Radiological signs of pneumoperitoneum in an extremely low birthweight infant

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DESCRIPTION

A twin male infant weighing 820 g was born at 26^{+5} weeks of gestation. At birth he received mechanical ventilation, surfactant and subsequently indomethacin treatment for a large patent ductus arteriosus.

On day 8 of life he had frequent episodes of desaturations. Transillumination of the chest was negative. Abdominal examination and laboratory studies were unremarkable. Chest and abdominal radiographs showed signs of pneumoperitoneum. These included presence of subdiaphragmatic air in the right upper quadrant, Rigler's sign, falciform ligament sign, cupola sign and scrotal air (figures 1 and 2). An emergency laparotomy revealed an isolated perforation of jejunum, which was repaired.

Rigler's sign—Double wall or bas-relief sign, first described by Leo Rigler,[1] where both outer and inner walls of the bowel wall can be visualised when there is air in the peritoneal cavity and within the intestinal lumen.

A variant of Rigler's sign occurs where the outside of the bowel wall is visible because the lumen is filled with fluid. A pseudo-double wall sign is produced when two loops of distended bowel are adjacent to each other and their adjoining wall are outlined by intraluminal gas in both loops.[2]

Falciform ligament sign (Silver sign)—Falciform ligament appears as a linear density running parallel to the right border of the spine when free air lies on either side of it.[3]

Cupola sign (Lord Nelson's hat sign)—Inverted cup-shaped arcuate lucency seen in supine radiographs within the median subphrenic space.[4]

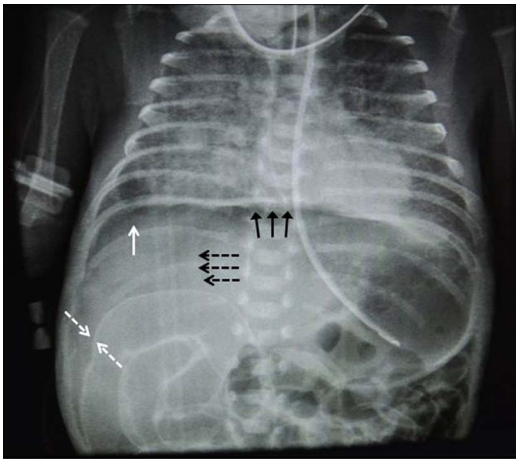

Figure 1 Supine radiograph of the chest including the upper part of the abdomen showing the presence of free intraperitoneal gas as evidenced by the outlining of the falciform ligament (dashed black arrows), the presence of air on both sides of the bowel wall (dashed white arrows), known as Rigler's sign, subdiaphragmatic air in the right upper quadrant (solid white arrow) and cupola sign showing air within the median subphrenic space (solid black arrows).

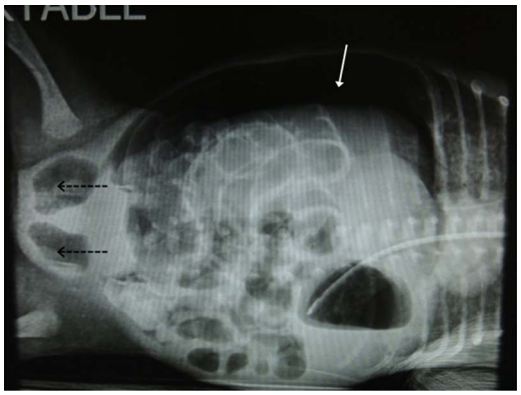

Figure 2 Left decubitus abdominal radiograph showing the presence of free intraperitoneal air outlining the right lateral abdominal wall (solid white arrow). Rigler's sign (dashed white arrows) and air in the scrotum (dashed black arrows).

Learning points

- Radiological imaging is a vital tool and subtle imaging signs that can alert a physician towards the presence of a pneumoperitoneum must be specifically looked for in radiographs.
- In neonates, besides a supine film, a lateral decubitus view should be taken to confirm suspected-free air, when in doubt.
- Early recognition of these useful radiological signs of pneumoperitoneum followed by immediate intervention can be life saving.

Contributors SR wrote the case under the supervision of SC who summarised the findings and did appropriate literature search. TE-lH reported the findings. VSR edited the report and approved.

Competing interests None.

Patient consent Obtained.

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REFERENCES

1 Rigler LG. Spontaneous peumoperitoneum: a roentgenologic sign found in the supine position. *Radiology* 1941;37:604–7.
2 de Lacey G, Bloomberg T, Wignall OK. Pneumoperitoneum: the misleading double wall sign. *Clin Radiol* 1977;28:445–8.
3 Hokama A, Nakamura M, Kinjo F, *et al*. The falciform ligament sign of pneumoperitoneum. *J Emerg Trauma Shock* 2011;4:440.
4 Mindelzun RE, McCort JJ. The cupola sign of pneumoperitoneum in the supine patient. *Gastrointest Radiol* 1986;11:283–5.

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