

The outcome and analysis of 40 cases of fetal gastroschisis

Naser O. Malas, MD, JBOG, A. S. Al-Ghoweri, MD, JBOG, R. M. Shwyiat, JBOG, ABOG.

ABSTRACT

Objectives: This collaborative retrospective study was undertaken at Royal Medical Services Hospital, Amman, Jordan, between 1993 through to 2000. Its purpose was to assess the difference in terms of morbidity and mortality in neonates with gastroschisis delivered by cesarean section versus vaginal delivery.

Methods: The records of all neonates born with gastroschisis (n=40, 26 females, 14 males) from 1993-2000 were analyzed. The mode of delivery was noted. Those babies delivered by cesarean section (n=22) were labelled group one, while those delivered vaginally (n=18) were labelled group 2. The mean maternal age was 26.45 ± 5.97 and 28.30 ± 4.22 years for groups one and 2 ($P < 0.05$). Statistical analysis was carried out using standard deviation (SD), Fisher's exact test and Mann-Whitney U test.

Results: The mean gestational age at diagnosis was 17.59 ± 1.58 for group one, and 17.95 ± 1.44 weeks for group 2 ($P > 0.05$). The mean gestational age at cesarean section was 36.04 ± 1.02 , and for vaginal delivery, $38.40 \pm$

1.10 ($P > 0.05$). The mean maternal age was 26.45 ± 5.97 for group one, and 28.30 ± 4.22 years for group 2 ($P < 0.05$). The mean birth weight was 2.39 ± 0.39 kg for group one, and 3.10 ± 0.20 for group 2 ($P < 0.05$). Surgical repair was immediate after delivery and the mean neonatal age was 41.04 ± 6.40 minutes for both groups. The mean days of stay at hospital were 24.26 ± 8.75 for group one, and 34.20 ± 7.30 days for group 2 ($P < 0.05$).

Conclusion: Our study demonstrated that complications and morbidity were less in the cesarean section group compared to the vaginal delivery group. Immediate surgery for the neonate, in either group, was performed either by primary or secondary closure. However, a large multicenter, prospective randomised study is needed to ascertain the suitable route for delivery in gastroschisis fetuses.

Keywords: Gastroschisis, fetus.

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Gastroschisis is a para-umbilical full thickness defect of the abdominal wall with evisceration of bowel and complete absence of a covering sac with a normal umbilical cord insertion, regardless of the defect.¹ Incidence of gastroschisis is one of 4,000 live births,² and increasing.³ Infants with gastroschisis are at increased risk of preterm delivery.⁴ The overall survival rate is (92%).⁵ Postoperative complications include: Necrotising enterocolitis, sepsis, meconium ileus and others. There is a debate regarding the mode and timing of delivery. However, early

delivery by cesarean section at completed 37 weeks, provided spontaneous delivery has not started, may benefit the neonate. The reason for this is that the amniotic fluid volume peaks around 33-34 weeks gestation and starts to reduce thereafter.⁶ This will result in compression from the uterine wall and fetal parts on the gut, possibly causing morbidity after delivery. It is therefore believed that abdominal birth reduces the likelihood of both contamination and bowel compromise secondary to compression, compared to vaginal delivery.⁷ The purpose of this

From the Department of Obstetrics and Gynecology, Royal Medical Services, King Hussein Medical Centre, Amman, Jordan.

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Address correspondence and reprint request to: Dr. Naser O. Malas, Fetal Medicine, PO Box 555, Amman 11621, Jordan. Tel. +962 (77) 410525. Fax. +962 (6) 5714573. E-mail: naserm1@hotmail.com

study was to assess the difference in terms of morbidity and mortality in fetuses with gastroschisis delivered by cesarean section versus vaginal delivery.

Methods. The records of all babies born with gastroschisis (n=40, 26 females, 14 males) from 1993 through to 2000 were analyzed. The mode of delivery was noted. Those babies delivered by cesarean section (n=22) were labelled group one, while those delivered vaginally (n=18) were labelled group 2. Many cases were referred from other hospitals related to the Royal Medical Services, Amman, Jordan. All were diagnosed, delivered and managed at the Obstetric and Neonatal departments at King Hussein Medical Centre (KHMC), Amman, Jordan, between February 1993 through to October 2000. Statistical analysis was carried out using standard deviation (SD), Fisher's exact test and Mann-Whitney U test. Many mothers were referred from other hospitals related to the Royal Medical Services. All were diagnosed, delivered and managed at the Obstetrics and Neonatal departments at KHMC. All data (fetal, neonatal and operative) were obtained from the medical records department in the centre. Gestational age was confirmed by date of the last menstrual period, together with the ultrasound findings (femur length and biparietal diameter). As shown in **Table 1**, group one neonates and group 2 had 18. Twenty-six cases were females and 14 cases were males (ratio 2:1). The mean maternal age were 26.45 ± 5.97 and 28.30 ± 4.22 years for groups one and 2 ($P < 0.05$). The antenatal diagnosis of this condition was 100%. The mean gestational age at diagnosis was 17.59 ± 1.58 , 17.95 ± 1.44 weeks for groups one and 2 ($P > 0.05$). Karyotyping was not carried out.

Results. The analytic data using Mann-Whitney U test, and Fisher's exact test showed that the mean gestational age at cesarean section group was $36.04 \pm$

1.02 weeks, while in the vaginal group was 38.40 ± 1.10 ($P > 0.05$). The mean birth weight was 2.89 ± 0.39 kg in group 1 and 3.10 ± 0.20 kg in-group 2 ($P > 0.05$). Surgical repair was immediate after delivery at a mean neonatal age of 41.04 ± 6.40 minutes for both groups. The mean days of stay at hospital for group one was 24.26 ± 8.75 and 34.20 ± 7.30 days for group 2 ($P < 0.05$). In group one, 6 cases had intestinal complications, such as necrotising enterocolitis, bowel dilatation, and intestinal atresia, along with other intestinal anomalies such as malrotation of the intestine with Ladd's band. In group 2, 14 cases had intestinal complications, such as necrotising enterocolitis, bowel dilatation, and intestinal atresia, with other intestinal anomalies such as malrotation of the intestine with Ladd's band. The protocol in antenatal care of such cases was to follow them up by high-resolution ultrasound to detect bowel dilatation or any other associated problems. When such a dilatation is not present, monthly visits were arranged until 32 weeks. However those who had signs of bowel dilatation or other associated bowel problems were followed up every 2 weeks up to 32 weeks of gestation, then weekly up to their booking date of cesarean section at 37 weeks; or until spontaneous labor ensued. Six cases in group 2 developed intestinal dilatation and underwent intestinal resection, with end-to-end anastomosis, and prolonged parental feeding. There was no significant difference in the apgar score ($P > 0.05$) between group one (mean=8.50) and group 2 (mean=8.25). Post surgical complications were frequent, and more than one occurred in some neonates. The most common was sepsis, 9 cases in group one compared to only 5 in group 2 ($P < 0.05$). Wound infection with abdominal scar formation was the 2nd frequent complication with 2 cases in group one and 5 in group 2 ($P < 0.05$). Other complications are illustrated in **Table 2**.

Table 1 - Comparison of characteristics related to mothers and gastroschisis fetuses in cesarean sections versus vaginal deliveries.

Characteristics	Group one (Caserean section n=22)	Group 2 (Normal delivery n=18)	P	Significance
Mean maternal age	26.45 ± 5.97 years	28.30 ± 4.22 years	$<0.05^*$	S
Mean gestational age at diagnosis	17.59 ± 1.58 weeks	17.95 ± 1.44 weeks	>0.05	NS
Mean gestational age at delivery	36.04 ± 1.02 weeks	38.40 ± 1.10 weeks	>0.05	NS
Mean birth weight	2.89 ± 0.39 kg	3.10 ± 0.20 kg	>0.05	NS
Mean days of hospital stay	26.26 ± 8.70	34.0 ± 7.30	$<0.05^*$	S
Apgar score	8.5	8.25	>0.05	NS

n - number, *Mann-Whitney + Fisher's exact test, S - significant, NS - non significant

Table 2 - Neonatal complications following definitive surgery in the 2 study groups

Complication	Group one (Cesarean section n=22) n (%)	Group 2 (Vaginal delivery n=18) n (%)	P
Sepsis	4 (18.2)	9 (50)	<0.05*
Wound infection	2 (9.1)	5 (27.8)	<0.05*
Short bowel syndrome	1 (4.5)	3 (16.7)	>0.05
Necrotising enterocolitis	1 (4.5)	1 (5.6)	>0.05
Bowel atresia	1 (4.5)	1 (5.6)	>0.05
Incisional hernia	2 (9.1)	3 (16.7)	>0.05
Gastroesophageal reflux	1 (4.5)	1 (5.6)	>0.05
Electrolyte imbalance	3 (13.6)	4 (22.2)	>0.05

n - number, * Mann-Whitney+ Fisher's exact test
Only 6 neonates in group one and 14 in group 2 had complications. Some neonates suffered from more than one complication.

Discussion. Diagnosis of gastroschisis is established at around the 18th week of intrauterine life during routine anomaly scanning. These fetuses should be monitored by serial ultrasound during the antenatal period. This monitoring is to evaluate the growth of the fetus and the intestinal condition (bowel wall thickening and the marked bowel dilatation in most cases, due to intestinal atresia), which results in ischemic damage of the intestine and polyhydramnios.⁸⁻¹¹ It is a well-known fact that karyotyping is only indicated in cases of omphalocele, not gastroschisis as the latter is not associated with chromosomal abnormalities; therefore we did not attempt to perform karyotyping for any of our patients. From our retrospective observation and analysis to data confined to gastroschisis, **Table 1** shows that group one neonates had a significant reduction in morbidity, in terms of days of hospital stay ($P<0.05$). This was of value in minimising effort and reducing cost. Elective cesarean section may be important in that to avoid further pressure on the diseased intestine, and to prevent impending bowel damage.¹² This resulted in decreasing the morbidity in terms of hospital days as well as decreasing the mortality. It is imperative to discuss with the parents the advantages and hazards of performing an abdominal birth before deciding the mode of delivery. To improve the prognosis of gastroschisis fetuses, the delivery should be undertaken at a centre specialised in high-risk pregnancies and neonatal intensive care. Moretti et al¹³ compared vaginal versus abdominal delivery for such fetuses. Out of 41 babies delivered vaginally, 3 infants suffered from significant morbidity: one infant had long-term nutritional problems, one had biliary cirrhosis and the 3rd had failure to thrive.

When compared to the cesarean sectioned babies in the same study, all 15 were followed up and none had any long-term morbidity.¹³ Our study showed a high incidence of sepsis, as a post-surgical complication in group 2 (and this postoperative complication is the most frequently reported complication in infants with gastroschisis.⁹ To reduce the risk of neonatal sepsis, we advocate changing the intravenous cannula regularly. The survival rate in our study was 100%, and this supports the previous studies, which showed a figure of 92%.⁵

In conclusion, regardless of the route of delivery, immediate surgery should be performed either by primary or secondary closure. Our study showed that complications and morbidity were less in the cesarean section group compared with the vaginal delivery group, however a larger multicenter prospective randomised study is needed in order to determine the suitable route for delivery in gastroschisis fetuses.

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