

NEONATAL INTESTINAL OBSTRUCTION: FACTORS AFFECTING SURVIVAL

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SUMMARY

A total of 64 newborn patients with different problems requiring abdominal surgery were studied during one year period from Oct, 1993 to Sept, 1994. Imperforate anus (undergoing colostomy) occurred in 28(43.75%). Jejunoileal atresia accounted for 15(23.44%) cases while Hirschsprung's disease was seen in 6(9.36%) patients. Gastroschisis and meconium ileus each occurred in 3(4.68%). Duodenal obstruction, omphaloceles, neonatal bowel perforation and incarcerated inguinal hernias accounted each for 2(3.12%) cases while meconium peritonitis was seen in one (1.56%) patient. Survival rates for imperforate anus, Hirschsprung's disease and jejunoileal atresia were 89.28%, 100% and 60% respectively. Gastroschisis meconium ileus showed 33.33% and 66.66% survival rates respectively. All the rest of the newborn patients survived from surgical manipulations. The overall survival was 81.25% for all 64 patients exposed to surgery. Delay in presentation, shortage of expert personnel (surgeons and anaesthetist and medical staff and lack of facilities were the major problems related with the management of neonatal intestinal obstruction. The overall mortality was 18.75%. Infection (septicemia), respiratory failure and metabolic disturbances being the major causes of death.

INTRODUCTION

Neonatal intestinal obstruction may be due to a variety of conditions, mostly congenital anomalies. Medical nursing, anaesthetic and surgical expertise is needed for the management of these patients. Refinement in the surgical techniques and advances in neonatal anaesthesia along with improvement in postoperative care especially intensive newborn care improves over all survival of these patients.^{1,2}

A prospective survey study of 64 newborn patients with different conditions presenting as neonatal intestinal obstruction was done to analyse the

factors affecting survival of these patients in our circumstances.

MATERIAL AND METHODS

A prospective survey study of 64 patients with different congenital anomalies presenting as neonatal intestinal obstruction was performed in the Paediatric Surgery Unit of PGMI/LRH Peshawar from Oct: 1993 to Sep: 1994. Age at admission, sex, weight and gestational maturity of the infant was recorded in every case. All these patients were diagnosed clinically and radiologically. After necessary preparation they were operated in emergency, by different surgeons of this unit.

Tracheo-oesophageal fistula (TOF) and pyloric stenosis were not included in this study and similarly those with imperforate anus who did not need colostomies in the neonatal period.

All these newborn patients were surgically treated and different surgical procedures undertaken according to the type of pathology causing intestinal obstruction. These patients were managed post-operatively on the same lines regardless of the cause of obstruction and type of anomalies. Total parenteral nutrition was administered to some of the patients undergoing laparotomy and bowel anastomosis and those with prolonged ileus i.e. more than 5 days. The results of these patients were analyzed with respect to sex, gestational maturity, age at presentation, the type of anomaly and the line of management.

RESULTS

A total of 64 newborn patients were studied of different conditions requiring abdominal surgical intervention.

Sex: Out of the total 64 patients 49 (76.56%) were male and 15 (23.43%) were female infants with a male to female ratio of 49/15 (3.26:1). The highest male to female ratio occurred in patients with imperforate anus and Hirschsprung's disease which was shown to be 6:1 and 5:1 respectively. Jejunoileal atresia and neonatal bowel perforation was seen to be more or less equally distributed among the male and female infants i.e. 7:8 and 1:1 respectively. 2/3rd of the patients with gastroschisis were male and 1/3rd female infants. The rest of peritonitis, omphalocele and incarcerated inguinal hernia occurred exclusively in male infants.³

Age at Admission:- The average age of all infants at presentation was 8 days. Majority of the patients (89%) presented within the first week of life, while only 7 (11%) presented after the first week. The infants who presented late after the first week of life included the patients with Hirschsprung's disease (3 patients), jejunoileal atresia (3), and inguinal hernia (1). The patients who presented earlier were Omphalocele or imperforate anus.²

Gestational Maturity and Birth Weight:- All the patients were delivered at home with full term gestational period. There were 14(22%) patients with low birth weight (<2.5 Kg). The high proportion of low birth weight (LBW) was among the patients with gastroschisis (66.66%), jejunoileal atresia (46.66%). One-third of the patients with meconium ileus and 1/7th with imperforate anus were associated with low birth weight.⁴

Features and Type of Anomaly:- Most of the conditions were diagnosed on clinical grounds such as gastroschisis omphalocele, inguinal hernia and imperforate anus. All the patients except gastroschisis were evaluated by radiological examination for the evidence of intestinal obstruction and also the level of obstruction: Many of the conditions were confirmed by surgical exploration such as duodenal obstruction, jejunoileal atresia, Hirschsprung's disease, meconium ileus, meconium peritonitis and neonatal bowel perforation.

Imperforate anus was the most frequent cause of intestinal obstruction seen in 28 (43.44%) cases. 6 (9.36%) of the patients were with Hirschsprung's disease. Gastroschisis and meconium ileus each occurred in 3 (4.68%) cases. Duodenal obstruction, omphalocele, neonatal bowel perforation and incarcerated inguinal hernia, each was

TABLE - I
SEX INCIDENCE OF DIFFERENT ANOMALIES

DISEASE	SEX		TOTAL
	MALE	FEMALE	
1. ARA	23	5	28
2. Jejunoileal atresia	7	8	15
3. Hirschsprungs Disease	5	1	6
4. Gastroschisis	2	1	3
5. Meconium ileus	3	—	3
6. Duodenal Obstr.	2	—	2
7. Omphalocele	2	—	2
8. Inguinal Hernia	2	—	2
9. Neonatal Small Bowel Perforation	2	—	2
10. Meconium peritonitis	1	—	1
Total:-	49	15	64

seen in 2 (3.12%) cases while only one case (1.56%) of meconium peritonitis was seen. There was not a single case of necrotizing enterocolitis, colonic atresia, meconium plug syndrome, neonatal intussusception, incarcerated internal hernia or volvulus neonatorum diagnosed clinically, radiologically or operatively.

Surgery and Consequences:- All the patients were exposed to surgical intervention in emergency after appropriate preoperative preparation and resuscitation.

28 patients with imperforate anus were operated upon for colostomy. 3 (10.71%) expires postoperatively and 25 (89.28%) survived. 15 patients of jejunoileal atresia were treated by closed bowel anastomosis (13 cases) and ileostomies (2 cases). Out of them 6 (40%) expired post-operatively and 9 (60%) were discharged home. 6 newborns presented with intestinal obstruc-

tion due to Hirschsprung's disease were treated by temporary colostomies, all (100%) of them survived. Three patients, with meconium ileus, two were treated by temporary ileostomies who survived and one who had resection and bowel anastomosis expired post operatively, showing 33.33% mortality. Out of 3 patients with gastroschisis, 2 (66.66%) were treated by primary closure of the abdominal wall defect, expired post operatively. One patient (33.33%) with gastroschisis, who was exteriorized due to accidental bowel perforation during manipulation survived. Two neonatal bowel perforation treated by temporary enterostomies survived from surgery and discharged home. One meconium peritonitis and two omphaloceles with adhesions obstruction were treated by lysis and primary closure of the abdomen, all 100% survived. Two incarcerated inguinal hernia were treated by exploration and repair of the hernia. In one patient gangrenous small bowel and

TABLE – II
AGE OF PRESENTATION

DISEASE	NO PRESENTING		TOTAL
	BEFORE 1ST WEEK	AFTER 1ST WEEK	
1. ARA	28	—	28
2. Jejunoileal atresia	12	3	15
3. Hirschsprungs	3	3	6
4. Obst Inguinal Hernia	1	1	2
5. Gastroschisis	3	—	3
6. Meconium ileus	3	—	3
7. Duodenal Obst	2	—	2
8. Omphalocele	2	—	2
9. Neonatal Small Bowel Perforation	2	—	2
10. Meconium peritonitis	1	—	1
Total:–	57(89%)	7(11%)	64

Meckel's diverticulum was found, which was resected and end to end anastomosis was undertaken. Both of them survived form surgery showing 100% survival.

Post-operative complications were seen in many patients. 1/v line sepsis was commonly observed in patients in whom the line was used for parenteral nutrition. Hypothermia was observed in 3 patients (2 bowel atresia and imperforate anus). Neonatal jaundice was seen in 2 bowel atresia patients and 1 with imperforate anus, post operatively. Septecaemia and aspiration pneumonia was the most common cause of death which occurred in 7 patients. In three patients (1 small bowel atresia and 2 gastroschisis) delayed bowel function was observed, expired due to respiratory embarrassment. In two patients no cause of death could be discovered.

Regarding the technical complications, there was one colostomy wound dehiscence and one colostomy necro-is

due to twisting of the stoma, both required revision of the colostomy. The overall mortality of these patients exposed to surgery was 18.75%.⁴

DISCUSSION

The purpose of this study was to know the factors that affected the survival of patients presented with intestinal obstruction in the neonatal period. Sex, birth weight, gestational maturity, age at admission, type of pathology and type of surgical treatment offered were the parameters correlated with the short term outcome and survival of these patients.

Delay in presentation and failure of recognizing many of the surgical conditions in the newborn have resulted into prolonged morbidity and raised mortality of these patients.³ The incidence of congenital anomalies is decreasing as maternal ultrasound during gestation has resulted in the recognition

TABLE – III
INCIDENECE OF LOW BIRTH WEIGHT IN DIFFERENT ANOMALIES

DISEASE	ABOVE 2.5 KG	BELOW 2.5 KG	TOTAL
1. ARA	4	24	28
2. Jejunioleal atresis	7	8	15
3. Gastrischisis	2	1	3
4. Meconium ileus	1	2	3
5. Hirschsprungs Disease	—	6	6
6. Duodenal Obst	—	2	2
7. Omphalocele	—	2	2
8. Obst Inguinal Hernia	—	2	2
9. Neonatal Small Bowel Perforation	—	2	2
10. Meconium Peritonits	—	1	1
Total:–	14(22%)	50(78%)	64

of the life threatening anomalies and has helped a lot in the management of these patients with congenital abnormalities.⁵

Early presentation and early surgical intervention have an impact on the survival of these patients.^{6,7} In this study it was obvious that it did not affect the outcome of treatment though the primary disease and associated conditions were the denominators it determine the results of treatment. Gestational maturity and birth weight are important to be considered as prematurity and low birth weight (LBW) is associated with raised mortality and prolonged morbidity in patients with neonatal intestinal obstruction. But intensive newborn care and total parenteral nutrition has improved the survival in gastroschisis and jejunoileal atresia associated with low birth weight.

The ratio of low birth weight is more in jejunoileal atresia (46.66%) and gastroschisis (66.66%). The ratio of low

birth weight babies in jejunoileal atresia in a study by Adeyemi³ is 34% which is less than that of our study. The low birth weight ratio in this study associated with jejunoileal atresia is even more than that reported by Martin and Zerella 1976 which is 37%.⁸

The result of treatment varied with the type of pathology Hirschsprung's disease (100%) and imperforate anus (89.28%) treated by colostomies showed better results with a survival rates of 100% and 89.28% respectively. Gastroschisis and jejunoileal atresia treated by primary repair and enterostomies showed 33.33% and 60% survival rates respectively. Luck et al 1985 in Chicago reported 80% survival of patients with gastroschisis compared to our study showing 33.33% survival.⁹ But these results are much better than the results of Iliff 1990⁴ who showed 100% mortality of the patients with gastroschisis. The results of jejunoileal atresia showing 60% survival are better than the results of Adeyemi 1989 and

TABLE – IV
RESULTS OF TREATMENT

DISEASE	RESULTS		TOTAL
	SURVIVAL	MORTALITY	
1. ARA	25(98.2%)	3(10.71%)	28
2. Jejunoileal atresia	9(60%)	6(40%)	15
3. Hirschsprungs Disease	6(100%)	—	6
4. Gastroschisis	1(33.33%)	2(66.66%)	3
5. Meconium ileus	2(66.66%)	1(33.33%)	3
6. Duodenal Obst	2(100%)	—	2
7. Omphalocele	2(100%)	—	2
8. Obst Inguinal Hernia	2(100%)	—	2
9. Neonatal Small Bowel Perforation	2(100%)	—	2
10. Meconium Peritonitis	1(100%)	—	1
Total:–	52(81.21%)	12(18.79%)	64

Iliff 1990^{3,4} who report 40% and 50% survival rate and these are the studies done in the developing countries where most of the facilities are lacking. Recently the survival rate of patients with jujenoileal atresia has been improved, and is 90% as reported by Touloukian 1993.⁷

The rest of the neonates with surgical problems did very well showing 100% survival except the patients with meconium ileus who showed 33.33% mortality. Adeyemi in 1989 reported 20% mortality for Hirschsprung's disease, 32% for imperforate anus and 100% for duodenal obstruction. Incarcerated inguinal hernia accounted for no mortality as in our study.

The patients treated in this study were managed in the general ward with out the help of newborn intensive care. The common problems which were found during the management of these

patients included, delay in presentation, shortage of specialized personnel and inadequacy of lack of facilities. In the days of modern surgery the mortality has decreased with the advent of intensive newborn care, early diagnosis and prompt management supported by parenteral nutrition. Advances in neonatal anaesthesia and prophylactic use of antibiotics has brought dramatic improvements in the survival these patients.^{1,6,10}

The overall mortality shown in the study is 18.75%, which is not satisfactory in the days of modern surgery where all the standards of newborn management are fulfilled. Although these results are not satisfactory, but in the developing countries where these facilities are lacking, the results are still encouraging. The provision of newborn intensive care facilities, improvement in newborn anaesthesia, modified surgical techniques by an expert surgeon, prophylactic anti-

biotic cover and support of parenteral nutrition, all affect the outcome and survival of these patients.

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