and 6 months in the highest-risk fascial-healing patients.
B — Outpatient follow-up (Dec 2025 – Feb 2026)	Standard advice: no heavy exercise for 3 months; no structured imaging follow-up; return-to-training decisions made by athlete and his sports physician.	P1NP/CTX-I repeated at 4 weeks. If P1NP is in the lowest quartile (high recurrence risk), instruct prolonged binder use, stricter return-to-sport progression, and prophylactic 3-month ultrasound. Earlier elective repair if a defect appears on imaging before clinical recognition.
C — Elective hernia repair (Almaty, Apr 2026)	Local-tissue edge-to-edge aponeurotic plasty with additional fixation of a synthetic polypropylene mesh; Redon drain; no biological augmentation.	Pre-incisional P1NP/CTX-I. With this patient's expected high collagen index (Group 3 of the protocol), primary fascial closure with subaponeurotic LR-PRP and no synthetic mesh would be considered, sparing him a permanent foreign body and the chronic pain risk that goes with it. If his biomarker had been low (Group 1) the present mesh choice would still have been used, but augmented with subaponeurotic LR-PRP at the four corners of the defect before fascial closure.
D — Postoperative monitoring	Standard wound care; bandage 6 months; Diet No. 5 for 3 months; suture removal at day 14.	Same wound care + structured ultrasound surveillance at 1, 3, 6 and 12 months. VAS pain documented at each visit. Hernia recurrence is the registered primary endpoint of the dissertation protocol.

Several limitations of the present interpretation must be acknowledged. The case is a single observation, and counterfactual reasoning is, by definition, about that. The biological argument relies on the assumption that this patient would have fallen into the high-collagen group, which has not been verified at the time of writing because a preoperative biomarker assay was not part of the standard work-up at either centre. The PRP literature in abdominal-wall surgery is small and heterogeneous; randomised evidence is dominated by tendon and orthopaedic indications [14]. The Almaty hernia repair was performed using a recognised mesh-augmented technique with a respectable short-term result, and it is not our intention to suggest that the

operating team should have done otherwise within the constraints of standard practice. The point, rather, is that the standard practice itself does not yet treat the biological substrate as a decision variable. The present case is the kind that should generate that conversation.

Two practical observations also deserve mention. First, the international transfer of care between two healthcare systems with different documentation languages and laboratory conventions added complexity to the perioperative review. The Mediclinic Airport Road discharge summary was a 31-page document in English; the Syzganov NSCS discharge summary was a 5-page document in Russian and Kazakh. Both contained the information needed to reconstruct the timeline, but the patient himself was the only continuous record of decisions taken between the two admissions. A standardised perioperative passport for cross-border athlete care, including collagen biomarker values when available, would simplify this. Second, the patient remained motivated to return to elite competition throughout. Elective hernia surgery in this population must therefore weigh chronic mesh-related symptoms against the durability of primary fascial closure — exactly the trade-off that biomarker stratification is designed to inform.

Conclusions

We report a 38-year-old elite kickboxer who sustained a duodenal perforation during a competitive bout in Abu Dhabi, was treated abroad with primary repair, three-drain abdominal lavage and a 20-day intensive course, and returned to Almaty, where a clinically significant midline ventral hernia developed within five months and was repaired electively with mesh-augmented local-tissue plasty. Both operations were performed to a high contemporary standard. Neither operation, however, took into account the patient's collagen turnover or the potential of biological augmentation. The case is exactly the population that the corresponding doctoral programme in our institution is designed to serve, and it is reported as a real-world worked example of how a biomarker-guided, PRP-augmented protocol would have changed three decision points along the timeline. The patient is alive and well, and is returning to training at the time of submission; long-term follow-up is planned, with structured ultrasound surveillance at 1, 3, 6, and 12 months.

Declarations

Ethics approval and consent to participate

The clinical reporting in this case followed the principles of the Declaration of Helsinki (2013 revision) and the Code of Ethics of the Republic of Kazakhstan. The case is reported under the umbrella ethics approval of the Local Ethics Committee of the Non-Commercial Joint-Stock Company "Kazakh-Russian Medical University", Almaty, Kazakhstan (Minutes No. 26/145; Registration No. 145; date of approval 17 September 2024).

Consent for publication

Written informed consent for the publication of clinical details, intraoperative photographs, postoperative wound images, and de-identified imaging was obtained from the patient. A copy of the signed consent form is available for review by the Editor-in-Chief on request. Patient identifiers have been removed from all figures.

Availability of data and materials

All data supporting the conclusions of this article are included within the article itself. The original discharge documents from both institutions and all imaging studies are held under medical confidentiality at the corresponding author's institution and are available on reasonable request after approval by the Local Ethics Committee.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

K.A.M. conceived the case report, collated source documents from both institutions, drafted the manuscript and prepared the figures and tables. S.K. supervised the molecular-biology framing and reviewed the discussion. N.T.J. and V.M.M. supervised the surgical research programme under which the case is reported and revised the manuscript critically for important intellectual content. N.D. supervised case-record retrieval and operative logistics. M.A.K. contributed to clinical interpretation and manuscript review. All authors read and approved the final version submitted for publication.

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Abbreviations

ASA: American Society of Anesthesiologists physical status classification

CRP: C-reactive protein

CT: Computed tomography

CTX-I: C-terminal telopeptide of type I collagen

ICU: Intensive care unit

LR-PRP: Leukocyte-rich platelet-rich plasma

NGT: Nasogastric tube

NSCS: National Scientific Centre of Surgery (A.N. Syzganov)

P1NP: Procollagen type I N-terminal propeptide

PCT: Procalcitonin

PRP: Platelet-rich plasma

PVH: Postoperative ventral hernia

VAS: Visual analogue scale

WBC: White blood-cell count

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