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# Surgical Management of Giant Colonic Diverticulum Presenting After Laparoscopic Lavage for Diverticular Perforation and Sepsis

Authors' Contribution:

Study Design A

Data Collection B

Statistical Analysis C

Data Interpretation D

Manuscript Preparation E

Literature Search F

Funds Collection G

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**Corresponding Author:** Jonathan R. Chino, e-mail: [jchino@cmhshealth.org](mailto:jchino@cmhshealth.org)**Conflict of interest:** None declared

**Patient:** Female, 74-year-old  
**Final Diagnosis:** Giant diverticulum  
**Symptoms:** Abdominal discomfort • bloating and constipation  
**Medication:** —  
**Clinical Procedure:** Laparoscopic washout • open sigmoidectomy  
**Specialty:** Surgery

**Objective:** Rare disease

**Background:** Diverticulosis and its complication of diverticulitis is a common condition that can be found in up to 35% of the population. Giant colonic diverticulum is a rare entity with fewer than 200 cases reported in the scientific literature. Development of a giant diverticulum as a sequelae of laparoscopic washout is an unreported event in current literature.

**Case Report:** The patient was a 74-year-old female who had a well-known history of diverticulosis and diverticulitis. She developed perforated sigmoid diverticulitis, underwent laparoscopic washout and recovered without colon resection. Within a year after washout, she developed abdominal distention and bloating, and computed tomography (CT) imaging revealed a giant diverticulum. She went on to undergo surgery for resection of her sigmoid colon, which contained the giant diverticulum. Her recovery was otherwise uneventful.

**Conclusions:** To our knowledge, this is the first case report of giant diverticulum presenting as a complication of abdominal washout for management of acute diverticulitis. Initial CT scan performed at the time of perforation did not demonstrate this diverticulum, indicating that it developed within the year after abdominal washout for sepsis and acute rupture, likely due to weakening of the colonic wall secondary to ongoing inflammation. The very rare presentation of giant diverticulum makes it difficult to establish a clear link to washout, however, this case establishes a groundwork for further investigation as our fund of knowledge on the subject continues to grow.

**MeSH Keywords:** Diverticulitis • Diverticulitis, Colonic • DiverticulumFull-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/923457>

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## Background

Diverticulosis and its complication of diverticulitis is a common condition that can be found in up to 35% of the population. Giant colonic diverticula are a known but much less common variation, and are defined as diverticulum over 4 cm. These diverticula are described pathologically with the McNutt pathologic classification system [1]. They are most commonly treated with sigmoid resection.

Laparoscopic abdominal washout is an accepted and useful tool for treatment in cases of diverticulitis that are not responding to medical management, and in situations in which it would not be prudent to proceed to a Hartmann's procedure [2]. This can be due to patient status and comorbidities, or simply due to severity of diverticulitis that would make surgery particularly difficult. Washout can serve as a temporizing measure to help patients recover from acute diverticulitis flares, in order to have an interval definitive procedure in the future.

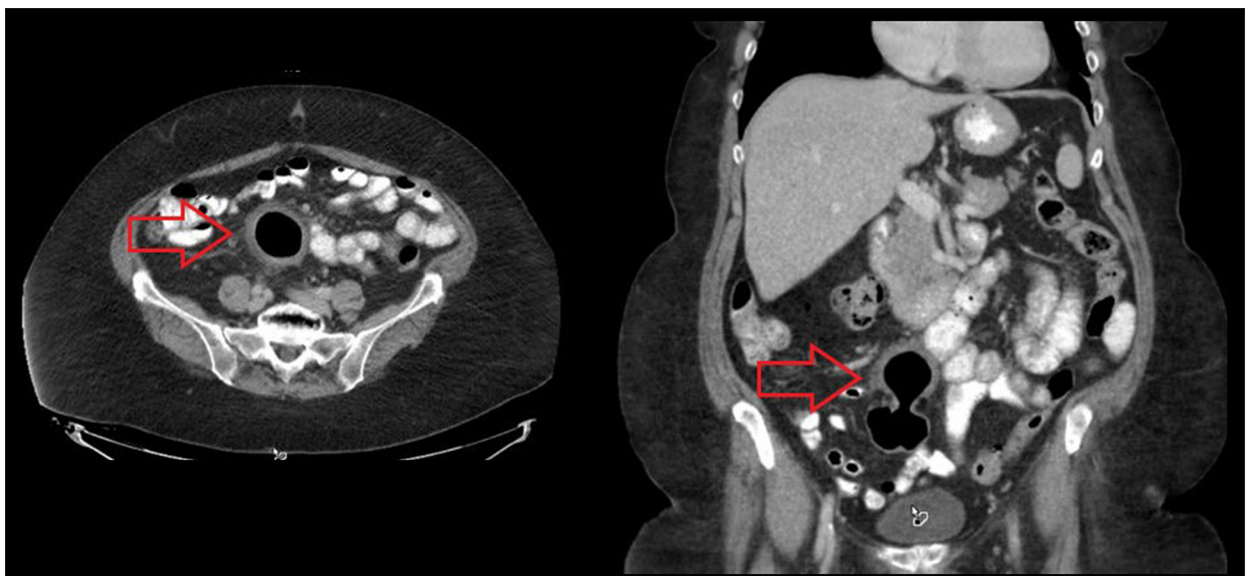
We present a novel case in which a patient underwent laparoscopic washout for perforated sigmoid diverticulitis and went on to develop a giant diverticulum at the time of the definitive operation.

## Case Report

The patient was a 74-year-old female who had a well-known history of diverticulosis and diverticulitis. She was at her care facility recovering from knee surgery when she developed abdominal pain. The patient was brought to the hospital and plain films demonstrated pneumoperitoneum. Her exam was

notable for a tender abdomen, which was distended with voluntary guarding. Although she met criteria for sepsis, she was hemodynamically stable with a heart rate of 92 beats per minute and blood pressure of 110/64 and it was felt she was a candidate to begin with a diagnostic laparoscopy. She was started on piperacillin/tazobactam and then taken urgently to the operating room for exploration. Upon laparoscopic entry, the patient was found to have a feculent contamination throughout the abdomen, including multiple interloop adhesions and abscesses. The entire small bowel was run, during which time a loop of bowel in the left lower quadrant was pulled up and revealed a 11×7-cm stool-containing abscess pocket in the retroperitoneum. After this cavity was thoroughly irrigated, a 1-cm hole was identified in the sigmoid colon. This was closed with two figure-of-eight 2-0 vicryl sutures. After extensive irrigation and manual removal of stool and debris, two drains were placed in the pelvis; one into the abscess cavity and one overlying it.

No giant diverticulum was identified on preoperative imaging or during surgery, which included running the bowel from the terminal ileum to the ligament of Treitz. She recovered from sepsis and had an otherwise uncomplicated post-operative and medically treated course. One drain was removed before discharge, and the second a week later. The patient was discharged to acute rehab and recovered without complications. Six months later, she returned to her primary care physician with distention and bloating, and underwent evaluation with computed tomography (CT) of the abdomen and pelvis. The CT demonstrated a 5-cm-diameter rounded, gas-filled, thick-walled and inflamed giant sigmoid diverticulum versus contained sigmoid perforation, which communicated with the sigmoid lumen via a thin channel (Figure 1).



**Figure 1.** CT of the diverticulum in axial, coronal imaging of giant diverticulum at presentation. Red arrow denotes gas-filled diverticulum.

The patient then underwent an elective attempted laparoscopic sigmoidectomy. Intraoperatively, a 5-cm giant diverticulum of the sigmoid colon was identified, centered within a mass of dense adhesions (Figure 2). Due to the extensive amount of adhesions, the operation was converted to open and completed without issue. She had an uneventful recovery and was discharged on postoperative Day 6.

Pathology demonstrated a 5-cm giant diverticulum with extensive serosal fibrinous adhesions compatible with the patient's history of ruptured diverticulum. Margins and specimen were negative for dysplasia or malignancy (Figure 3).

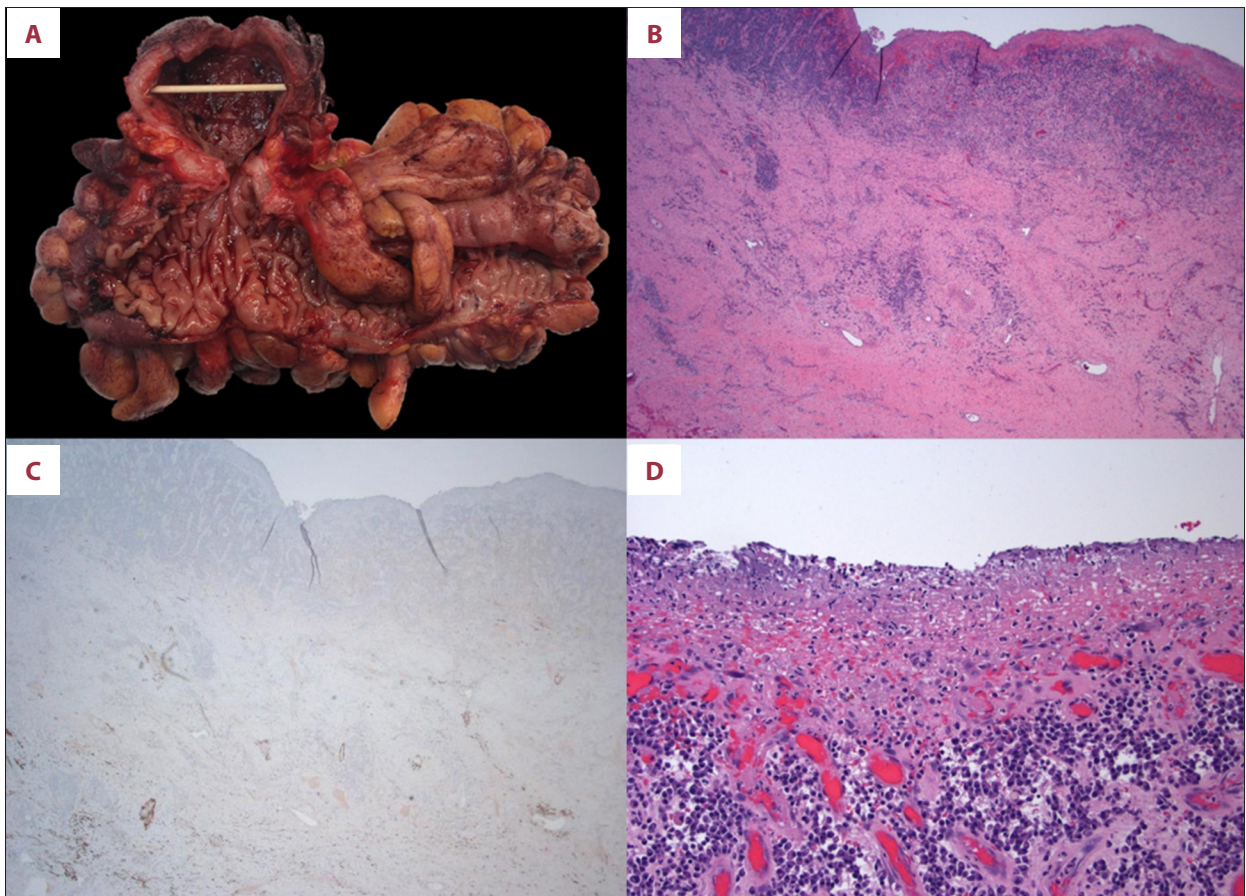
## Discussion

Giant colonic diverticula (diverticula >4 cm) are rare entities with fewer than 200 cases reported in the literature. Ninety percent of these giant diverticula originate from the sigmoid colon. Most giant diverticula are typically filled with air via a hypothetical ball valve mechanism that allows air into the diverticulum without letting it out, leading to progressive growth. They can present incidentally on abdominal x-ray or CT, or with rupture or associated abscess. Rarely do they present as malignancies. Radiographic

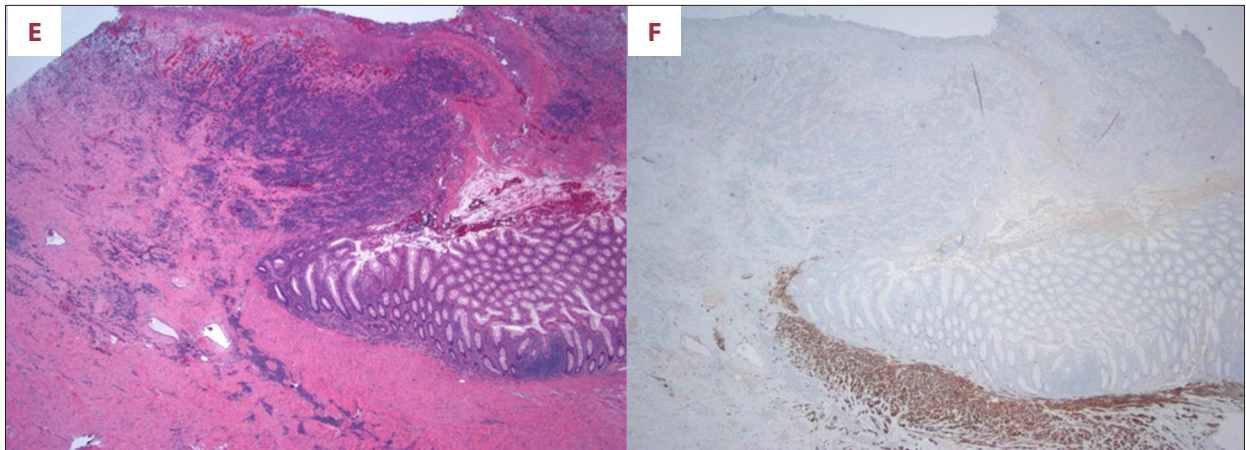


**Figure 2.** Surgical specimen showing closed giant diverticulum.

manifestations of the diverticulum can be confusing, and they may be missed on imaging. They may be confused with abscesses on CT and often do not fill with contrast during a barium enema procedure. Radiographic signs include the lifting balloon sign characterized by migration of the diverticulum out of the left lower quadrant, creating an air-filled cystic lesion seen in the left hypochondrium [3]. Giant diverticula are often not well appreciated on colonoscopy as the diverticular opening can be negligible, and as such colonoscopies are not recommending during workup [4].







**Figure 3.** Giant diverticulum histology, Case 2. (A) Gross image of open colon with diverticulum (A). Fibrotic wall of giant diverticulum (40×) (B). Immunohistochemical stain for smooth muscle (desmin) demonstrating absence of muscularis mucosae and muscularis propria (40×) (C). Higher-power representative image of the diverticulum mucosal surface showing acute inflammation, granulation tissue, and absence of epithelium (200×) (D). H&E (E) and corresponding desmin immunohistochemical stain (F) demonstrating an abrupt end of muscularis propria at the transition point into the fibrotic wall of the diverticulum (40×). Features compatible with Type 2 giant diverticulum (inflammatory type).

McNutt and colleagues proposed a classification system that divides giant diverticula into three subtypes [1]. They describe Type 1 diverticula as showing remnants of the muscularis mucosa near the transition point from the colon into the diverticulum, while more distal aspects of the wall are cyst-like and lined by chronic inflammation and granulation tissue with underlying fibrosis. Type 2 diverticula are described as potentially arising from subserosal perforations (likely a ruptured diverticulum) progressing to a walled-off abscess with connection to the colon and a cyst wall composed of fibrous tissue and acute inflammation. Type 3 diverticula include a complete mucosal lining with intact smooth muscle layers (muscularis mucosae and muscularis propria) and are thought to be congenital in origin.

A more recent review article by Nigri and colleagues [5] included 166 cases of giant colonic diverticulum in 138 studies. They found that Type 2 diverticula (inflammatory diverticula) were the most prevalent (66%) of the reported cases, followed by Type 1 (22%) or pulsion diverticula (typical diverticula with herniation through muscular layer, but followed by slow continuous growth). Type 3 giant diverticula (true diverticula with all muscle layers; possible embryologic anomaly) were least common (12%). The histomorphologic features in the current case, including a fibrotic wall, lumen lined by acute inflammation with granulation tissue, and predominantly absent smooth muscle layers, are most consistent with the description of Type 2 giant colonic diverticulum.

An additional classification system has been proposed by Choong and Frizelle and divides the diverticulum into two types. The first is a pseudodiverticulum with a wall of fibrinous

tissue, and the second a true diverticulum containing all layers, which is congenital [6].

Standard of care treatment is resection of the diverticulum as well as the surrounding colon to healthy tissue. Some advocate for a more traditional hemicolectomy on the affected side, to reduce any chance of recurrence [5]. Others have had success with a simple wedge resection of the diverticulum [7]. Surgery can be open, laparoscopic, or robotically assisted depending on the availability of specialty equipment and surgeon experience.

## Conclusions

To our knowledge, this is the first case report of giant diverticulum presenting as a complication of abdominal washout for management of acute diverticulitis. Our patient had a McNutt type II diverticulum or inflammatory type, which is the most common. Initial CT scan performed at the time of perforation did not demonstrate this diverticulum, indicating that it developed within the year after abdominal washout for sepsis and acute rupture, likely due to weakening of the colonic wall secondary to ongoing inflammation. The very rare presentation of giant diverticulum makes it difficult to establish a clear link to washout, however, this case establishes a groundwork for further investigation as our fund of knowledge on the subject continues to grow.

## Acknowledgement

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