

Prenatal Sonographic Diagnosis of Ventral Abdominal Wall Defects : Case Series Report

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Abstract : *Fetal ventral abdominal wall defects require prenatal diagnosis for proper management. To evaluate the role of prenatal sonography in identifying characteristics of each type of defect, 12 cases were prospectively collected and followed. They consisted of 3 body stalk anomaly, 4 gastroschisis and 5 omphalocele. All of them were sonographically diagnosed with no false positive. All body stalk anomalies were uniformly fatal, 3 of the 4 gastroschisis and only 1 of the 5 omphalocele survived. All of the body stalk abnormal cases and 4 of the 5 omphalocele had other associated anomalies but there were none in the cases of gastroschisis. Better prognosis for neonates with gastroschisis appears to reflect the lower frequency of associated congenital anomalies and severity of the defect. (Thai J Obstet Gynaecol 1992;4:119-124.)*

Key words : gastroschisis, omphalocele, body stalk anomaly

The three main types of ventral abdominal wall defects detected by prenatal sonography are omphalocele, gastroschisis and body stalk anomaly⁽¹⁻⁶⁾. They are associated with external herniation of abdominal contents but in omphalocele the defects are in the midline at the site of the umbilicus, whereas, gastroschisis is a paraumbilical defect usually located to the right of the midline. Body stalk anomaly is a severe abdominal wall defect due to failure of formation of the body stalk and is characterized by absence of the umbilicus and umbilical cord and the sac is covered by amnion and placenta. It is important to diagnose these two conditions in utero

in order to plan further management and detect other associated anomalies. Gastroschisis is essentially an isolated entity, whereas, omphaloceles are at risk for other abnormalities that include cardiac anomalies (ventricular and atrial septal defects, tetralogy of Fallot) up to 47 %, neural tube defects up to 39 %, gastrointestinal anomalies, and trisomies to 35 - 58 %⁽¹⁾. Prenatal diagnosis of an omphalocele should prompt a careful search for additional anomalies as well as amniocentesis for chromosome study.

The objective of this case series is to study the characteristics of ventral wall defects in ultrasound findings and neonates.

Materials and Methods

Ultrasonographic prenatal diagnoses were performed by the authors, who were perinatal sonographers, from June 1989 to July 1991, using convex real-time scanner with a 3.5 MHz transducers (Aloka Model 650). Various indications required examinations including abnormal fundal growth, decrease of fetal movement, suspicion of twins, threatened abortion, etc.. The most important sonographic finding to differentiate between gastroschisis and omphalocele is the presence of the covering of membranes or not, eviscerated mass with covering membrane is omphalocele and without in the other. Body stalk anomaly is diagnosed when the fetus is attached to the placenta and large ventral defects allow protrusion of the viscera and the umbilical cord cannot be demonstrated⁽¹⁾.

When the ventral abdominal wall defect is diagnosed, the obstetric and previous history were carefully reviewed and the patient followed until delivery.

Results

Twelve cases of ventral abdominal wall defect were diagnosed in utero and followed by the authors. Of the 12 cases, 3 were body stalk syndrome, 4 were gastroschisis and 5 were omphalocele. The outcome of the neonates confirmed the ultrasound diagnosis in all cases. Demographic

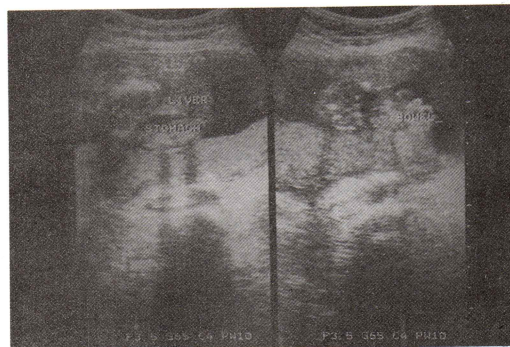


Fig. 1 Sonogram of fetus with body stalk anomaly shows herniated viscera and in proximity with the placenta. The umbilical cord could not be identified (Case 2).

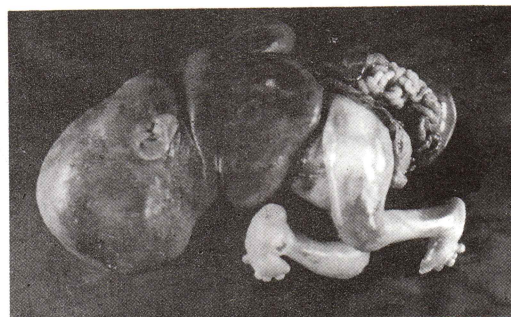


Fig. 2 The figure shows severe ventral abdominal wall defect with large herniated viscera of body stalk anomaly. This fetus was absence of umbilical cord and had short limbs, kyphosis and scoliosis (Case 2).

information and ultrasound findings of these pregnancies are presented in Tables 1 and 2 respectively.

All of the body stalk anomaly were stillborns, 3 of the 4 gastroschisis and only 1 of the 5 omphalocele survived after surgical correction. All of body stalk anomaly and 4 of the 5 omphalocele had other associated anomalies but there were none in gastroschisis, however, no chromosome

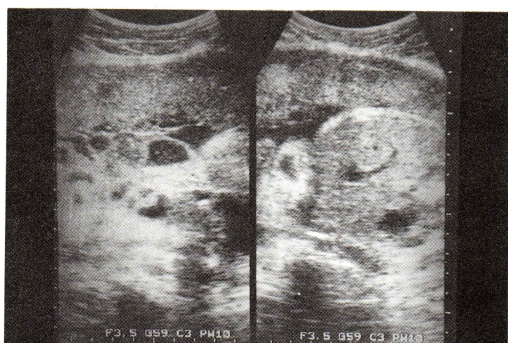


Fig. 3 The imaging illustrates floating bowel in the amniotic cavity of the fetus with gastroschisis (Case 6).



Fig. 5 Omphalocele in a third trimester fetus. The herniated liver with peritoneal membrane coverings was seen (Case 10).



Fig. 4 Newborn with gastroschisis. There is no covering membrane, and the defect is on the right paraumbilical area (Case 6).



Fig. 6 Typical omphalocele of the newborn in the same case of Fig. 5.

Table 1 Demographic data of the pregnancies

No.	Age (Years)	Parity	Weeks of diagnosis	Weeks of delivery	Maternal complications	Indications for ultrasound exam.
1.	35	2-0-0-1	19	20	Elderly gravida	Threatened abortion
2.	20	0-0-0-0	21	21	-	No fetal heart beat
3.	23	0-1-1-1	24	40	-	Decreased movement
4.	20	0-0-0-0	26	39	-	Decreased movement
5.	21	1-0-0-1	32	37	-	? IUGR
6.	42	1-0-3-1	34	38	Elderly gravida	? IUGR
7.	27	2-0-0-2	36	40	Gestational DM	Gestational DM
8.	30	2-1-0-2	29	35	Premature labour	? IUGR
9.	29	1-0-1-1	20	21	-	Small for dates
10.	25	0-0-0-0	35	36	Premature labour	Decreased movement
11.	22	0-0-1-0	28	29	Twins	Large for dates
12.	21	0-0-1-0	24	40	-	Uncertain dates

Table 2 Ultrasound findings and neonatal outcomes

No.	Ultrasound findings and diagnosis	Mode of delivery	Neonatal outcomes
1.	Body stalk anomaly, absence of umbilical cord, deformity of chest wall, short limbs, normal amniotic fluid, herniated viscera \bar{c} membrane coverings.	Therapeutic abortion with Sulprostone	Male, stillbirth, body stalk anomaly, absence of umbilical cord, deformity of chest wall, short limbs.
2.	Body stalk anomaly, absence of umbilical cord, short limbs, kyphosis, scoliosis, no heart beat, decreased fluid, herniated viscera \bar{c} membrane coverings.	Therapeutic abortion with Sulprostone	Male, stillbirth, body stalk anomaly, absence of umbilical cord, short limbs, kyphosis, scoliosis.
3.	Body stalk anomaly, anencephaly, absence of umbilical cord, large VSD, decreased fluid, herniated viscera \bar{c} membrane coverings.	Normal delivery	Female, stillbirth, large VSD, body stalk anomaly, large eviscerated mass, anencephaly.
4.	Gastroschisis, herniated bowel \bar{s} coverings at Rt paraumbilicus, oligohydramnios.	C/S	Male, Apgar scores 9,10, gastroschisis, surgical correction, survived.
5.	Gastroschisis, herniated bowel \bar{s} covering at Rt paraumbilicus, normal fluid, low lying placenta.	C/S	Female, Apgar scores 7,9, gastroschisis, IUGR, surgical correction, dead from sepsis.
6.	Gastroschisis, herniated bowel \bar{s} covering at Rt paraumbilicus, normal fluid, normal growth.	C/S	Male, Apgar scores 8,10, gastroschisis, surgical correction, survived.
7.	Gastroschisis, herniated bowel \bar{s} coverings at Rt paraumbilicus, normal fluid, normal growth.	C/S	Female, Apgar score 10,10, gastroschisis (only small bowels), surgical correction, survived.
8.	Omphalocele (liver & bowel \bar{c} membrane coverings), ? IUGR, oligohydramnios.	Normal delivery (advanced labour on admission)	Male, Apgar scores 8,10 omphalocele, IUGR, surgical correction, survived, normal chromosome, no other anomaly.
9.	Large omphalocele, (mass \bar{c} membrane coverings) very short femurs, deformity of spines, normal amniotic fluid, small head circumference, mild fetal ascites.	Normal delivery	Male, stillbirth, IUGR, normal chromosome, large omphalocele (liver & bowel), very short femurs, deformity of spines and pelvis, microcephaly.
10.	Large omphalocele (liver & bowel \bar{c} membrane coverings), oligohydramnios, no IUGR, mild fetal ascites.	C/S	Male, Apgar scores 8,9, large omphalocele, bowels necrosis, VSD, surgical correction dead from sepsis, normal chrromosome study.
11.	Conjoined twins (Thoracopagus), one heart, meningocele and omphalocele of one fetus (liver & bowel \bar{c} membrane coverings), normal fluid.	C/S	Both female, stillbirth, gastroschisis of both liver and bowels and sacral meningocele in one fetus, conjoined twins (Thoracopagus), one heart.
12.	Omphalocele (liver & bowel \bar{c} membrane coverings), anencephaly, normal fluid.	Normal delivery	Female, stillbirth, anencephaly, large omphalocele.

C/S = Caesarean section

disorder was detected in all cases of this study. Additionally, 3 of the 9 omphalocele and gastroschisis had birth weights below the 10th percentile.

Discussion

In omphalocele, the umbilical cord inserts into the membrane surrounding the herniated mass, whereas

in gastroschisis the cord inserts normally into the fetal abdomen. A membrane consisting of amnion and peritoneum surrounds the herniated contents of an omphalocele but gastroschisis represents a full thickness abdominal wall defect without the covering membranes, so the herniated bowel loops float freely in the amniotic fluid⁽¹⁻⁴⁾. Unprotected by a membrane, and at risk for ischemic events and necrosis as in one case in this report, the eviscerated bowel is prone to secondary complications, including thickening and fibrosis. Interestingly, all cases with sonographic demonstration of eviscerated liver were omphalocele, but only the small bowel is eviscerated in all cases of gastroschisis. This finding supports the previous report which found that only the small bowel is eviscerated in most cases of gastroschisis⁽²⁾. Therefore, sonographic demonstration that the liver has herniated through an abdominal wall defect is considered strong evidence for omphalocele.

This report suggests that ventral abdominal wall defects increase the incidence of oligohydramnios (3 in 10) which may represent other anomalies or fetal distress. Oligohydramnios may lead to poor quality of ultrasonic imaging and make it difficult to differentiate between gastroschisis and omphalocele.

We found fetal ascites in only two cases of omphalocele, but not in gastroschisis, this may be explained by the absence of a covering membrane in gastroschisis allowing ascites to

escape into the surrounding amniotic fluid.

In conclusion, in spite of this small series, it was shown that omphalocele is associated with other anomalies more often than gastroschisis. Some sonographic characteristics other than the presence of membrane covering, i.e. fetal ascites, liver in herniated mass, other anomalies, may help in the distinction between these two conditions. For body stalk anomaly, it is always lethal. Sonography can be used to accurately diagnose ventral wall defects in utero and can distinguish between body stalk anomaly, gastroschisis and omphalocele in most cases.

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