



## Bioscientia Medicina: Journal of Biomedicine & Translational Research

Journal Homepage: [www.bioscmed.com](http://www.bioscmed.com)

### Strangulated Incisional Hernia Post Appendectomy: A Rare Case Report

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#### ARTICLE INFO

##### Keywords:

Appendectomy  
Hemicolectomy  
Incisional hernia  
Strangulated

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All authors have reviewed and approved the final version of the manuscript.

<https://doi.org/10.37275/bsm.v8i3.927>

#### ABSTRACT

**Background:** Incisional hernia is a condition in which internal organs, such as the intestines, protrude through a previous surgical incision or suture. This occurs due to the failure of the abdominal wall to close properly. The closure of the abdominal wall is influenced by patient-related factors and technical factors during surgery. Incisional hernia following appendectomy is a rare condition, with an incidence rate of less than 0.12%. With this case report, the author aims to contribute to the literature on strangulated incisional hernia post-appendectomy. **Case presentation:** A 42-year-old male presented to the emergency department with complaints of right lower abdominal pain for the past three days. The patient reported a lump that had been intermittently present for the past nine years but became persistent three days ago. The patient had a history of appendectomy nine years ago. Vital signs were relatively stable, and physical examination revealed a bluish mass measuring 10x8x4 cm in the abdomen. Radiological abdominal assessment revealed a high-level obstructive ileus. Subsequently, the patient underwent a laparotomy, and a right hemicolectomy was performed, removing a segment measuring 50 cm from the ileocecal junction to the ascending colon. **Conclusion:** Incisional hernia following appendectomy is a rare complication, but it can occur due to various risk factors, such as surgical site infection, improper choice of suture material, and inappropriate wound closure technique. The management of this condition can involve the use of tension-free synthetic mesh in either laparotomy or laparoscopy.

#### 1. Introduction

An incisional hernia is a medical condition that occurs in patients who have undergone prior surgery. This condition arises when internal organs, such as the intestines, protrude through a previous surgical incision or suture line. Incisional hernia falls under the category of ventral hernias. Incisional hernias along the midline of the abdomen occur more frequently compared to those in other abdominal regions.<sup>1,2</sup> An incisional hernia can occur post-surgery due to the failure of the abdominal wall to close completely. Incisional hernias most commonly arise following a laparotomy, with a post-laparotomy

incidence rate ranging from 15-20%. Despite various proposed surgical closure techniques and research conducted on cases of incisional hernias, occurrences still manifest in post-laparotomy patients. This is attributed to the abdominal wall closure being influenced by patient-related factors, comorbidities, and technical factors intrinsic to the surgery itself.<sup>1,3,4</sup>

One type of incisional hernia that can occur is a post-appendectomy incisional hernia. Surgical wounds following an appendectomy are typically smaller compared to those post-laparotomies, resulting in a lower incidence of incisional hernias post-appendectomy. The incidence rate of incisional

hernias following appendectomy is less than 0.12%, significantly lower than the 15-20% seen post-laparotomy.<sup>1,5</sup>

Incisional hernias following appendectomy commonly result from wound infections in appendicitis, with or without perforation, and may also be associated with peritonitis. Other frequent causes include placing drainage tubes through the incision and excessive tightening of sutures on abdominal muscles, leading to muscle necrosis and subsequent weakness of the abdominal wall. Progressive enlargement is often observed in incisional hernias. This can occur asymptotically or lead to complications such as obstruction, incarceration, or strangulation of organs passing through the hernia ring.<sup>2,6</sup> In this reported case, an strangulated incisional hernia was identified in a 47-year-old male who presented at the emergency department. Through this case report, the author aims to contribute to the literature on incisional hernias post-appendectomy.

## 2. Case Presentation

A 42-year-old male presented to the emergency department with complaints of right lower abdominal

pain persisting for the last three days, progressively worsening. The pain is reported as constant throughout the day, characterized by a stabbing sensation. The patient has a history of appendectomy nine years ago, subsequent to which a lump appeared in the postoperative scar that intermittently manifested. The lump predominantly surfaced during straining or lifting heavy objects and subsided in the supine position. However, for the past three days, the lump has become irreducible. The complaints are accompanied by nausea, vomiting, difficulty in defecation, and the absence of flatus for the same duration. There is no history of blunt trauma.

Vital sign examination revealed a blood pressure of 96/59 mmHg, a heart rate of 99 beats per minute, a respiratory rate of 18 breaths per minute, a temperature of 36.9 degrees Celsius, and oxygen saturation of 99% on room air. Physical examination revealed, upon inspection of the right iliac region, a transverse scar beneath which a bluish mass measuring 10x8x4 cm was observed. Auscultation detected increased bowel sounds. Palpation of the mass revealed a soft consistency and tenderness upon pressure.



Figure 1. Clinical presentation of the patient.

Laboratory investigations revealed the following blood parameters: Hemoglobin (Hb) 16.9 g/dL, hematocrit (Ht) 49.0%, Leukocytes 16,980 cells/mm<sup>3</sup>, and Platelets 202,000/mm<sup>3</sup>. Subsequently,

radiological examination in three positions, namely upright and left lateral decubitus (LLD), demonstrated the presence of a fluid level in the bowel, leading to the impression of a high-level obstructive ileus.

Table 1. Blood examination results of the patient

Examination	Flag	Result	Unit	Normal value
Hematology				
Hemoglobin		16.9	gr/dL	13.7-17.5
Leukocytes	H	16980	/mL	5000-10000
Platelets		202000	/mL	150000-450000
Hematocrit	H	49.0	%	40-48
Differential count (DIFF)				
Basophils		1	%	0-1
Eosinophils	L	0	%	
Stem neutrophils	L	0	%	
Segmented neutrophils	H	88	%	
Lymphocytes	L	7	%	
Monocytes		4	%	
Clinical chemistry				
Glucose		73	mg/dL	70-200
Ureum		26	mg/dL	20-40
Creatinine		1.0	mg/dL	0.5-1.5
AST/SGOT		35	U/L	<37
ALT/SGPT		17	U/L	<42
Electrolyte				
Sodium		140	mEq/L	135-155
Potassium		5.0	mEq/L	3.6-5.5
Chloride		95	mEq/L	95-108



Figure 2. Results of abdominal X-ray examination in three positions.

Based on the examination results, the diagnosis of incisional hernia post-appendectomy was established. The patient underwent decompression with the insertion of a nasogastric tube (NGT) and received antibiotic therapy with ceftriaxone 2 grams/24 hours IV combined with metronidazole 500mg/8 hours IV, and analgesic therapy with ketorolac 30mg/8 hours. Subsequently, the patient was scheduled for a laparotomy procedure.

During the laparotomy procedure, exploration of the ileum revealed several loops entering the right

hernia ring with a dark discoloration and partial omentum entering. Consequently, a functional side-to-side anastomosis resection was performed using an ileum and colon stapler. Subsequently, a right hemicolectomy spanning 50 cm from the ileocecal junction to the ascending colon was conducted. Finally, repetitive irrigation and drying, closure of the median incision, placement of a drain, and internal suturing of the hernia defect were performed.



Figure 3. Intraoperative clinical image of the patient, depicting ileum necrosis.

### 3. Discussion

An incisional hernia is a medical condition that occurs in patients who have undergone prior surgical procedures. This condition manifests when internal organs, such as the intestines, protrude through the scar tissue or sutures from a previous operation. Incisional hernia represents a subtype of ventral hernia. Incisional hernias along the midline of the abdomen are more commonly observed compared to incisional hernias occurring in other regions of the abdomen.<sup>1,2</sup> Incisional hernia can occur postoperatively due to the failure of the abdominal wall to close adequately. It most commonly arises following laparotomy, with an incidence rate of 15-20% post-laparotomy. Despite various surgical closure techniques and research on incisional hernia cases, they continue to manifest in post-laparotomy patients. This is attributed to factors related to the patient, comorbidities, and technical aspects of the surgery influencing abdominal wall closure.<sup>1,3,6</sup>

One specific type of incisional hernia is a post-appendectomy incisional hernia. The incision after an appendectomy is smaller than that after laparotomy, resulting in a lower incidence of post-appendectomy incisional hernias (less than 0.12%) compared to post-laparotomy hernias (15-20%).<sup>1,4</sup>

Two types of incisional hernias may occur after an appendectomy. The more common type involves a hernia through all the layers of the abdominal wall. The second type is an interstitial incisional hernia, where the hernia passes through defects in the transversus abdominis and internal oblique muscles but not through the aponeurosis of the external oblique muscle.<sup>4</sup>

Incisional hernia post-appendectomy is a complication that can arise within weeks to years after the surgery. The primary cause is wound infection postoperatively. However, other contributing factors include obesity, advanced age, male gender, collagen metabolism abnormalities, and peritonitis during appendicitis.<sup>5,7</sup>

Risk factors such as suture material selection and closure technique also play a crucial role. The use of catgut for aponeurosis closure can contribute to incisional hernia development due to the lesser tensile strength compared to synthetic absorbable sutures. Research by Beltran and Cruces (2008) recommended using a running stitch technique with close intersuture spacing to reduce the risk of post-appendectomy incisional hernia.<sup>7,8</sup>

Incisional hernia results from the failure of the abdominal wall layers to heal properly. When a defect occurs in the scar from a previous abdominal incision,

abdominal cavity contents may prolapse through the defect and be forced outward due to intra-abdominal pressure.<sup>9</sup> Conditions causing increased intra-abdominal pressure, such as chronic lung disease with coughing, obesity, ascites, constipation, pregnancy, and ileus, contribute to incisional hernia formation.<sup>10</sup> Often, the defect is initially subtle, becoming more apparent with gradual size increase. When the intestines enter the hernia sac and become trapped, strangulation can occur, leading to tissue necrosis and potential fatality.<sup>9</sup>

Common symptoms of postoperative incisional hernia include a non-painful bulge in the abdominal wall at the postoperative site, exacerbated during coughing and relieved while lying down. Incisional hernias are typically influenced by increased intra-abdominal pressure. Other possible symptoms include abdominal discomfort, tension, and burning sensations at the hernia site. The presence of pain and obstructive symptoms indicates a complicated hernia with strangulation.<sup>11</sup>

Several modalities are employed to diagnose incisional hernia, including physical examination, ultrasonography (USG), computerized tomography scan (CT scan), and magnetic resonance imaging (MRI), with a preoperative diagnosis. Radiography primarily determines acute hernia types, with abdominal X-rays revealing signs of obstruction or free intra-abdominal air. Ultrasonography provides instant dynamic evaluation at a lower cost without ionizing radiation, measuring hernia sac size, hernia muscle thickness, and content. However, its use depends on the operator and may be challenging in obese or large hernia patients. MRI is employed to assess herniation during increased intra-abdominal pressure (Valsalva manoeuvre) and is preferred for young patients due to its radiation-free nature and excellent soft tissue contrast resolution. MRI is also utilized to expedite examinations and evaluate postoperative complications. Nevertheless, MRI is relatively expensive compared to CT scans and less available, limiting its use for routine cases. Therefore, CT scans remain the primary modality for diagnosing hernias

and evaluating complications, being cost-effective, widely available, and operator-independent.<sup>12</sup>

The management of incisional hernias involves both invasive and non-invasive conservative approaches. Small asymptomatic hernias can be observed with a low complication risk, about 2.6% per year in several studies. However, larger or symptomatic hernias should undergo surgical intervention if no contraindications exist to avoid complications, alleviate symptoms, and improve the patient's quality of life.<sup>13</sup>

Laparotomy, laparoscopy, and robotic surgery are commonly used for managing incisional hernias. However, in general, the use of a hernia mesh is recommended for repairing most incisional hernias as it reduces the recurrence rate compared to primary suture repair.

#### **4. Conclusion**

Incisional hernia following appendectomy is a rare complication, but it can occur due to various risk factors, such as surgical site infection, improper choice of suture material, and inappropriate wound closure technique. The management of this condition can involve the use of tension-free synthetic mesh in either laparotomy or laparoscopy.

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