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Original Article

Outcomes of Management of Congenital Abdominal Wall Defect at Chiang Mai University Hospital: A 5-Year Review

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Abstract

Background: **Omphalocele and gastroschisis are the two most common congenital malformations of the abdominal wall. The goal of surgery is to accomplish abdominal wall closure in a single stage, although a number of options exist when this is not possible.**

Method: **A retrospective study of patients with gastroschisis and omphalocele treated at Chiang Mai University Hospital between January 2006 and September 2011 was performed. Perinatal data and long term outcomes were collected.**

Result: **Medical records of 95 infants with gastroschisis and 23 infants with omphalocele were reviewed. Prenatal diagnosis was made in 42/95 infants (44%) in the gastroschisis group, and 15/23 infants (65%) in the omphalocele group. Associated anomalies were seen in 26/95 infants (27%) in the gastroschisis and in 18/23 infants (78%) in the omphalocele groups. In infants with gastroschisis, primary fascial closure could be performed in 65/95 (68%), with the advantages of a short-duration total parenteral nutrition, shorter hospital stay, and lower complication rates. In infants with omphalocele, abdominal wall closure was done in 10/23 (43%), with the advantages of shorter hospital stay and lower incidence of ventral hernia. The survival probability at 1 to 2 years was 92% in the gastroschisis and 87% in the omphalocele groups. Most of these infants had normal long term growth and development.**

Conclusion: **Primary fascial closure can usually be achieved in gastroschisis, and to a lower extent, in omphalocoele, with clear advantages. Long-term outcomes were favorable in most cases.**

Keywords: **Gastroschisis, omphalocele, abdominal wall defect**

Introduction

The two most common congenital abdominal wall abnormalities are omphalocele and gastroschisis. The location and the presence or absence of a covering sac are the main differences between the two conditions. Omphalocele is a prolapse of intraabdominal organs into the umbilical cord region covered by a membranous sac. The three layers of the sac consist of peritoneum, Wharton's jelly and amnion. At 12 weeks of gestation, the body folds failed to form the abdominal wall. Common defects are at the lateral folds[1]. Due to the covering sac, the intestines are well protected

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resulting in normal morphology and function. This developmental defect occurs early in embryogenesis so other organs might be affected as well. Associated anomalies are seen in about 60% of omphalocele patients. Chromosomal abnormalities are also frequently found[2].

Gastroschisis is a defect in the abdominal wall without a membranous sac coverage. Many theories were proposed to explain the occurrence of the gastroschisis. Failure of the umbilical coelom to form is one theory. The elongation of the embryonic intestine stretching the body wall causing rupture at the weakest point on the right side of the umbilicus during the early resorption of the right umbilical vein is another theory. The defect is usually located on the right side of the umbilicus. The intestines float into the amniotic fluid resulting in intestinal inflammation and edema. Delayed gastrointestinal function may occur after birth[3].

Postnatal management of large omphaloceles or those with other life threatening anomalies is usually dressing the sac with an aseptic solution. Commonly used solutions in the past included mercurochrome, alcohol, and silver nitrate, which were effective but toxic escharizing agents. More recently silver sulfadiazine, povidone iodine solution, silver-impregnated dressings, neomycin, and polymixin/bacitracin ointments have been used. Granulation tissue will form beneath a protective eschar. A gradual process of epithelization from the borders of the defect takes place over a period of weeks and months. Small sac, or ruptured omphaloceles are treated by primary closure of the musculofascial defect or skin flap closure alone. The degree of visceroabdominal disproportion is used to determine the size of an omphalocele.

In gastroschisis, the goal of treatment is to return the visceral organ into the abdominal cavity. The surgical closure consists of either primary fascial closure, skin closure or staged closure. The choice of treatment options depends on the degree of visceroabdominal disproportion, swelling of bowel, airway compromise, and abdominal pressure after reduction of organs[4].

In the past most infants with congenital anterior abdominal wall defects died due to concomittent anomalies and complications of treatment. But recent developments in prenatal diagnosis and treatment have resulted in decreased morbidity and mortality. The aim of the present study is to present the results of treatment of these two congenital abdominal wall defects at Chiang Mai University Hospital, focusing on perinatal and neonatal morbidity and mortality, associated anomalies, complications, and outcomes.

Methods

This is a retrospective study of newborns with omphalocele and gastroschisis (ICD-10 codes Q79.2 and Q79.3) treated at Chiang Mai University Hospital between January 2006 and September 2011. The collected data included prenatal diagnosis, gestational age, mode of delivery, birth weight, associated malformations, treatment, complication, hospital stay and longterm outcomes.

Omphalocele was defined as an abdominal wall defect with a sac covering the visceral organ. Gastroschisis was defined as an abdominal wall defect without a sac and with visceral organs protruding through the defect. Prematurity was defined as delivery at less than 37 weeks of gestational age. Very low birth weight (VLBW) was defined as a birth weight less than 1,500 grams, Low birth weight (LBW) was defined as a birth weight less than 2,500 grams.

All statistical analyses were performed using STATA 11.0 (StataCorp LP, College Station, TX, USA). Comparison of quantitative data between two groups was performed using Student's *t* test and summarized using mean and SD, or compared using Wilcoxon rank sum test and summarized using median and interquartile range, as appropriate. Comparison of categorical data was performed using Fisher's exact test and summarized with counts and percentage. Statistical significance was defined as a *P*-values less than 0.05.

Results

Medical charts of 122 infants with congenital abdominal wall defects were reviewed. Ninety-five infants with gastroschisis, 23 with omphalocele, 3 with cloacalextrophy and 1 with patent omphalo-mesenteric duct were identified. The annual number of patients is shown in Figure 1.

Gastroschisis

Ninety-five infants were diagnosed with

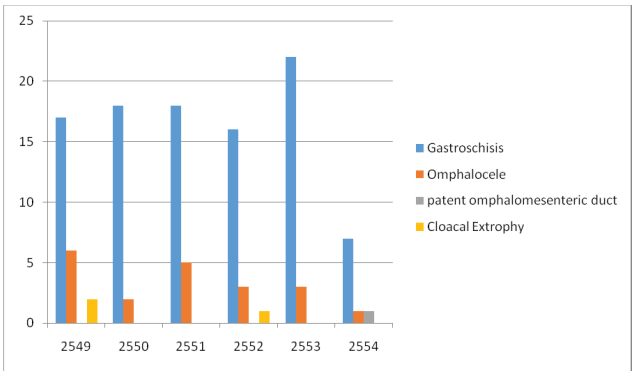

Figure 1 Annual number of patients with congenital abdominal wall defect treated at Chiang Mai University Hospital

gastroschisis, 37 were male and 58 were female. Prenatal diagnosis was made in 42 cases (44%). The average age of the mothers was 21.5 years. Birth was by spontaneous vaginal delivery in 70 cases (74%), and in the rest, by Caesarean section (indications include previous Caesarean section in 32%, fetal distress in 24%, cephalopelvic disproportion in 20%, breech presentation in 16%, and other obstetric indications in 8%, of patients). The average gestational age was 36 weeks, and 47 (49%) infants were prematurely delivered. The average birth weight was 2,276.3 grams (Table 1). Twenty-six infants (27%) had associated malformations (Table 2). Complications and outcomes of treatment of newborns with gastroschisis are shown in Tables 3 and 4.

Sixty-five infants with gastroschisis had primary fascial closure. The remaining 30 (32%) were treated with staged closure due to visceroabdominal disproportion. The staged closure group comprised 7 cases (7%) of skin flap closure, 20 cases (21%) of silo placement, and 3 cases (3%) of mesh graft repair. Characteristics of patients who were treated with fascial closure and staged closure are shown in Table 5. The average defect size of the fascial closure group was less than that of the staged closure group. The median hospital stay is significantly longer in the staged closure group. The median duration of total parenteral nutrition (TPN) was significantly less in the fascial closure group. Bowel obstruction, wound infection, and ventral hernia was found more often in the staged closure group.

The median follow up time for patient with gastroschisis was 32 months, and 8 cases (8%) died during hospitalization. Causes of death included sepsis, respiratory failure and underlying brain anomaly. Seven patients (7%) were reported as having short bowel syndrome, and 31 patients (36%) had delayed growth according to the Thai standard curve of growth for Thai children. In addition, 6 patients (7%) had delayed development.

Table 1 Characteristicsof infantswith gastroschisis (N=95) or omphalocele (N=23)

Characteristics	Gastroschisis N (%)	Omphalocele N (%)	*P*-Value
Female	58 (61)	6 (26)	0.004
Prenatal diagnosis	42 (44)	15 (65)	0.103
Average maternal age (years)*	21.5 ± 5.0	27.4 ± 5.3	< 0.001*
Mode of delivery			
Normal labor	70 (74)	12 (65)	0.444
Cesarean section	25 (26)	8 (35)	
Prematurity	47 (50)	6 (26)	0.060
Average gestational age (weeks)*	36.0 ± 2.2	37.3 ± 2.1	0.20*
Average birth weight (grams)*			
Birth weight category	2,276.3 ± 510.4	2,763.3 ± 501.7	<0.001*
Very low birth weight	6 (6)	0	0.014
Low birth weight	59 (62)	8 (35)	
Normal birth weight	30 (32)	15 (65)	
Average size of defect (cm)*	3.1 ± 1.1	7.7 ± 3.1	<0.001*

*Mean ± standard deviation, *p*-value from Student's *t*-test

Table 2 Anomalies associated with gastroschisis (N=26) or omphalocele (N =18)

Associated Anomaly	Gastroschisis N (%)	Omphalocele N (%)	*P*-Value
Bowel atresia	5 (5)	1 (4)	0.999
Anorectal malformation	0	1 (4)	0.195
Cardiovascular system	9 (10)	7 (30)	0.015
Patent foramen ovale	3 (3)	1 (4)	0.999
Patent ductus arteriosus	5 (5)	3 (13)	
Atrial septum defect	5 (5)	4 (17)	
Ventricular Septum Defect	2 (2)	0	
Tetralogy of fallot	0	1 (4)	
Pulmonic valve stenosis or atresia	3 (3)	0	
Neurological anomaly	6 (6)	2 (9)	0.653
Meningomyelocele	1 (1)	0	0.999
Genitourinary tract	4 (4)	4 (17)	0.046
Undescended testis	2 (2)	1 (4)	0.999
Ambiguous genitalia	0	1 (4)	
Others	2 (2)	2 (9)	
Skeletal anomaly	5 (5)	2 (9)	0.621
Diaphragmatic hernia	0	1 (4)	0.999
Indirect inguinal hernia	3 (3)	6 (26)	0.002

Table 3 Perioperative and postoperative complications for infants with gastroschisis (N=95) or omphalocele (N=23)

Complications	Gastroschisis N (%)	Omphalocele N (%)	*P*-value
Bowel perforation	2 (2)	2 (9)	0.170
Bowel gangrene	2 (2)	0	0.999
Bowel obstruction	6 (6)	4 (17)	0.103
Necrotizing enterocolitis	4 (4)	0	0.999
Enterocutaneous fistula	7 (7)	1 (4)	0.999
Intra-abdominal collection	3 (3)	1 (4)	0.999
Gastroparesis	11 (12)	4 (17)	0.488
Wound infection	14 (15)	6 (26)	0.219
Wound evisceration	5 (5)	1 (4)	0.999
Pneumonia	4 (4)	0	0.999
Respiratory failure	14 (15)	5 (22)	0.526
TPN cholestasis	21 (22)	2 (9)	0.239
Sepsis	24 (25)	5 (22)	0.999
Liver failure	3 (3)	0	0.999
Hypothyroid	1 (1)	1 (4)	0.353

Omphalocele

Twenty-three babies were diagnosed with omphalocele, including 17 males and 6 females. A prenatal diagnosis was made in 15 cases (65%). The average age of the mothers was 27.4 years. Fifteen infants (65%) were born by spontaneous vaginal delivery. Caesarean section was done in 8 cases (35%), resulting from multiple indications (previous caesarean section in 38%, fetal distress in 25%, cephalo-pelvic disproportion in 13%, and other obstetric indications in 25% of cases). The average gestational age was 37 weeks, with an average birth weight of 2,763.3 grams as

Table 4 Outcome and follow-up for infants with gastroschisis (N=95) or omphalocele (N=23)

Outcome	Gastroschisis N (%)	Omphalocele N (%)	*P*-value
Death	8 (8)	3 (13)	0.446
Sepsis with multiorgan failure	4 (4)	1 (4)	
Respiratory failure	2 (2)	2 (9)	
Brain anomaly	1 (1)	0	
Other causes	1 (1)	1 (4)	
Hospital stay (days)[#]	35 (23-54)	46 (30-83)	0.154[#]
Duration of TPN (days)[#]	50 (20-36)	15 (6-35)	0.259[#]
Median follow up time (months)[#]	32 (14-50)	40 (23-61)	0.109[#]
Short bowel syndrome	7 (7)	0	0.999
Abnormal growth	31 (36)	10 (50)	0.310
Abnormal development	6 (7)	3 (15)	0.366
Repair ventral hernia	20 (21)	17 (74)	<0.001

[#]Median (interquartile range), *p*-value from Wilcoxon rank sum test

Table 5 Characteristics of infants with gastroschisis undergoing primary fascial closure (N=65) or staged closure (N=30)

Characteristic	Primary fascial closure N (%)	Staged closure N (%)	*P*-Value
Average birth weight (grams)*	2,298.42 ± 504.6	2,228.36 ± 528.4	0.537*
Average size of defect (cm)*	2.9 ± 0.9	3.7 ± 1.2	0.001*
Associated anomalies			
Cardiovascular system	6 (9)	3(10)	0.999
Bowel atresia	3 (5)	2 (7)	0.649
Place of birth			
Chiang Mai University Hospital	19 (29)	4 (13)	0.124
Other hospitals (referred)	46 (71)	26 (87)	
Hospital stay (days)[#]	30 (22-45)	44.5 (31-88)	0.005[#]
Duration ofTPN (days)[#]	17 (11-26)	26 (20-55)	0.003[#]
TPN cholestasis	13 (20)	8 (27)	0.595
Gastroparesis	6 (9)	5 (17)	0.315
Bowel obstruction	1 (2)	5 (17)	0.011
Necrotizing enterocolitis	3 (5)	1 (3)	0.999
Enterocutaneous fistula	4 (6)	3 (10)	0.675
Intraabdominal infection	1 (2)	2 (7)	0.234
Wound infection	6 (9)	8 (27)	0.034
Wound evisceration	3 (5)	2 (7)	0.649
Systemic infection	16 (25)	8 (27)	0.806
Presenting ventral hernia	7 (11)	13 (43)	<0.001
Death	4 (6)	4 (13)	0.257

*Mean ± standard deviation, *p*-value from Student's t-test; [#]Median (interquartile range), *p*-value from Wilcoxon rank sum test; cm = centimeter; TPN = total parenteral nutrition

Table 6 Characteristics of infants with Omphalocele who underwent dressing sac (N=13) or primary abdominal wall closure (N=5)

Characteristics	Dressing sac N (%)	Abdominal wall closure N (%)	*P*-Value
Average birth weight (grams)*	2,957.7 ± 471.6	2,604.0 ± 269.0	0.196*
Average size of defect (cm)*	8.7 ± 2.6	7.4 ± 3.6	0.402*
Associate anomalies			
Cardiovascular system	5 (38.5)	2 (40.0)	1.000
Anorectal malformation	0	1 (20.0)	0.278
Hospital stay (days)#	46 (37-83)	30 (23-54)	0.460#
Duration ofTPN (days)#	7 (4-25)	15 (13-31)	0.300#
TPN cholestasis	1 (8)	1 (20)	0.490
Gastroparesis	2 (15)	1 (20)	0.999
Bowel obstruction	2 (15)	2 (40)	0.533
Enterocutaneous fistula	0	1 (20)	0.278
Intraabdominal infection	0	1 (20)	0.278
Wound infection	4 (31)	1 (20)	0.999
Wound evisceration	1 (8)	0	0.999
Systemic infection	2 (15)	1 (20)	0.999
Ventral hernia	13 (100)	3 (60)	0.065
Hypothyroid	1 (8)	0	0.999
Death	1 (8)	0	0.999

*Mean ± standard deviation, *p*-value from Student's *t*-test; #Median (interquartile range), *p*-value from Wilcoxon rank sum test; cm = centimeter; TPN = total parenteral nutrition

shown in Table 1. Eighteen infants (78%) had associated malformations, as shown in Table 2. Complications and outcomes of treatment of newborn with omphalocele are shown in Tables 3 and 4.

There were five infants with omphalocele with ruptured sac at presentation, who underwent surgical management. Eighteen infants without rupture were treated either with dressings (13 cases), or abdominal wall closure (5 cases). The choice of treatment depended on the degree of visceroabdominal disproportion, which was determined by surgeon. Characteristics of infants treated with either dressings or abdominal wall closure are shown in Table 6.

The median follow up time of patients with omphalocele was 40 months. Three infants (13%) died during hospitalization. The cause of death included sepsis, respiratory failure, and underlying associated anomalies. Ten infants (50%) had delayed growth according to the standard curve of growth of Thai children, and 3 patients (15%) had delayed development. No patient had gastrointestinal problems.

Discussion

Congenital abdominal wall defects could be prenatally diagnosed in 75 to 80% of cases[5]. Gastroschisis and omphalocele are the two most common defects. Cloacalexstrophy and bladder exstrophy can also be diagnosed prenatally with ultrasonography. In the present study, gastroschisis was detected prenatally in 44% and omphalocele in 65% of cases. This may be due to most of our cases being referred from primary and secondary care hospitals.

The present study found that 50% of neonates with gastroschisis were preterm. Spontaneous preterm delivery in gastroschisis was found more often than in the generalpopulation[6]. In 2009, Maramredd[7] found that sepsis, longer duration to reach full enteral feedings, and longer length of stay were more often seen in preterm neonates with gastroschisis. In 2012, Barseghyan[8] found that a significant number of gastroschisis infants were born spontaneously with gestational age of less than 37 weeks. The cause may be due to fetal distress, the presence of intra-amniotic inflammatory factors and/or the alteration of the

amount of amniotic fluid[6]. The average gestational age in the present series was 36 weeks which was in the range of previous reports[6].

There have been reports regarding the harmful effect of the amniotic fluid. In 2004, Moir[9] proposed a hypothesis that preterm delivery prevents gastrointestinal compromise, facilitates primary fascial closure and improves surgical outcomes. They found that elective preterm delivery improved the surgical outcome with no significant morbidity from prematurity. In 2008, Hadidi[10] concluded that elective cesarean delivery before 36 weeks significantly facilitates earlier enteral feeding and is associated with a higher rate of primary fascial closure. The timing of delivery is still controversial.

For omphalocele the timing of delivery is not controversial. The average gestational age in the present series was 37.3 weeks and only 26% of omphalocele infants were born prematurely. Preterm delivery is not recommended for omphalocele[6]. The present study revealed that more infants with gastroschisis tended to be premature than with omphalocele. The average birth weight in the gastroschisis group was significantly lower than in the omphalocele group (2,276.3 gm vs. 2,763.3 gm, $p < 0.001$). Six cases (6%) of gastroschisis had very low birth weight, which was not found in the omphalocele group.

The optimal mode of delivery of infants, with either gastroschisis or omphalocele, is controversial as well. In the literature, 53% of children with gastroschisis and up to 80% of children with omphalocele were delivered by caesarean section[5]. For gastroschisis, planned cesarean section is advocated in some reports[11]. In 1999, Dunn[12] found that vaginal delivery was associated with more frequent silo staged repair compared with cesarean section. However, Logghe[13] found, in a 2005 randomized controlled trial, that there were no significant increased benefits of elective as compared with spontaneous delivery. It seems that the mode of delivery should be dictated by obstetrical indications. In the present study, most infants with an abdominal defects (72%) were born safely by vaginal delivery.

Both omphalocele and gastroschisis may coexist with other anomalies. In the present study, infants with omphalocele had more associated congenital anomalies than those with gastroschisis (78% vs. 27%). Similarly, in the 2014 Texas Birth Defects Registry[14], 654/814 (80%) of infants with omphalocele and 594/1831 (32%) of those with gastroschisis had associated anomalies.

Because of significant fluid and heat loss, operative repair of abdominal wall defects should be done as soon as possible after birth. The choice of operative procedure depends on the size of the defect, the clinical status of the patient, and the degree of viscero-abdominal disproportion. Gastroschisis patients undergoing primary fascial closure benefitted from a shorter duration of TPN, reduced hospital stay, and the avoidance of any further surgery during admission. They also had fewer bowel obstruction and wound infection episodes, and a lower incidence of ventral hernia compared with those undergoing staged closure. Patients with large omphaloceles would need to undergo delayed operation, cared for in the meanwhile by protecting their sacs with antiseptic solution. If closure is immediately possible, then the advantages included a shorter hospital stay, but this did not reach statistical significance, and a lower incidence of ventral hernia. Perioperative complications did not differ significantly between patients undergoing dressings with delayed operation, and those undergoing immediate abdominal wall closure.

The present study showed that primary fascial closure was successful in 83% (19/23) of gastroschisis patients who were born in Chiang Mai University Hospital, but only 67% (46/72) of referred cases were successfully closed. Prenatal transfer to a medical center

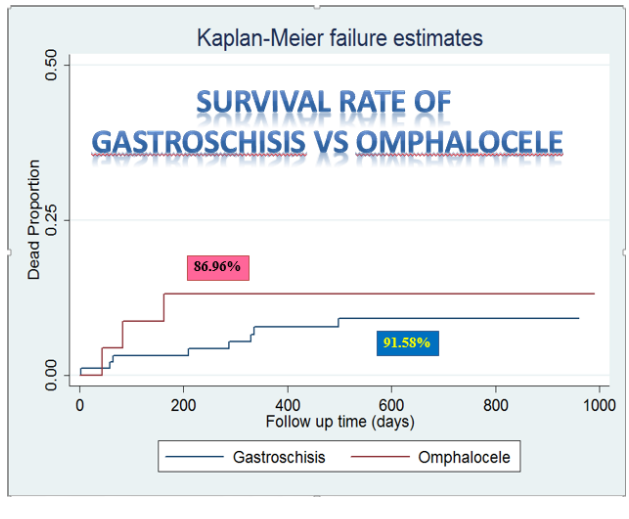

Figure 2 A graph of cumulative incidences of death, with estimates of survival probabilities, of infants with gastroschisis (blue line) or with omphalocele (red line)

with neonatal intensive care and pediatric surgical capabilities is therefore preferable for infants born with abdominal wall defects.

The 2-year survival probabilities were 92% and 87% for infants with gastroschisis and those with omphalocele in the present study, respectively (Figure 2). These numbers were within the range found in other studies. Common causes of death were similar for infants with either gastroschisis or omphalocele, including sepsis with multiorgan and respiratory failure. Only one infant died as a result of an associated anomaly (an infant with gastrochisis and alobar holoprocencephaly).

The median follow-up time was 32 months in patients with gastroschisis and 40 months in those with omphalocele. The majority of patients with gastroschisis achieved normal growth and development, but 36% had delayed growth associated with low to very low birth weight. Approximately half of patients with omphalocele achieved normal development, while the remaining half had delayed growth due to associated heart disease. Short bowel syndrome was found only in patients with gastroschisis, which was associated with bowel atresia and bowel gangrene.

Conclusion

During a five-year period at Chiang Mai University Hospital, more infants with gastroschisis were seen than those with omphalocele. Infants with omphalocele had more associated anomalies, especially cardiovascular anomalies. Primary fascial closure is the preferred treatment for infants with gastroschisis, except when there is evidence of rising intra-abdominal or airway pressure. Repair with artificial silo is advisable for the latter. If a prenatal diagnosis of gastroschisis has been made, transfer of the pregnant woman to a suitable tertiary care center before delivery is recommended, so that optimal care immediately after birth can be provided, increasing the opportunity for primary fascial closure. Silversulfadiazine and Povidone iodine solution can be safely used for dressing the omphalocele sac, with suitable caution. Postoperative gastrointestinal and wound related problems usually resolve with time in the vast majority of patients. Long-term outcome was favorable in most cases.

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บทคัดย่อ

ผลการรักษาภาวะผนังหน้าท้องไม่ปิดแต่กำเนิดในโรงพยาบาลมหาราชนครเชียงใหม่: การศึกษาทบทวน 5 ปี

นันดา โกสลากร, เจษฎา สิงห์เวชสกุล, จิราภรณ์ โกรานา

หน่วยกุมารศัลยศาสตร์, ภาควิชาศัลยศาสตร์, คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่, โรงพยาบาลมหาราชนครเชียงใหม่

ความสำคัญ: ภาวะผนังหน้าท้องไม่ปิดในเด็กแรกเกิดที่พบบ่อยสองภาวะ คือ Omphalocele และ Gastroschisis โดยการรักษาภาวะทั้งสองนั้นมีเป้าหมายในการปิดผนังหน้าท้องให้ได้ในขั้นตอนเดียว แต่ในบางครั้งก็ไม่สามารถทำได้เนื่องจากลำไส้และอวัยวะภายในที่ออกมาเทียบกับช่องท้องมีขนาดที่ไม่พอเหมาะกัน ดังนั้นจึงมีทางเลือกในการรักษาต่าง ๆ ที่สามารถทำให้ปิดผนังหน้าท้องได้ในที่สุด

วิธีการศึกษา: เป็นการศึกษาทบทวนย้อนหลังในผู้ป่วยที่ได้รับการวินิจฉัยว่าเป็น Omphalocele และ Gastroschisis ที่ได้รับการรักษาในโรงพยาบาลมหาราชนครเชียงใหม่ ในระหว่างมกราคม 2549-กันยายน 2554 โดยมีการเก็บข้อมูลต่าง ๆ ของทารกแรกเกิด ทั้งในช่วงก่อนคลอด ระหว่างคลอด และหลังคลอด รวมถึงผลในการรักษาในระยะยาวอีกด้วย

ผลการรักษา: จากการศึกษาพบว่า มีผู้ป่วยที่เป็น Gastroschisis 95 ราย และ Omphalocele 23 ราย โดยผู้ป่วยทั้งสองกลุ่มส่วนหนึ่งได้รับการวินิจฉัยก่อนคลอด โดย Gastroschisis วินิจฉัยได้เป็นจำนวน 42/95 (44%) และ Omphaloceleวินิจฉัยได้ เป็นจำนวน 15/23 (65%) ภาวะผิดปกติร่วมพบได้ 26/95 (27%) ใน Gastroschisis และ 18/23 (78%) ใน Omphalocele ในส่วนของผู้ป่วย Gastroschisis พบว่าสามารถปิดผนังหน้าท้องได้ตั้งแต่แรกคลอด 65/95 (68%) ซึ่งทำให้สามารถลดระยะเวลาในการรับสารอาหารทางหลอดเลือดดำ ลดระยะเวลานอนโรงพยาบาล และลดภาวะแทรกซ้อนต่าง ๆ ได้ ในส่วนของ Omphalocele การปิดหน้าท้องในช่วงแรกเกิดทำได้ 10/23 (44%) ซึ่งช่วยลดระยะเวลาในการนอนโรงพยาบาล และการลดการเกิดไส้เลื่อนผนังหน้าท้อง โอกาสรอดชีวิตของผู้ป่วย Gastroschisis และ Omphalocele คิดเป็น 92% และ 81% ตามลำดับ ทารกส่วนใหญ่มีการเจริญเติบโตและพัฒนาการที่ปกติในการติดตามผลระยะยาว

สรุปผลการรักษา: การปิดผนังหน้าท้องแต่แรกเกิดมักสามารถทำได้ในผู้ป่วย Gastroschisis และหากสามารถวินิจฉัยก่อนคลอดได้ในผู้ป่วยกลุ่มนี้สามารถส่งตัวมารดามาคลอดในสถาบันที่ผ่าตัดรักษาเด็กได้จะทำให้ผลการรักษาดีขึ้น ส่วนใน Omphalocele การใช้ยาทาบริเวณถุงให้มีเนื้อเยื่องอกคลุมสามารถทำได้โดยภาวะแทรกซ้อนต่ำ และสามารถใช้ได้อย่างระมัดระวัง ผลการรักษาในระยะยาวในผู้ป่วยทั้งสองกลุ่มอยู่ในเกณฑ์ดีและมีอัตราการเสียชีวิตต่ำ