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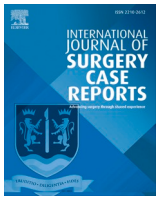

Case report

# A rare presentation of appendicitis contained within an incisional hernia post loop ileostomy reversal – A case report

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ABSTRACT

*Introduction and importance:* Appendicitis within an incisional hernia is rare, with current literature describing a small number of cases, occurring through a variety of surgical incisions. We describe a case of appendicitis contained within an incisional hernia following reversal of a loop ileostomy, on a background of previous sigmoid cancer resection. This is the second such case we were able to identify on literature review.

*Case presentation:* A 45 year old man presented with one day of migratory abdominal pain, predominantly focused at a tender, irreducible lump in his right lower quadrant, underlying the scar from previous reversal of loop ileostomy. CT on admission revealed an incisional hernia, containing an inflamed appendiceal tip. He underwent an uncomplicated laparoscopic appendicectomy and primary suture closure of the hernia defect, and was discharged the following day. Acute appendicitis was confirmed on histopathology.

*Discussion:* Placement of a defunctioning ileostomy is common in the management of colonic cancers, and incisional hernias are a common complication. It is however rare for an appendix to be contained within a hernia sac, and even rarer for appendicitis to develop in this setting. As a result, the presentation of this condition may mimic that of an incarcerated or strangulated incisional hernia, with pre-operative diagnosis typically relying on diagnostic imaging.

*Conclusion:* Incisional hernia appendicitis is rare and presents a diagnostic challenge. Early recognition of this dual pathology is necessary to allow for prompt surgical management of both the appendicitis and hernia, as well as guiding the approach for hernia repair.

## 1. Introduction

Acute appendicitis and abdominal wall hernias are both common surgical pathologies, but the presence of an inflamed appendix within a hernia sac is a rare occurrence [1]. Clinically, it may be difficult to distinguish from a strangulated incisional hernia, however accurate and timely diagnosis is necessary to appropriately guide treatment, consisting of appendicectomy as well as repair of the hernia defect. This case reports describes a patient who presented with a hernia at the site of a previously reversed loop ileostomy, containing an inflamed appendix – this is the second case of appendicitis within an ileostomy-site hernia we were able to identify on review of current literature. He subsequently underwent laparoscopic appendicectomy and primary closure of his hernia defect. We discuss considerations in both diagnosis and management of this rare condition.

## 2. Methods

This case report was prepared in accordance with the SCARE Statement consensus-based surgical case report guidelines [2].

## 3. Case

We present the case of a 45-year-old Caucasian male, who presented to the emergency department of our hospital in Melbourne, Australia. He reported a 24 h history of migratory abdominal pain, which started as a sudden onset generalised cramping, gradually localising to a firm, painful lump underlying a surgical scar in the right iliac fossa (RIF). At presentation, the pain was described as constant, with no aggravating or alleviating factors. He reported nausea, without vomiting. He denied any bowel or urinary symptoms, as well as subjective fevers or rigors.

The patient's past surgical history was significant for T3N0M0

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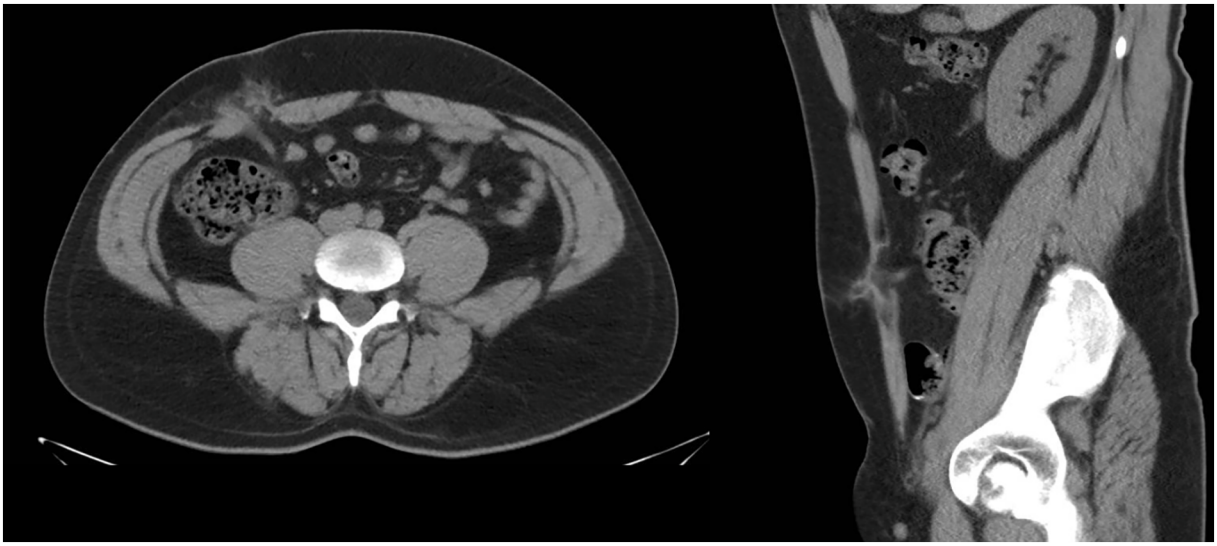

**Fig. 1.** CT images of appendix entering hernia defect.

sigmoid adenocarcinoma, for which he underwent laparoscopic high anterior resection with loop ileostomy four years prior. His ileostomy was reversed 12 months later. Subsequent surveillance CT imaging and endoscopy was unremarkable, with his most recent colonoscopy 12 months prior. He denied any other medical or surgical history, did not take any regular medications, and was a non-smoker. No significant family history was noted.

Vital signs were normal, and he was afebrile at presentation. The patient was obese, with a BMI of 32.5 kg/m$^2$. Examination of his abdomen revealed focal tenderness in the right lower quadrant, directly underlying his ileostomy reversal site scar. A firm, 3 cm diameter mass could be felt at this point, which was tender, irreducible and did not have a cough impulse.

A provisional diagnosis of acute appendicitis was made based on clinical presentation, with a differential diagnosis of incarcerated incisional hernia considered. The patient was kept nil by mouth, given intravenous crystalloid fluids and further investigations were arranged.

No abnormality was seen on initial blood tests, including the white cell count (WCC) and C-reactive protein (CRP). A non-contrast CT scan of his abdomen and pelvis revealed an incisional hernia containing fat and a mildly dilated appendiceal tip (7 mm diameter) with surrounding fat stranding (Fig. 1).

Informed consent for surgery was obtained, and the patient was taken to the operating theatre. Surgery was performed by the on-call general surgeon of the day. Intraoperatively, an incisional hernia defect at the previous loop ileostomy site was seen (Fig. 2). The hernia sac was reduced, revealing an inflamed appendix tip without perforation. The appendix was mobilised from adjacent adhesions, and routine laparoscopic appendicectomy was performed. Continuous suture repair of the hernia defect was performed using Medtronic 0 PDS V-Loc barbed sutures (Fig. 3). Post-operative recovery was uneventful, and the patient was discharged home the following day with instructions to avoid heavy lifting. No post-operative complications were noted on routine follow up, and the patient reported a satisfactory recovery. Histopathology subsequently confirmed acute appendicitis.

## 4. Discussion

Placement of a defunctioning stoma is common practice in bowel cancer resection with primary anastomosis. This figure is highest in patients undergoing rectal cancer resection, 89 % of whom received a stoma in a review of practice in Australia and New Zealand from 2007 to 2019 [3]. This practice reduces the risk of anastomotic leakage and resultant pelvic sepsis in low pelvic anastomoses. However, a recognised drawback of this approach is the risk of incisional hernia development at the stoma site following reversal, estimated to affect 6.1 % of patients [4].

The presence of the appendix within a hernia was first described in 1735 by Claudius Amyand, and the term Amyand's hernia has been used to describe an incarcerated inguinal hernia containing appendix (whether normal or inflamed) [1]. The incidence of this is rare, estimated at 0.19–1.7 % of inguinal hernia cases, with an even smaller subset containing an inflamed appendix, affecting only 0.07–0.13 % of Amyand's hernias [1].

Reports of incisional hernias containing an inflamed appendix are rare, but have been described involving a variety of incisions, including Pfannenstiel [5,6], Kocher [7], and laparoscopic port-site incisions [8]. Our literature review identified only one other case of appendicitis within an incisional hernia at an ileostomy reversal site [9].

Clinical presentation in such cases may differ from the classical presentation of appendicitis. Patients often present with a tender, irreducible mass at a previous incision site as their primary complaint, which may instead raise clinical suspicion of a strangulated incisional hernia. Given the rare nature of this pathology, it is likely not to be a leading differential diagnosis on initial presentation, and would likely be identified based on imaging or intraoperative findings. In the case of our patient, CT imaging provided a clear diagnosis, demonstrating an inflamed appendix contained within the incisional hernia sac.

Identification of an inflamed appendix either intraoperatively or on pre-operative imaging suggests the need for prompt appendicectomy followed by hernia repair. Due consideration must be given to the surgeon's chosen approach for repairing such a hernia. While the use of synthetic mesh is associated with a lower recurrence rate compared to suture repair, placement of a synthetic within a contaminated or infected wound would carry an increased risk of surgical site infections. Given the rarity of this condition, no literature exists to specifically evaluate the safety of mesh repair of a hernia containing an inflamed appendix. Earlier guidelines cautioned over the use of mesh in contaminated wounds [10]. But more recent systematic reviews found no overall increase in surgical site infection with the use of mesh in clean-contaminated and contaminated fields in the setting of ventral hernia repair [11,12]; and that biologic mesh may be considered in these circumstances [11,12]. In this case, the surgeon thought it prudent to opt for primary suture repair.

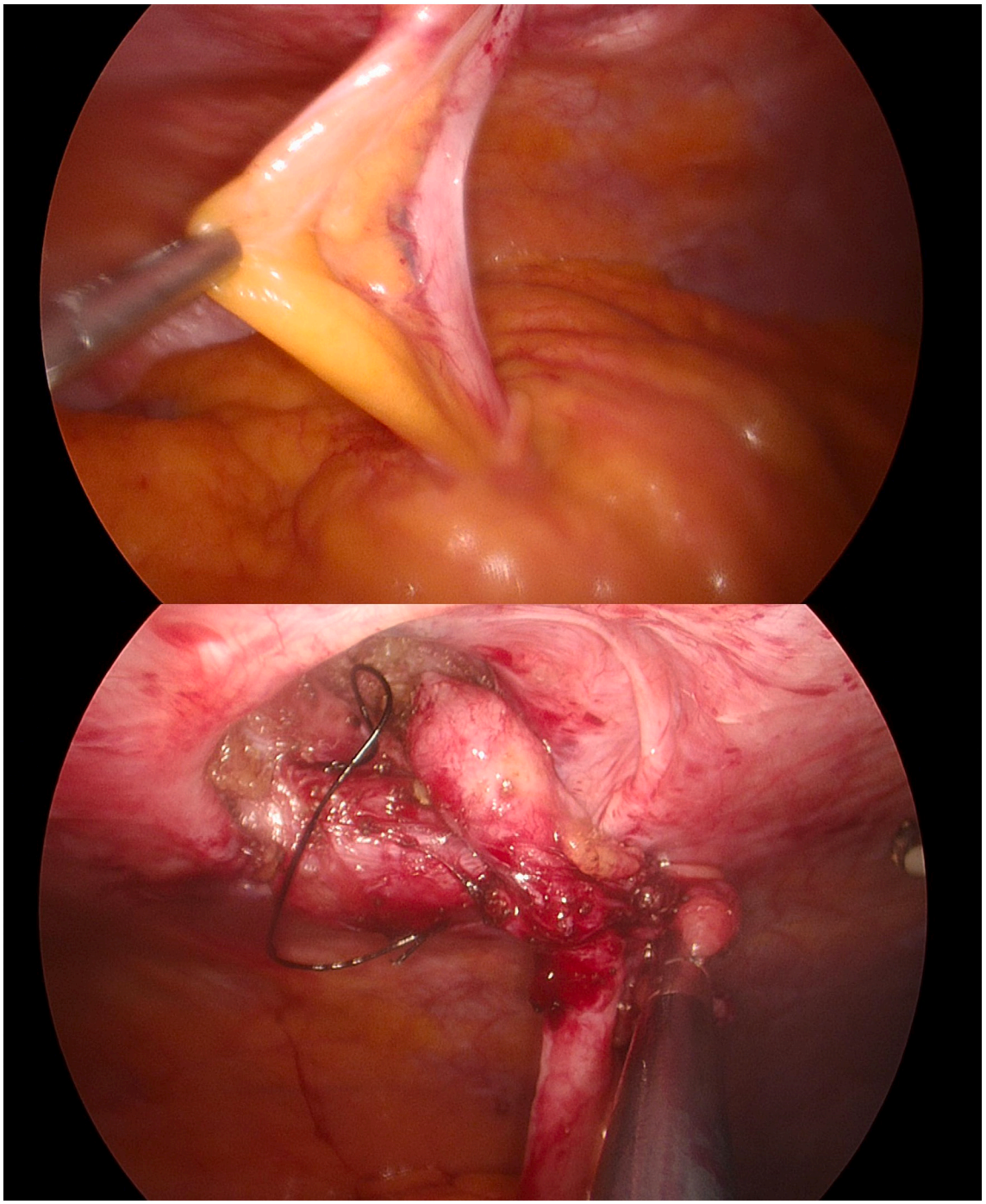

**Fig. 2.** Laparoscopic view of appendix entering hernia defect, and previous nylon suture used in the closure of the ileostomy defect.

## 5. Conclusion

Incisional hernia appendicitis is a rare, albeit recognised clinical entity. Early recognition may be difficult based on clinical assessment alone, as it may be easily mistaken for an incarcerated or strangulated incisional hernia. Imaging plays a key role in making an accurate pre-operative diagnosis. Surgical management consists of appendicectomy, as well as incisional hernia repair.

## Ethical approval

We have consulted our institution's research ethics committee, and were advised that this project is exempt from requiring ethics approval, provided written consent has been obtained from the patient and the clinical details provided have been de-identified.

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This research did not receive any funding.

## Author contribution

Marek Bak – Conceptualisation, writing - original draft.
Kumail Jaffry – Literature review, writing – review and editing.
Pee Yau Tan – Supervision, writing – review and editing.

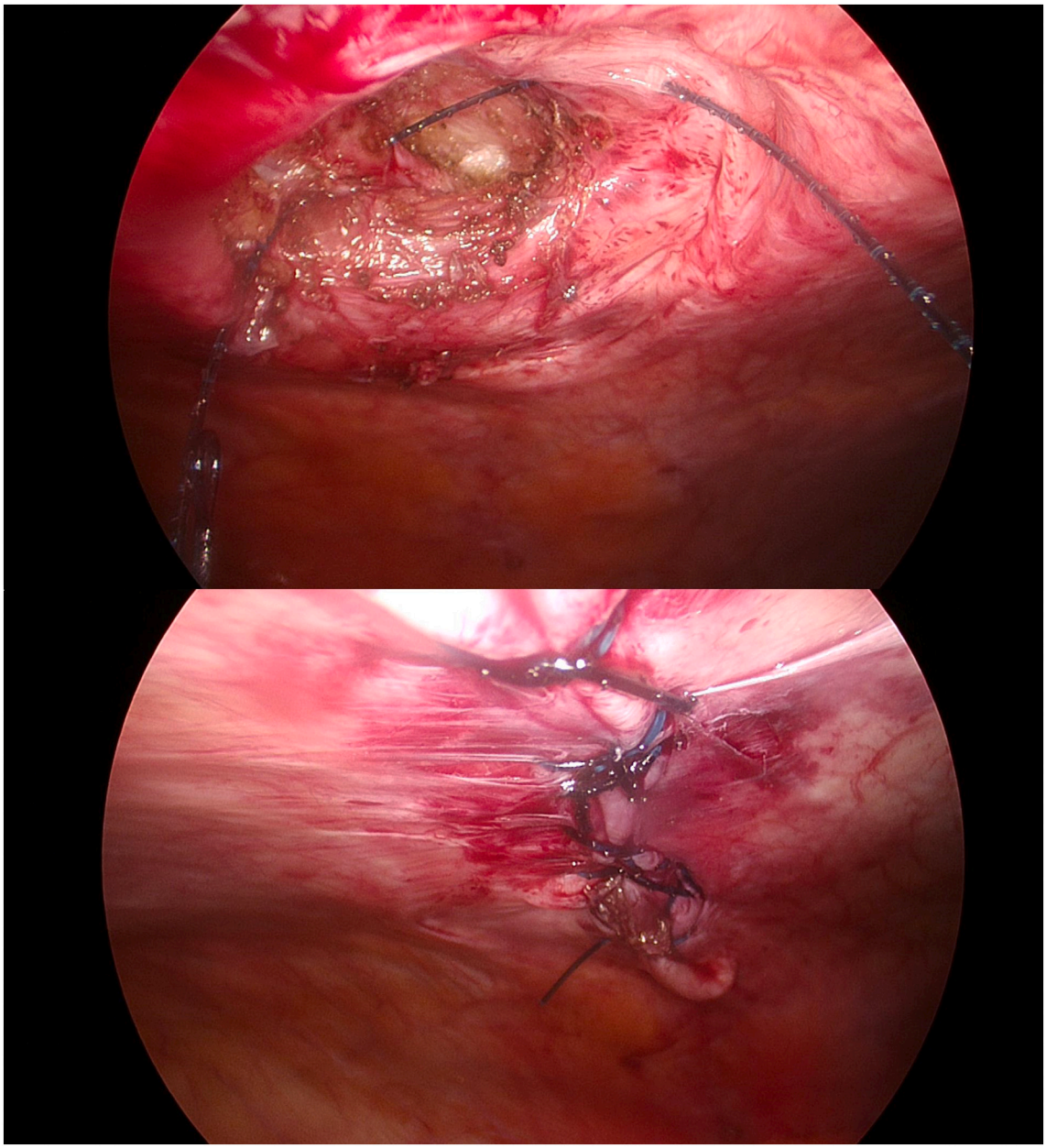

**Fig. 3.** Laparoscopic view of hernia defect before and after primary repair.

## Registration of research studies

Not applicable – Not a First in Man study.

## Guarantor

Marek Bak – Primary author.
Pee Yau Tan – Research Supervisor.

## Consent

Written consent was obtained from the patient for publication of this case report and the included clinical images. A copy of this consent form may be provided for review by the Editor-in-Chief on request.

## Declaration of competing interest

All authors declare they have no conflict of interest.

## Acknowledgements

None.

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