
ORIGINAL ARTICLE**The Study of Newborns with Congenital Gastrointestinal Tract Obstruction**

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Abstract

Introduction: Gastrointestinal Tract Obstruction (GITO) is one of the most common causes of surgical emergencies in newborns. Management of these patients depends on the site of obstruction, associated anomalies, the time of diagnosis and the surgery. **Aim:** The purpose of this study was to evaluate clinical manifestations, associated anomalies and the outcome of these patients with GITO admitted to Imam Reza and Razi Hospitals of Kermanshah. **Material and Methods:** This is an observational study, which is conducted to investigate all the newborns, admitted to the Neonatal Intensive Care Unit (NICU) of Imam Reza & Razi Hospital of Kermanshah during ten years from 2002 to 2012 with diagnosis of GITO. The history of the newborn, operation records and case records of the patients in addition to clinical and para-clinical conditions and their pathological results were studied. **Results:** During the study period, 235 cases of GITO were investigated. Among them, 63 were admitted with imperforate anus, 62 with Hirschsprung's disease, 52 with esophageal atresia, 9 with ileal atresia, 17 with jejunal atresia, and 16 with duodenal obstruction and 6 with colonic atresia. The most common symptoms at the time of admission were abdominal distension in 108, absence of meconial defecation in 85, and bile vomiting in 42 cases. 189 (80.4%) of newborns were operated. The overall mortality rate of newborns under study was 31.2%. The highest rate of mortality was observed in newborns with esophageal atresia 61.5%. **Conclusion:** The results of the present study showed that approximately 5% of the cases admitted to NICU suffered from congenital GITO. Considering the high number of cases and the increased probability of death in these patients, close attention, better management and treatment of these patients seems crucial.

Keywords: Gastrointestinal Tract Obstruction, Neonatal Intensive Care Unit, Newborn.

Introduction:

Congenital GITO is one of the most wide spread surgical emergencies in the newborns with the prevalence rate of one in 1500 live births [1]. The ability to manage these patients depends on some factors such as the obstruction site associated anomalies, the time of diagnosis and the surgery. Delay in diagnosis can result in intestinal perforation, sepsis, pneumonia, aspiration and hyperbilirubinemia. Etiologically, in most cases, the reason of intestinal obstruction is unclear, but unknown teratogenic factors are considered as the possible cause [2]. Using prenatal ultrasonography by experienced staff, the GITO can be diagnosed prenatally. Transferring the mother to an equipped medical center for neonatal surgery, acceleration in neonatal surgery and counseling with parents are among the benefits of diagnosing prenatally [1]. The symptoms and signs of intestinal obstruction in neonates can be slight and nonspecific. Bile vomiting is a symptom of obstruction distal to ampulla of Vater and requires urgent investigation [3]. As a rule, newborns with bile vomiting suffer from intestinal obstruction, unless proven otherwise [1, 3-6]. In developed countries, the survival rate of neonates with GITO has increased to 90% in recent years by improvement in neonatal care conditions and advancement in anaesthesia techniques and surgery, the most common cause of mortality in neonates with GITO are delay in operation, sepsis, and

hemodynamic disorders. Treatment and rehabilitation of the disability resulting from congenital disorders imposes enormous costs on the human society, therefore diagnosing and preventing the incidence of congenital disorders is more cost effective. Due to the importance of this problem and the lack of accurate information about the frequency and the distribution of congenital GITO in Kermanshah province, this investigation has been undertaken. This study has been conducted to evaluate clinical symptoms, associated anomalies and the outcomes among the newborns with various GITOs admitted to Imam Reza and Razi Hospitals in Kermanshah, Iran.

Material and Methods:

This is an observational study. The subjects under study were all the newborns hospitalized in NICU in Imam Reza and Razi Hospitals of Kermanshah, Iran with the primary diagnosis of congenital GITO or newborns hospitalized with other primary diagnoses, but their GITO has been confirmed afterwards. The samples with desired features of GITO were selected from the newborn cases being hospitalized from October 2002 to

September 2012, and the required data have been collected based on the information forms already prepared. The samples were evaluated in terms of the following factors: gender, birth weight, age, the age at the onset of symptoms, associated congenital disorders such as VACTERL (Vertebral anomalies, Anal atresia, Cardiac defects, Tracheoesophageal fistula and/or Esophageal atresia, Renal & radial anomalies and Limb defects) syndrome, brain disorders such as microcephaly and macrocephaly, the rate of mortality, the rate of recovery, mothers with polyhydramnios and the type of obstruction. Data collected was analyzed using SPSS software. In quantity variables, the numerical index of mean value and standard deviation were used and two-dimension table was used to show the distribution of the type of obstruction in terms of other factors.

Results:

During ten years of study from 2002 to 2012, 5000 newborn cases admitted to NICU were investigated. Among them 235 cases were diagnosed with GITO.

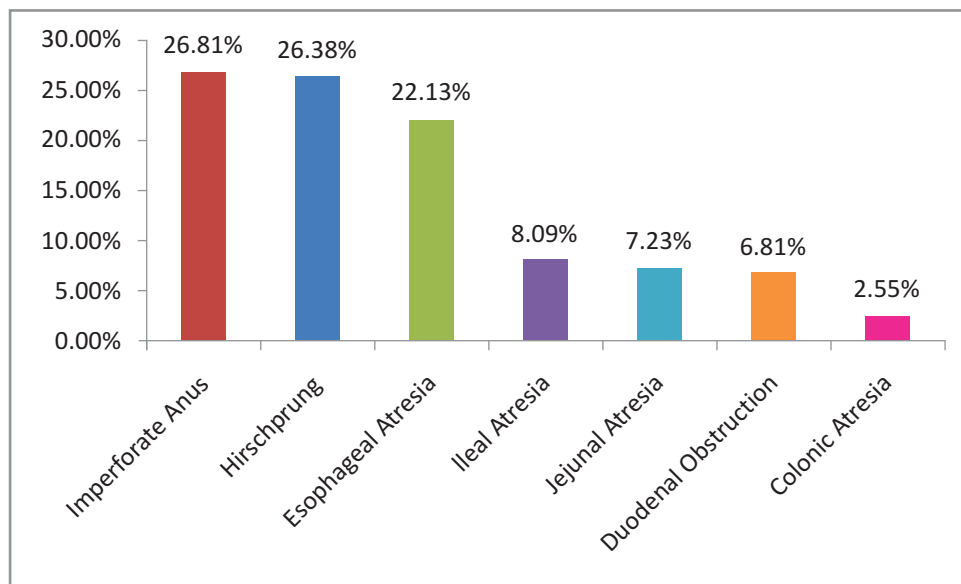
Table 1: Frequency Distribution of the Characteristics of the Patients under Study

Complication	Number (%)	Sex ratio	Preterm newborns' ratio	Ratio of the newborns lower than 1.5 kg	Mortality No. (%)
Esophageal atresia	52 (22.1)	0.92	26.9	3.8	32 (61.5)
Imperforate anus	63 (26.8)	2.15	12.7	0	9 (14.3)
Colonic obstruction	06 (02.5)	2	33.3	0	3 (50.0)
Hirschsprung's disease	62 (26.4)	1.6	11.3	1.6	9 (14.5)
Ileal obstruction	19 (08.1)	1.7	36.8	0	9 (47.4)
Jejunal obstruction	17 (07.2)	1.8	23.5	5.9	8 (47.1)
Duodenal atresia	16 (06.8)	1.7	37.5	6.3	6 (37.5)

Therefore, the prevalence rate of GITO in hospitalized newborns was 47%. 143 newborns were boys (60.9%) and 92 of them were girls (39.1%). They were 197 term (83.8%), 34 pre-term (14.5%) and 4 post-term (1.7%) newborns. In general, the most common causes of obstruction were respectively: imperforate anus (26.81%), Hirschsprung's disease (26.38%), esophageal atresia (22.13%), ileal atresia (8.09%), jejunal atresia (7.23%), duodenal obstruction (6.81%) and colonic atresia (2.55%), (Graph 1).

Most of the newborns (79.5%), i.e. 187 cases were hospitalized in the first week after birth. About 11% (25 newborns) were hospitalized in the second week. The proportions of newborns hospitalized in the third and fourth weeks were 2.5% (6 newborns) and 6.4% (15 newborns), respectively.

With regard to the weight distribution, most of the newborns were over 2500 grams (72.1%). In 25.3% of the cases, they were 1500 to 2500 grams and in 2.6% of the cases, they were 1000 to 1500 grams.



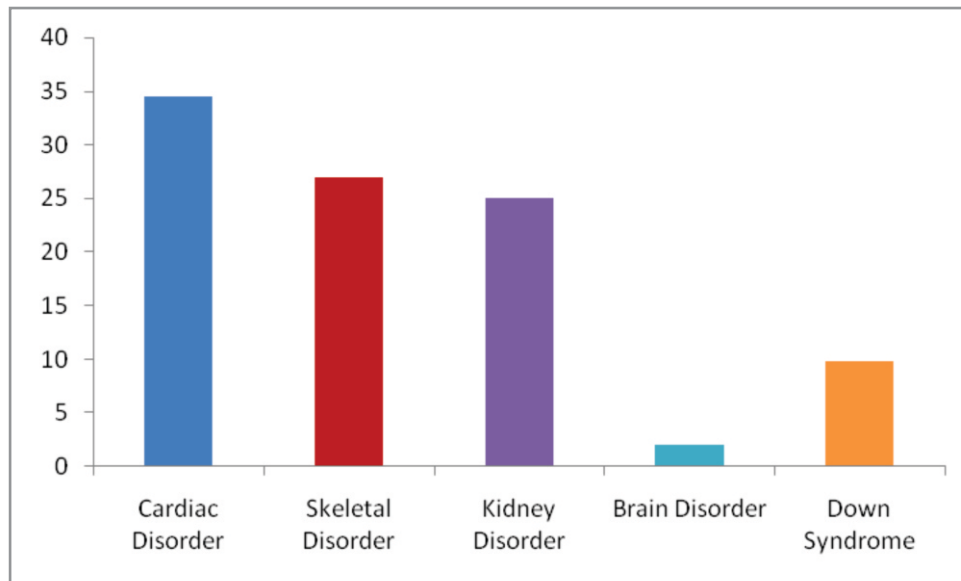
Graph1: Frequency Distribution of the Patients Based on the Obstruction Site

The most common clinical symptoms at the time of hospitalization in all patients were abdominal distention (46.06%), absence of meconial defecation (36.22%) and bile vomiting (17.72%).

The clinical symptoms started from the first week in 89.4% of the cases (210 cases), from the second week in 4.3% (10 cases), from the third week in 2.5% of the cases (6 cases) and from the fourth week in 2.5% of the cases (6 cases).

The mothers' history of polyhydramnios was observed in 6.4% of the cases, which was observed separately in 21.2% of newborns with esophageal atresia, in 12.5% with duodenal obstruction, in 5.9% with jejunal atresia and 1.6% with imperforate anus. In newborns with ileal and colonic atresia, no polyhydramnios history was observed in mothers.

The most common associated anomalies are shown in (Graph 2).



Graph 2: Frequency Distribution of the Patients Based on the Associated Anomalies

In this study, by brain disorders, we mean macrocephaly or microcephaly and by skeletal disorders, we mean anomalies in vertebrae, such as hemivertebral, scoliosis or deformity in the ribs. Most of the newborns with intestinal obstruction were operated during their first week (36.9%), second week (23.2%), third week (8.6%), and fourth week (1.7%) and after fourth week (9.9%) postnatally.

The most common cause of GITO was imperforate anus (26.8%). Among them about 13% were preterm newborns, the number of boys was twice that of girls and their mortality rate was 14.3.

The highest mortality was observed in patients with esophageal atresia (over 60%) and was at the end of their hospitalization period. In this group, about 27% were pre-term and 3.8% were lower than 1500 grams. Sex ratio was about one.

The highest rates of preterm cases was observed in patients with duodenal atresia (38%). In duodenal atresia, the number of boys was more than girls and mortality probability was 37.5%. In addition, 6.3% of the newborns were less than 1500 grams.

The characteristics of the patients under study are summarized in Table 1. In this study, colonic obstruction had the lowest frequency relative to other types {6 (2.5%)}. The number of boys was twice the number of girls and more than 33% of them were preterm. Half of these newborns died finally.

Discussion:

The results of this study show that about 5% of newborns admitted to ICU are patients with GITO. The most common causes of congenital GITO have been imperforate anus, Hirschsprung's disease and esophageal atresia. About one third (1/3) of the patients have died because of esophageal atresia. The highest rate of mortality has been observed in this condition.

In a study conducted in Nigeria the most common cause of obstruction has been obstructed anus and Hirschsprung's disease respectively [7]. In a study by Ozturk and colleagues, the most common obstruction site has been jejunoileal, duodenal and then colonic [8]. With regard to gender distribution, the number of male newborns has been

higher which can be explained by the higher prevalence of Hirschsprung's disease and imperforate anus in male newborns. Ghare-Beyg-Loo and Nik-Avar have observed similar results [9, 10].

The time of hospitalization: About two third (2/3) of the newborns have been admitted during the first week after birth and then they have been admitted in the second, third and fourth week after birth. The cause of increase in admission at the fourth week is the high prevalence of Hirschsprung's disease the symptoms of which may start with delay.

Gestational age: More than two third (2/3) of GITO have occurred in term newborns the cause of which are the high prevalence of imperforate anus and Hirschsprung's disease in this study. The high prevalence of preterm newborns can be explained by prevalence of esophageal atresia as the third common cause, which is common in preterm babies.

The most common clinical symptoms in this study have been abdominal distention, absence of meconial defecation and bile vomiting, which is consistent with other studies [11].

In duodenal obstruction, most cases have been observed in term newborns, which vary from Dalla study based on preterm being associated with duodenal obstruction [12]. The most common associated anomaly in these patients has been cardiac problems with prevalence rate of 18% like the aforementioned study [12]. The most commonly associated anomaly in jejunal obstruction has been skeletal disorder with prevalence rate of 11%. However, in Adeyemi study, cardiac problem has been the most common anomaly [7].

The most common clinical symptom in colonic atresia has been bile vomiting (9.2%), which is similar to other studies [12]. Cardiac and skeletal anomalies with the prevalence rate of 16% have

been the most common associated anomalies. Mortality rate has been 50% in this group, which is not consistent with Dalla study. This difference may be the result of low number of subjects in this study [12]. Mortality rate in Hirschsprung's disease has been 14%, which is not consistent with Buston study with mortality rate of 0.2% [13]. Probably, cause of death in this group is the result of delay in going to the hospital and enterocolitis necrosis. In general, 80.6% of newborns with GITO have been operated and in remaining cases, no surgery has been undertaken because of the absence of parents' satisfaction or being sent to other equipped centers or the high rate of major associated anomalies. General mortality rate in studied newborns has been 33.1%. In general, compared to other studies, mortality rate is quite different, which can be the result of the lack of pediatric surgical specialties, the lack of timely prenatal diagnosis or late transfer to third level centers because of the lack of empty beds in NICU [12]. In this study, the most common cause of death has been associated congenital disorders, sepsis and delay in surgery. Certainly, higher rate of mortality in esophageal atresia in this study compared to other studies can be the result of late sending of these patients from other medical centers to Imam Reza Hospital or because of associated anomalies. Ultrasonographic diagnosis of GITO could be made only in 14(5.96%) pregnancies.

Conclusion:

In this study, the most common cause of GITO has been imperforate anus, which is similar to other studies, but the rate of mortality in GITO, especially in esophageal atresia, has been higher compared to other studies, which could be the result of delay in surgery or associated anomalies and more research is required in this case.

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