

Pneumoperitoneum by ultrasonography: clinical imaging

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A 65-year-old woman presented to emergency department with progressing abdominal pain since yesterday. She used the ED for palliative therapy (receiving analgesics). Her past medical history was significant for uterine leiomyosarcoma with metastatic lesions in the liver for which she had a total abdominal hysterectomy without chemotherapy. On her physical examination, she had BP = 80/50 mmHg, PR = 100 beats/min with a low-grade fever. She had abdominal distention due to ascites with generalized abdominal tenderness. Due to her worrisome vital signs, she was brought to the resuscitation CPR room. Cardiac monitoring and IV fluid therapy were started. To assess her volume status, ultrasonography was used to evaluate her IVC diameter and collapsibility. On sagittal sonographic of right upper quadrant by curvilinear probe, reverberation artefacts and enhanced peritoneal stripes were seen, which signified intraperitoneal-free air (Fig. 1). Chest X-ray study (Fig. 2) and abdominal pelvic CT scan confirmed this diagnosis (Fig. 3). At laparotomy, she was found to have peritonitis and a sigmoid perforation.

Acute abdominal pain is a common symptom in patients presented to the ED. Plain X-ray studies, abdominal pelvic CT, and ultrasound are diagnostic tools for detecting pneumoperitoneum. Even 2 ml of intra-abdominal-free air (IFA) can be detected by ultrasonography [1]. Sometimes, it is difficult to detect or differentiate IFA and intraluminal bowel gas.

There are some sonographic signs for diagnosing pneumoperitoneum: (1) gas above the liver. When patient is in a supine position, gas will obscure the liver; (2) bright reflection of the peritoneal line by gas; (3) gas outside the bowel, e.g., in the porta hepatitis; and (4) reverberation artefacts like lung A-lines [2].

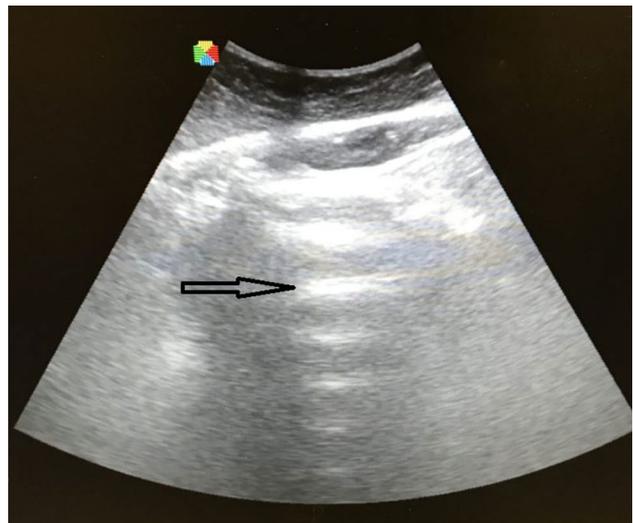


Fig. 1 Bed-side ultrasonography of the perihepatic space with the patient in a supine position showing free intraperitoneal air as an echogenic line with posterior reverberations



Fig. 2 Erect chest X-ray study showing subdiaphragmatic free air

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Fig. 3 Axial abdominal CT scan showing a collection of air anterior to the liver (pneumoperitoneum)

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Statement of human and animal rights This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent None.

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