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Massive Pneumoperitoneum in Neonate a Case Report in Owerri

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Abstract: Massive pneumoperitoneum in a neonate should be treated as an emergency; immediate action of management should be applied as soon as the diagnosis is made. A four day old male neonate was admitted into the intensive care baby unit (ICBU) with severe birth asphyxia, anaemia and sepsis. An exchange blood transfusion was done due to the anaemia and sepsis. The following morning, patient vomited twice after food, feeds were consequently withheld and baby was on nil per oral with intravenous infusion. By evening the patient developed fever and passed non-bloody but foul smelling meconium. That same night (5th day of life), the abdomen became distended and quite tense that the abdominal organs were difficult to palpate. Abdominal radiography showed bulging of the flanks; a large amount of free gas was seen under the diaphragm which compressed the abdominal viscera caudally and medially. A diagnosis of massive pneumoperitoneum was made, an emergency laparotomy was done; a longitudinal tear, about 9cm long was found in the descending colon, another perforation with necrotic border was found in the sigmoid colon with faecal soilage all over the peritoneal cavity. The affected segments of the colon were resected and transverse colosigmoid anastomosis was done, colostomy was not constructed because of the condition of the baby and poor management of colostomy in the environment. Post operative recovery was uneventful; the patient was discharged on the 29th post operative day at age of 6 weeks.

Keywords: Colonic perforation; Necrotizing enterocolitis; Birth asphyxia; Sepsis.

1. Introduction

Pneumoperitoneum means free gas or air in the peritoneal cavity [1]. Pneumoperitoneum in the new-born is an acute emergency in more than 90% of cases [1, 2] and requires immediate intervention. The causes of pneumoperitoneum may either be due to pathological perforation of the viscus such as necrotizing enterocolitis, hirschsprung disease, gastric and duodenal perforations or iatrogenic causes like thermometer injury to rectum, intubation and mechanical ventilation [3-6].

The patient should be well examined; the investigations carried out should be well scrutinized to know the next line of action. The patient should be positioned for 10 minutes for the free gas to rise to the highest point in the abdomen before the film is taken [2]. When pneumoperitoneum is suspected, it's always advisable to do left lateral decubitus view in addition to the erect view, because 90% of the cases can be demonstrated in this position [2]. Though in very ill patients, only supine view can be obtained; it is therefore necessary to know the signs of pneumoperitoneum in this view [2].

- i. Free air in the peritoneal cavity appearing as an oval lucency which surrounds the abdominal content: "football-sign".
 - ii. Triangle formed by the air outside adjacent loops of bowel: "triangle sign".
 - iii. Falciform ligament seen adjacent to the right side of spine in the right upper quadrant of the abdomen: "Falciform ligament sign".
 - iv. Umbilical artery remnant which produces an inverted V in the lower abdomen: "Lateral Umbilical sign".
 - v. A tapering conical soft tissue density in the pelvis representing the urachus: "Urachus sign".
 - vi. Air in the median subphrenic space with a sharp upper border and poorly delineated lower margin: "Cupola sign".
 - vii. Oval or linear collection of gas at the Morrison's pouch (hepatorenal fossa) and subhepatic space [2, 3].
- Fast decision should be taken when the cause is well established and diagnosis made. Management should commence without delay especially in a case of massive pneumoperitoneum with peritonitis [7]. If laparoscopic surgery is to be performed in the case of neonatal pneumoperitoneum the risk of gas embolism should also be considered [8].

A focal spontaneous colonic perforation at term or close to term is rare [6], abdominal distension is the most specific clinical sign seen in focal spontaneous colonic perforation [6].

2. Objective

The main objective of this case report is to create awareness of pneumoperitoneum in neonates in our local environment, and to proffer solution.

3. Case Report

A 4 day old male neonate was admitted into the Intensive Care Baby Unit (ICBU) with severe birth asphyxia, anaemia and sepsis.

There was augmentation of labour with oxytocin and foetus had distress in labour, umbilical cord was coiled around the baby's neck, the mother and the baby are Rhesus positive. An anaemic blood transfusion was done due to anaemia and sepsis, the following morning patient vomited twice after taking food, feed were consequently withheld and the baby was on nil per oral with intravenous infusion. By evening patient developed fever and passed non bloody but foul smelling meconium. That same night (5th day of life), the abdomen became distended and quite tense that the organs were difficult to palpate, the conjunctiva was neither pale nor icteric, chest was clear and the cardiovascular system was normal. Abdominal radiograph showed bulging of the flanks; a large amount of free gas was seen under the diaphragm which compressed the abdominal viscera caudally and medially – "Football- sign", (Fig 1A and 1B – Supine and Erect respectively). A linear tissue shadow was noted at the right side of the spine adjacent to the liver – "falciform ligament sign" (Fig 1A – arrow).

A diagnosis of massive pneumoperitoneum was made, and an emergency laparotomy was also performed that night. As soon as incision was made on the abdomen, a large amount of air escaped and the distended abdomen collapsed immediately. A longitudinal tear, about 9cm long was found in the descending colon, another perforation with necrotic borders was found in the sigmoid colon with faecal soilage all over the peritoneal cavity. The affected segments of the colon were resected, transverse colosigmoid anastomosis was done, and colostomy was not constructed because of the condition of the baby and poor management of colostomy in the environment. Post operative recovery was uneventful, breast feeding was commenced and the patient was discharged on the 29th post operative day at age of 6 weeks.

4. Discussion

The most common cause of pneumoperitoneum in neonate is necrotizing enterocolitis [7, 8] and this is one of the causes in this case report. Operative management is the main and usual treatment of neonates with pneumoperitoneum and necrotizing enterocolitis [4] as was done in this case report.

Apart from necrotizing enterocolitis, isolated colonic perforation, caecal perforation, perforated pouch colon, gastric and duodenal perforation are also main causes of pneumoperitoneum in neonates [7]. In this case presentation, the baby has 9cm tear on perforation in the descending colon.

The clinical presentation will depend on the amount of gas leakage [9]. If the leakage is small, the patient may not present with any symptom but if there is a large amount of gaseous escape, as in this case report, tense abdominal distension with resultant elevation at the diaphragm will develop [9].

Neonatal pneumoperitoneum with peritonitis requires immediate surgical intervention [3], but if there is pneumoperitoneum without peritonitis, conservative management with very close monitoring should be done [10]. Also the abdominal girth should be measured frequently to detect any deterioration in the patients' condition [4]. Neonatal pneumoperitoneum without peritonitis with a normal abdominal examination is rare [4].

Due to the transitional circulation in neonates, they are vulnerable to gas embolism if laparoscopic surgery is performed in the case of neonatal pneumoperitoneum [8]. Gas can pass through the umbilical vein and ductus venosus to enter the patent foramen ovale or patent ductus arteriosus to the arterial circulation [8]. Cardiovascular collapse may result due to air embolism [8].

5. Conclusion

We have reported the cause of neonatal pneumoperitoneum in this very case study; however [11] have reported a case of Idiopathic neonatal pneumoperitoneum with favorable outcome in which laparotomy was avoided too.

Therefore each case of neonatal pneumoperitoneum should be carefully studied and proper management applied i.e. it should be treated as an emergency with very close monitoring.

Legends to Figures

Figure-1A. Shows the abdominal cavity of the patient in Supine position.



Figure-1B. Shows the abdominal cavity of the patient in erect position.



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