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A FOETAL STUDY FOR CONGENITAL ANTERIOR ABDOMINAL WALL DEFECTS

Anatomy

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ABSTRACT

Omphalocele and gastroschisis are congenital abdominal wall defects due to improper fusion of embryonic folds during intraembryonic period. Due to this abdominal content will protrude through the defect leading to foetal mortality and morbidity. The present study explained a case of omphalocele and a rare left sided gastroschisis in the foetuses collected from Victoria general hospital and Gitam institute of medical sciences and research, Visakhapatnam. Omphalocele is associated with chromosomal anomalies but gastroschisis is an isolated condition. The embryological explanation for omphalocele is improper fusion of embryonic folds but the reason for left sided gastroschisis is early degeneration of left umbilical vein. Maternal infections, medications and smoking habits act as a predisposing factor for these conditions. Recent medical advances and neonatal care decreasing the incidence and morbidity of these congenital abnormalities.

KEYWORDS

Omphalocele, Gastroschisis, Embryonic Folds, Chromosomal Abnormalities

INTRODUCTION:

At the time of embryonic folding, embryo folds in cephalic ,caudal with two lateral folds and all these folds converge at the umbilicus .During this period yolk sac differentiate into derivatives of gut and the midgut differentiate rapidly .The intestinal coils migrate into the umbilical ring as physiological herniation of intestine and they resolve into the abdomen by 10th week. In this process any defect or failure in fusion of embryonic folds leads to anterior abdominal wall defects. Through this defect various abdominal contents will protrude. This opening varies in size and can usually be diagnosed between the tenth and fourteenth weeks of pregnancy. The two main abdominal wall defects are omphalocele and gastroschisis and these defects were described as early as 16th century .Omphalocele is a midline abdominal wall defect where the abdominal contents like the intestines, stomach, andliver will protrude into the umbilical cord and are covered by amnion. So persistence of bowl in the cord beyond 12 weeks is omphalocele. Gastroschisis is a defect in the abdominal wall normally located to the right side of umbilical cord and rarely on the left side without a covering sac or membrane so the contents protrude into the amniotic cavity.

Omphalocele is frequently associated with chromosomal anomalies with an incidence of 1 in 4000 births but gastroschisis is an isolated anomaly with an incidence of 1in 6000cases.

James Glasser (1) thought maternal infections, usage of vasoconstrictor drug and maternal smoking that lead to placental insufficiency are the causes of these congenital conditions. The babies with omphalocele and gastroschisis will present with premature birth or low birth weight .With advanced investigative procedures and progress in surgery and neonatal care the mortality and morbidity of these cases are decreasing. The present study explained two congenital abdominal wall defects an omphalocele and a rare left sided gastroschisis and its embryological aspects.

MATERIALAND METHODS:

As a part of research activity and development of department museum, 60 destitute foetuses were collected from Victoria general hospital and Gitam institute of medical sciences and research Visakhapatnam. In this process foetus of various gestation ages were collected. All the foetuses were separated according to their gestational ages and anomalous foetuses were separated to know their incidence. Anomalies like neural tube defects and abdominal wall defects were found. The abdominal wall defects were identified as omphalocele and gastroschisis. The CR length of these foetuses were measured to know their gestational age. The level of defect and the contents were studied along with the position of umbilical cord. The foetuses were subjected to radiological examination for further details.

OBSERVATIONS:

Out of 60 foetuses collected 3 cases presented with defect in the abdominal wall. Two of them were identified as omphalocele, gastroschisis, and the other foetus had a varied presentation with multiple anomalies, so it was excluded from this study.

A female foetus with crown rump length of 24.2 cm, presented with a swelling in the umbilical region. It was a midline swelling covered with amnion and umbilical cord was extending from that swelling. It was a closed sac and the contents were not seen. The radiological examination of the foetus revealed multiple loops seen herniated into membrane covered defect and umbilical cord insertion is directly from the swelling. As it was a closed swelling, it was a case of omphalocele. No other external anomalies were found in the foetus(fig.1)

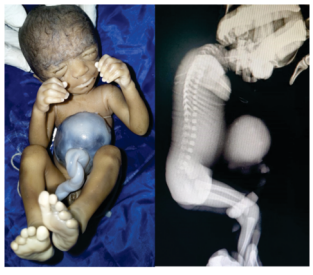

Fig.1 showing the omphalocele with umbilical cord attached to the swelling

In another case a female foetus with crown rump length of 26.3cm was identified with a defect in the anterior abdominal wall exposing the major abdominal contents to the external surface without any covering membrane. The contents were identified as stomach, small intestines, liver and spleen and they were present to the left side of umbilical cord. The radiological study revealed that herniated contents were free floating and not covered by membrane and herniated bowel wall thickened. With all these features the case was identified as left sided gastroschisis –a rare presentation. This foetus also presented with scoliosis. (fig.2)

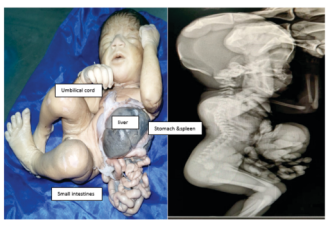

Fig.2 showing the fetus with gastroschisis with exposed abdominal contents

DISCUSSION:

An omphalocele occurs when intestinal contents fails to return to the abdominal cavity after physiological herniation into the umbilical cord during first trimester. The contents are covered by peritoneum and amnion and the cord is attached to the sac . Small omphalocele recover well and long term medical problems occur with large ones. Omphaloceles are frequently associated with chromosomal abnormalities and other birth defects. (2) Chromosomal abnormalities like trisomy's 13,18 and 21 are diagnosed in foetuses of omphalocele and is more common with central omphalocele than with epigastric omphalocele. (3)

Gastroschisis is a full-thickness defect in the abdominal wall, just to the right of a normal insertion of the umbilical cord and rarely on the left side. Left sided gastroschisis is a rare presentation as only 32 cases were reported as described by Marcelo Francetich et al .(4) This rare case has been found mostly in females. Compared to the commonly observed right sided lesions, LSG have increased incidence of associated extra-intestinal and intestinal anomalies which make their prognosis worse. [5]

The aetiology of gastroschisis is vascular in nature. The premature involution of right omphalomesenteric artery leads to weakening in the abdominal wall through which intestinal contents rupture into the amniotic cavity. The bowl loops are often thickened, and it results from chemical peritonitis caused by contact with foetal urine in amniotic fluid. (6) Nonvascular explanation of this condition includes failure of incorporation of vitelline duct into the umbilical cord and abnormal development of the ventral abdominal wall resulting in the failure of midline fusion of the lateral folds. (7,8) Recent theory about gastroschisis result from failure of one or more folds which were responsible for wall closure and that a right-sided defect predominated because the yolk stalk was positioned on the right and slight mispositioning of the yolk stalk to the left of midline in the setting of wall fold failure could lead to left-sided defects. (9) or early regression of the left umbilical vein (10)

As omphaloceles are frequently associated with chromosomal abnormalities and other birth defects than the gastroschisis, the long term prognosis of gastroschisis is better than omphalocele.(2) An elevated maternal serum alpha fetoprotein level may be the earliest indicator to detect abdominal wall defects more so with gastroschisis than omphalocele.(11)

Both exomphalos and gastroschisis are diagnosed by antenatal ultrasound and other associated anomalies can be diagnosed through amniocentesis. With recent medical advances and increased surgical and neonatal care the mortality and morbidity associated with these defects can be reduced.

CONCLUSION:

Omphalocele and gastroschisis are congenital abdominal wall defects that occur due to improper fusion of embryonic folds or early regression of umbilical vein. In these defects abdominal contents will protrude outside. As omphalocele will have associated chromosomal abnormalities its prognosis is poor compared with gastroschisis which is an isolated anomaly. These conditions can be diagnosed through antenatal scan and mortality and morbidity can be reduced through proper surgical and neonatal care.

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