Govaresh/ Vol. 19, No.4, Winter 2015; 288-91.

Original Article

Long Term Clinical Outcome of Small Intestinal Atresia in Children, A Single Center Experiences

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ABSTRACT

Background:
Prognosis of small intestine Artesia, the most common agents causing intestinal obstruction in neonates, has improved in last decades. Some variable such as weight change, type of feeding, post operation oral feeding starting time, and adequacy of energy and protein intake can change patients clinical outcomes.
We performed a retrospective study to evaluate all neonates with small intestinal Artesia who were admitted to pediatric intensive care unit (PICU), during 2002-2010 and followed-up their clinical outcomes over an 8-year period.
Materials and Methods:
We reviewed medical records of all patients with small intestinal atresia treated at Dr. Sheikh hospital in the between 2002 and 2010. Information of all patients were recorded, including demographic data, type and location of atresia, other problem or anomalies, being term or preterm, term of stay and length of hospitalization, weight change, type of feeding, post operation oral feeding starting time, and adequacy of energy and protein intake.
Results:
65 neonates presented with small intestinal atresia treated at Dr. Sheikh hospital during 2002-2010 entered our study. The age of neonates at admission time was median 3 days (1 day – 2 month). The median weight at reception was 2.32 ±0.6 kg (ranged 0.75-3.85 kg). The median of hospitalization period was 15 days. The mean amount of delivered calorie- protein and energy intake was significantly lower than the guidelines of the American Society for Parenteral and Enteral Nutrition (p<0.001).
Conclusion:
We recommend full investigation of congenital anomalies and possible prevention of infections and its resultant sepsis in all infants with intestinal atresia, in order to reduce the risk of mortality in these infants.
Keywords: Small intestinal atresia; Follow up; Outcome; Neonate

please cite this paper as:
Ghafouri-taleghani F , Norouzy AR , Zarifian AR, Khademi GR, Banikazemi Z, Sadat Sangsefidi Z, Imani B. Long term clinical outcome of Small intestinal atresia in children, a single center experiences. *Govaresh* 2015;19:288-91.

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Received: 20 Aug. 2014
Edited: 26 Nov. 2014
Accepted: 27 Nov. 2014

INTRODUCTION

Small intestine Artesia is among the most common agents causing intestinal obstruction in neonates. Reports indicate the rate of intestinal Artesia something between 0.4 and 3.1 per 10000 new births(1-4). Luow and Barnard in 1955 demonstrated the vascular accident thory of its causation. Fockens in 1911 performed the first successful surgery for atresia, and since then survival has progressively improved to greater than 90% in developed nations(5-8). Prognosis of this type of obstruction has improved in last decades because

of alterations in diagnostic modalities, operative techniques, total parenteral nutrition, and neonatal intensive care(9). We performed a retrospective study to evaluate all neonates with small intestinal Artesia who were admitted to pediatric intensive care unit (PICU) of DR. Sheikh hospital, during 2002-2010. We examined patients' demographic data, location of Artesia, adequacy of energy and protein intake and length of hospitalization and followed-up their clinical outcomes over an 8-year period.

METHODS AND MATERIALS

65 neonates presented with small intestinal atresia treated at Dr. Sheikh hospital during 2002-2010 entered our study that 27 infants (41.5%) had duodenal atresia and 38 (58.4%) had jejunoileal atresia(According to most of the affected). Unfortunately, no data for length of intestine resection in all patient.

43% of infants were fed Parenteral and 56% were fed parenteral and enteral(16 neonates use breastfeeding and 21 neonates use formula feeding).

After approval was obtained from the local ethical committee of Mashhad University of Medical Sciences and informed consent was obtained from the parents of patients as local protocol, study was initiated. We reviewed medical records of all patients with small intestinal atresia treated at Dr. Sheikh hospital in the between 2002 and 2010. Information of all patients were recorded, including type of atresia, other problem or anomalies, being term or preterm, term of stay, weight change, type of feeding, post operation oral feeding starting time, and adequacy of energy and protein intake. We followed-up children by phone call interviews and checked their nutritional status, current weight, gastrointestinal problems, and taken drugs.

Finally, data were entered into SPSS software (version 11, SPSS Inc, Chicago, IL). Analysis was performed using X^2 test for categorical data and student t-test for continuous variables. Two-tailed P values which were below 0.05 were considered statistically significant. Data were summarized using mean and standard deviation for normally distributed variables and median for non-normally distributed continuous variables.

RESULTS

65 neonates were evaluated with small intestinal atresia. Various clinical features of the infants illustrates in table 1.

The age of neonates at admission time was median 3 days (1 day – 2 month). Moderate/severe acute malnutrition was defined as weight for age greater than -2 Z-scores, using Centers for Disease Control and Prevention (CDC) growth charts 2000. 39.3% of term infants were malnourished at birth.

Table 1: Clinical characteristics of neonates with small intestinal atresia

Clinical feature	Duodenal atresia (n=27)	Jejuna atresia (n=27)	Ileal atresia (n=11)
Sex (M:F)	(14:13)	(10:17)	(8:3)
Maturity (term: preterm)	(18:9)	(18:9)	(10:1)
Birth weight(kg)	2.26 (0.67 SD)	2.43 (0.54 SD)	2.40 (0.60 SD)
Duration of hospital stay (mean days)	14.25	16.18	12.45
Start of oral feeding postop-erative (mean days)	9.43	13.13	8.5
Mortality in hospital	8	5	2

The median weight at reception was 2.32 ±0.6 kg (ranged 0.75-3.85 kg). 44.8% of babies had weight loss during hospitalization and 15.5% had no weight gain (p-value>0.05). 19 neonates (29%) were preterm (exact gestational age was not accessible in most children).

Bilious vomiting from the first day of birth, abdominal distention and delayed or absent passage of meconium reported for most of neonates. 27 infants (41.5%) had duodenal atresia and 38 (58.4%) had jejunoileal atresia. 15 neonates(23%) had other complications which included Down's syndrome, structural cardiac defects, genitourinary defects, imperforated anus and orthopedic abnormalities. Hepatomegaly is not an anomaly (Table-2) .

9 of the 65 infants died in hospital (mortality rate = 13%). The most common cause of death was sepsis which occurred in 5 out of 9 cases (55%). 2 infants died after discharge. The median of hospitalization period was 15 days. Maximum hospitalization period was 50 days and minimum was 3.

Post operation oral feeding was initiated on the third day after surgery (5 infants had early oral feeding) for the first infant and the fortieth day for the last one (median was 11 days). Feeding was started on admission day with dextrose solution. The mean amount of calorie delivered to term and preterm infants were 62.17 ± 19.76 kcal/kg and 66.44 ± 18.39 kcal/kg, respectively which were significantly lower than what the American Society

Table 2: Congenital anomalies associated with small intestinal atresia

Anomalies	N = 14 (%)
Down 's Syndrom	4 (6)
Structural Cardiac Defect	4 (6)
Genitourinary	2 (3)
Imperforate Anus	3 (4)
Orthopedic	1 (1)
Total	14 (21)

for Parenteral and Enteral Nutrition mentioned in their guidelines(p<0.001). The actual energy intake average for all infants was 60.52% ± 18.73% of recommended (p<0.001).3 babies (4.61%) had 100% energy intake according to mentioned guidelines. The mean amount of delivered protein for term infants was 1.38 ± 0.6 gr/kg and for preterm infants was 2.06 ± 1.02 gr/kg. It was also significantly lower than the guidelines of the American Society for Parenteral and Enteral Nutrition (p<0.001). None of term infants had their entire needed protein intake, but 2 preterm infants (10.5%) had.

We followed-up 22 of 65 infants after their discharge (mean follow-up period was 2-7 years). 30% of followed-up infants had gastrointestinal complications includingbellyache1 or 2 times a week (3 neonates), vomiting (2 neonates) and intestinal adhesion (1 neonate). Sepsis (1 patient), superficial wound infections (2 patients), postoperative pneumonia (1 patient) were other complications in followed-up infants. Thus, 20% of followed-up children readmitted to hospital after their discharge. All followed-up kids had normal weight and growth except one, who had short stature.

DISCUSSION

Intestinal atresia is still believed to be among the most probable causes of intestinal obstruction in infants(10). Evidence suggests that detection of proximal intestinal atresia is more probable and atresia occurred in distal parts of intestine is harder to detect(11). Mongolian children have especial growth chart which have lower growth comparison with normal children.

Jejunoileal atresia was the most prevalent type of atresia in our patients (58.4%), which is in line with other studies(11-13).

In our study weight of infants at admission time was median 2.32 ±0.6 kg (ranged 0.75-3.85 kg). In another study done by Burjonrappa et al., the mean birth weight of infants was 2.64 kg. In their study, infants with colonic atresia had the highest birth weights among three groups duodenal, jejunoileal and colonic atresia(11).

Median length of stay in hospital was 15 days in our study which is relatively low, compared with 25 days in the study done by Stollman et al.(13). Piper and colleagues also reported higher median of hospitalization period for their study subjects(14).

The median time until post operation oral feeding was 11 days in all subjects of our study. This is higher than the median for subjects in the work done by Stollman et al.(13). In the study done by Piper and colleagues, median days to full oral feeding after surgery for three groups of duodenal, jejunoileal and colonic atresia were 10, 17 and 4, respectively all of which were lower than the results of Burjonrappa's study(11,14).

Our findings are nearly similar to the ones in the study done by Nusinovich et al. which states that the mean amounts of delivered protein and energy for infants with intestinal atresia is lower than normal(12).

Down's syndrome, structural cardiac defects, genitourinary defects, imperforated anus and orthopedic abnormalities were congenital anomalies associated with intestinal atresia in our study subjects which were related to the risk of mortality. This is in accordance with other studies in which the authors mentioned associated congenital anomalies as mortality risk factors(11,14).

Piper et al. stated that infants with these associated congenital anomalies are more likely to lose weight during hospitalization(14). This finding is in relation with our results, in which 44.8% of neonates lost weight during hospitalization and also 15.5% had no weight gain.

Mortality rate in our study was 13% which is higher than other studies(7-10). The main cause of death in our study subjects was sepsis. Although in other studies sepsis was not the most prevalent cause of mortality, it was among the major causes of death(11,13). In some other studies the role most of deaths were because of congenital anomalies associated with severe atresia(12,14).

CONCLUSION

We recommend full investigation of congenital anomalies and possible prevention of infections and its resultant sepsis in all infants with intestinal atresia, in order to reduce the risk of mortality in these infants.

ACKNOWLEDGEMENTS

We are thankful from Mashhad University of Medical Sciences that approved our study and allowed us to use hospital records in Dr. Sheikh Hospital.

REFERENCES

1. Cragan JD, Martin ML, Moore CA, Khoury MJ. Descriptive epidemiology of small intestinal atresia, Atlanta, Georgia. *Teratology* 1993;48:441-50.
2. Martínez-Frías ML, Castilla EE, Bermejo E, Prieto L, Orioli IM. Isolated small intestinal atresias in Latin America and Spain: epidemiological analysis. *Am J Medical Genet* 2000;93:355-9.
3. Forrester M, Merz R. Population-based study of small intestinal atresia and stenosis, Hawaii, 1986–2000. *Public Health* 2004;118:434-8.
4. Shakya V, Agrawal C, Shrestha P, Poudel P, Khaniya S, Adhikary S. Management of jejunoileal atresias: an experience at eastern Nepal. *BMC Surg* 2010;10:35.
5. Ekwunife O, Oguejiofor I, Modekwe V, Osuigwe A. Jejuno-ileal atresia: A 2-year preliminary study on presentation and outcome. *Niger J Clin Pract* 2012;15:354-7.
6. Ozturk H, Ozturk H, Gedik S, Duran H, Onen A. A comprehensive analysis of 51 neonates with congenital intestinal atresia. *Saudi Med J* 2007;28:1050-4.
7. LOUW JH. Congenital intestinal atresia and stenosis in the newborn. Observations on its pathogenesis and treatment. *Ann R Coll Surg Engl* 1959;25:209-34.
8. Baglaj M, Carachi R, Lawther S. Multiple atresia of the small intestine: a 20-year review. *Eur J Pediatr Surg* 2008;18:13-8.
9. Sweeney B, Surana R, Puri P. Jejunoileal atresia and associated malformations: correlation with the timing of in utero insult. *J Pediatr Surg* 2001;36:774-6.
10. Grosfeld JL. Pediatric surgery: Mosby inc; 2006.
11. Burjonrappa S, Crete E, Bouchard S. Comparative outcomes in intestinal atresia: a clinical outcome and pathophysiology analysis. *Pediatr Surg Int* 2011;27:437-42.
12. Nusinovich Y, Revenis M, Torres C. Long-Term Outcomes for Infants with Intestinal Atresia Followed at Children's National Medical Center, Washington. *J Pediatr Gastroenterol Nutr* 2013;57:324-9.
13. Stollman TH, de Blaauw I, Wijnen MH, van der Staak FH, Rieu PN, Draaisma JMT, et al. Decreased mortality but increased morbidity in neonates with jejunoileal atresia; a study of 114 cases over a 34-year period. *J Pediatr Surg* 2009;44:217-21.
14. Piper HG, Alesbury J, Waterford SD, Zurakowski D, Jaksic T. Intestinal atresias: factors affecting clinical outcomes. *J Pediatr Surg* 2008;43:1244-8.