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Neonatal pneumoperitoneum: Aetiology and risk factors – Need for early surgical intervention

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Overview: Neonatal pneumoperitoneum is a serious problem associated with high mortality due to resulting sepsis.Co-morbid factors such as prematurity, respiratory problems, low birth weight and nutritional factors negatively affect outcome.

Study objective: To review the spectrum of causes of pneumoperitoneum in a newborn, their management and subsequent outcome at a suburban children's hospital (Children's Hospital Malad West Mumbai) and identify risk factors that require attention for better survival of neonates withpneumoperitoneum.

Methods: All the neonates admitted with a diagnosis of pneumoperitoneum during the period of last four years (2009-2013) were retrospectively analyzed. Free air was confirmed by erect abdominal X-ray or lateral decubitus films in certain cases. The data sheets analyzed regarding age of presentation, cause of bowel perforation, management offered and subsequent outcome achieved. All patients of NEC without evidence of perforation were excluded from the study.

Results: Fifty four neonates were admitted with diagnosis of pneumoperitoneum during period of the study. There were 42 (78%) males and only 12 (22%) females. All of them had pneumoperitoneum at time of admission. The median birth weight was 2.3 kg and median age at presentation was four days. Eighty nine percent (48) were referred from nearby nursing homes (maternity and children's). Abdominal distension was the leading symptom and sign (72%). Co-morbid factors were present in 90%, with prematurity as the leading factor in 28 babies (52%).NEC (33 babies) remained the single major cause of pneumoperitoneum in the newborn (61%). However in 21 (39%) neonates, the cause was not related to NEC – gastric perforations (6), isolated colorectal perforations (5), cecal perforations (3) and duodenal perforations (2). In other five cases no cause could be found.Predominant cause of perforation in the small and large intestine was NEC and most common site of perforation was the terminal ileum. Mechanical ventilation was thought to be the cause of the perforation in four of the six neonates with gastric perforations; other two probably related to naso-gastric tube. Intestinal Obstruction contributed to one cecal and both duodenal perforations. Treatment was individualized according to the presentation. Most of the NEC related perforations (52%) were managed by peritoneal lavage along with excision and repair of perforations. Four of the very sick preterm neonates of suspect NEC were initially managed by peritoneal drains alone. All the other neonates underwent exploratory laparotomy with primary closure (n=16), resection and anastomosis (n=19), Ileostomy (n=7), Colostomy (n=4), partial gastrectomy (n=3), and gastrojejunostomy (n=1). Eighteen neonates (33%) underwent multiple operations. Surgical site infection is the commonest post-operative complication occurring in twelve neonates. Neonates who remained stable intra-operatively and those that underwent primary anastomosis had a lower mortality and decreased duration of in-patient stay than for those managed with stomas. Overall mortality was 32% (17). NEC group mortality was 27% (9/33). Highest mortality 50% (3/6) was seen in gastric perforations. Isolated colorectal perforations carried the lowest risk of mortality 20% (1/5). Mortality rate from small bowel perforations was 27% seen mainly in neonates with NEC.

Conclusions: NEC is a major cause of pneumoperitoneum in a neonate, yet there are several other causes leading to free air in the peritoneal cavity. Surgical Drainage willinvariably be requiredand a prompt surgical consultation is desirable in a neonate with pneumoperitoneum.

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