International Journal of Scientific Reports
Wardak AB et al. Int J Sci Rep. 2026 Dec;12(12):xxx-xxx
https://www.sci-rep.com
pISSN 2454-2156 | eISSN 2454-2164

DOI: https://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20264255

Case Report

Appendiceal neoplasm: challenges in laparoscopic specimen retrieval and the need for cost-effective innovations in low-and middle-income countries

Abdul Baseer Wardak[1]*, Imdad Ullah[2], F. N. U. Attaullah[3], Zain Ul Abidin[1], Mohammad Idrees[1]

[1]Department of General Surgery, Razia Bhalol Wardak Hospital, Kabul, Afghanistan
[2]Department of Plastic Surgery, Hayatabad Medical Complex, Peshawar, Pakistan
[3]Department of Neuro-Surgery, Peshawar General Hospital, Peshawar, Pakistan

Received: 27 October 2026
Accepted: 12 November 2026

***Correspondence:**
Dr. Abdul Baseer Wardak,
E-mail: a.baseer21@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Appendiceal neoplasms are rare and often present with nonspecific symptoms, making preoperative diagnosis challenging. Early recognition and careful surgical management is essential to prevent complications, particularly tumor rupture and pseudomyxoma peritonei. The laparoscopic retrieval of resected mass can be challenging in low- and middle-income countries (LMICs), where retrieval bags or pouches are often expensive or unavailable. The patient was a 67-year-old male with multiple comorbidities that presented with lower abdominal pain, distension, and nausea for 10 days. Contrast-enhanced computed tomography revealed a dilated, fluid-filled appendix with mural calcification, suggestive of an Appendiceal mucocele. The patient underwent laparoscopic appendectomy, and histopathological examination confirmed a low-grade appendiceal neoplasm. Safe extraction of a large appendiceal mass during laparoscopy presents a significant technical challenge, particularly when specimen retrieval pouches are expensive or non-available. The improvised surgical glove retrieval is commonly used in resource-limited settings. Extracting large specimens through a 10-mm port may increase the risk of bag rupture, tumor injury, and intraperitoneal spillage. This is especially concerning in appendiceal neoplasms because of the risk of pseudomyxoma peritonei. This case report highlights the significance of cost-effective safe retrieval of resected neoplasms laparoscopically and the need for readily available alternative. Frugal surgical innovations may help improve patient safety and reduce disparities in surgical care in resource-limited settings.

Keywords: Appendiceal tumors, Mucinous appendiceal neoplasm, Case report, Frugal surgical innovation

INTRODUCTION

Appendiceal tumors are rare neoplasms detected in approximately 2 % of appendectomies.[1] They have a very low incidence in the general population, with a median age of the patient between 50 and 60 years and slightly higher occurrence rate in females.[2] The clinical presentation is often vague, varying from nonspecific abdominal pain, presenting as acute appendicitis, or being asymptomatic. Different types of neoplasms are incidentally discovered during appendectomies or in routine imaging for other conditions.[3]

Among these, appendiceal mucinous neoplasms are clinically significant because of their potential to rupture and disseminate mucin-producing epithelial cells into the peritoneal cavity, resulting in pseudomyxoma peritonei.[2] Early surgical intervention is essential to prevent further complications. The current advances in the field of surgery have introduced minimally invasive procedures

such as laparoscopy, that leads to decreased post-op admission time, surgical site infection rate and post op pain. However, it has its own limitations in LMICs.[4] The Laparoscopic safe resection and retrieval of the specimen, as in case of appendectomy in low income setups, creates an extra burden on the operating surgeon due to the high cost of equipment's and non-affordability of the patients.[5] The alternative cost-effective materials used to retrieve the specimen vary around the world and may lead to adverse effects such as seeding, spillage, or retained parts of the resected or perforated oozing mass inside body cavities.[6,7] Our case report highlights the need for cost-effective innovation to tackle this problem for better patient care in line with recent advances.

CASE REPORT

A 67 years old male, known case of ischemic heart disease and Diabetes Mellitus on medications, with previous surgical history of Coronary artery bypass grafting 2.5 years ago and laparoscopic cholecystectomy 7 years back, now presented to Emergency Department of Peshawar General Hospital, complaining of diffuse lower abdominal pain for 10 days. According to patient, the pain was associated with abdominal distension and nausea.

Physical examination

Physical examination Showed a soft, non-tender, and non-distended abdomen. Abdominal bowel sounds were audible on auscultation. The rest of the general physical examination was non-significant.

Laboratory findings

Laboratory findings showed elevated white blood cell count of 19,000 cells/µL and a CRP level of 20mg/L. The rest of the laboratory findings were within normal limits.

Imaging findings

CT scan of the abdomen revealed a fluid-filled, dilated appendix with mural calcification, suggestive of an appendiceal mucocele.



Figure 1: CT contrast.
*Green arrow points towards the appendiceal mass.

Treatment

Emergency laparoscopic appendectomy was planned. During the procedure, the resected neoplastic mass was retrieved via the 10 mm umbilical port using a surgical glove due to the high cost of the specimen retriever system. This becomes particularly challenging when the mass girth exceeds the 10 mm port. As was the case with this patient's resected mass (Figure 2). There was a lot of manipulation needed to safely remove the glove and the mass together, which could've punctured the surgical glove or the mass inside.

The patient was discharged on the 2nd post op day, clinically and vitally stable.



Figure 2: Resected appendiceal mass.

Outcome and follow-up

The specimen was sent for Histopathological examination, which showed low-grade mucinous neoplasm. The patient was advised to undergo a 30 day follow-up colonoscopy, which was normal. The patient was satisfied with his treatment.

Ethical approval and consent was taken from the patient.

DISCUSSION

The laparoscopic retrieval of resected appendicular mass is a challenge in LMICs. The disposable specimen retrieval pouches used with laparoscopic instruments are too costly and not afforded by the local population. There is also a limitation in the availability of these instruments. Some of these disposable specimen retrieval pouches cost more than the whole procedure in LMICs.[8,9] The most commonly used laparoscopic specimen retrieval system from large body cavities in these countries is via surgical gloves that are cut and put through the port to safely evacuate the organ.[7] However, the large size of the organ can complicate the laparoscopic retrieval. There is a lot of manipulation needed to safely remove the glove and the mass together. For example, in case of distended gallbladder or large appendiceal mass retrieval, the glove gets stuck below the 10mm port, and increasing the diameter of the 10mm port is performed with reverse

dissection, which can result in puncturing of the gloves or the organ inside the gloves. In such a case, there is a very high risk of spillage. Although two studies have shown there were no differences concerning post op surgical site infections.[10,11] In the case of appendiceal neoplasm, there is a very high likelihood of pseudomyxoma peritonei.[12]

CONCLUSION

Our case report highlights the need for a cost-effective alternative to the laparoscopic pouches that are also easily available in LMIC and are spillage-proof. As noted, increased risk of neoplastic masses puncturing during retrieval from body cavities can lead to the seeding and relapse of neoplastic masses. A study by Paolucci et al found that the occurrence of abdominal wall malignancies is higher with laparoscopic procedures than open. The high surgical disease burden and the increasing cost of surgical equipment's create a surgical care disparity in low-and middle-income countries. To tackle the invisible disease burden of recurrences in these low-resource setups there is an extensive need for frugal innovation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Fournier K, Rafeeq S, Taggart M, Kanaby P, Ning J, Chen HC, et al. Low-grade Appendiceal Mucinous Neoplasm of Uncertain Malignant Potential (LAMN-UMP): Prognostic Factors and Implications for Treatment and Follow-up. Ann Surg Oncol. 2017;24(1):187-93.
2. Spyropoulos C, Rentis A, Alexaki E, Triantafillidis JK, Vagianos C. Appendiceal mucocele and pseudomyxoma peritonei; the clinical boundaries of a subtle disease. Am J Case Rep. 2014;15:355-60.
3. Wang H, Chen YQ, Wei R, Wang QB, Song B, Wang CY, et al. Appendiceal mucocele: A diagnostic dilemma in differentiating malignant from benign lesions with CT. AJR Am J Roentgenol. 2013;201(4):W590-5.
4. Soper NJ, Brunt LM, Kerbl K. Laparoscopic general surgery. N Engl J Med. 1994;330(6):409-19.
5. Curwen O, Gaber M, Gerogiannis I. In Pursuit of the Most Cost-Effective Laparoscopic Appendicectomy: A Review of the Literature. Surg Innov. 2023;30(5):601-6.
6. Stavrou G, Fotiadis K, Panagiotou D, Faitatzidou A, Kotzampassi K. Homemade specimen retrieval bag for laparoscopic cholecystectomy: A solution in the time of fiscal crisis. Asian J Endosc Surg. 2015;8(2):223-5.
7. Islam S, Bheem V, Maughn A, Harnarayan P, Dan D, Naraynsingh V. Surgical glove use for specimen removal in laparoscopy, the cheapest available: a prospective study. Trop Doct. 2020;50(1):94-99.
8. Ethicon specimen retriever system. Available at: https://www.medicalecart.com/products/ethicon-pouch-endopouch-retriever-specimen-retrieval-bag-system-4-inch-x-6-inch-10mm-diameter-224ml-bag-volume-box-of-06.html. Accessed on 14 September 2026.
9. Medtronic Endo-Bag specimen retrieval system. Available at: https://revmedconnect.com/device/ethicon-endo-surgery/pouch/10705036012986. Accessed on 14 September 2026.
10. Turner SA, Jung HS, Scarborough JE. Utilization of a specimen retrieval bag during laparoscopic appendectomy for both uncomplicated and complicated appendicitis is not associated with a decrease in postoperative surgical site infection rates. Surgery. 2019;165(6):1199-202.
11. Bostan MS, Uğurlu C. Is it necessary to use specimen retrieval bag for reducing surgical site infection in laparoscopic appendectomy? A randomized controlled trial. Ulus Travma Acil Cerrahi Derg. 2023;29(2):203-11.
12. Govaerts K, Lurvink RJ, De Hingh IHJT, Van der Speeten K, Villeneuve L, Kusamura S et al. PSOGI. Appendiceal tumours and pseudomyxoma peritonei: Literature review with PSOGI/EURACAN clinical practice guidelines for diagnosis and treatment. Eur J Surg Oncol. 2021;47(1):11-35.
13. Paolucci V, Schaeff B, Schneider M, Gutt C. Tumor seeding following laparoscopy: international survey. World J Surg. 1999;23(10):989-95.
14. Prinja S, Nandi A, Horton S, Levin C, Laxminarayan R. Costs, Effectiveness, and Cost-Effectiveness of Selected Surgical Procedures and Platforms. In: Debas HT, Donkor P, Gawande A, Jamison DT, Kruk ME, Mock CN, editors. Essential Surgery: Disease Control Priorities, Third Edition (Volume 1). Washington (DC): The International Bank for Reconstruction and Development / The World Bank. Chapter 18. 2015.
15. Tran VT, Ravaud P. Frugal innovation in medicine for low resource settings. BMC Med. 2016;14(1):102.

Cite this article as: Wardak AB, Ullah I, Attaullah FNU, Ul Abidin Z, Idrees M. Appendiceal neoplasm: challenges in laparoscopic specimen retrieval and the need for cost-effective innovations in low-and middle-income countries. Int J Sci Rep 2026;12(12):xxx-xx.