

Pneumoperitoneum

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DUCOM

Pneumoperitoneum

describes gas within the peritoneal cavity, often due to critical illness.

The most common cause of pneumoperitoneum is the disruption of the wall of a hollow viscus.

CAUSES:

perforated hollow viscus

peptic ulcer disease

ischemic bowel

bowel obstruction

necrotizing enterocolitis

appendicitis

diverticulitis

malignancy

inflammatory bowel disease

- mechanical perforation

- trauma
 - colonoscopy
 - foreign bodies
 - iatrogenic
-

postoperative free intraperitoneal gas

peritoneal dialysis

mechanical ventilation

pneumomediastinum

pneumothorax

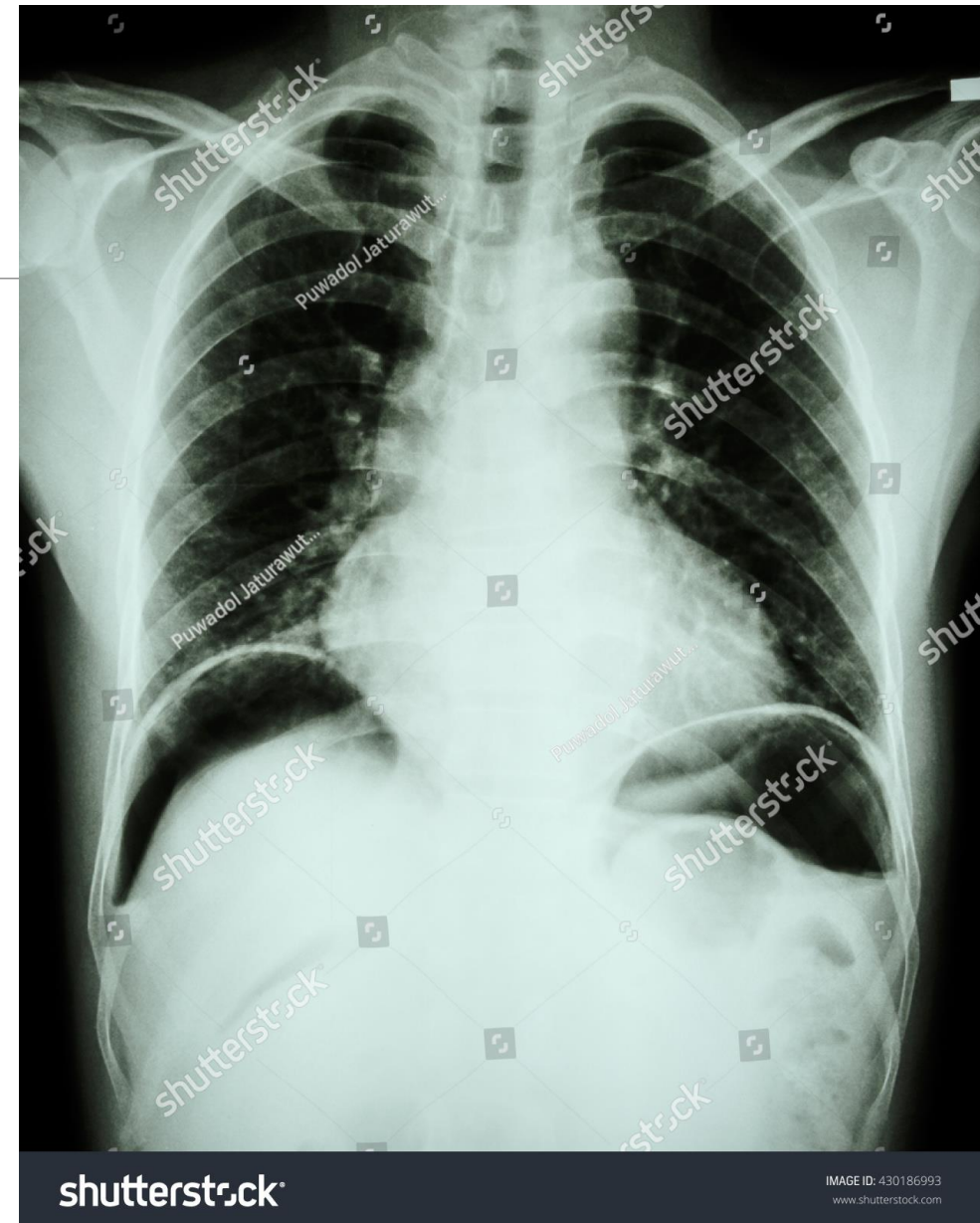
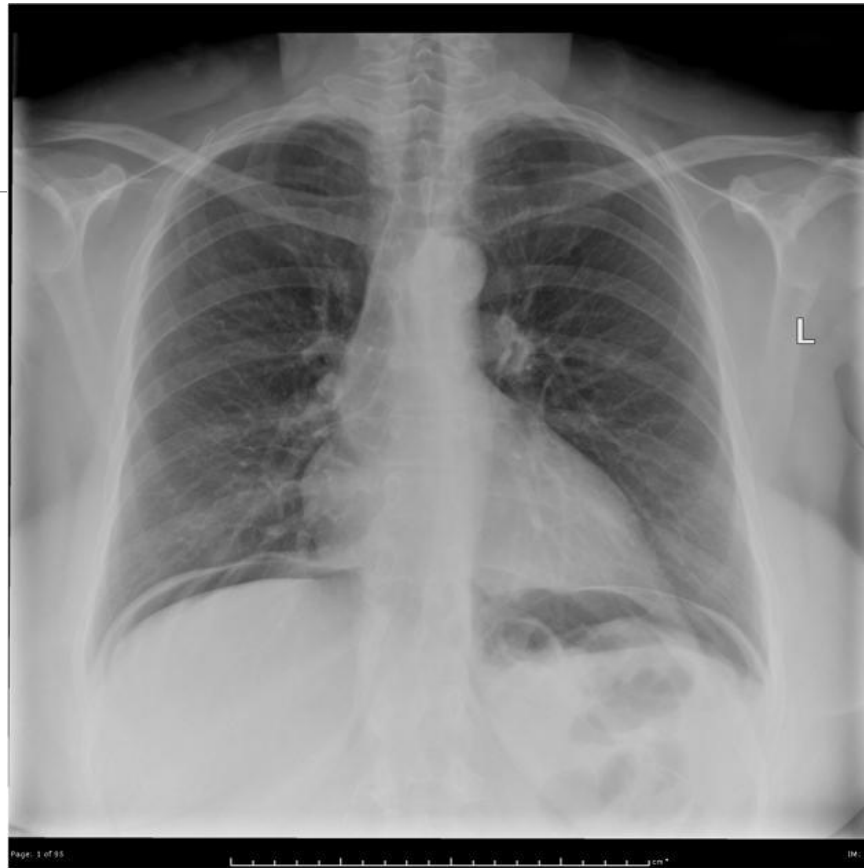
Radiographic features

Plain radiograph

Chest radiograph

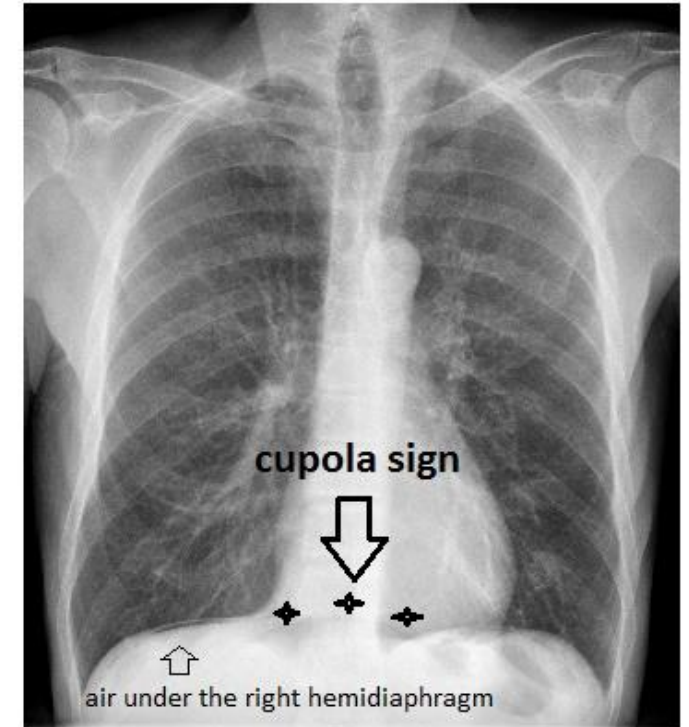
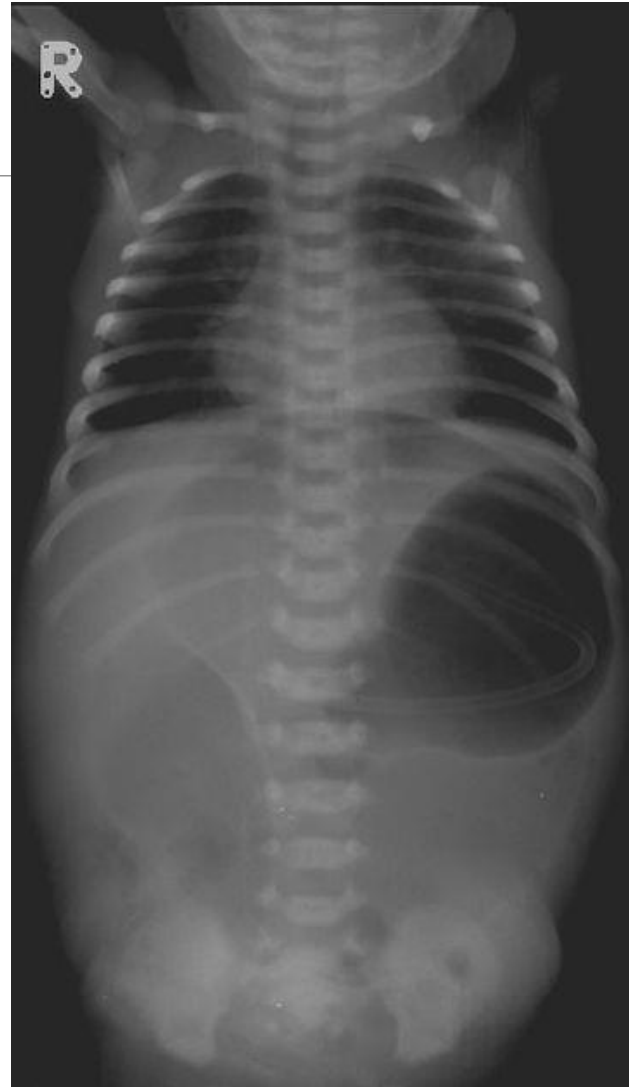
An erect chest x-ray is probably the most sensitive plain radiograph for the detection of free intraperitoneal gas. If a large volume pneumoperitoneum is present, it may be superimposed over a normally aerated lung with normal lung markings.

- ❖ subdiaphragmatic free gas
- ❖ leaping dolphin sign
- ❖ cupola sign(on supine film)
- ❖ continuous diaphragm sign



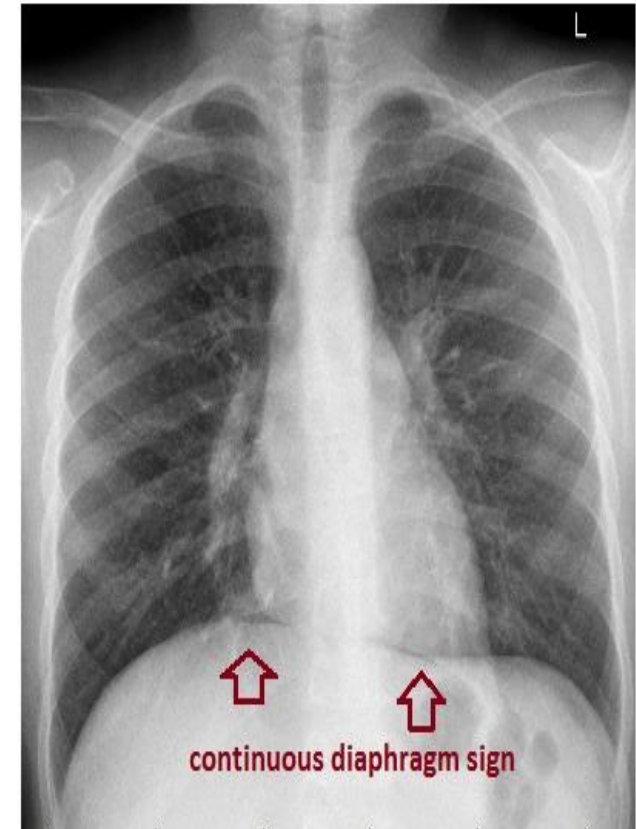
The **cupola sign** is seen on a supine chest or abdominal radiograph in the presence of pneumoperitoneum.

It refers to non-dependent gas that rises within the abdominal cavity of the supine patient to accumulate underneath the central tendon of the diaphragm in the midline. It is seen as lucency overlying the lower thoracic vertebral bodies. The superior border is well defined, but the inferior margin is not ¹.



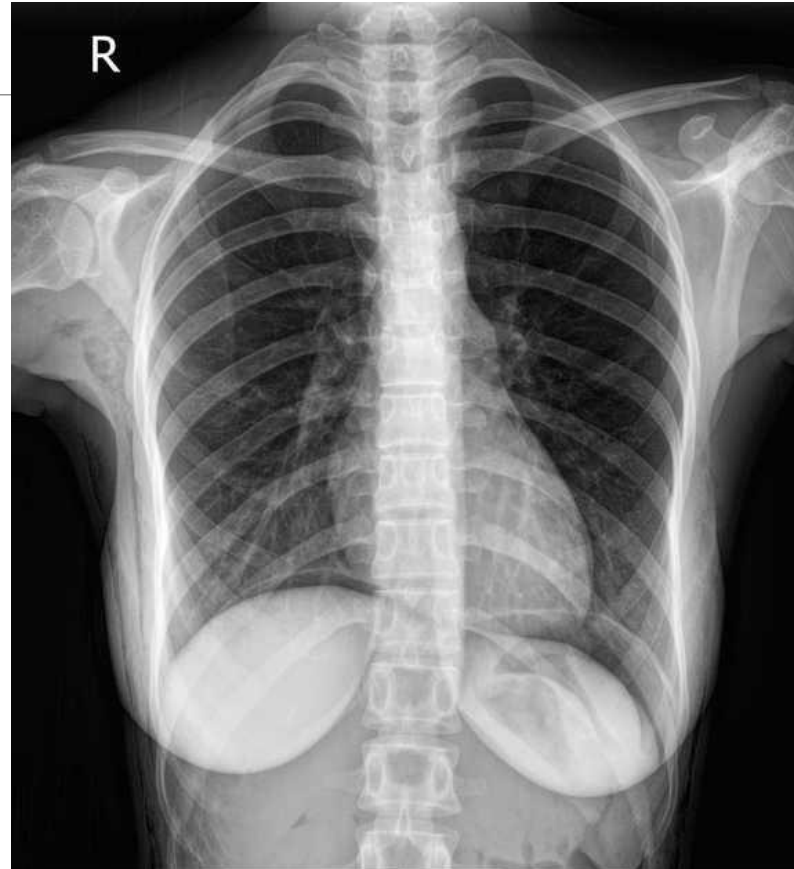
The **continuous diaphragm sign**

is a chest radiograph sign of pneumomediastinum or pneumopericardium if lucency is above the diaphragm, or of pneumoperitoneum if lucency is below the diaphragm.



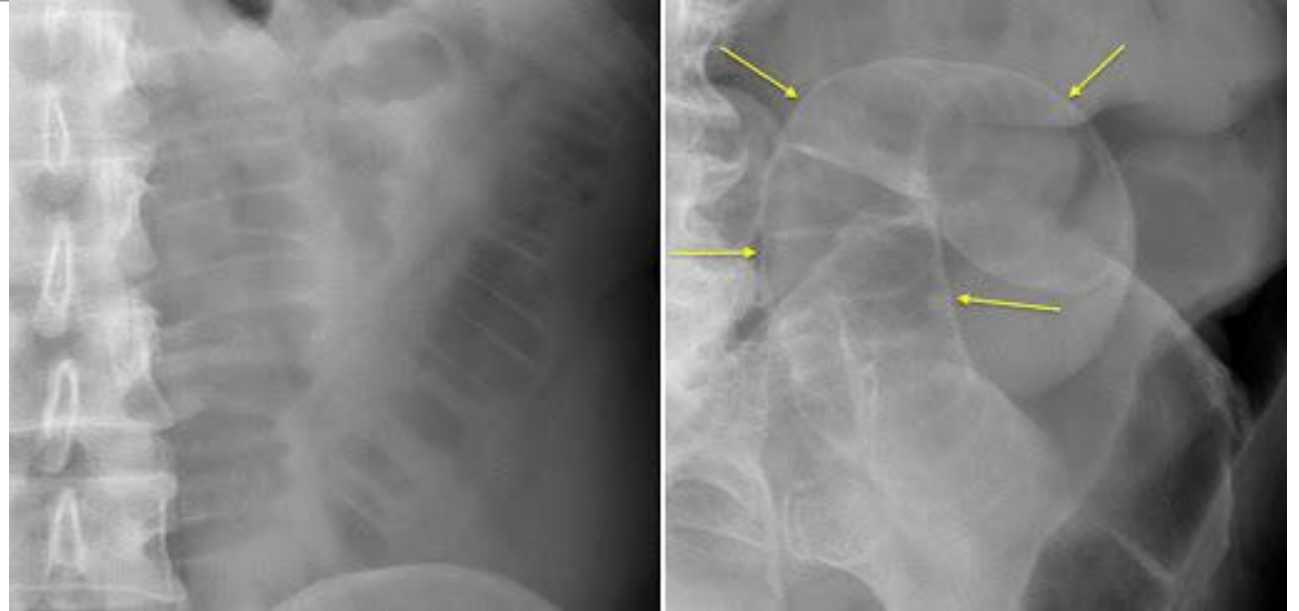
The **leaping dolphin sign**

(also known as the **diaphragm muscle slip sign**) may be seen in pneumoperitoneum on a supine abdominal radiograph. It represents the outlining of the diaphragmatic muscle slips by free intraperitoneal gas and usually requires a moderate to large volume of pneumoperitoneum



bowel-related signs

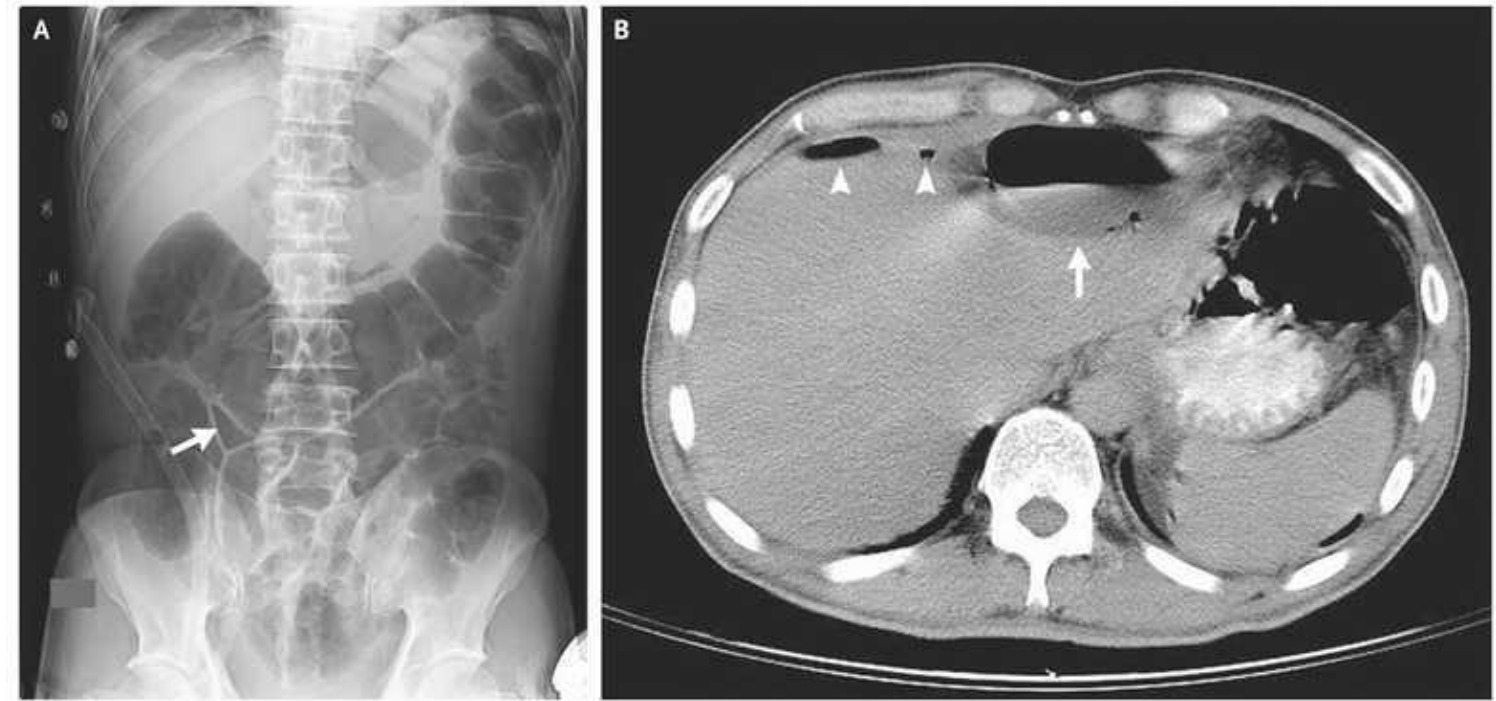
- **double wall sign** (also known as Rigler sign or bas-relief sign).
- The **Rigler sign**, also known as the **double-wall sign**, is a sign of pneumoperitoneum seen on an abdominal radiograph when gas is outlining both sides of the bowel wall, i.e. gas within the bowel's lumen and gas within the peritoneal cavity. It is seen with large amounts of pneumoperitoneum (>1000 mL).



Telltale triangle sign

is a radiographic sign seen on plain abdominal radiographs in a supine, cross table lateral or decubitus view

It describes the appearance of a radiolucent triangle of gas formed between three loops of bowel or between two loops of bowel and the abdominal wall ¹



peritoneal ligament-related signs:

- football sign
- falciform ligament sign
- lateral umbilical ligament sign (also known as inverted "V" sign)
- urachus sign

The **football sign**

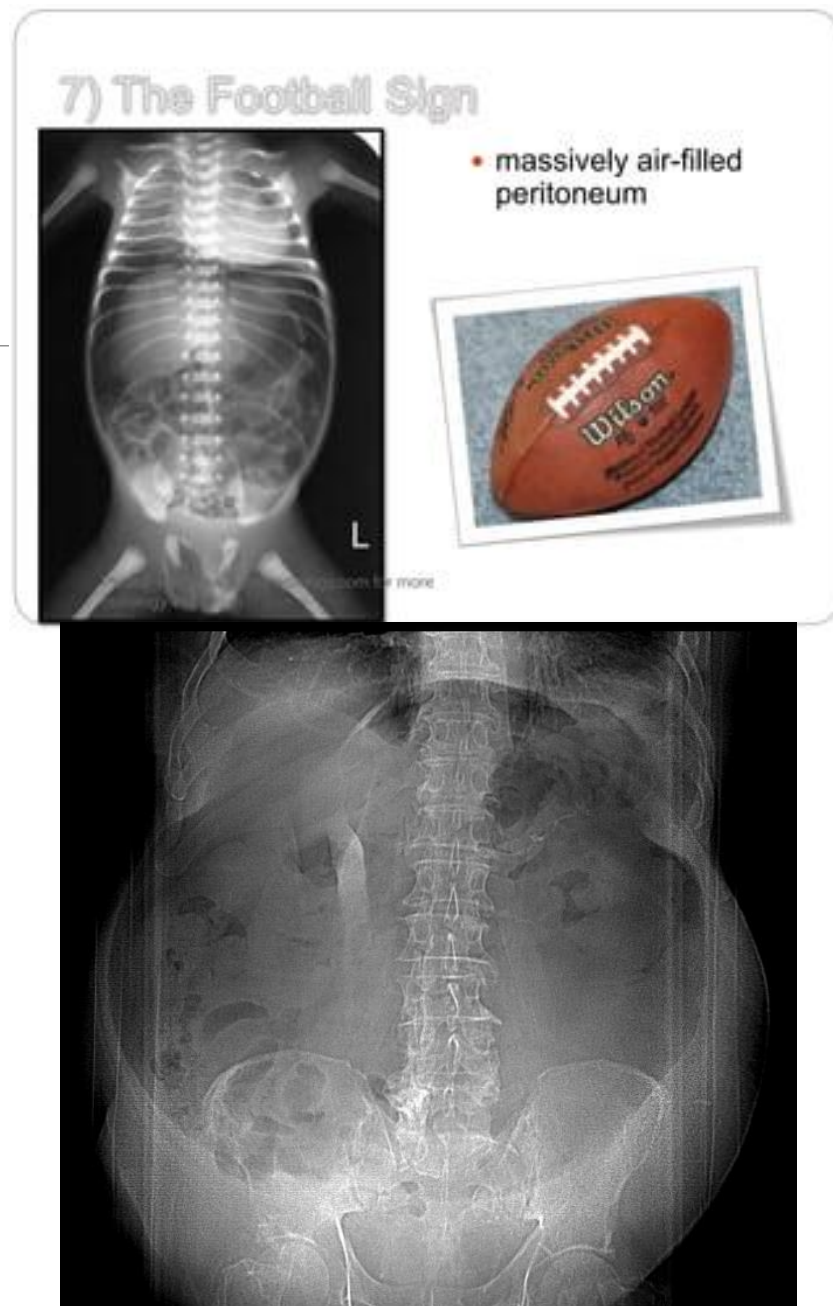
is seen in cases of massive pneumoperitoneum, where the abdominal cavity is outlined by gas from a perforated viscus.

It is most frequently seen in children with advanced necrotizing enterocolitis. Other causes include:

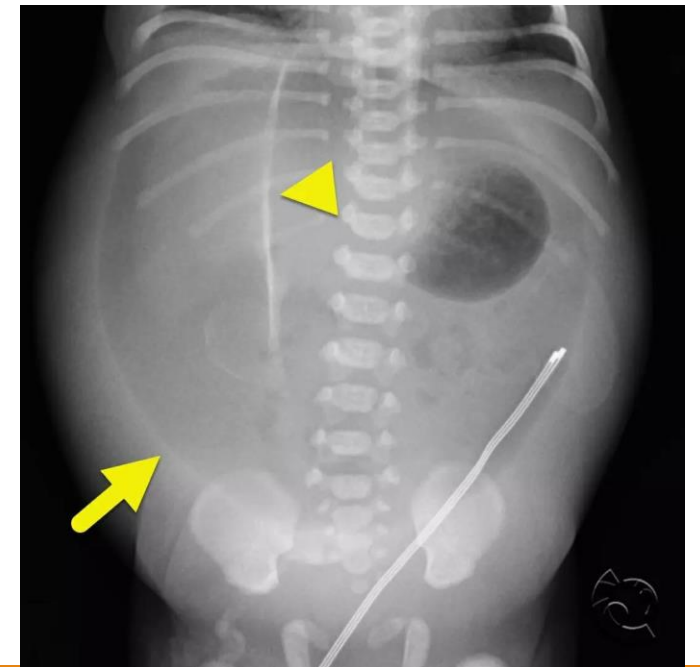
bowel obstruction with secondary perforation

- malrotation with midgut volvulus
- Hirschsprung disease
- meconium ileus
- intestinal atresia

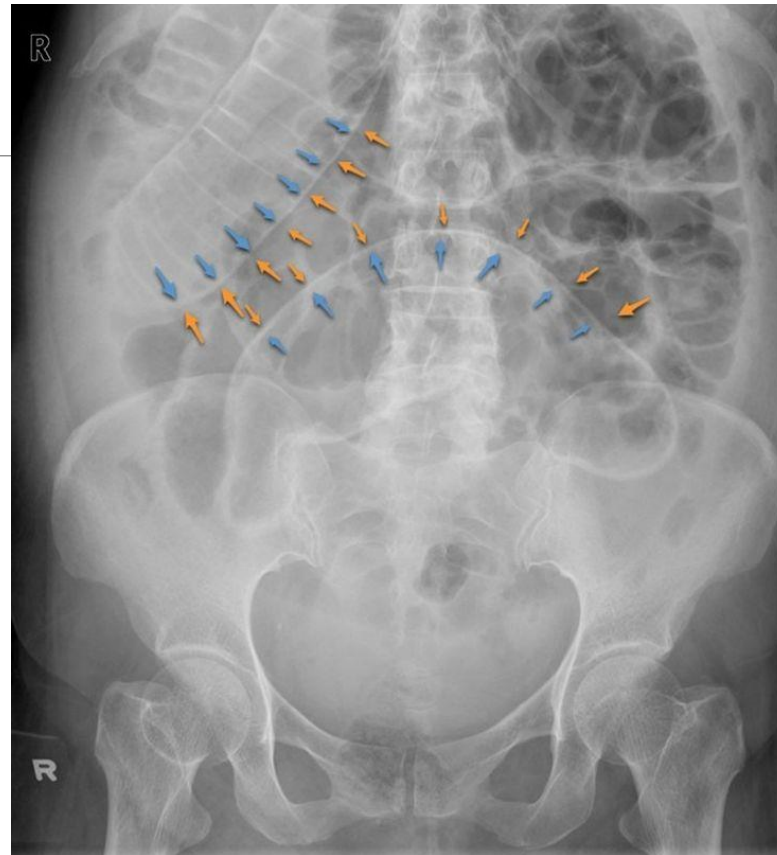
peptic ulcer disease



The **falciform ligament sign**, also called the **Silver sign**, is characterized by the falciform ligament being outlined with free abdominal gas in cases of pneumoperitoneum of a large amount.



The **inverted "V" sign**, also known as the **lateral umbilical ligament sign**, is a sign of pneumoperitoneum manifested by the visualization of an inverted "V" shape in the pelvis on supine view of abdominal radiographs.

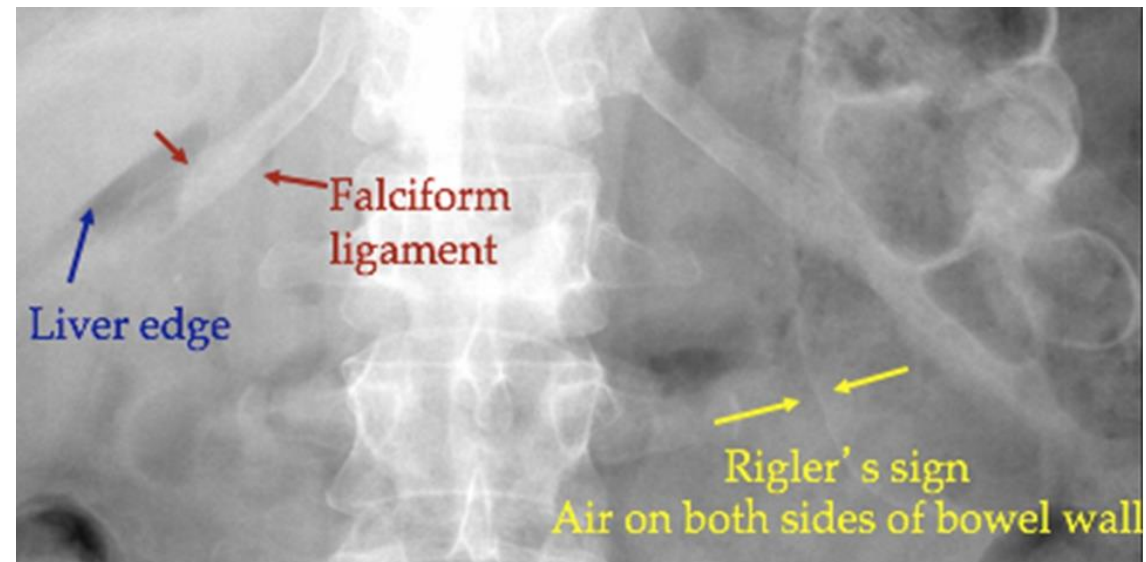
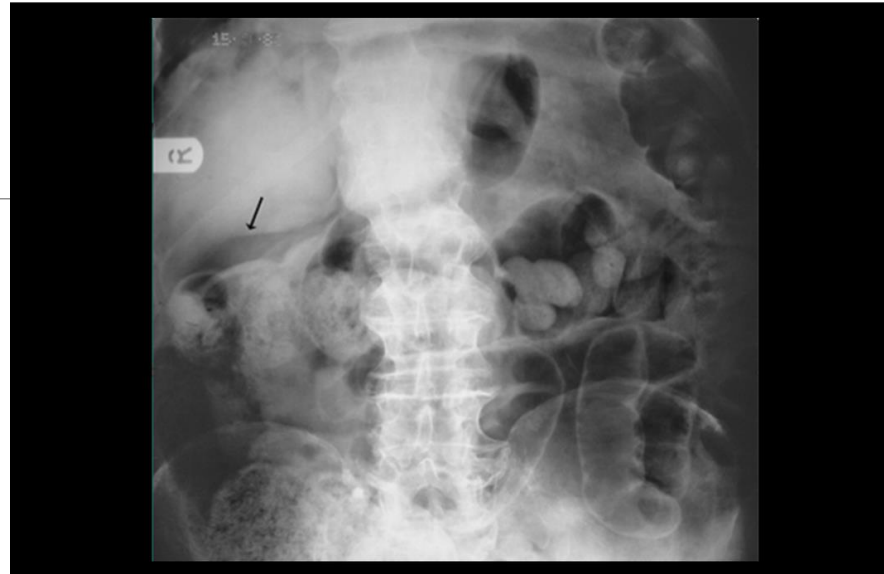


right upper quadrant signs:

- cupola sign
- fissure for ligamentum teres sign
- hepatic edge sign
- lucent liver sign
- Morison's pouch sign
- periportal free gas sign

Hepatic edge sign

The **hepatic edge sign** is a radiographic sign of pneumoperitoneum seen on a supine plain abdominal radiograph. It is represented by a cigar-shaped pocket of free air in the subhepatic region, which tracks superomedial following the contour of the liver.



The **periportal free gas sign** has been described as being strongly suggestive for upper gastrointestinal tract perforation.

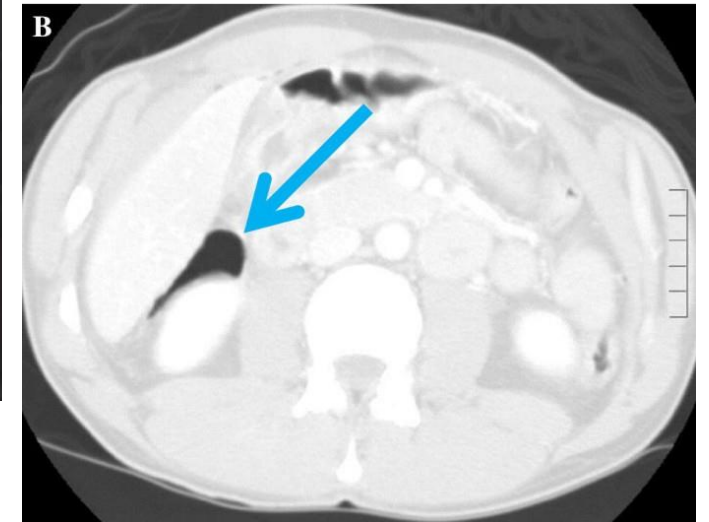


The **doge cap sign**, ((**Morison's pouch sign**)),

is a radiographic sign of pneumoperitoneum

. It presents as a triangular-shaped (although may also be crescentic or semicircular) gas lucency,

usually bound by the 11th rib in the right upper quadrant on abdominal radiographs due to air in Morison's pouch.



Differential diagnosis

Pseudopneumoperitoneum

describes any low attenuation within the abdominal cavity that masquerades as free intraperitoneal gas or pneumoperitoneum.

basal linear atelectasis

pneumomediastinum (mimicking cupola sign)

Chilaiditi sign

diaphragmatic undulation

gas within skin folds

biliary, portal vein or bowel wall gas

fat within the subdiaphragmatic space or the ligamentum teres

properitoneal fat stripe

benign post-traumatic pseudopneumoperitoneum

*Thank you
for Listening!*