J Biochem Tech (2020) Special Issue (1): 187-192
ISSN: 0974-2328

Evaluation of causes, clinical presentations and outcome in newborns with congenital intestinal obstruction, admitted in Imam Hospital NICU, Ahvaz, Iran, 21.3.2014 until 21.3.2017

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Received: 10 July 2019 / Received in revised form: 20 October 2019, Accepted: 27 October 2019, Published online: 25 January 2020

Abstract

Introduction and project introduction: Neonatal intestinal obstruction (NIO) is the commonest neonatal emergency surgery, so that 1 in every 2000 live births is estimated to have CIO. This problem is caused by multiple conditions, and the treatment outcome depends on the time of diagnosis and appropriate intervention. Methods: The study was retrospective with a review of the records of all hospitalized patients with CIO diagnosis at NICU of Imam Khomeini Hospital of Ahvaz. Obstruction symptoms and clinical presentations have been classified and studied in several commonly used groups in similar studies. Results: The most common cause of obstruction in the case group was in intestinal atresia with 46.6%, followed by imperforated anus (15.5%), intestinal malrotations (12.1%), hirschsprung (11.2%), meconium ileus (8.6%) and other causes of obstruction (6%). Distension exists in 34.5% of the patients studied in population. Vomiting in this study existed in 81.9% of patients and meconium deficiency in 56% of neonates.

Key words: Causes of Obstruction, Intestinal Obstruction, Neonates, Obstruction Symptoms .

Introduction

NIO is the commonest neonatal emergency surgery, so that 1 in every 2000 live births is estimated to have CIO. This problem is caused by multiple conditions, and the treatment outcome depends on the time of diagnosis and appropriate intervention. (de Silva et al., 2006)

An accurate history and physical examination, corroborated by simple radiologic studies, usually leads to the correct diagnosis. (de Silva et al., 2006; de la Hunt, 2006)

The main symptoms of intestinal obstruction are: (Juang and Snyder, 2012)

- History of maternal polyhydramnios
- Feeding intolerance
- Bilious emesis
- Delayed passage of meconium
- Failure to pass transitional stools
- Abdominal distention

This obstruction can be located in any part of the gastrointestinal tract.
The prevalence of midgut malrotation is 1 in 6,000 births. (Shiau et al., 2007)

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The duodenal obstruction is approximately one in 6,000 to 10,000 neonates. This problem occurs in 4% of trisomy 21 neonates. Jejunum or ileum atresia is more common and is 1 in 1,500 births.

In the case of ileus meconium, 10-20% of the neonates with this problem simultaneously suffer from Cystic fibrosis, which has prevalence of 1 in 3,000 births and the most common genetic disease in people of European breeds. (Murphy and Sparnon, 2006)

Hirschsprung's disease affects 1 in 4500 to 7,000 neonates and is more common in white breeds and is 4 times more common in females than males. (Meza-Valencia et al., 2005)

Imperforated anus has a prevalence of 1 to 3 cases per 10,000 births and is more common in female sex. (Myers et al., 2001)

Overall, intestinal obstruction causes loss of fluid and electrolyte disorders, which can result from vomiting in proximal obstruction or the accumulation of water in the third space of the lumen of the intestine in distal obstructions. In order to reduce the mortality rate, in addition to correcting these, the physician should consider the underlying causes and problems of these patients. (Pani and Panda, 2012)

In most cases, surgical treatment is usually needed in these patients. (Burke et al., 2002; Chen, 1999; Das et al., 2008; Grosfeld and Rescorla, 1993; Hamidi et al., 2016; Kessmann, 2006)

The most common surgical emergency in neonates is intestine obstruction. The rapid diagnosis and selection of appropriate treatment and postoperative care are of the main causes of the results of the treatment in these neonates. In this study, the causes and clinical presentations and outcome of treatment in neonates with CIO were investigated in Imam Khomeini Hospital of Ahvaz.

Methods:

This study was retrospective through reviewing the records of all patients with CIO diagnosis at NICU of Imam Khomeini Hospital of Ahvaz. All patients are in their infancy age group. For all patients, definite intestinal obstruction was given, which was confirmed by radiography as well.

Causes of obstruction are divided into several common groups in similar studies. Thus, patients are evaluated in groups such as intestinal atresia, Hirschsprung, imperforated anus, and so on.

Clinical presentations, abdominal distention, vomiting and failure to pass meconium were investigated among clinical presentations along with the mortality rate in each group of patients.

Results:

Sex

In this study, 54.3% of the neonates were boys and 45.7% girls.

Gestational age

The mean gestational age in neonates was 36.18 weeks, with the highest gestational age of 41 weeks and the lowest gestational age of 28 weeks. The highest frequency of gestational age was 39 weeks (24 cases) and the lowest 32 and 41 weeks (each one with one case).

Birth weight

The most frequent weight was 3 kg, and the average weight of newborns was 2756.81 g, ranging from 900 grams to 4200 grams.

Type of delivery

In the delivery types, 43.1% of the deliveries were NVD and 56.9% were through cesarean section.

Mortality

In the study, of the 116 neonates examined, 15.5% (18 cases) died and 84.5% survived.

Moreover, of the 18 dead neonates, 55.6% (10 cases) died due to intestinal atresia, 16.7% (3 cases) due to imperforated anus, 11.1% (2 cases) due to meconium ileus, 5.6% due to hirschsprung (1 case), and 5.6% (1 case) due to intestinal malrotation.

Clinical presentations

The clinical symptom of distention was not present in 65.5% of cases and was observed in 34.5% of cases.

However, the clinical symptom of vomiting did not occur in 18.1% of cases and was present in 81.9%.

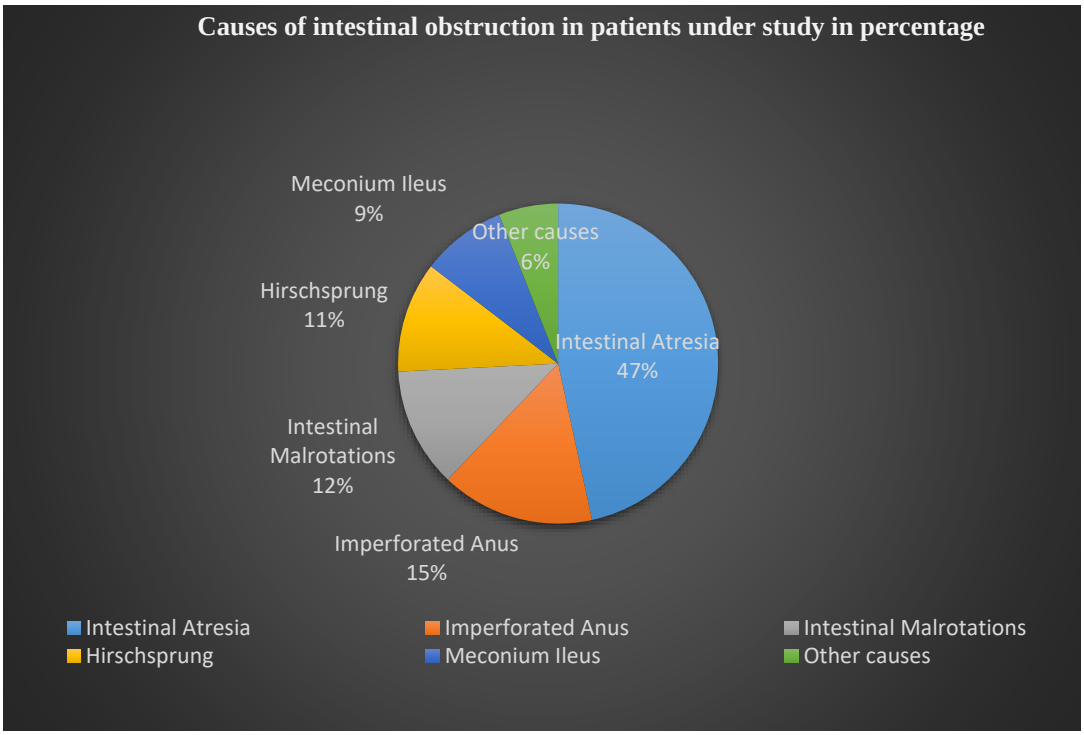
Lack of meconium excretion was not seen in 44% of cases, leaving 56% of cases to have this symptom.

Examining the causes of obstruction in the studied neonates

Distribution of causes of obstruction in the study population

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	other causes of obstruction	7	6.0	6.0	6.0
	imperforated anus	18	15.5	15.5	21.6
	-intestinal atresia	54	46.6	46.6	68.1
	hirschsprung	13	11.2	11.2	79.3
	meconium ileus	10	8.6	8.6	87.9
	intestinal malrotations	14	12.1	12.1	100.0
	Total	116	100.0	100.0	

Given the above table, 15.5% of the diseases were due to imperforated anus, 46.6% due to intestinal atresia, 11.2% due to hirschsprung, 8.6% due to meconium ileus, and 12.1% due to intestinal malrotation. Moreover, there were 1 case of colonic atresia, 4 cases with final diagnosis of GIO, and 2 cases of intussusception among the patients that were all placed in “other” category due to their low frequency.



Studying clinical presentations given different causes of obstruction:

- *Intestinal Atresia:*

Of the 116 patients studied, 54 cases (46.6%) had obstruction due to intestinal atresia. Meanwhile, the most common clinical symptom was vomiting, which was present in 52 (96.3%) of these patients. After that was failure to pass meconium with 23 cases (42.6%), and distension with 19 cases (35.2%).

- *Imperforated Anus:*

Of 116 patients, 18 cases (15.5%) were diagnosed with imperforated anus. Meanwhile, the most common clinical symptom was the failure to pass meconium, which occurred in 16 (88.9%) of these patients, followed by vomiting with 5 cases (27.8%) and distension with 3 cases (16.7%).

- *Hirschsprung:*

Of 116 patients, 13 cases (11.2%) had obstructed intestine due to Hirschsprung's disease. Meanwhile, the most common clinical symptom was vomiting, which occurred in 11 (84.6%) of these patients, followed by the failure to pass meconium with 8 cases (61.5%) and distension with 6 cases (46.2%).

Ileus Meconium:

Of 116 patients, 10 cases (8.6%) had obstructed intestine due to ileus meconium. Meanwhile, the most common clinical symptom was the failure to pass meconium, which occurred in 9 cases (90%) of these patients, followed by vomiting with 7 cases (70%) and distension with 4 cases (40%).

- *Intestinal malrotations:*

Of 116 patients, 14 cases (12.1%) had obstructed intestines due to intestinal malrotations. Meanwhile, the most common clinical symptom was vomiting, which occurred in 13 (92.9%) of these patients, followed by the failure to pass meconium with 5 cases (35.7%) and distension with 3 cases (21.4%).

- *Other causes*:

Among the patients who underwent initial diagnosis of intestinal obstruction in NICU, there were 1 cases of colonic atresia, 4 cases with the final diagnosis of GIO and 2 cases of intussusception, which due to low frequency all were included in the “other” category. Clinical manifestations in these individuals were as follows: a total of 7 cases (out of 116 patients) vomiting was reported in all cases (100%), distension in 5 cases (71.4%), and failure to pass meconium in 4 (57.1%) cases.

Discussion:

Fast and accurate diagnosis and subsequent decision making in neonates with obstructive symptoms are critical issues in pediatric medicine. Thus, recognizing common diseases in the region is considered as a helpful tool in diagnosis and treatment. The purpose of this study was to investigate the prevalence of CIO by examining all infants admitted to NICU with a diagnosis of CIO.

Sex:

In the population studied, 54.3% were boys and 45.7% girls, whereas in Sowande, 66% were boys and 34% were girls. (Ademuyiwa et al., 2009) Sexual dispersion in the study by Mahajan was 78% boys and 22% girls; (Annigeri et al., 2009) in the study by Singh, 69% were boys and 31% girls. (Rattan et al., 2016) Meanwhile, in our study, the prevalence of obstructive diseases in males was higher, but with a lower proportion.

Gestational age and birth weight and delivery type:

In the present study, patients had an average gestational age of 36 weeks with a minimum of 28 weeks and a maximum of 41 weeks, whereas patients who participated in the study by Anjali et al. were 32 to 42 weeks. (Verma et al., 2016)

In this study, the weight of neonates was also recorded, with a mean weight of 2756 g. Moreover, 43.1% of the patients were born by natural delivery and 56.9% by cesarean section. In other similar studies, the studies have not been conducting in terms of these three parameters. Although gestational age, type of delivery, and birth weight were recorded in this study, the relationship between these two parameters and obstruction has not been studied.

Clinical presentations:

According to similar studies, the clinical presentations of patients were examined in three groups of vomiting, distension, and failure to pass meconium.

Distension existed in 34.5% of the patients in the studied population. This figure was 69% in the same study by Singh et al. and 47% in the study by Nikavar. (Waran, 2008)

As abdominal distention is determined in the examination, recording it in the patient's biography depends on the examiner's skill too.

Vomiting in this study was found in 81.9% of patients. However, in similar studies, the incidence of vomiting in obstructive patients varied from 45% to 100%. (Rattan et al., 2016; Waran, 2008)

Failure to pass meconium in this study was observed in 56% of the neonates, which is almost the same as in the study by Nikavar. In the study mentioned, failure to pass meconium has been reported in 49% of patients.

In this study, the mortality rate of neonates was in 18 cases (15.5%) among all patients. This is an acceptable rate, given similar studies by Sowande with 28.6% deaths, Anjali 16.4%, Singh 13.5%, and Nikavar with a death rate of 10%.

Unfortunately, in the cases under investigation, almost all death causes in the patients was cardio-respiratory arrest, which rendered investigating the causes of death faulty, but in other studies, sepsis was the main cause of death before and after surgery.

The most common causes of mortality in neonates were intestinal atresia (55.6%), imperforated anus (16.7%) and mucous ileus (11.1%), which is somehow similar to other studies, which have stated intestinal atresia, Hirschsprung and imperforated anus as the common underlying causes in patients with intestinal obstruction. (Waran, 2008)

Distension exists in 34.5% of the patients studied in population. The most common cause of obstruction in the case group was in intestinal atresia with 46.6%, followed by imperforated anus (15.5%), intestinal malrotations (12.1%), hirschsprung (11.2%), meconium ileus (8.6%) and other causes of obstruction (6%).

The results were somehow the same as that in the study by Anjali, in which intestinal atresia (49.6%), Hirschsprung (13%) and malrotation (11.7%) were the most common causes of intestinal obstruction. Furthermore, in the study by Singh et al., atresia was the most common cause of obstruction (46.9%), but malrotation with 40.7% was the second most common cause of obstruction, whereas in the present study, imperforated anus after intestinal atresia was in the second rank of common causes.

On the other hand, the results of the study by Sowande et al. showed the common causes of NIO are, respectively, anorectal malformations (57.1%), Hirschsprung (19%) and intestinal atresia (12.7%), which is different from our results. Moreover, in the study by Nikavar et al., the most common cause of NIO was imperforated anus and Hirschsprung.

Similar studies on the causes of NIO are more or less consistent with the results of this study, and some studies have had different results, showing differences in the causes of obstruction in different groups.

Examining infants with signs and symptoms of intestinal obstruction needs fast and accurate diagnosis and appropriate action to achieve the desired outcome. This study was an attempt to investigate the causes of obstruction in all patients admitted to NICU during a 3-year period. In addition, the incidence of clinical presentations and mortality in these patients was studied. The presence of anomalies is one of the significant issues in many of these patients that need further examination. Moreover, the study of the cause of death seems necessary to identify and prevent its occurrence. It is also suggested that in the future, some field studies are needed to study the relationship between congenital obstructions and type of delivery, gestational age and birth weight, so that it is possible to predict the presence of obstruction and help diagnose them more accurately compared to the past.

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