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Non-operative Management of Perforated Hollow Viscera in a Palliative Care Unit

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Surgical dogma holds that perforation of a hollow viscus, indicated by pneumoperitoneum on imaging, mandates abdominal exploration.(1, 2) Non-surgical causes of pneumoperitoneum exist, but when perforation is the presumed etiology of free air in the abdomen, operative repair of the perforation has been standard.(3, 4) Successful non-operative management of perforated viscera occurs, but it is generally reserved for patients with reassuring clinical findings.(5-7) Occasionally surgeons encounter patients with a perforated viscus whose clinical findings suggest abdominal exploration is necessary, but who have life-threatening illnesses that make operation treacherous and its value questionable. Comfort-focused care for these patients is associated with a 100% 30-day mortality, but little has been written on these patients' experience.(2) Surgeons have little guidance for counseling patients and families about the outcome of non-operative management.

We present here a case series of eight patients from our institution with a perforated hollow viscus transferred to our palliative care unit (PCU) for comfort-focused care after a decision not to operate. We included all patients transferred to our PCU from 2012 to 2017 with CT findings of extraluminal air in the abdomen and a surgical consultation that resulted in a decision not to operate, and we identified twelve such patients. The two surgeon co-authors (MCS, OLG) reviewed the details of these patients, and patients were excluded if non-operative management would likely have been recommended even in the absence of a terminal diagnosis. Four such patients were excluded: one with Hinchey class I diverticulitis, two with contained iatrogenic perforations, and one with contained cecal perforation from Olgilvie's syndrome. The authors felt that the remaining eight patients would likely have been recommended to undergo surgical exploration if not for their life-limiting diagnoses (Table 1).

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In the PCU, patients generally received broad spectrum intravenous antibiotics while they were alert and able to spend meaningful, awake time with their loved ones. These antibiotics were discontinued when the treating palliative care physician felt they were no longer providing clinical benefit. The palliative care providers communicated regularly with the patient or the patient's surrogate on daily rounds and as needed when the patient's condition changed to help judge whether ongoing treatment of the intraabominal infection was providing clinical benefit. Persistent somnolence was the primary reason to discontinue antibiotics. Patients who remained awake and interactive generally completed a 5- to 7-day course of antibiotics. In the palliative care unit, patients received comfort focused care and minimal disturbances for monitoring. Pain was generally managed with intermittent parenteral opioids in either a patient-controlled or nurse-administered fashion, depending on the patient's mental status. Continuous opioid infusions were utilized if the frequency of need was high. Patients who could tolerate oral medications were offered enteral opioids for more durable pain relief. Nausea was managed with a combination of ondansetron and promethazine with the addition of prochlorperazine or haloperidol as needed. Families could visit without limit, and diets were liberalized to allow patients to eat if they were hungry.

Of these eight patients, four died in the hospital, but the other four survived to discharge with hospice. With this few patients, it is difficult to make conclusions about factors associated with survival to discharge, but all those who died in the hospital had peritonitis, a lactic acidosis, or both, while none of the survivors had either of these features. The constellation of findings in the patients who went on to die in the hospital would have certainly mandated operative exploration if not for their terminal diagnoses.

Nevertheless, the four survivors also had clinical presentations that would have pushed many surgeons to operate in the absence of a terminal diagnosis. Patient 5 suffered a visceral perforation from paracentesis. Although he did not have peritonitis, he had significant tachycardia and tachypnea, a diffusely tender and distended abdomen, and leukocytosis along with a moderate amount of air diffusely throughout his abdomen. Patient 6 had a breakdown of a two-week old small-bowel anastomosis which presented with diffuse abdominal tenderness without peritonitis, normal vital signs, and a mild leukocytosis. His CT showed only a small volume of extraluminal air emanating from the anastomosis, but it did not appear contained. Patient 7, had perforated diverticulitis with diffuse abdominal tenderness and air throughout his abdomen and a mild leukocytosis. Finally, patient 8 suffered a perforation of the afferent limb of his Whipple reconstruction when his duodenal cancer recurred. He had previously suffered a stroke, which was likely the etiology of his altered mental status. His vital signs were normal and his abdomen was distended but non-tender. Concerning findings for him were a white blood cell count of 18.2 and a CT showing moderate air throughout the abdomen, suggesting that the perforation was not contained.

These four each had a constellation of findings that in healthier patients might have led to emergent operative intervention. The ability of these patients to survive several days and be stable enough to discharge to hospice indicates that such an outcome is an important possibility for surgeons to discuss with terminally-ill patients with a perforated hollow viscus. These four patients each lived several days outside of an intensive care unit without mechanical ventilation in an environment where they could interact with their loved ones,

which almost certainly would not have been the case if they had undergone general anesthesia and an operation. Although rapid decline and death from the perforated viscus remain likely, this course is not inevitable.

This small case-series offers some guidance for surgeons who encounter the challenging situation of a terminally-ill patient with a perforated viscus. This series shows that it is a false dichotomy to view operating as “doing everything” and non-operative management as “doing nothing.” Inpatient comfort-focused care is a viable and appropriate treatment strategy that can allow patients to spend more of their final days with their families, avoid painful interventions, and perhaps even return home. When operating is no more likely to bring long-term survival than not operating, non-operative management and its potential benefits should be seriously considered and discussed with these patients.

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Table 1

Patient Presentations and Outcomes

Patient Characteristics	Vital Signs	Physical Exam	Labarotory Values	CT Findings	Length of Stay after Surgery Consult	Discharge Disposition
Patient 1: 38 year old man with cirrhosis and unclear etiology of free air	T: 97.0 P: 94 BP: 92/53 RR:22	No AMS Abdomen tender and distended without peritonitis	WBC: 29.5 Lactate: 5.1 mg/dl	Large amount of diffuse free air and ascites	3	Death
Patient 2: 52 year old woman with metastatic cancer of unknown primary with erosive gastric mass	T: 97.4 P: 115 BP: 135/82 RR: 23	No AMS Abdomen tender and distended without peritonitis	WBC: 15.4 Lactate: 4.8 mg/dl	Moderate diffuse free air throughout abdomen with mass eroding into stomach	5	Death
Patient 3: 76 year old woman with metastatic squamous cell carcinoma with perforation of colonic stent	T: 97.3 P: 128 BP: 103/55 RR: 21	AMS Abdomen tender with peritonitis but non-distended	WBC: 11.8 Lactate: 2.1 mg/dl	Moderate amount of diffuse free air throughout abdomen	1	Death
Patient 4: 48 year old man with metastatic melanoma and perforated diverticulitis	T: 97.8 P: 110 BP: 113/81 RR: 20	AMS Abdomen tender, distended with peritonitis	WBC: 18.2 Lactate: 5.3 mg/dl	Large amount of diffuse free air throughout abdomen with diverticulitis	1	Death
Patient 5: 46 year old man with metastatic colon cancer and perforation from paracentesis	T: 98.2 P: 122 BP: 112/67 RR: 26	No AMS Abdomen tender and distended without peritonitis	WBC: 24.2 Lactate: not obtained	Moderate, diffuse free air throughout abdomen with ascites	6	Home Hospice
Patient 6: 26 year old man with AIDS and small bowel lymphoma with anastomotic breakdown 2 weeks after small bowel resection	T: 98.2 P: 72 BP: 122/76 RR: 14	No AMS Abdomen tender but non-distended without peritonitis	WBC: 13.4 Lactate: 1.4 mg/dl	Small amount of diffuse free air throughout abdomen along with small amount of air around anastomosis	25	Home Hospice
Patient 7: 66 year old man with cirrhosis and unresectable hepatoma and perforated diverticulitis	T: 97.1 P: 89 BP: 99/62 RR: 18	No AMS Abdomen tender and distended without peritonitis	WBC: 12.4 Lactate: 1.8 mg/dl	Moderate diffuse free air throughout abdomen with ascites	3	Inpatient Hospice
Patient 8: 52 year old man with recurrent duodenal cancer s/p Whipple procedure with perforation of obstructed afferent limb	T: 99.7 P: 89 BP: 137/77 RR: 19	AMS Abdomen distended but non-tender without peritonitis	WBC: 18.2 Lactate: 0.7 mg/dl	Moderate diffuse free air throughout the abdomen	26	Inpatient Hospice

T=temperature, P=pulse, BP=blood pressure (in mmHg), RR=respiratory rate, AMS=altered mental status, WBC=white blood cell count (in thousands),