OUTCOME OF BISHOP KOOP PROCEDURE IN NEONATAL JEJUNOILEAL ATRESIAS: A RETROSPECTIVE ANALYSIS

Mohammad Imran,[1] Hayat Ur Rehman,[2] Inayat Ur Rehman,[1] Tariq Waheed,[1] Imran Khan[1]

ABSTRACT

Objective: *To find out the efficacy of Bishop Koop procedure in terms of duration of hospital stay, postoperative complications and survival rate for jejunoileal atresias (JIA) in neonates in our setup.*

Material and Methods: *This retrospective study was carried out at Pediatric unit, Khyber Teaching Hospital, Peshawar. Cases of JIA admitted from January 2009 to June 2010 were retrospectively analyzed. Patient's age, sex, weight, type of delivery; gestational age, clinical presentation, associated anomalies, management and outcome were recorded from ward register. Nineteen neonates with age of 5 days and above , with a weight ≤ 3 kg and cases having lower jejunal and ileal atresias were included in the study.*

Results: *All 19 neonates (10 with jejunal atresia and 9 with ileal atresia) underwent Bishop Koop procedure. Type 3(a) was the most common (68.42%) atresia seen in the series. The mean age was 5.83 days and mean weight was 2.73kg. Postoperative hospital stay was 5-9 days (mean 5.78 days). Two patients (10.5%) died of postoperative leak from anastomotic site with septicemia while 17 (89.5%) patients survived. In 10 (52.6%) patients Bishop Koop chimney closed spontaneously, and in seven (36.8%) patients closure was done at the age of 1 year. Only one (5.3%) patient developed wound infection and one (5.3%) had adhesive intestinal obstruction; both were treated conservatively.*

Conclusion: *Bishop Koop procedure is a safe technique with good outcome in terms of decrease morbidity, mortality and short hospital stay thus helping in improving the survival. However more efforts are recommended to improve our intensive care to achieve better outcome.*

Key Words: *Jejunoileal Atresias, Bishop Koop Procedure, Neonates.*

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INTRODUCTION

Jejuno ileal atresia (JIA) is a serious congenital anomaly and a common cause of intestinal obstruction in neonates occurring one in approximately 5000 live births[1]. Goeller is credited with the first description of ileal atresia in 1684[2]. Intestinal atresia is the product of late intrauterine mesenteric vascular accident[3] (blood supply was not received by a portion of bowel) as attested by Louw and Barnard in 1955. The diagnosis is suspected with maternal history of polyhydramnios (the higher the atresia), and in neonates presenting with bilious vomiting, abdominal distension and constipation. Plain X- ray abdomen shows "thumb-size" dilated bowel loops and barium enema a microcolon of disuse. Louw[3] classified JIA into various pathological types (Figure I). Associated anomalies in Jejuno-ileal atresias are found only in 10% of the cases and include omphalocele, malrotation, duodenal atresia and cardiac anomalies[4].

Evans[5] reported a survival rate of 9.3% in patients with gastrointestinal atresia in 1951 while recent reports from the developed countries showed a survival rate of up to 90%[6]. This reduction in mortality rate has largely been due to better understanding of etiological factors, better knowledge of the fact that the dilated bowel proximal to the atretic segment was dysfunctional leading to refinement in surgical procedures, improved anastomotic technique, improvement in anesthesia and neonatal care, as well as the development of total parenteral nutrition [7]. However, in developing countries like ours, the results are still not satisfactory[3] as the mortality rate is from 41% -68%[8,9] after surgery.

Various surgical procedures have been described worldwide to correct JIA like primary resection with end to end anastomosis, Bishop-Koop procedure, Mikulicz double barrel ileostomy and Santulli technique. The most common and currently practiced procedure is primary resection of the dilated bowel with end to end anastomosis. It still carries the risk of anastomotic leakage or dysfunction due to discrepancy in the bowel size between the proximal and distal ends or sepsis caused by bacte-

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SHOWING VARIOUS PATHOLOGICAL TYPES OF JEJUNOILEAL ATRESIAS (JIA)

Intestinal atresia: mucosal web Type 1 atresia

Intestinal atresia: fibrous cord Type 2 atresia

Intestinal atresia: mesenteric gap defect Type 3-a atresia

Intestinal atresia: "apple peel" type of deformity Type 3-b atresia

Multiple areas of intestinal atresia Type 4 atresia

Fig. 1

rial overgrowth leading to high morbidity and mortality. As there is extensive resection of gut leading to short gut syndrome and often necessitating total parental nutrition (TPN).

Harry Bishop and Everett Koop in 1957 described resection of dilated segment with end to side anastomosis and atretic small distal segment is directed out as distal ostomy. Although this procedure is not primarily done for JIA[5] but researchers have recommended it as it has low short hospital stay, early feeding, low morbidity, mortality and avoidance of TPN as compared to primary anastomosis. In Bishop-Koop procedure the distal ostomy provides the benefit of deflating dilated proximal bowel and also helps to transit the contents gradually through the distil unused segment of bowel. Thus the distal segment of intestine begins to dilate and function steadily and allows early enteral feeding which reduces the need for parenteral nutrition. In Bishop Koop procedure intestinal length is preserved as there is limited resection of the small intestine so usually negating use of TPN. The main disadvantages of enterostomy is, that it needs further surgery for its closure, leads to skin excoriation and leakage which may aggravates the nutritional status of neonate. In Pakistan various studies have been conducted on management of JIA with variable results. Keeping in view the merits of Bishop Koop procedure, a study was conducted with the objective to determine the efficacy of Bishop Koop procedure in terms of duration of hospital stay, postoperative complications and survival rate for jejunoileal atresias (JIA) in neonates in our setup.

MATERIAL AND METHODS

This descriptive retrospective analysis was performed in the pediatric unit of Khyber Teaching Hospital Peshawar. Cases of JIA admitted from January 2009 to June 2010 were retrospectively analyzed. Total of 19 neonates over the age of 5 days, weight of 3 kgs and less with jejenoilleal atresias who subsequently underwent Bishop Koop Procedure were included in the study. Neonates who presented early (<5 days),neonates whose parents were unwilling for study, neonates who underwent Bishop Koop Procedure for other reasons and neonates who had not completed the follow up were excluded from the study. The study was duly approved by the ethical committee of the hospital and informed consent had been taken from the parents of neonates included in the study. Data was retrieved from the previous records of the neonates and included patient's demographics, medical history, presentation, peroperative findings, any post operative complications, and length of hospital stay. The results were analyzed using the statistical package for social sciences (SPSS) Windows version 14.

RESULTS

Out of nineteen studied neonates 13 were males and 6 were females with male to female ratio of 2.16:1. The age range was from 2 days to 8 days with a mean age of 5.83 days and their weights were between 1.2 to 3 kg with an average weight of 2.73 kgs. Age and weight distribution of the neonates of current series is shown in figure 2 and figure 3 respectively. The gestational age was between 34 to 40 weeks with a mean of 37 weeks. The Clinical presentation included abdominal distension (100%), bilious vomiting (100%), failure to pass meconium (90%), and jaundice (19.35%). Congenital abnormalities of heart were the most common associated

AGE DISTRIBUTION OF PATIENTS WITH JEJUNOILEAL ATRESIAS (N=19)

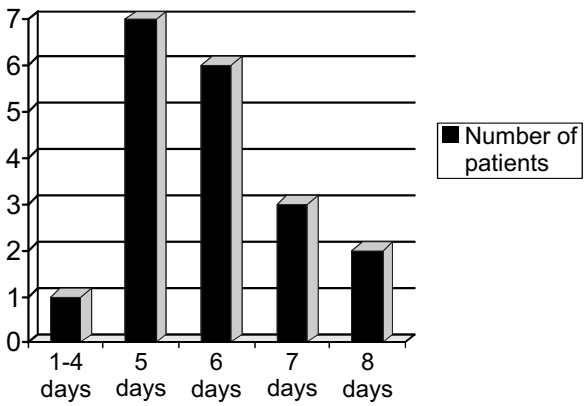

Fig. 2

WEIGHT OF NEONATES (N=19)

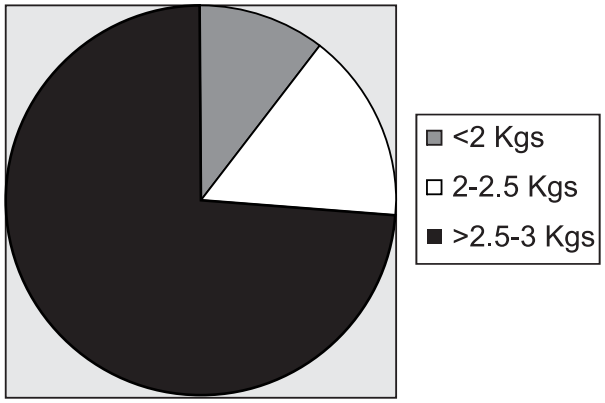

Fig. 3

CONGENITAL ANOMALIES ASSOCIATED WITH JEJNOILEAL ATRESIA NOTED IN PRESENT STUDY

Type of congenital anomaly	Frequency/%
Omphalocele	2 patients (10.52%)
Malrotation	6 patients (31.57%)
Duodenal atresia	2 patients (10.52%)
Cardiac anomalies	4 patients (21%)

Table I

VARIOUS TYPES OF JEJUNOILEAL ATRESIAS OBSERVED

Pathological type	Frequency (%)
Type 1	1(5.2%)
Type 2	3(10.52%)
Type 3(a)	13(68.42%)
Type 3(b)	1(5.2%)
Type4	1(5.2%)

Table II

anomalies seen while the rest are shown in Table II. Jejunoileal atresia Type III(a) was the most common pathological category noted during operation while the rest of distribution is given in Table II. Bishop Koop Procedure was performed in all patients after resuscitation by different grades of pediatric surgeons. Two patients (10.52%) developed anastomotic leakage and presented with abdominal distension on 5th post operative day, both were re-explored after resuscitation and re anastomosis was done but both of them died because of peritonitis and sepsis while seventeen (89.7%) patients survived. One of them had type3-b jejnuileal atresia while the other had type 4 atresia. Hospital stay of neonates after surgery was from 5-9 days with mean of 5.78 days. Patients were followed up regularly in our out patient department for any short term or long term complication. One patient developed wound infection and another adhesive intestinal obstruction which waere treated conservatively while the rest of the patients are doing well till date. In ten patients Bishop Koop chimney closed spontaneously, and in seven patients closure was done at the age of 1 year.

Figure 4 shows the per-operative findings in JIA showing proximal dilated and distal narrow bowel. Figure 5 shows the upright plain abdominal radiograph of neonate with jejunal atresia and showing multiple air fluid

PER-OPERATIVE FINDINGS IN JIA SHOWING PROXIMAL DILATED AND DISTAL NARROW BOWEL

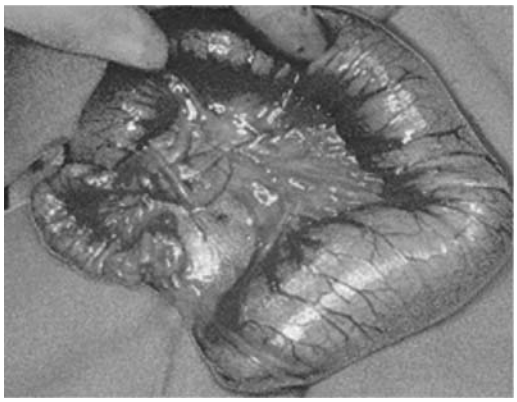

Fig. 4

UPRIGHT PLAIN ABDOMINAL RADIOGRAPH OF NEONATE WITH JEJUNAL ATRESIA SHOWING MULTIPLE AIR FLUID LEVELS

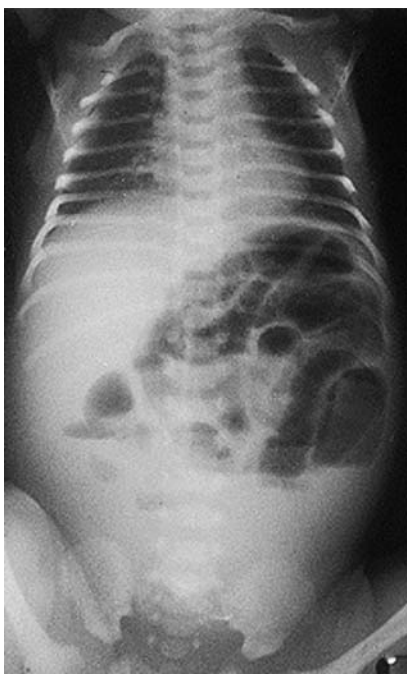

Fig. 5

BARIUM ENEMA SHOWING MICROCOLON IN TYPE 3(a) ATRESIA

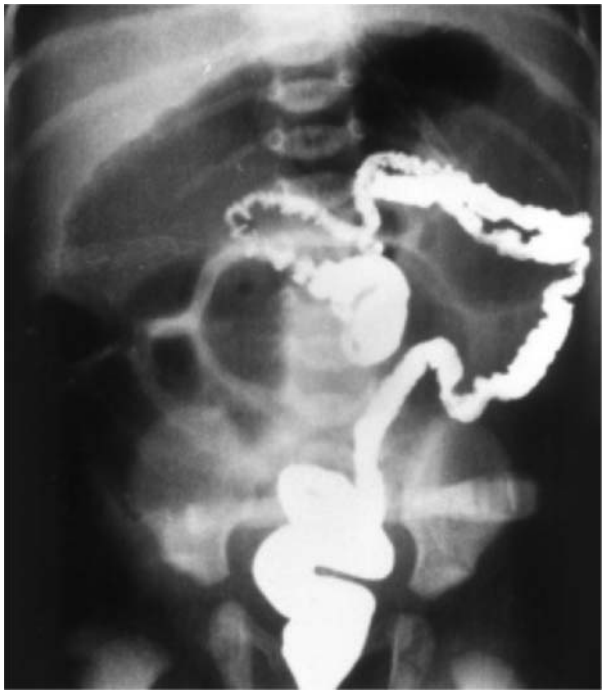

Fig. 6

levels while Figure 6 Barium enema showing microcolon in Type III-a atresia.

DISCUSSION

The choice of a surgical procedure for the treatment of intestinal atresia is dependent upon the pathological type of atresia and the presence of associated congenital anomalies of gut like malrotation, volvulus or meconium peritonitis.Viosin performed an enterostomy for intestinal atresia in 1804[10]. In 1911 Fockens performed the first successful resection with primary anastomosis for intestinal atresia[11]. In developed countries the survival rate has increased significantly over the past few decades because of improvement in anastomotic techniques, neonatal anesthesia and ICU care, as well as better development of total parenteral nutrition and generous use of antibiotics to control sepsis. In developing countries like ours the condition is still unsatisfactory. The contributory factors leading to high mortality here include late presentation or diagnosis, poor nutritional status of the patients, improper management at primary and secondary health centers, non availability of well equipped neonatal intensive care units[8,12-13].

Critical analysis of the results of current study shows that despite the lack of ideal environment for neonatal intensive care, good results were achieved in neonatal jejunoileal atresias with Bishop Koop procedure in terms of duration of hospital stay, postoperative complications and survival rate. Our study was conducted on nineteen neonates showing mean hospital stay of 5.78 days, morbidity rate of 5.88% and mortality rate of 10.52% with a survival rate of 89.7%.

The preoperative resuscitation plays a vital role in management and especially its value in cases with delayed presentation cannot be overemphasized. Any delay in resuscitation usually increases the incidence of intestinal gangrene, intestinal perforation, intestinal volvulus and sepsis with multiorgan damage. In current study majority of the neonates presented with adverse prognostic factors like preoperative hypovolemia, electrolyte imbalance, dehydration, sepsis, and unconjugated hyperbilirubinemia so a standard protocol of resuscitation was followed after initial evaluation in such neonates including gastrointestinal decompression, correction of fluid losses, correction of hypothermia and electrolytes imbalance, commencement of regular antibiotics to combat sepsis and administration of vitamin K injection to counter any bleeding tendency. Hospital stay of neonates after Bishop Koop procedure was from 5-9 days (mean 5.78) while in other studies it ranged from 7 days to 45 days especially in cases where it was prolonged due to postoperative complications[14].

Bishop Koop procedure is a safe reconstructive procedure[15] as it is associated with low morbidity. In our study morbidity rate was 11.76% which is comparable to other similar study by Shakya et al[16]. The most common complication observed was anastomotic leakage followed by superficial wound infection late adhesive intestinal obstruction one case each. This procedure is a better option as it avoids postoperative gaseous distension and helps in early enteral feeding. Early recognition of anastomotic leakage or peritonitis is essential. Clinical findings are usually adequate for this purpose[17]. Reoperation should be performed as early as possible. In our study two patients (10.52%) developed anastomotic leakage and presented with abdominal distension on 5th post operative day, both were re-explored after resuscitation and re anastomosis was done by senior pediatric surgeons but both of them died because of peritonitis and sepsis. The case of intestinal obstruction and case with wound infection were managed conservatively.

In our study after passage of stools or when N/G aspirate was clear or its volume was less than 1 ml/kg per day, patients were started on clear fluid if tolerated then on milk feeding after 18-24 hours in small amount and gradually shifted to full feed on 5th post operative day as has been recommended by others[18]. The early start of oral feeding helps in reducing the bacterial overgrowth in the gut and decreasing the sepsis rate and thus decreasing the morbidity. Post operatively patients were maintained on N/G decompression, I/V fluids and broad spectrum antibiotics, if patient did not pass stools after 4-5 days, saline and paraffin (3 ml saline and 2 ml paraffin) per rectal wash/ or through the bishop Koop chimney for one or 2 days was found to be very beneficial.

The reported mortality rates following surgery have dropped from 70% in 1961 to 80-90% today. These results are related to the early diagnosis and development of effective operative techniques as well as to improved intensive neonatal care and parenteral nutrition. The mortality in our study was 10.52% with a survival rate of 89.7%. Late presentation, multiple atresias, associated anomalies, sepsis, low birth weight and peritonitis were found to be the main contributors to death Despite the presence of adverse prognostic factors, the overall survival in our series is comparable to the survival figures of 86 to 96.7%, described in recent large series of Jejunoileal atresia reported in the literature[19]. The factors responsible for mortality in this series are delayed presentation, septicaemia due to anastomotic leakage and lack of neonatal ICU. Limitations of study are limited number of cases in study and non availability of well equipped neonatal ICU.

CONCLUSION

It is concluded from results of the current study that Bishop Koop procedure is a safe technique with good outcome in the management of jejunoileal atresias. This technique has improved the survival of patients and minimized the postoperative complications. However well designed, large scale comparative studies are required to compare the outcome of Bishop Koop procedure with other available procedures in the management of jejunoileal atresias.

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AUTHORSHIP

MI: conception and design, acquisition of data, drafting the manuscript

HUR: drafting the manuscript

IUR: final approval of the version to be published

TW: Revision of manuscript

IK: acquisition of data

CONFLICT OF INTEREST

Authors declare no conflict of interest

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NONE DECLARED