



## Case report

# A novel surgical solution to impossible fascial closure due to contaminated abdominal cavities: A case report

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## ABSTRACT

**Introduction:** Chronic, large, and old incisional hernias often lead to surgical complications and major hindrances during emergent laparotomies. The most challenging stages of the laparotomy in such cases occur during opening and fascial closure.

**Case presentation:** This article explains the novel surgical technique employed for the complex abdominal closure upon concluding an emergent laparotomy on a 68-year-old female patient. This innovative technique is appropriate for patients with contaminated abdominal cavities and scant fascia who require abdominal operations in cases where biological mesh is not available or is not a viable option.

**Conclusion:** This surgical technique can help surgeons restrict abdominal contents and organs (particularly the bowel loops) and prevent migration out of the abdominal cavity during the early post-operative stages, hence, reducing post-surgical complications. The discussed surgical technique ensures that the abdominal fascia defect is limited using skin flaps. This defect later develops into a small hernia sac within a few weeks. Patients then need to have a secondary delayed elective operation on this significantly smaller sized hernia for repair using synthetic mesh.

## 1. Introduction

Incisional hernias are a common complication of abdominal surgeries reported in up to 11% of total patient's post-surgery and in up to 20% of those who developed post-operative wound infections [1]. Patients with large incisional hernias are candidates for reconstructive surgery using synthetic mesh, nevertheless, contaminated abdominal cavities significantly increases the risk of post-operative mesh infection [2]. During such infections the mesh must often be removed, causing a fascial wall deficit that is often larger and more distressing for the patient when compared to the original hernia [3]. Currently, selective biological meshes are available for use in fascial wall reconstruction in the case of contaminated abdomens, however, they are very expensive and not routinely available in lower socioeconomic nations. Within this case report, conveyed in line with the SCARE 2020 criteria, we explain a simple new surgical technique for abdominal closures in contaminated abdomens with chronic retracted fascia [4].

## 2. Case presentation

A 68-year-old female with a history of hypertension (for which she was taking Losartan pills), multiple previous laparotomies, a large incisional hernia (which was previously operated on), and no significant family history presented with abdominal pain and obstipation. The conducted diagnostic studies, including an abdominal x-ray and an abdominopelvic CT-scan (Fig. 1) revealed a high-grade partial obstruction within the distal ileum due to adhesions likely caused by previous surgeries. Consequently, the patient was prepared for laparotomy and adhesiolysis. During the laparotomy, it became evident that the patient had a large fascial defect from the xiphoid to the hypogastric region. Despite this, the contents of the hernia sac were separated carefully. After complete enterolysis, an obstruction was observed in the terminal ileum area, to address this, the patient then underwent ileocecectomy. Due to this, some gastrointestinal (GI) secretions unavoidably contaminated the abdominal cavity.

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<sup>1</sup> Narjes Mohammadzadeh accepts full responsibility for the discussed surgical procedure, the conduction of this case study, had access to data, and controlled the decision to publish.

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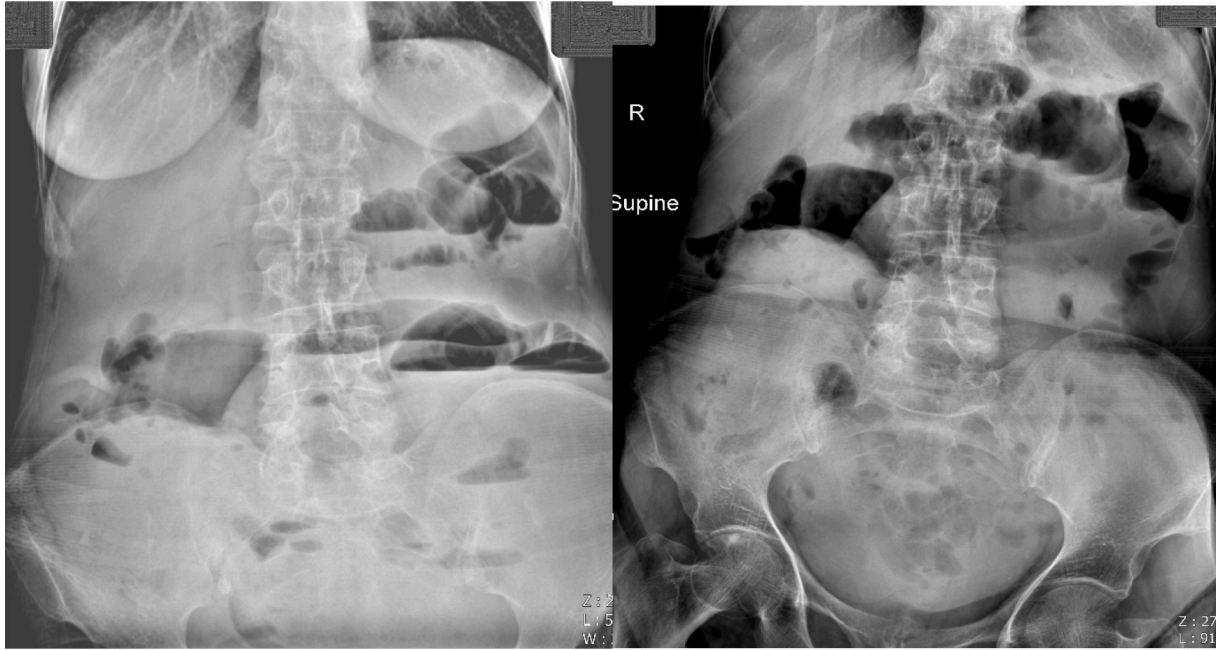
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**A:**



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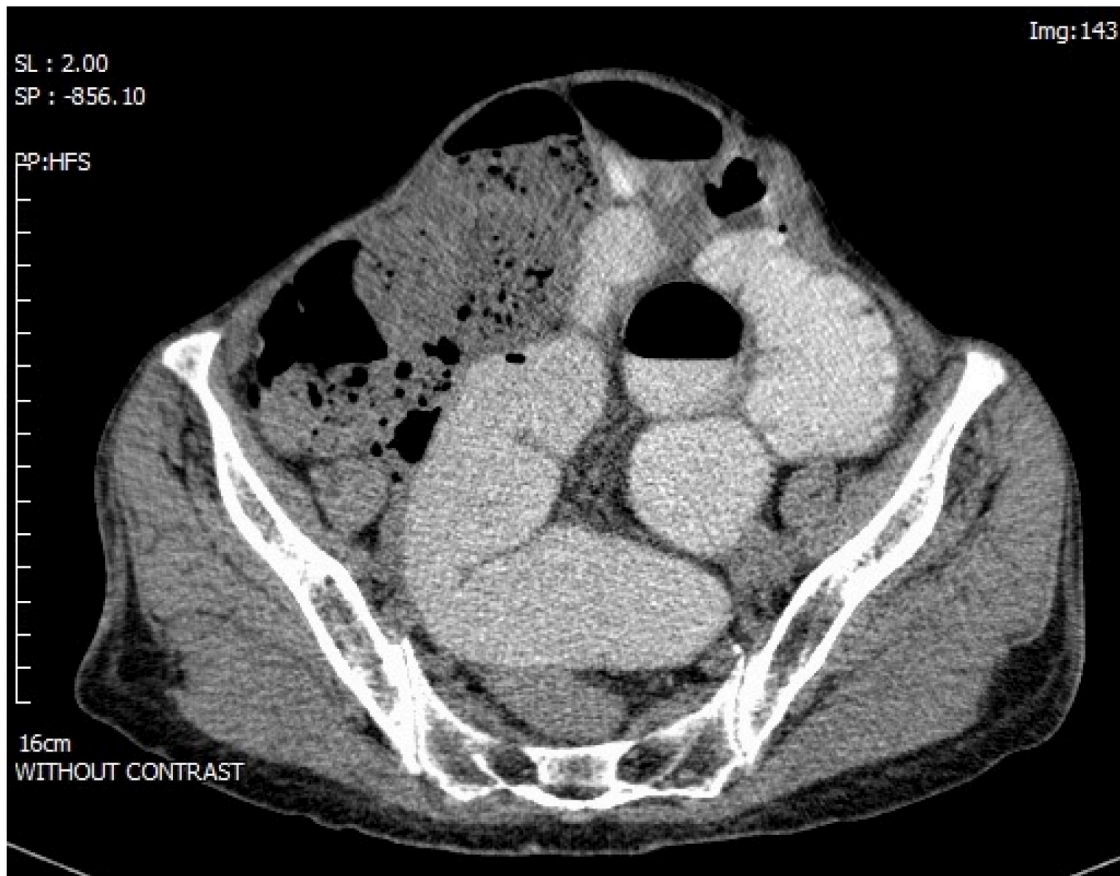


Fig. 1. Pre-operative imaging; abdominal X-ray (A) & abdominopelvic CT scan (B).

To initiate closure, the bilateral components' separation was completed, and the open ends of the fascia were approximated with interrupted sutures as much as possible without creating tension in the upper and lower ends of the fascial defect. Nevertheless, the central part of the fascia remained open as the tension created did not allow for primary closure [5,6]. Due to previous laparotomies, the abdominal wall fascia could not be approximated without tension and fascial edges still could not reach one another during closure [7]. Moreover, due to the contamination of the abdomen with secretions, it was not possible to insert a synthetic mesh for abdominal closure based on the high risk of infection (it is important to note that biological mesh is also very expensive and not routinely available to surgeons in lower socioeconomic nations) [8,9]. To address this issue, this new abdominal wall defect (which was more limited than the first one) was covered by ipsilateral skin flaps as a novel procedure (please refer to Fig. 2 for details). This surgical technique can help surgeons restrict abdominal contents and organs (particularly the bowel loops) from migration out of the abdominal cavity during the early post-operative stages, hence, reducing post-surgical complications. The discussed surgical technique ensures that the abdominal fascia defect is limited using skin flaps. This defect later develops into a small hernia sac within a few weeks. Patients then need to have a secondary delayed elective operation on this significantly smaller sized hernia for repair using synthetic mesh.

### 2.1. Procedure presentation

The skin and the hernia sac were opened and complete adhesiolysis was successfully conducted. The old sac was resected, and the free edges of the fascia were completely released. After raising the bilateral skin flaps, component separation was done. Successively, the bilateral flaps composed of the anterior rectus fascia and the fascia of oblique muscle were pulled towards each other after lateral longitudinal release (components' separation). After this, the upper and lower parts of the fascia were approximated with interrupted sutures as much as possible.

After approximation, the remaining defect at the central part of the

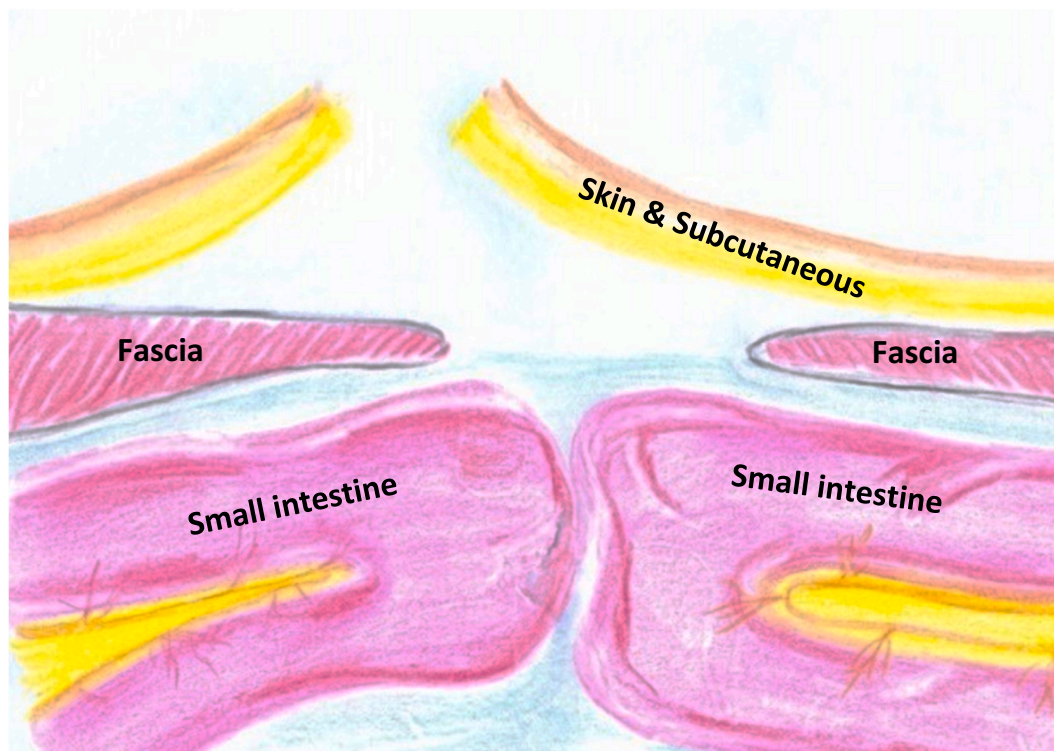
fascia was sized 40 mm by 50 mm. To tend to this issue, one of the options presented was to leave the fascia completely open and close the skin over the abdominal contents [10]. However, this would likely result in a large and painful hernia for the patient. Therefore, the decision was made to restrict the fascial defect with ipsilateral skin flaps to control the free movement of viscera and abdominal contents over the fascia. For this purpose, ipsilateral skin flaps were drawn over the fascial defect. Next, the subcutaneous tissue of the flaps was fixed tight and continuous to the edges of the defect with absorbable sutures as demonstrated in Fig. 3. During this procedure, the skin flap was placed in a traction set. After circumferential fixation of the subcutaneous part of the flap around the fascial defect, the skin was sutured 1 cm lateral to the midline (Fig. 3). Due to the patient's condition, the performed technique did not put her at a higher risk than the previous conventional condition.

### 2.2. Follow up

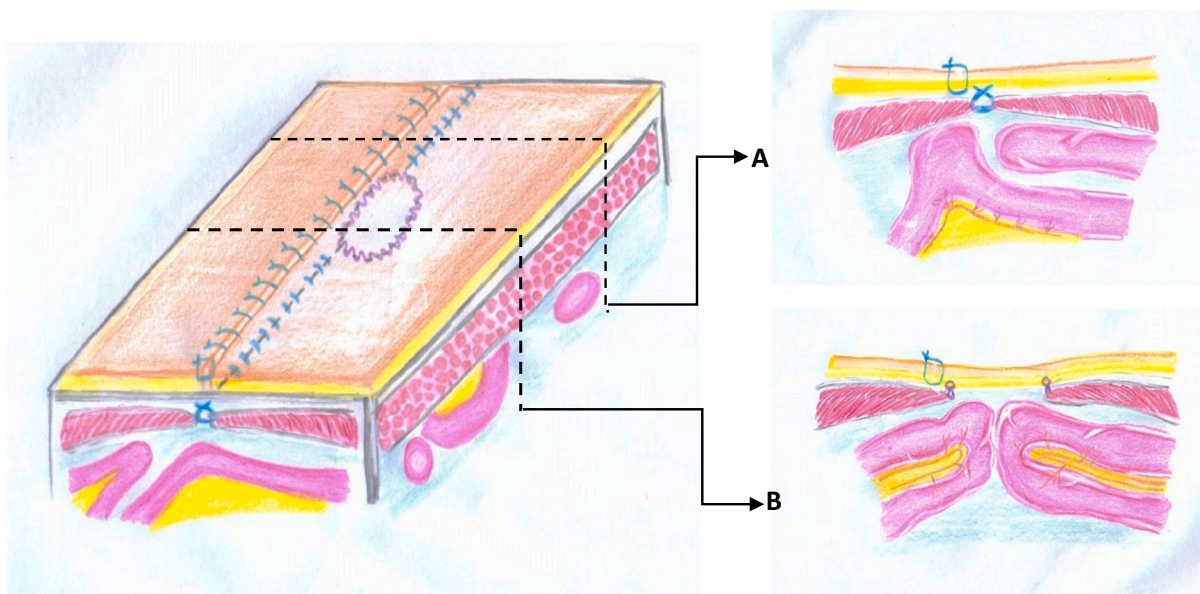
Day 2 post-operation, the patient had passage of gas and fecal defecation occurred on day 4. The patient was discharged 5 days after surgery. 10 days after the surgery, the patient reported to the clinic with around 2 mL of discharge from the suture per day. On day 14, the discharge stopped and the sutures were removed. During the physical exam 2 months after the operation, it was noted that the abdominal wall defect was still limited due to the covering of the fascial defect with skin flaps as discussed, moreover, the hernia had not increased in size. After surgery, the patient was advised to use abdominal bandage for at least 3 months. Furthermore, the patient did not have any complaints about the hernia or pain. Currently, it is planned to repair the fascial defect using synthetic mesh coverage and the Onlay Method.

### 3. Discussion and conclusion

Based on referral texts and recent articles, abdominal closure for a contaminated peritoneal cavity with a retracting fascia is challenging [2,3,5]. If component separation can release sufficient fascial tissue for



**Fig. 2.** Image highlighting a cross-section of the surgical site. From top to bottom: skin flaps, fascial defects with fascial ends unable to reach each other, abdominal cavity with small intestine.



**Fig. 3.** Figure highlighting cross-sections of the surgical site at the zone of the fascial defect (Area B) as well as at the sites with normal fascial closure (Area A). From top to bottom: skin, subcutaneous tissue, fascia, abdominal cavity.

abdominal closure, successful primary closure can be completed despite the retracted fascia [10]. If the tissue release by component separation cannot approximate the fascial edges together, reconstruction with a mesh should be considered [2]. Biological meshes are the most appropriate in cases where contamination of the abdominal cavity has occurred, this is because synthetic meshes provide a comparatively higher risk for post-operative infection [2,3].

Regrettably, biological meshes are very expensive and also are not available all the time (particularly in developing countries) so the explained technique can resolve the need for biological mesh in emergent laparotomies when abdominal contamination has occurred. In this technique, the skin flaps restrict the abdominal contents in the region of the fascial defect, as such, the bowel loops and abdominal contents cannot exit at the site of the fascial defect. After a short period of time, patients can take part in a reconstructive surgery for the remaining small incisional hernia using synthetic mesh.

It must be noted that in the course of receiving informed consent, the measures taken and the possible risks were discussed with the patient. The patient noted her desire that in the ideal situation, she too would receive treatment using biological mesh, however, in light of the sanctions currently present in Iran she stated her contentment with the measures taken and the use of the highlighted novel technique.

#### Consent for publication

We have the patient's informed consent for the publication of this case report.

#### Availability of data and materials

All of the patient's data and imaging are available.

#### Ethics approval

Not applicable.

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#### CRedit authorship contribution statement

NM, AG were the surgical team involved in the care of the patient, directly involved in the outlined surgery, the managing of complications, and the active follow up of the patient. MA and SA were involved in doing background research, literature review, and writing of the case report. All authors read and approved the final manuscript.

#### Declaration of competing interest

All authors declared no conflicts of interest and had specific contribution in performing the study or preparing the manuscript.

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Not applicable.

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