Characteristics of the clinical development of a newborn with gastroschisis in an intensive care unit in latin america

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Abstract

Introduction: Congenital malformations are major diseases observed at birth. They are the second most common cause of death in the neonatal population, the first one being prematurity.

Objective: To characterise the clinical outcome of newborns with gastroschisis (GS) in a neonatal intensive care unit.

Methods: A retrospective observational clinical study in 50 infants with GS using the association of intestinal abnormalities, impossibility of primary closure of the abdominal defect and reoperation necessity as classification criteria for the disease. The significance level was p < 0.05.

Results: The hospitalisation to primary surgery occurred with a median age of 2 hours. Fourteen percent of children were subjected to a primary silo interposition and 24% had associated intestinal malformation. Nineteen newborns (NB) required more than one surgery. The median length of stay was 33 days, higher in patients with complex GS (56 days). All NB recovered from urine output 48 hours after surgery and 40% had hyponatraemia and oligoanuria in this period. There was no difference between the natraemia and fasting time (p = 0.79). Weight gain was similar in both groups with total parenteral nutrition and became significantly higher in patients with simple GS after enteral feeding (p = 0.0046). These NB evolved 2.4 times less cholestasis. Late-onset sepsis occurred in 58% of patients and was related to the infection of the central venous catheter in 37.9% of cases. Mortality was higher in infants infected with complex GS and the overall mortality rate was 14%.

Conclusion: Clinical characterisation of newborns with gastroschisis depends on the complexity and the knowledge and conduct of morbidities to reduce mortality.

Key words: gastroschisis, new-born, mortality, total parenteral nutrition, renal insufficiency, infection.

INTRODUCTION

Congenital malformations are major diseases observed at birth. In the United States, a prevalence of about 3%[1] is cited. In Brazil, a study at the Fernandez Figueira Institute in Rio de Janeiro found that the prevalence was similar, i.e. 2.7% among live newborns (NB) and 6.7% among stillbirths. Among the causes of death, neonatal malformations are the second most common reason, the first one being prematurity[2].

Gastroschisis (GS) is a congenital malformation of the abdominal wall that has increased in prevalence worldwide; its causes have not been fully elucidated[3]. In the 1960s, the prevalence of this disease was 1:50,000 live births. However, Kirby et al.[4] recently reported that in the period from 1995 to 2005 in the United States, there was a

temporal increase of 2.23 per 10,000 live births to 4.42 per 10,000 Regarding the definition of live births. The current prevalence in South America is 2.9:10,000[5].

This disease is characterised by a defect in abdominal wall closure with herniation of the intestines and other abdominal organs into the amniotic cavity. The herniation is usually in the right periumbilical region, but may occur in some patients on the left underside[6].

The literature relates the increase in this disease with pregnancy at the age of 20 years, smoking, illicit drug use, and placental insufficiency with poor foetal oxygenation. Some authors report as a possible aetiology the use of substances as pseudoephedrine in nasal decongestants and environmental toxins. The possibility of a genetic aetiology is always present, as children from the same mother can have this problem. The most frequently observed risk factor is teenage pregnancy[7-10].

A prenatal diagnosis can be performed by measuring the alpha-fetoprotein produced by the foetal gastrointestinal tract and liver as well as foetal ultrasonography, which is considered the gold standard for diagnosis. The problem is diagnosed in the first routine ultrasound performed on the mother. This imaging test can show problems with the lateral abdominal wall and insertion of the cord, which is inserted normally. The viscera are observed floating in the amniotic fluid without membrane structures, generally including the small intestine, large intestine, stomach, appendix, fallopian tubes and ovaries, as well as portions of the urinary and/ or reproductive tract. Prenatal care is of great importance since early termination of pregnancy may occur due to changing foetal vitality. Although it does not seem to increase morbidity or mortality in vaginal delivery, often these deliveries are performed by caesarean section[11,12].

Mortality rates range from 3 to 10%, and high morbidity in the neonatal period is associated with factors related to slow post-operative intestinal adaptation with the use of prolonged parenteral nutrition (PPN), causing cholestasis associated with parenteral nutrition (CAPN) and central venous catheters (CVC) use for a prolonged period, infections and the presence of hydroelectrolytic disturbances associated with renal insufficiency[12]. The complexity of this malformation depends on its association with intestinal atresia, perforation, necrosis and volvulus, which makes the surgical management needed evolve to a short bowel syndrome frame, prolongs the hospital stay and promotes a number of comorbidities[13].

The objective of this study was characterise the clinical outcome of newborns with gastroschisis in a neonatal intensive care unit.

METHODS

This was a retrospective observational clinical study, conducted from October 2011 to October 2014, which included 50 newborns (NB) diagnosed with gastroschisis and transferred for treatment to Neonatal Intensive Centre 2 (CTIN2) of the Children's Institute at Hospital das Clinicas, Faculty of Medicine, University of São Paulo (HCFMUSP). The only exclusion criteria were infants who had other abdominal wall defects.

The following data were collected from patient records: maternal parameters (age, parity, prenatal diagnosis during prenatal care, gestational age, mode of delivery, use of licit or illicit drugs), newborn parameters (birth weight, Apgar score, gender, intestinal malformations and extraintestinal problems, hospital stay and mortality) and surgical treatment (time from birth to the initial surgical approach, the technique used and the number of reoperations).

The criteria for GS classification was done according to its complexity based on the presence of associated bowel abnormalities, inability to perform primary total surgical reduction and the necessity for reoperation. Thus, the patients were classified into non-complex and complex GS. Enteral nutrition was considered when it occurred by an orogastric or oral probe during at least 24 hours. Regarding the definition of infection, this group included all patients with a clinical status, as defined by the Surviving Sepsis Campaign 14 after the first 72 hours of life, who presented or not a positive culture in sterile secretions. Infection associated with catheter use was considered when infectious agent was identified in central and peripheral culture. Hyponatraemia was defined as serum sodium <135 mEq/L and hypoalbuminaemia as serum albumin < 3 g/dL. No patient received diuretics during the assessment period.

The NB data were recorded using a specific data collection form and compiled in a spreadsheet using the GraphPad statistical package Prism version 6.0c (GraphPad Software, La Jolla, California, United States). The qualitative variables were analysed by calculating the absolute and relative frequencies, while the described quantitative variables were analysed by calculating the median and the minimum and maximum values. The Mann-Whitney test was used to compare the median data between groups, while for the comparative analysis of the medians of more than two groups used the Kruskal-Wallis test with Dunn's post-test. The tests were performed with a confidence interval limits of 95% and a p-value < 0.05 was considered significant.

RESULTS

During the three years of the research, 50 NB were admitted to the CTIN2 diagnosed with gastroschisis (GS) (Table 1). There was no difference in relation to female (26 cases) and male (24 cases) gender. Gestational age and the average weight at birth was 36 1/7 weeks and 2309 g, respectively. In the group of mothers, six (12%) had a diagnosis of foetal malformation just after delivery, although all had received prenatal care. The total of 43 pregnant women (86%) underwent caesarean delivery and 77% were pregnant for the first time with an average age of 20.8 years.

The median age of the NB upon hospital admission for surgical correction was 2 hours, with a maximum of 6 days. According to the charts, none of the patients

Table 1: Demographic characteristics of the 50 patients diagnosed with gastroschisis

		General
Maternal age (years)		20.8 (13-33)
Prenatal care		50 (100%)
Parity		
	Prim gravida	37 (77%)
	Multiparous	11 (23%)
Prenatal diagnosis		44 (88%
Birth type		
	Vaginal	7 (14%)
	Caesarean	43 (86%)
Gender		
	Female	26 (52%)
	Male	24 (48%)
Gestational age (weeks)		
	Median (Minimum – Maximum)	36 1/7 (30 1/7 – 39 3/7)
Birth weight (grams)		
	Median (Minimum – Maximum)	2309 (1485-3710)
Extra intestinal associated anomalies		9 (18%)
	Cardiac (interatrial communication)	4
	Cryptorchidic	2
	Arthrogryposis	1
	Unique kidney	1
	Pseudointestinal obstruction	1
Intestinal anomalies		12 (24%)
	Lesion (ischaemia; perforation)	9
	Intestinal atresia (ileal or colonic)	3
Surgery duration (hours)		
	Median (Minimum – Maximum)	2 (1-144)
Type of surgical approach		
	Primary closure	43 (86%)
	Silo	7 (14%)
Concomitant interventions (resection, anastomosis)	9 (18%)	
Number of surgical approaches		19 (38%)
	'One	13 (68.4%)
	Two or more	6 (31.5%)
Hospitalisation time (days)		
	Median (Minimum – Maximum)	33 (0-167)
	Simple gastroschisis (n = 30)	
	Median (Minimum – Maximum)	29 (17-30)
	Complex gastroschisis (n = 20)	
	Median (Minimum – Maximum)	64 (0-167)
Outcome	Mortality (n = 7)	
	Survival	14%
	(n = 41)	82%
	Hospitalisation (n = 2)	4%

presented with perinatal asphyxia based on the Apgar score. Of the 50 patients, 86% were submitted to primary correction of the defect in the abdominal wall, while 14% opted for initial use of a silo due to ventilatory and haemodynamic instability observed during the primary reduction of intestinal loops. The silo is a silicone bag, which protects the intestinal loops that after the surgery were still externalised from the abdomen, due to the impossibility of placing the intestinal contents inside immediately, or because the child presented hemodynamic instability. There was an association with other malformations in 24% of NB and there was the need for an additional surgical approach in 19 patients due to bowel obstruction, perforation, volvulus or closure of the abdominal wall with removal of the previously used silo.

General mortality observed was 14.5% (seven patients). The median length of stay of patients receiving hospital discharge was 33 days (maximum of 140 days and a minimum of 17 days), and was longer (median 56 days, maximum 140 days and minimum 24 days) in those with complex GS (multiple surgical approaches or with an associated intestinal anomaly). Table 2 shows the characteristics of the NB who died during hospitalisation.

Table 2: Demographic characteristics of seven patients diagnosed with gastroschisis who died during hospitalization

		Deaths
Maternal age (years)		19 (16-26)
Prenatal care		7 (100%)
Parity		
	Primi gravida	6 (85.7%)
	Multiparous	1 (14.3%)
Prenatal diagnosis		
Birth type		
	Vaginal	2 (28,6%)
	Caesarean	5 (71.4%)
Gender		
	Female	4 (57.1%)
	Male	3 (42.9%)
Gestational age (weeks)		
	Median (Minimum – Maximum)	35 (30-39)
Birth weight (grams)		
	Median (Minimum – Maximum)	2240 (1550-277)
Extra intestinal associated anomalies		0
	Cardiac (Interatrial communication)	
	Cryptorchidic	
	Arthrogryposis	
	Unique kidney	
	Pseudo intestinal obstruction	
Intestinal anomalies		6 (85.7%)
	Lesion (ischaemia; perforation)	3
	Intestinal atresia (ileal or colonic)	3
Surgery duration (hours)		
	Median (Minimum – Maximum)	6 (1-144)
Type of surgical approach		
	Primary closure	4 (57.1%)
	Silo	3 (42.9%)
Concomitant interventions (resection, anastomosis)		6 (85.7%)
Hospitalization time (days)		
	Median (Minimum – Maximum)	51 (0-167)

The deceased patients showed a higher prevalence of intestinal anomalies and a consequent need for concomitant interventions in the first surgical approach, in addition to longer hospitalisation.

Renal adaptation

The general evolution of the urine output in patients submitted to surgical correction is shown in Table 3. Although all patients achieved effective urine output within

Table 3. Newborn diuresis evolution in the GS postoperative period

Time	Diuresis (mL/kg/h) Median (Minimum – Maximum)	Oligoanuria
6 hours	0.3 (0-4.7)	n=19
12 hours	1.6 (0-4)	n=11
24 hours	1.9 (0-6.9)	n=5
36 hours	2.7 (0.5-8.5)	n=5
48 hours	3.5 (1.1-11.5)	n=0

48 hours post-op, five patients (12.5%) remained oliguric following 36 hours of evolution.

Of all patients, 35 (70%) presented hyponatraemia with serum sodium levels varying between 110 and 133 mEq/L; 20 (57%) presented with oliguria (urinary debit < -1.0 0.5 mL/kg/hour) or oligoanuria. Only three NB did not evolve with changing serum sodium and urine output (diuresis). Natraemia normalisation occurred after the fifth day of evolution in all patients. There were no differences regarding natraemia and fasting time (p = 0.79). The newborns at term received during the first and second day 80 mL/kg/weight water volume, i.e. 20 mL

more than normally prescribed on these days for newborns at term, while the pre-terms received 90 mL/kg due to the big insensitive loss that occurs in these NB, due to externalisation of the handles in the abdominal cavity. In the first 48 hours of life, infants did not receive electrolytes, and after surgery, the fluids and electrolytes provided depended on the water-electrolyte balance of each patient.

Regarding the dosage of serum albumin, this was provided at a median of 2.4 g/dL (minimum 1 g/dL and maximum 3.6 g/dL).

Nutrition

All patients started PPN on the first day of life. The PPN composition was customised according to the needs of the patient considering gestational age and post-surgical stress. The lipid portion was composed of a lipid emulsion up to 20% with medium chain triglycerides (MCT) or 20% lipid emulsion of MTC and oils of soy, olive and fish (MTC/olive/soy/fish 20%), following established practice in the service during the period of hospitalisation of the patient. This customised solution provided the maximum supply of amino acids, and on the third day of life, the individual tolerance was evaluated based on laboratory tests of kidney function and the intensity of cholestasis according to the dosage of copathological correlation and liver enzymes of the NB (Table 4).

The analysis of patients with regard to nutritional development and the type of GS (simple or complex) showed that there was no difference between the registered weight at birth and the beginning of an enteral diet. Although the weight was 1.5 times higher in patients with complex GS in the case outcome, weight gain per day of hospitalisation was significantly higher in patients with simple GS (p = 0.023). This weight gain was similar during the usage of PNN in two groups, and was significantly higher in patients with simple GS after the introduction of an enteral diet (p = 0.0046). Greater height gain was found at hospital discharge in patients with simple compared to GS with complex GS (p = 0.014) (Table 4).

In relation to the diagnosis of cholestasis, this was observed 2.4 times more frequently in patients with complex GS when compared to patients with simple GS. Regardless of the presence of cholestasis, there was an increase in the dosage of serum GS in patients with complex GS (p = 0.0013) (Table 4).

Table 4: Nutritional condition of 50 patients with GS (Mann-Whitney test)

	Simple GS (n = 29) Median (Minimum – Maximum)	Complex GS (n=21) Median (Minimum – Maximum)	P
Fasting total time (days)	19 (10-49)	38 (14-81)	0.0002*
Weight (grams)			
Birth	2380 (1570-3710)	2240 (1485-2990)	0.56
Beginning of enteral diet	2678 (1980-4175)	3090 (1980-4480)	0.077
Outcome	3010 (2140-4250)	2240 (1485-2990)	0.56
Time to reach full die (days)	5.5 (3-25)	6 (3-118)	0.37
PPN 20%	4 (13.8%)	2 (9.5%)	-
IL 20% com MCT	**9 (31%)**	**4 (19%)**	
MCT/soya/olive/fish	16 (55.2%)	14 (66.7%)	
20%	0	1 (4.8%)	
PPN absence			
PPN time (days)	23 (13-67)	45 (20-171)	0.0002*
Ponderable gain (g/day)			
Exclusive PPN	18 (1-42)	17 (6-26)	0,76
Enteral diet	28 (8-58)	17 (4-42)5	0.0046*
During hospitalisation	22 (8-38)	16 (8-27)	0.023
Length (cm/week)	3.9 (0.6-7.8)	2.8 (1.3-4.8)	0.014*
Cholestasis	9 (31%)	16 (76%)	0.0004*
GGT (U/L)	161.5 (104-651)	622 (53-1875)	0.0013*
AP (U/L)	454 (178-640)	538 (220-957)	0.18

* p < 0.05; GS = gastroschisis; PPN = prolonged parenteral nutrition; IL = intralipids; MCT = medium chain triglycerides; GGT = gamma glutamyl transferase; AP = alkaline phosphatase.

Infection

There was a 58% frequency of late sepsis (29 cases) among the 50 NB with simple and complex GS; 37.9% (11 cases) of infections were associated with the use of CVC. Patients who presented late sepsis did not differ regarding the gestational age, sex, weight or time elapsed before the initial surgical approach when compared to patients who showed no infection (Table 5).

The time of hospitalisation and invasive mechanical ventilation was higher in those patients who had complex GS and who required more than one surgical approach (p < 0.0001). As expected, the use of blood products in those patients was higher, except for the use of fresh plasma, which was similar in the three groups (p = 0.12) (Table 5).

Of the patients without infection, three underwent an additional surgery 4, 6 and 18 days later to remove the silo in the first two cases and due to a late resection for jejunal atresia in the third patient. The length of stay was 44, 43 and 44 days, respectively (Table 5).

Table 5: Late-onset sepsis in 50 newborns with GS (multivariate analysis - ANOVA)

	Non-sepsis (n = 21)	With sepsis (n=29, 58%) Simple GS (n = 11)	Complex GS (n = 18)	p
Hospitalisation time (days) Median (Minimum – Maximum)	29 (17-44)	34 (25-68)	59 (24-167)	0.0027*
Surgical reproaches (%)	3 (14.3%)	2 (18.2%)	14 (77.8%)	<0.0001*
Positive culture	-	11 (100%)	14 (77,8%)	0.99
Gram positive				
Gram negative	6 (54.5%)	6 (42.8%)		
Negative culture		0	14 (77.8%)	
CVC associated infection	-	5 (45.4%)	6 (33.3%)	0.45
Time until surgery (hours) 'Median (Minimum – Maximum)	2 (1-9)	1 (1-48)	3 (1-144)	0.48
GA (weeks) Median	36 5/7	36 6/7	36 1/7	0.67
Birth weight (grams) Median	2450	2310	2093	0.25
Gender Male	12 (57.1%)	5 (45.4%)	7 (38.9%)	0.52
Female	9 (42.9%)	6 (54.6%)	11 (61.1%)	
Mechanical ventilation time (days) Median (Minimum – Maximum)	0 (0-18)	1 (0-56)	4 (0-29)	0.015*
Blood products				
Red blood cells	*1.05/patient*	2.7/patient	3.9/patient	0.0001*
Fresh plasma	0.19/patient	1.1/patient	1.6/patient	0.12
Platelets	0	3.2/patient	1.7/patient	0.002*
Albumin	3.1/patient	4.6/patient	6.7/patient	0.03*
Death	1 (0.05%)	1 (9%)	5 (27.8%)	0.066

GS = gastroschisis; CVC= central venous catheter; GA = gestational age; *p < 0.05;

■ DISCUSSION

The experience of the Neonatology Service of reference in Latin America in the clinical management of patients with gastroschisis emphasises three challenging medical conditions to the neonatal intensive care specialist physician: renal adaptation, nutrition and infection.

Several clinical papers[5-8] show that the prevalence of GS has increased significantly in recent years throughout the world, i.e. by 67% in two years. This fact, coupled with a usually prolonged hospitalisation, has led to a high burden on the public health service regarding the care of these patients.

The general mortality of 14% observed in this study is higher than that described in the literature, probably because of the complexity of the patients due to the high prevalence of intestinal anomalies and multiple surgical interventions (24% and 38% of cases, respectively). In relation to maternal age, we observed the same trend described in the literature, i.e. an association between malformation and young mothers. Among all mothers, only 36% were older than 21 years of age.

One factor to be considered concerns the delivery route chosen for patients with this type of malformation. We observed that, unlike the practice adopted in other countries, where vaginal birth is chosen regardless of malformation, surgical birth was preponderant in our series (86% of cases) as it offered better initial surgical treatment and optimised management.

Term newborns delivered vaginally were transferred from another hospital in 71% of cases. Only one NB (14%) showed no drilling, ischemia or necrosis of handles that culminated with extensive bowel resection and short bowel syndrome, which shows a lack of preparation in the initial care in the delivery room and neonatal transport.

In relation to hydroelectrolytic and renal adaptation, some studies have shown that the monitoring of intraoperative intra-abdominal pressure confers benefits to patients because it added a given goal facing the decision of primary surgical correction or interposition of silo, until better accommodation of the intestinal loops could be achieved[15,16]. In the cases presented in this study, intraoperative hemodynamic instability and post-surgical urinary flow recovery were used to inform this decision.

The evaluation of renal function by urine output during the first 48 hours of life is inaccurate, since oliguria (< 0.5-1.0 mL/kg/hour) may be caused by oligoanuria

in the postnatal period and secondary hypovolemia/prerenal insufficiency to big insensitive loss caused by exteriorisation of the intestinal loops and a decrease in renal perfusion pressure caused by the sudden and inevitable rise in intra-abdominal pressure in the immediate postoperative period[17,18].

Although all patients in the study recovered urine output within 48 hours after surgery, the concern in this period is to the need to recover renal function, with the preferable treatment by volume expansion with colloid solution (20% human albumin diluted in half with 5% dextrose) in 98% of patients. Despite the water restriction adopted, the development of hyponatraemia was observed in 70% of cases, which is associated with increased morbidity and mortality in the literature.

Nutrition is one of the biggest challenges in the management of patients with GS. The time to restore intestinal transit varies, especially in association with intestinal atresia, ischemic injury or extensive surgical resection. The fasting time for patients with simple GS in our series (median 19 days) was similar to that found in the literature, with weight gain during PPN similar to that expected in eutrophic patients on enteral nutrition (22 g/kg/day).

PPN in these children is a challenge, not only due to the difficulties associated with hydroelectrolytic and glucose control, but also due to the association between prolonged fasting and frequent episodes of bacterial sepsis, causing almost always a cholestasis associated to parenteral nutrition (CANP) framework, characterised by increased direct bilirubin and liver enzymes. The severity and progression of this case often affects the maintenance of PPN or even makes it unfeasible since the proposed treatment is a reduction of amino acids and lipid emulsion, resulting in an unsatisfactory supply of nutrients for proper growth[19,20].

The recent introduction of a 20% lipid emulsion with fish oil (omega-3) brought a better outlook in the control of CANP[19]. The replacement of the 20% lipid emulsion (20% Lipid® SMOF), consisting of fish and olive oils as well as long chain triglycerides (TCM/TCL) increased direct bilirubin and liver enzymes. A decrease in these indicators allows for the maintenance of adequate protein-calorie offering PPN and satisfactory weight gain[19-21].

It was found in experimental studies of rabbit foetuses with induced GS that a reduction occurred in the absorption of amino acids and glucose compared to the control group, along with a decrease in the expression of genes involved in the absorption of nutrients in enterocytes[21,22]. In the patients in our study, refeeding was hampered by intestinal dysmotility with frequent episodes of vomiting and abdominal distension. Slow introduction in small volumes of formulae based on protein hydrolysates was used in most cases. However, the requirement of human milk, when possible, has better indication.

Sepsis is a major cause of morbidity and mortality in NBs, despite advances in intensive care[23,24]. It is believed that the severity of the clinical evolution of sepsis is due to several factors, such as prematurity and varying degrees of deficiencies in the innate and adaptive immune responses[25-27], which affect the interaction between the host and the infectious agent with, consequently, an impact on the cascade of events comprising the immune response.

Despite this greater susceptibility of NB to infectious conditions, it has been observed that, in patients with GS, other predisposing factors also contribute, such as exposure of the viscera to the external environment, prolonged fasting with a greater possibility of bacterial translocation, the need for long-term venous access for PPN and surgical approaches with the possibility of intestinal handling.

A study by Baird et al.[28] showed surgical wound infection in 12.6% of cases and infection associated with CVC in 14.9%, particularly with coagulase-negative staphylococci. Still, the authors demonstrated the importance of early closure of the abdominal wall and infectious complications. A high frequency of late sepsis (58%) was observed in the present study; 37.9% of infections were associated with the use of CVC. Despite the wide availability of using peripherally inserted central catheters in routine service (86% of patients) and their association with lower rates of infection in the literature, the high rate of infection associated with venous catheters observed in our study raises an alert regarding the care and guidance of antimicrobial therapy, as 72.7% of these infections were related to Staphylococcus epidermidis.

Success in the treatment of gastroschisis depends on the joint efforts of a highly trained multidisciplinary health care team and the development and implementation of a proper care protocol at each institution, taking into account the clinical surgical complications of this complex neonatal pathology.

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Resumo

Introdução: As malformações congênitas fazem parte das principais doenças observadas ao nascimento. Entre as causas de óbito no período neonatal as malformações foram a segunda causa, sendo ainda a primeira, a prematuridade.

Objetivos: Caracterizar a evolução clínica dos recém-nascidos (RN) com gastrosquise (GTQ) em uma unidade de terapia intensiva neonatal e descrever as morbidades renal, nutricional e infecciosa relacionados ao manejo clínico pós-natal na unidade de terapia intensiva neonatal.

Método: Foi realizado estudo observacional retrospectivo em 50 RN com GTQ, utilizando a associação de anormalidades intestinais, impossibilidade de fechamento primário do defeito abdominal e necessidade de reoperação como critérios de classificação para a doença. O nível de significância foi p < 0,05.

Resultados: A admissão hospitalar para cirurgia primária ocorreu com mediana de idade de 2 horas. O total de 14% das crianças foram submetidas a uma interposição de silo primária e 24% apresentaram malformação intestinal associada. Dezenove RN necessitaram mais de uma intervenção cirúrgica. A mediana do tempo de estadia foi de 33 dias, sendo maior nos pacientes com GTQ complexa (56 dias). Todos os RN recuperaram o débito urinário a partir de 48 horas do pós-operatório e 40% apresentaram hiponatremia e oligoanúria nesse período. Não houve diferença entre a natremia e o tempo de jejum (p = 0,79). O ganho ponderal foi similar em ambos os grupos com nutrição parenteral total e tornou-se significativamente maior nos pacientes com GTQ simples após a alimentação enteral (p = 0,0046). Esses RN evoluíram 2,4 vezes com menos colestase. Sepse tardia ocorreu em 58% dos pacientes e foi relacionada à infecção do CVC em 37,9% dos casos. A mortalidade foi maior nos RN infectados com GTQ complexa e a taxa global de mortalidade foi de 14%.

Conclusão: A caracterização clínica dos RN com GTG depende da complexidade e do conhecimento e condução das morbidades para diminuir a mortalidade.

Palavras-chave: gastrosquise, recém-nascido, mortalidade, nutrição parenteral total, insuficiência renal, infecção.