

Deadly Air – The Fatal Trio of Pneumopericardium, Pneumomediastinum, and Pneumoperitoneum

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INTRODUCTION

- Pneumopericardium is a rare condition characterized by air or gas accumulation within the pericardial sac surrounding the heart.
- In severe cases, pneumopericardium can affect cardiac function and lead to life-threatening complications requiring prompt diagnosis and treatment¹.
- Pneumomediastinum is diagnosed when there is air within the mediastinal space. It can be spontaneous, traumatic, or iatrogenic and often due to a fistulous communication².
- Pneumoperitoneum is recognized as air within the peritoneum, usually due to a perforated viscus. It usually requires urgent surgical management³.
- The development of all three together is uncommon.
- We report a unique case of the development of pneumopericardium, pneumomediastinum, and pneumoperitoneum due to a perforated ulcer at the gastro-jejunal [GJ] anastomosis and the development of an esophageal-jejunal fistulization to the pericardium.

CASE DESCRIPTION

History

- 51-year-old female – PMH of gastric ulcer status post gastric resection complicated by ulceration at the gastro-jejunal (GJ) anastomosis with perforation. It previously required an exploratory laparotomy and resection of the GJ anastomosis. She now presented to the emergency room for diffuse abdominal pain and weight loss.

Physical Exam

- On arrival, afebrile, HR 95 bpm, RR 16 bpm, blood pressure 87/75 mmHg.
- General: Cachectic, chronically ill-appearing, no acute distress
- GI: Wound in lower abdomen with beige/green drainage, abdomen soft, non-tender, non-distended, normoactive bowel sounds

Hospital Course

- CT Abdomen and Pelvis – Free intraperitoneal air and fluid due to perforated marginal ulcer at the level of the gastro-jejunal anastomosis.
- GI consulted, and EGD showed normal upper and middle third of the esophagus with esophageal-jejunal fistula with ulceration at the staple line.
- Bariatric surgery and hepatobiliary surgery were consulted. Patient underwent revision of gastric bypass surgery with small bowel resection and jejunostomy. An esophageal stent was placed at the site of ulceration.
- Post-operative course was complicated by hypotension and hypoxemia.
- Chest x-ray showed the development of a pneumopericardium.
- Repeat chest x-ray a couple of days later showed persisting pneumopericardium and evidence of pneumomediastinum which was confirmed on CT scan.
- A few days later, the patient underwent an upper GI barium swallow that confirmed extravasation of the contrast into the pericardium.
- An echocardiogram obtained showed a small pericardial effusion without evidence of tamponade. Echogenic material was noted in the pericardial space.
- Discussed with general surgery and cardiothoracic surgery who felt that due to her frailty, patient was not a surgical candidate for pericardiectomy
- A couple of days later, she developed worsening hypotension and hypoxemia.
- Palliative care was consulted, and the patient was transitioned to comfort care where she passed away peacefully.

LABS/IMAGING

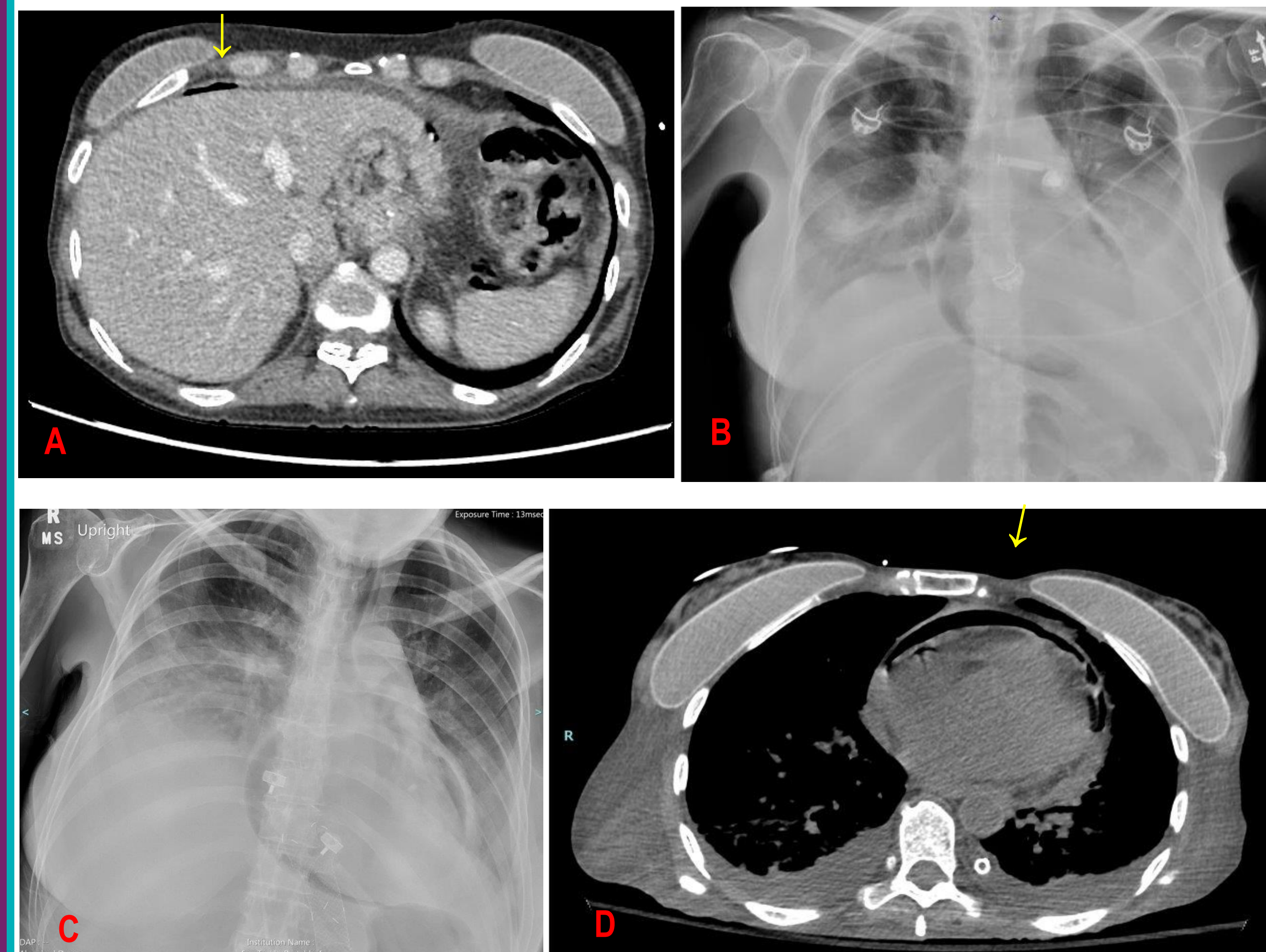


Fig. 1 A-D: Imaging From Hospitalization

- A. (Top Left):** Axial CT Scan showing intraperitoneal free air (yellow arrow) due to perforated marginal ulcer
- B. (Top Right):** Initial chest x-ray showing evidence of pneumopericardium
- C. (Bottom Left):** Chest x-ray showing persisting pneumopericardium with evidence of pneumomediastinum
- D. (Bottom Right):** Axial CT scan of the chest showing pneumopericardium (yellow arrow)

LABS/IMAGING

ADMISSION LAB VALUES		
Component	Value	Reference Range
Sodium	143 mmol/L	136-144 mmol/L
Potassium	3.7 mmol/L	3.6-5.0 mmol/L
Chloride	104 mmol/L	101-111 mmol/L
CO2	22	20-29 mmol/L
BUN	11 mg/dL	8-20 mg/dL
Creatinine	0.31 mg/dL	0.4-1.0 mg/dL
Protein	4.5 g/dL	6.0-8.5 g/dL
Albumin	2.2 g/dL	3.8-4.9 g/dL
WBC	5.1 x 10E3/uL	3.4-10.8 x 10E3/uL
Hgb	9.8 g/dL	11.1-15.9 g/dL
Hct	31.4%	34.0-46.6%
Platelets	385 x 10E3/uL	150-450x10E3/uL

Disclosures

- The presenting author and co-authors of this poster have no financial relationships to disclose.

DISCUSSION

- Pneumopericardium is a rare air leak syndrome that can occur due to trauma (about 60% of cases), fistulization, air movement from pneumomediastinum, or bacterial infections^{4,5}.
- The presence of all three air leak syndromes co-occurring is rare - a literature review revealed only 15 documented cases of the three together.
- The majority of these co-occurring cases appeared to be related to trauma resulting in tracheal rupture often in the setting of intubation or due to endoscopic procedures resulting in colonic perforation.
- This patient's biggest risk factor was likely perforation and fistulization of the marginal ulcer as a late complication of bariatric surgery⁶.
- Due to the rarity of the development of all three occurring together, there is limited information on the common clinical presentations, best diagnostic imaging modalities, and specific treatment and management.

CONCLUSION

- Bariatric surgery has a known risk of marginal ulcer development which can result in perforation.
- Further research is needed to look at the rate of occurrence of the development of air leaks due to trauma from perforation and fistulization after bariatric surgery to help aid in early detection and treatment of these patients.

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