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Small Bowel Atresia in Khartoum Teaching Hospital

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Abstract - *Introduction:* Intestinal atresia is a common cause of neonatal intestinal obstruction. Duodenal atresia occurs most properly due to failure of recanalization of the foregut, while jejuno-ileal atresia is due to intra uterine ischemia.

Objectives: To describe the pattern, clinical presentation, surgical treatment and outcome of bowel atresia.

Patients & Method: The study was Observational, analytic, hospital based study.

Result: Study of 40 patients with small bowel atresia showed that; more than 80% of patients were neonates, males: females' ratio was 1.4:1. Duodenal atresia was found in 27.5 % while jejunoileal atresia was found in 82.5% (57.5% was jejunal and 15% was ileal). All patients presented with vomiting most of them were bilious. Features of Dawn syndrome reported in four patients, all of them were duodenal (36%), cardiac anomalies occurred in 18% of duodenal atresia. Malrotation was found in three patients one was duodenal and two were jejunoileal. Prematurity occurred in 20% of patients, low birth weight was found in 45%.

Keywords : *duodenal atresia, jejunal atresia, ileal atresia.*

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Small Bowel Atresia in Khartoum Teaching Hospital

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Mortality rate was 32.5% due to multiple causes; cardiac anomalies, jaundice, prematurity and type of atresia were the commonest causes.

Conclusion: In our country lack of neonatal intensive care unit and total parenteral nutrition increases the mortality rate, availability of these things plus pre natal diagnosis will improve the outcome.

Keywords: duodenal atresia, jejunal atresia, ileal atresia.

I. Introduction

Atresia is a congenital disorder characterized by complete occlusion of bowel lumen. Stenosis refers to a partial occlusion with incomplete obstruction [1]. It is one of the three common causes of neonatal intestinal obstruction, the other two being Hirschsprung's disease and anorectal malformations [2]. The incidence of jejunoileal atresia is 1 per 5000 live births [3], while duodenal atresia has an incidence of about 1 per 5000-10,000 lives births [4].

Jejuno-ileal atresia (JIA) usually associated with gastro intestinal anomalies like malrotation, internal hernia & gastroschisis [5], on the other hand duodenal atresia (DA) commonly associated with systemic anomalies like Down's syndrome, cardiac and renal anomalies [6].

Jejunoileal atresia classified to 4 types as follow: type 1: is a mucosal (septal) atresia, type 2: a fibrous cord (band) separates both atretic segments, the mesentery is usually intact, and length of the intestine is normal. Type 3: has two sub-division: type 3a in this type of atresia, both blind ends are completely separated without a fibrous cord between them. The atresia has a V-shaped mesenteric gap, and the intestine is shortened, while in Type 3b (apple-peel deformity) Christmas-tree deformity, both intestinal segments are separated as in type 3a, and the mesenteric defect is large. In type 4: atresia refers to any number and combination of atresias type 1 to 3 [7]. Duodenal atresia has three types; type 1 just membrane or web it is the commonest, type 2 is fibrotic cord seperates proximal & distal bowel and type 3 is a complete separation of the atretic segments [8].

Patients with duodenal atresia usually presents with vomiting, most the time it's bilious, failure to gain weight, epigastric fullness, delayed passage of meconium & aspiration also may occur [9]. Presentation of jejunoileal atresia depends on the location of the obstruction, although the majority is present with bilious emesis, distal atresia is usually present with abdominal distention & delayed passage of meconium [9]. Polyhydromnias is frequently occur with small bowel atresia [10].

Prenatal diagnosis can be achieved in 46% of DA and 41% of JIA [9], double bubble and triple bubble is characteristic of DA and JIA respectively [11].

a) Objectives

To describe the patterns of small bowel atresia in Khartoum Teaching Hospital, study the clinical presentation, to know the modalities of surgery & outcome in patients with small bowel atresia and report the association with other anomalies & maternal diseases.

b) Patients & Method

The study was Observational, analytic, hospital based study it include 40 patients that were admitted Khartoum Teaching hospital department of Pediatric Surgery in the period between Sep. 2011 and May. 2013, Patients were referred from all parts of Sudan.

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Study variables included were age, gender, and residence, presenting symptoms, clinical sign and postoperative outcomes. Data was collected using a structured, pretested questionnaire and analyzed using a computer program-Statistical Package for Social Sciences (SPSS) version 20. Results were presented in tables and graphs.

II. Result

a) Patients characteristic

This study included 40 patients with small bowel atresia, mean age 47.0 (SD±150) days; it ranged 2- 900 days. The great majority of our patients 33 (82.5%) were neonate. Males were 23 (57.5%) and female 17 (42.5%) with a male to female ratio of 1.4:1. Of the neonates 21 (63.6%) were males.

b) Low birth weight and prematurity

The mean body weight was 2.8% (SD ± 1.2), in the range 2-8 kg. Eighteen (45%) of our patients were of low birth weight (weight less than 2.5 kg at birth). Prematurity was found in 8 (20%) patients that were born at less than 37 weeks' gestation.

c) Site and type of atresia

Distal atresia was the commonest of the small bowel accounting for 72.5% (jejunal 57.5 and ileal 15%) whereas duodenal atresia was seen in 11 (27.5%).

d) Classification of Jejuno-ileal type

Type 1 and type 2 were the commonest types of distal small bowel atresia accounting for 10 (34.5%) and 7 (24.1%) respectively. The other types ranged from 10- 17%.

e) Clinical presentation

The common presenting symptoms to our patients were; vomiting to all of them which was bilious almost to 39 (97.5%), Delayed passage of meconium 33 (82.5%) and constipation26 (65.0%). Dehydration 32 (80.0%) and abdominal distension 27 (67.5%) were the major physical signs detected in addition to jaundice, wasting and visible peristalsis in varying percentage.

Common presentation of small bowel atresia that scoring greater than 70% in each of the three different types were found as follow: duodenal atresia (bilious vomiting, delayed passage of meconium and dehydration); jejunal atresia (bilious vomiting, abdominal distension delayed passage of meconium, constipation and dehydration) and ileal atresia (bilious vomiting, abdominal distension and constipation). The constipation and abdominal distension were significantly characterizing distal atresia with P values of 0.008 and 0.002 respectively. Polyhydromnias was occurred in 26 patients, six were duodenal (i.e. 54.5% of patients of DA) and twenty were jejunoileal (i.e. 69% of patients of JIA).

f) Similar condition in siblings and associate anomalies

History of similar conditions in siblings was noted in six patients (15%) while other congenital anomalies were evident in five patients (12.5%) and Down's syndrome was seen in four patients (10%). The association of Down's syndrome with duodenal atresia was found to be significant P value 0.003.Other congenital anomalies were found to be associated with duodenal atresia in four patients (80%) and jejunal atresia in one patient(20 %) and this as well was statistically significant P value 0.018. However, similar history in siblings was not significant for the type of small bowel atresia P value 0.362.

g) Investigations

Blood Anaemia was seen in two patients (05.00%), hypokalaemia in 11 (27.5%), hyponatraemia in a single patient whereas elevated blood urea and electrolytes in eight patients (20%).

h) Plain abdominal X-ray

This modality of investigation was done to all patients, it demonstrated air fluid level in 25 patients (62.5%) all of them were distal atresia 19 (76.0%) jejunal and 06 (24.0%) ileal, and this was found statistically to be significant (P value 0.000).Double bubble sign was significantly noted in 11 patients (27.7%) seven patients of them (63.6%) were cases of duodenal atresia and four patients (36.4%) were jejunal atresia (P value 0.005).

i) Treatment

After stabilization operative management was done to all patients, resection and anastomosis was the commonest operation performed 25 (62.5%), Duodenotomy and enterotomy were the least modalities of surgery to be done, each in a single patient. Other types of operation performed were duodenoduodenstomy, duodenojejunostomy and jejunoplasty. For patients with duodenal atresia, five (45.5%) ended with duodenoduodenstomy and a similar number with duodenojejunostomy. Resection and anastomosis was done to 19 (76.0%) jejunal and six (24.0%) ileal atresia. The modalities of surgery for the type of atresia was found to be significant (P value 0.000).

j) Outcome

Eighteen patients (45.0%) were discharged home in good general condition, morbidity was seen in eight patients (20.0%) and the mortality rate was 14 (35%).

k) Mortality

The majority of the deaths 10 (71.5%) were cases of jejunal atresia, three (21.4%) of duodenal atresia and a single case (7.1%) of ileal atresia.

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Concerning the type of surgery, the peak of mortality after resection and anastomosis 8 (57.1%), three (21.4%) after duodenoduodenostomy, two cases (14.2%) of jejunoplasty and the rest of the mortality among the others.

III. Discussion

Small intestinal atresia is a major cause of intestinal obstruction especially in the neonatal period. This study was conducted in department of pediatric surgery in Khartoum Teaching Hospital between Sep 2011 to Aug 2013.

Our study of forty patients showed that; males were preponderance females (males: females = 1.4: 1). This is matching with other international studies [9, 12].

The ages of patients was extended from two days to three years, but more than 80% of cases were in the neonatal period, this is equivocal to other international series [12]. We found that prematurity was associated with 20% of patients, Thamar &et al found that prematurity was associated with 52% of JIA.

In current study jejunal atresia is the commonest type (57.5%) followed by duodenal (27.5%) & ileal (15%), Chirdanetal found in their study of 24 patients of bowel atresia that 19 were JIA, 5 were duodenal & 1 patient was colonic [12]. Sathyaprasad B etal in their study found same result that JIA was more common than duodenal [9].

On the other hand Hannah G etal in their study of 132 patients found that duodenal atresia is common than JIA [13], also Kate E etal reported same result [14]. So there is no commonest site of small bowel atresia.

Our study found that the commonest type of JIA was type 1(34.5%), and the least common was type 3b (10.3%), the second one was type 4 (24.2%), then type 2 (17.2%). In study that done in Iraq Waad M S etal reported that the commonest type of jejunoileal atresia was type I and occurred in (30%), the second was type IIIa occurred in (20%).The least frequent type was type IV (6%) [7].Other study done in Nigeria by Ekwunife O H etal showed that Type I atresia occurred with most frequency then type IIIb followed by type IV[15]. Type 1 seems to be the commonest type.

Vomiting was the commonest presentation in our, it occurred in all patients; it was bilious in all patients except only one with JIA, study that done by Hayrettin et al in Turkey found that vomiting occurred in all cases of duodenal atresia and in 21 out of 24 of JIA [16].

Abdominal distention occurred in 27 patients; 24 patients of them were jejunoileal and just 3 patients were duodenal (epigastric mainly). It is similar to literature series that found 23 patients of JIA out of 24 had abdominal distention and there was no distention in duodenal atresia [16].

Regarding passage of meconium, 24 patients of JIA (82.8%), nine patients of DA (81.8%) had delaying passage of meconium. in compare to international literature there is study reported that , 17 patients of JIA out of 24 had delayed passage of meconium, no patients of DA had delayed passage of meconium [16].

Jaundice occurred in two patients of DA (18%) and 11 patients of JIA (38%), this is similar to international study; Chirdanetal found that jaundice occurred in 20% (1 out of 5) of patients of duodena atresia [12], in JIA Waadetal in their study of 50 patients of JIA found that jaundice occurred in 15 patients (30%) [7].

Features of Dawn syndrome were found in four patients, all of them had DA they represented 36%of patients of DA. Rangsanetal in their study of 277 patients of congenital obstruction found that features of Dawn syndrome were found in 86 patients it equal 37.9%of patients which is similar to our result[17]. Mauricio Aetal found features of Dawn syndrome in 27% of their patients [18].

Congenital cardiac anomalies were found in two patients; both of them were duodenal equal 18.2% of patients of DA. Kate E etal in their study found that congenital heart disease were found in 12.3% of patients of DA [14]. In Mauricio Aetal study congenital heart diseases were found in 46 patients (27%) [18], Sathyaprasadetal found congenital heart disease in 49% of patients of duodenal atresia [9].

Malrotation was found in three patients; one was duodenal equal 9%, two were JIA equal 6.9%, in compare; it is near the results in international series that found malrotation in 8% of JIA and [9] .Hayrettin Oztruketal found that malrotation occurred in two patient out of 20 of DA(10%), and in three out of 24 patients of JIA (12.5%) [16].

We found that Polyhydromnias occurred in 54.5 % of DA, Diagnosis of the patients depend on clinical finding pluse plain abdominal x ray which was done in all patients, double bubble signs was found in seven patients of DA , also it was found in three patients of proximal jejunal atresia this is similar to international series[12]. Unfortunately pre natal ultra sound was not done.

DA was treated surgically by either duodenoduodenostomy which was done for six patients, one of them was failed and operated for the second time, or duodenojejunstomy which was done for five patients, the anastomosis is side to side diamond shape, it is the same international series [18, 12]. Duodenotomy was done for one patient of stenosis.

In JIA the most common operation used was resection of proximal part and end to end anastomosis it was done in 25 patients out of 29(86%) JIA.Waadetal used resection and anastomosis in 78% [7], Thamar H etal were used resection & anastomosis in 69% [5].

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etal were used resection & anastomosis in 69% [5]. Tapering enteroplasty was done for three patients due short bowel length [12].

Enterostomy was done for patient with perforation & peritonitis, this is similar to which was reported by Thamar et al in their study [5]

Nineteen patients were discharged in a good condition (47.5%), prolonged ileus was occurred in 20% of patients, and two patients (5%) had wound infection (they died).

Mortality rate of the current study was 32.5, it's too much in compare to mortality rate in USA & Europe; Sathyaprasad etal in their study found that in 59 patients of DA mortality rate was zero, in 63 patients of JIA mortality rate was 11% (7patients) [9]. But our mortality rate is reasonable to some extent if it is compared with the mortality reports in studies that were conducted in developing country; Chirdan etal in their study of 24 patients of bowel atresia in Nigeria found that mortality rate was 41.7% [12].

IV. Conclusion

In our country lack of neonatal intensive care unit and total parenteral nutrition increases the mortality rate, availability of these things plus pre natal diagnosis will improve the outcome.

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