

## CLINICAL IMAGE

# Portal Vein Gas in Necrotising Enterocolitis

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Figure 1: Gas in the portal vein branches

A 28-day-old boy developed abdominal distension, blood-stained gastric drainage, apnoea and hypotension. Born to G7P4A3 mother at 36w gestation, his birthweight was 1450g. He was treated in the immediate postnatal period for respiratory distress due to hyaline membrane disease with surfactant and mechanical ventilation. He was then treated for probable sepsis. On 21st day of birth he was found to have conjugated hyperbilirubinemia, intermittent pale stools and intermittent light-yellow stools, lethargy and hepatomegaly. C-reactive protein was positive. Echocardiogram showed small patent ductus arteriosus. He was given nasogastric tube-feeds of formula milk in the last 3 days. On examination, abdomen was uniformly distended and soft without erythema, oedema, tenderness or mass. Abdominal skiagram showed dilated bowel loops and portal vein gas (PVG), indirect evidence of free air and fluid in peritoneal cavity (Fig.1).

## DISCUSSION

Clinically and radiologically, our patient had modified Bell's stage IIIB NEC. Presence of PVG is very prominent in radiographs, but pneumoperitoneum,

the hallmark of stage IIIB was, not typical. Portal vein gas represents gas distributed through fine radicles of portal vein. The bacterial translocation and production of hydrogen gas into the bowel wall cause pneumatosis intestinalis. This gas can embolize from

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the bowel wall through the mesenteric veins to the portal venous system and the non-dependent parts of the liver, particularly the left lobe and anterior segment of the right lobe.[1] Alternatively, PVG may be due to action of gas-forming bacteria within the portal vein itself. Abdominal sonography is very specific and sensitive for early detection of portal and hepatic gas thus allowing early diagnosis and efficacious treatment of NEC. At a more advanced stage, PVG can be seen on abdominal radiographs. Furthermore, PVG may only be a transitional sign or can persist for longer than 2d.[1] Presence of portal vein gas differentiates NEC from spontaneous intestinal perforation (Gordon's classification).[2] Presence of PVG in the abdominal radiograph of a patient with NEC has very high score (score 9 out of 10) in 10 point Duke abdominal assessment scale (DASS) score.[3] Coursey et al observed that presence of fixed bowel loop, significant or highly probable pneumatosis intestinalis or portal vein gas in abdominal radiographs progressed to pneumoperitoneum in 46.5% study group of NEC patients but not in control patients.[4] Presence of PVG is fleeting and that is why it has low reported incidence of 10% to 30%, but has 61% incidence in NEC with pan-intestinal involvement. [5] In patients found to have intestinal perforation at surgery, only 63% of them had radiographic evidence of free air thus demonstrating, perforation can occur in high number of patients without evidence of pneumoperitoneum. Presence of

pneumoperitoneum or PVG is among best indications of laparotomy. All patients with PVG who underwent laparotomy were found to have full-thickness bowel necrosis and 52% of them had pan-intestinal involvement. [5] Overall surgical mortality of patients with PVG is 54% and mortality of pan-intestinal NEC is 42%-100%.

## REFERENCES

1. Abboud B, Hachem JE, Yazbeck T, Doumit C. Hepatic portal venous gas: Physiopathology, etiology, prognosis and treatment. *World J Gastroenterol.* 2009; 15: 3585-90.
2. Gordon P, Christensen R, Weitkamp JH, Maheshwari A. Mapping the new world of necrotizing enterocolitis (NEC): review and opinion. *EJ Neonatol Res.* 2012; 2:145-72.
3. Coursey CA, Hollingsworth CL, Gaca AM, Maxfield C, DeLong D, Bisset GIII. Radiologists' agreement when using a 10-point scale to report abdominal radiographic findings of necrotizing enterocolitis in neonates and infants. *Am J Roentgenol.* 2008;191:190-7.
4. Coursey CA, Hollingsworth CL, Wriston C, Beam C, Rice H, Bisset GIII. Radiographic predictors of disease severity in neonates and infants with necrotizing enterocolitis *Am J Roentgenol.* 2009;193:1408-13.
5. Sylvester KG, Liu GY, Albanese CT. Necrotising enterocolitis. In: Coran AG, ed-in-chief, Adzick NS, Krummel TM, Laberge JM, Shamberger RC, Caldamone AA, associate eds. *Pediatric Surgery.* 7th ed., Vol. II. USA: Elsevier, Saunders; 2012:1187-1207.