



SPOT THE DIAGNOSIS: IMAGE CHALLENGE

A Postoperative Patient with Hypoxia and an Abnormal Chest Radiograph

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CLINICAL VIGNETTE

A 67-year-old woman with a history of breast cancer underwent radical mastectomy with axillary lymph node dissection. One hour after surgery, pulse oximetry showed a peripheral oxygen saturation (SpO₂) of 70%. The patient was found to be tachypneic; her other vital signs were within normal limits. An anteroposterior (AP) supine chest radiograph was obtained (Figure 1):



Figure 1. Anteroposterior supine chest radiograph obtained one hour after surgery.

What is the most significant abnormality on this chest radiograph?

- A. Bilateral basal opacification
- B. Blunting of both costophrenic angles
- C. Gas-containing structure in the right lower hemithorax
- D. Low lung volumes and atelectatic bands

ANSWER

C. Gas-containing structure in the right lower hemithorax.

DISCUSSION

The chest radiograph shows a focal, confluent, gas-containing rounded structure in the right lower hemithorax. The right main bronchus is displaced leftward, and both costophrenic angles in addition to the diaphragmatic contour are obscured, reflecting that the pathology is in direct contact with the diaphragm. This finding is accompanied by bibasilar opacification, atelectatic bands, and costophrenic blunting (Figure 2).

The preoperative posteroanterior (PA) radiograph (Figure 3) shows heterogeneous opacification of the right hemithorax, blunting of the right costophrenic angle, and the same gas focus in the right lower zone, albeit smaller. These findings represent the herniated, gas- and content-filled bowel loop superimposed on the adjacent atelectatic lung. Furthermore, these features argue against diaphragmatic eventration or chronic hemidiaphragm elevation, both of which typically present as a smooth, continuous elevation of

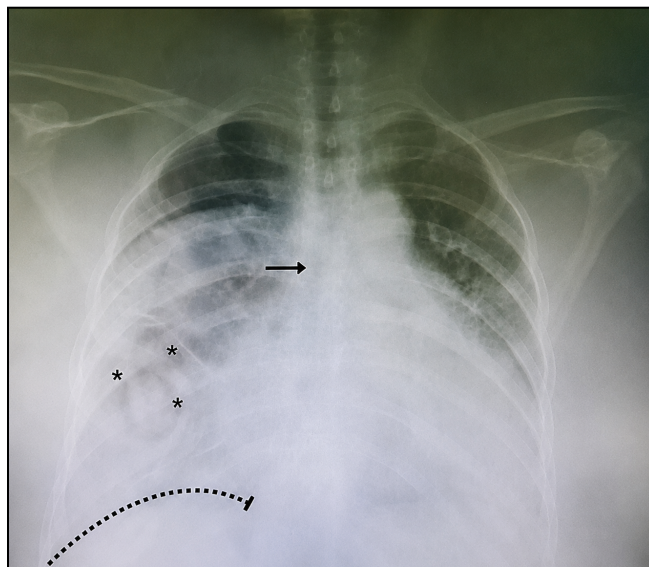


Figure 2. Anteroposterior supine chest radiograph obtained one hour after mastectomy, showing dense opacification of the right middle and lower lung zones, scattered atelectatic bands, blunting of both costophrenic angles, obscured right diaphragm (dotted line), a rounded, gas-containing structure in the right lower hemithorax (asterisks), and leftward shift of the right main bronchus (arrow).



Figure 3. Preoperative posteroanterior chest radiograph, showing heterogeneous opacification of the right hemithorax, blunting of the right costophrenic angle, and a smaller, similarly gas-filled focus in the right lower zone (asterisk), indicating that the diaphragmatic defect and herniated bowel were present prior to surgery.

the hemidiaphragm without discrete bowel gas above its contour. In this case, by contrast, the gas pattern is already present at baseline and simply enlarges postoperatively, indicating a fixed anatomic defect rather than a functional or intermittent elevation. The patient was managed with supplemental oxygen, which produced only minimal improvement in saturation; repositioning her upright produced a rapid, substantial improvement in both oxygenation and symptoms, pointing toward a mechanical process exacerbated by positional changes rather than a primary cardiopulmonary cause. In this patient, computed tomography (CT) confirmed the diagnosis of a Morgagni diaphragmatic hernia; images were not available for inclusion. She was referred for surgical evaluation following recovery from mastectomy.

Diaphragmatic hernias are broadly classified as hiatal (the most common), congenital (resulting from incomplete diaphragmatic formation in utero), or traumatic (resulting from blunt or penetrating injury).¹ The two principal congenital subtypes are Bochdalek hernias (~90% of congenital cases), which are posterolateral, predominantly left-sided defects that

typically present in neonates with respiratory distress, and Morgagni hernias (~2–5%), which are anterior retrosternal, predominantly right-sided defects with a female predominance (~61%) and are often diagnosed incidentally in adulthood at a mean age of ~42–57 years across series.¹⁻⁴ Although diaphragmatic hernias may remain asymptomatic for years, their presence can be unmasked when physiological conditions favor cephalad displacement of abdominal viscera through a pre-existing defect.

Perioperative changes in intra-abdominal pressure, patient positioning, and mechanical ventilation may transiently promote this displacement, making the immediate postoperative period an underrecognized window for initial symptomatic presentation. The characteristic imaging findings include intrathoracic bowel gas with haustral markings and air–fluid levels above the hemidiaphragm, although, as demonstrated in this case, these features may be subtle on a single supine anteroposterior chest radiograph. Computed tomography confirms the diagnosis and defines the anatomy. Despite their often indolent course, surgical repair is recommended because the defect will not close spontaneously and carries an approximately 10% lifetime risk of complications, including incarceration, bowel obstruction, and strangulation.¹⁻⁵

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

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ETHICS STATEMENT

The authors obtained verbal informed consent, witnessed and documented in accordance with institutional guidelines, for publication of medical information and images.

Why Not the Other Choices?

- **Bilateral basal opacification:** a nonspecific finding seen in atelectasis, aspiration, effusion, and pulmonary edema alike; it does not by itself indicate a specific cause and, taken alone, would not explain the severity of abrupt-onset hypoxia observed here.
- **Blunting of both costophrenic angles:** a nonspecific postoperative finding, commonly accompanying small effusions or basal atelectasis, with low diagnostic specificity.
- **Low lung volumes and atelectatic bands:** expected in the immediate postoperative period given poor inspiratory effort, supine positioning, and incisional splinting. It doesn't account for the level of hypoxia observed in this patient.

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