ORIGINAL ARTICLE

Neonatal Duodenal Obstruction: Clinical Presentation and Outcome

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ABSTRACT

Objective — *To find out causes, modes of presentations and surgical outcome in neonates with duodenal obstruction.*

Study design — *Descriptive case series.*

Place & Duration of study — *Department of Paediatric Surgery National Institute of Child Health (NICH) Karachi, from September 2011 to August 2013.*

Methodology — *All neonates presenting with duodenal obstruction were included. Age at presentation, symptoms and signs, associated anomalies, treatment provided and outcome were recorded. Investigations done included CBC, serum electrolytes, urea / creatinine, x-ray abdomen and echocardiography. Surgical procedures were tailored according to the cause of obstruction. Data was recorded on a performa. Analysis was done using SPSS version 17.*

Results — *A total of 17 patients (males 13, females 4) were managed. Age ranged from 1 day to 20 day (mean=4 day). Weight of the babies ranged from 1.5 kg to 3.0 kg (mean=2.24 kg). One patient was delivered via cesarean section. The causes of obstruction were duodenal atresia (n=8), annular pancreas with duodenal atresia (n=4), annular pancreas with duodenal atresia and malrotation (n=3) and only malrotation (n=2). Double duodenal atresia was present in one patient. Associated imperforate anus was found in five cases, multiple atresias of gut and jejunal atresia in one case each. Three patients had Down syndrome. All patients were operated. Two patients had anastomotic leak. A total of seven patients survived. Those who expired had duodenal atresia (n=5), annular pancreas group (n=4) and malrotation (n=1). Sepsis was the major contributor to the mortality.*

Conclusions — *Late presentation with low birth weight were the salient observations. Multiple associated gut related surgical anomalies added to operative stress. High mortality (59%) was of concern and sepsis remained the major contributor.*

Key words — *Duodenal atresia, Annular pancreas, Malrotation, Neonatal intestinal obstruction.*

INTRODUCTION:

Intestinal obstruction in neonates, infants and children can result from both congenital and acquired causes. Obstruction can occur at any level, from duodenum to anal canal. Duodenum is not an uncommon site of obstruction in pediatric age group. Number of conditions can cause obstruction at duodenal level including atresia, stenosis, annular pancreas and malrotation with bands. There is great age variation at presentation in cases of malrotation and duodenal stenosis while other conditions presents in newborn period.[1]

Associated anomalies commonly occur in patients with duodenal atresia. The most frequently noted conditions are Down syndrome and cardiac

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anomalies.[2] Patients with duodenal atresia can be diagnosed in antenatal period.[3] Postnatal bilious vomiting is the commonest symptom with which babies are brought to ER. Both open and laparoscopic approaches are made for corrective surgery in these patients.[4]

Early diagnosis is key to good outcome while late presentation is associated with morbidity and mortality. Over the decades mortality is significantly decreased as care of neonates has improved.[5] This happy outcome is not reported from developing countries.[6] This study was carried out to review case records of patients who presented with obstruction at duodenal level in order to find out modes of presentations, treatment given and outcome of the management provided.

METHODOLOGY:

This descriptive case series was carried out at the Department of Paediatric Surgery National Institute of Child Health Karachi over two years period from September 2011 to August 2013. The file records of all the neonates who presented with duodenal obstruction were reviewed. The variables recorded were age at presentation, cause of obstruction, associated anomalies, treatment provided and outcome of the management. All patients were subjected to investigations including CBC, serum electrolytes, and urea / creatinine, echocardiography and x-ray abdomen.

All patients were operated and the surgical procedures were tailored according to the cause of obstruction. Routine pediatric care was provided to all the patients. Nutrition in the form of partial parenteral support was given in selected group of babies. Data was recorded on a performa and SPSS version 17 was used for analysis. Descriptive statistics were used for numerical and categorical data and presented as mean, standard deviation and percentages.

RESULTS:

In two years a total of 17 neonates with duodenal obstruction were managed. There were 13 males and 4 females. All patients presented with bilious vomiting. The age of the patients ranged from 1 day to 20 day (mean=4 day). Antenatal ultrasound was done in 14 patients. It was reported as normal in four patients. In eight patients polyhydramnios was reported. In two cases duodenal atresia was suspected. One patient was born through cesarean section. This was the only patient referred within 24 hours. In other cases even with polyhydramnios and symptom of bilious vomiting referral was delayed. Weight of the babies ranged from 1.5 kg to 3.0 kg (mean=2.24 kg).

The causes of obstruction were divided into three groups. In group I duodenal atresia (n=8) was included. In group II, patients of annular pancreas with duodenal atresia (n=4), annular pancreas with duodenal atresia and malrotation (n=3) were included. Malrotation (n=2) cases were placed in group III. Of group I, five patients had type I duodenal atresia. In two of these a small opening was found in the web. Of these five, one had associated jejunal atresia and other who was born through cesarean section had associated imperforate anus. Three patients had other types of duodenal atresia with multiple small bowel atresias in one and double duodenal atresia associated with foreshortened gut in one. Other associated anomalies in this group were Down syndrome with patent ductus arteriosus. Surgical procedure in this group included duodenotomy with partial excision of web in type I

Table I: Associated Anomalies and Survival of the Patients

Variables	Duodenal Atresia (DA)	Annular Pancreas		Malrotation (MR)
		With DA	With DA & MR	
Number (n)	8	4	3	2
Associated Anomalies (n)	Imperforate Anus (1)	Imperforate Anus (1)	Imperforate Anus (2)	Imperforate Anus (1)
	Down Syndrome (1)	Down Syndrome (1)	Down Syndrome (1)	Horseshoe Kidney (1)
	PDA (1)	Cardiac Anomaly (1)	Ptosis (1)	
	Double DA (1)			
	Multiple Small Bowel Atresia (1)			
	Jejunal Atresia(1)			
Survival (n)	3	3		1

with web and duodenodudenostomy. Duodenocolostomy was performed in one patient with multiple small bowel atresias. Colostomy was performed in patient with imperforate anus and jejuna atresia repaired in other. Anastomotic leak occurred in one patient. Five babies of this group died. Major cause was septicemia.

Of group II, 4 patients had annular pancreas with duodenal atresia. Associated anomalies in this sub group included imperforate anus, Down syndrome and cardiac anomaly. In other sub group of annular pancreas, duodenal atresia with malrotation (n=3) two patients had associated imperforate anus while other anomalies in the group included Down syndrome and ptosis. Out of seven patients in this group three survived. In one patient anastomotic leak occurred while others had signs of sepsis that lead to demise. Of group III (malrotation), one patient had associated imperforate anus and other had horseshoe kidney. Ladd's procedure was performed in both the patients with addition of colostomy in one. One of the patients in this group died in postoperative period.A total of seven (41%) patients survived. Those who expired had duodenal atresia (n=5), annular pancreas group (n=4) and malrotation (n=1). Sepsis was the major contributor to the mortality.

DISCUSSION:

Number of anomalies can result in duodenal obstruction in neonatal period. Dudodenal atresia has a varied incidence, reported to occur 1 in 5000 to 10000 live births.[7] Such a population based incidence is not available from Pakistan. This study is an endeavour for reporting an experience from a tertiary care hospital that may provide useful hospital based data from southern Pakistan. Males were affected more than females in a ratio of 3:1.

In this study polyhydramnios was found in 57% patients which is reported in 33% to 50% of cases in literature.[8] Of theses 14% patients were suspected of having duodenal obstruction on antenatal ultrasound in index study. Presence of polyhydramnios must raise suspicion of associated anomalies related to gastrointestinal tract in addition to other causes.

Obstruction at the level of duodenum produces early symptoms in postnatal period. This include bilious vomiting and in some patients upper abdominal distension. These important symptoms were not picked up early in patients of present study. The mean age at referral to surgical unit was 4 days. This delay in referral is noted even in four out of five patients with imperforate anus where both the anomalies were not recognized. Head to toe complete examination must be learned by all the healthcare providers who handle obstetric cases as well as manage neonates. Early referral has great bearing on postsurgical outcome. The mean weight in the study group was 2.24 kg which is very much in conformity with what is reported in literature. These babies are usually premature and of low birth weight.[9]

Associated anomalies are frequently reported in patients with duodenal atresia which is up to 50% in some studies. The commonly associated anomalies are Down syndrome, congenital heart diseases, anorectal malformation, etc.[10] In present series as number of patients are few true incidence cannot be ascertained. However in addition to commonly reported associated anomalies unusual finding were multiple small bowel atresias, and imperforate anus more in number (41%) than reported in literature. It is also included double duodenal atresia and foreshortened small bowel. These anomalies added to morbidity.

Surgical approaches to the patients were dictated by type of the anomaly. All patients underwent open surgery though with technological advances minimally invasive approach to these patients is on increase and found to be equally effective with less postoperative pain and early recovery.[11,12] Diamond shaped anastomosis as popularized by Kimura was attempted in cases where mobilization of distal part of the duodenum was easy.[13] In other cases duodenojejunostomy was performed. Single layer extramucosal anastomosis was the technique routinely used in these cases. A reversed diamond shaped anastomosis has also been described in literature with favorable outcome.[14] Anastomotic leak occurred in two cases. This lead to sepsis and mortality.

High mortality was observed in this series which is alarming. The survival rate was only 41%. From advanced countries a survival rate of more than 90% is reported.[15] However from our part of the world sepsis is a major contributor to neonatal mortality.[16] Many factors contributed towards this end including low birth weight, unsupervised and home deliveries, late referral etc. On these existing factors addition of surgical procedure further complicated the situation. However this cannot be an excuse and efforts are needed at various levels to improve this dismal situation.

CONCLUSIONS:

Isolated duodenal atresia was the commonest cause of duodenal obstruction with associated annular

pancreas in majority of the cases. Associated anomalies occurred frequently and imperforate anus were found in 30% cases. Low birth weight, late referral and sepsis were major contributor to mortality in this series.

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