

Iatrogenic Pneumoperitoneum Incidentally Diagnosed During A Neonatal Echocardiography

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Abstract

Pneumoperitoneum, gas under the diaphragm, is often a sign of significant intra-abdominal pathology, be it perforation in the stomach or duodenum secondary to peptic ulcer disease or in the small or large bowel as a result of inflammatory bowel diseases, diverticulitis or cancer, it can also be iatrogenic as a result of endoscopy or laparoscopy. The diagnosis is made with erect chest and abdominal radiographs or by an abdominal Ultrasound Scan performed by a very skilled sonographer. Air is usually most visible under the right hemi-diaphragm than the left. Here, we present a troublesome case of a 13-day old neonate with pneumoperitoneum, which is believed to be an iatrogenic effect of nasogastric (NG) tube. This was discovered during a neonatal echocardiography.

Introduction

Pneumoperitoneum is a radiological finding most commonly associated with significant intra-abdominal pathology. In over 90% of cases, pneumoperitoneum is the result of perforation of a hollow viscus. Most of the pathological causes happens in adults not in neonates. It is very rare to have pneumoperitoneum with intra-thoracic, gynaecological or iatrogenic aetiology in a neonate. Other causes were ruled out, and we are left with pneumoperitoneum cause by an insertion of an NG tube.

Case Report

In one of the Sundays in March 2022, a 13-day-old female presented to the outpatient department of MBH with the following complains; inability for the baby to suck, weight loss and bluish tongue/lips when crying. On physical examination, the neonate appeared malnourish with mild abdominal distention. On auscultation, there was a murmur. The mother's obstetrical history was uneventful and there was normal vaginal delivery at a Health Centre. A suspicion for a congenital heart defect was made as a clinical diagnosis. The patient was admitted to the neonatal intensive care of the hospital.

First, the neonate was sent for a babygram, Fig 1.A



Fig. 1A The large bowel (transverse and descending colon) had some air and there was bizarre heart shadow.

An NG tube was inserted to assist in the feeding. Meanwhile the neonatal echocardiography was to be done the following day, Monday. On day 2 of admission, the NG tube seems not to work properly, it was discontinuous with difficulty.

The neonate was then sent for the echocardiogram to be done. The echocardiogram revealed the following

1. Hypoplastic LV and LA (small LV and LA)
2. A communication between the LA and RA, PFO (patent foramen ovale)
3. A communication between the ventricles, VSD (ventricular septal defect)
4. A communication between the PA and aorta, PDA (patent ductus arteriosus)

See figures 1.B below



Fig 1 B; Parasternal Long Axis (PLAX) of the heart revealing a small LV & LA (Hypoplastic left heart)

In the course of the echocardiogram, it was challenging to view the heart and IVC through the subcostal window. With kin observation, there was air

bubble at the ceiling of the peritoneum causing ringdown artifact Fig. 2

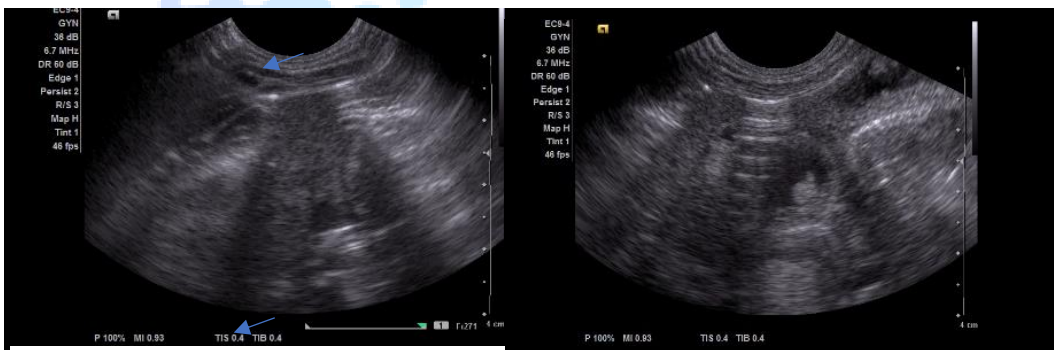


Figure 2 A & B with Ringdown Artifacts

Assessing the flanks and pelvis, with a high frequency curvilinear transducer, there was turbid free fluid

within the peritoneal cavity. And the ringdown artefacts were more prominent. Fig. 3



Figure 3 with turbid peritoneal free fluid

The suspicion of bowel perforation was stronger, then a second baby gram was done and there was free air under the right hemi diaphragm. (Fig. 4)



Fig. 4: presence of free air below the right hemi diaphragm. Arrow

Ruling out all the aetiologies of pneumoperitoneum, it was then clear that the only cause of the gastric perforation was the NG tube, which is iatrogenic.

Discussion

Pneumoperitoneum has many causes, not all of them are surgical. It can originate from intra-abdominal and intra-thoracic causes, as well as gynaecological and iatrogenic causes. Williams et al. in 1997 reviewed causes of pneumoperitoneum. Intra-thoracic causes include trauma, pneumothorax and others, and these can be associated with pneumomediastinum or pneumocardium. There is also an association with mechanical ventilation in intensive therapy unit patients following cardiopulmonary resuscitation

Air can be found in the abdomen via the vagina, uterus and salpinx. Pneumoperitoneum via a gynaecological route has been reported following coitus and Jacuzzi usage, as well as vaginal douching.

Air can be iatrogenically introduced to the peritoneum via endoscopic procedures such as oesophageal-gastro-duodenoscopy and colonoscopy. In our case it was by a Nasogastric Tube.

Intra-abdominal causes of pneumoperitoneum are better recognized as they are more common. Most of these causes are surgical in nature, and it is reported that over 90% of cases of pneumoperitoneum is the result of perforation of an intra-abdominal viscus.

It is commonplace for rapid surgical intervention/exploration, not only to find the

offending perforation, but to limit the degree of intra-abdominal contamination.

Conclusion

This was a complicated case of pneumoperitoneum. It presented a challenge in diagnosis and management, the diagnosis was incidental and the complex cyanotic heart disease, limiting management options. From this case, we can take an important learning point. Though the presentation of pneumoperitoneum is often diagnosed from a chest X-ray or an erect abdominal X-ray, there are instances where it can be diagnosed by Ultrasonography. Unfortunately, the neonate died 6 hours later. She could not withstand surgery because of the complex CHD.

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The authors want to declare here that, there is no conflict of interest as far as this case is concern.

The caregiver was told that images from the baby shall be used in teaching younger Imaging Technicians

References

1. <https://accesspediatrics.mhmedical.com/content.aspx?bookid=1303§ionid=79662351>
2. <https://radiologyupdate.org/f/2019/Dec-27/Non-Surgical%20Pneumoperitoneum.%20Causes%20and%20Imaging%20Findings.pdf>
3. Postgrad MedJ3 1997; 73: 531 - 537 C The Fellowship of Postgraduate Medicine, 1997
4. <https://jmedicalcasereports.biomedcentral.com/articles/10.1186/1752-1947-5-86>
5. Mularski RA, Ciccolo ML, Rappaport WD: Nonsurgical causes of pneumoperitoneum. West J Med. 1999, 170: 41-46.
6. Eslick GD, Chalasani V, Salama AB: Idiopathic pneumoperitoneum. Eur J Intern Med. 2006, 17: 141-143. 10.1016/j.ejim.2005.08.014.
7. Khan, T.R., Rawat, J.D., Ahmed, I. et al. Neonatal pneumoperitoneum: a critical appraisal of its causes and subsequent management from a developing country. *Pediatr Surg Int* **25**, 1093 (2009). <https://doi.org/10.1007/s00383-009-2488-6>
8. Grosfeld JL et al (1996) Gastrointestinal perforation and peritonitis in infants and children: experience with 179 cases over ten years. *Surgery* 120:650–656
9. Sharma SB et al (2004) Gastrointestinal perforations in neonates with anorectal malformations. *Indian J Gastroenterol* 23:107–108
10. Mestel AL, Trusler GA et al (1996) Pneumoperitoneum in the newborn. *Can Med Assoc J* 95:201–204

