International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Imaging Evaluation of Fetal Abdominal Wall Defects: A Radiological Perspective

Dr. Katuru Kanchana Keerthi[1], Dr. Rama Krishna Rao Baru M. D, DMRD, DNB[2], Dr. Uma Maheswar Reddy M. D[3]

Post Graduate, Department of Radiodiagnosis, Narayana Medical College, Nellore, Andhra Pradesh
Email: *kanchanakeerthi88[at]gmail.com*
Mobile number: 9652088766

[2]Professor & HOD, Department of Radiodiagnosis, Narayana Medical College, Nellore, Andhra Pradesh.

[3]Professor, Department of Radiodiagnosis, Narayana Medical College, Nellore, Andhra Pradesh.

Abstract: ***Abdominal wall defects (AWDs) in foetuses range in severity from mild conditions like umbilical cord hernia to complex syndromes such as limb–body wall syndrome. Accurate evaluation of the defect in relation to the umbilical cord insertion site is crucial for proper diagnosis. The most frequently occurring defects are gastroschisis and omphalocele, while rarer conditions include exstrophy complex, pentalogy of Cantrell, and limb–body wall syndrome. Although all these defects involve the herniation of viscera through the anterior body wall, they differ significantly in their imaging characteristics and postnatal treatment approaches. Accurate diagnosis of each condition is essential for effective prenatal counselling and appropriate postnatal management. This paper explores various foetal abdominal wall defects and provides diagnostic tips to aid in their identification.***

Keywords: Gastroschisis, Omphalocele, Exstrophy complex, Pentalogy of Cantrell, and Limb–body wall syndrome

Abbreviations: AWDs - Anterior abdominal wall defects.

1. Introduction

Abdominal wall defects (AWDs) encompass a diverse range of congenital abnormalities, presenting a significant challenge in prenatal and postnatal medical care. With an overall prevalence of six cases per 10, 000 births, AWDs represent a notable concern in neonatal health. The most common types of AWDs are gastroschisis and omphalocele, yet there are several more complex variants such as bladder exstrophy, cloacal exstrophy, body stalk anomaly, pentalogy of Cantrell, and abdominoschisis due to amniotic bands. Each type of AWD not only presents distinct clinical features but also demands different approaches in both prenatal and postnatal care. Furthermore, many AWDs are associated with other congenital abnormalities, which significantly influence prognosis and management strategies.

The importance of precise prenatal characterization of AWDs cannot be overstated, as it can greatly improve patient outcomes. However, due to the intricate nature of these abnormalities, achieving an accurate prenatal diagnosis can be challenging. Increasing awareness and understanding of the full spectrum of AWDs is essential for enhancing prenatal diagnostic accuracy, which in turn is crucial for optimal pregnancy management, including the timing and mode of delivery. This paper aims is to explore the various types of AWDs, their associated congenital abnormalities, and the implications of accurate prenatal diagnosis on pregnancy and neonatal outcomes.

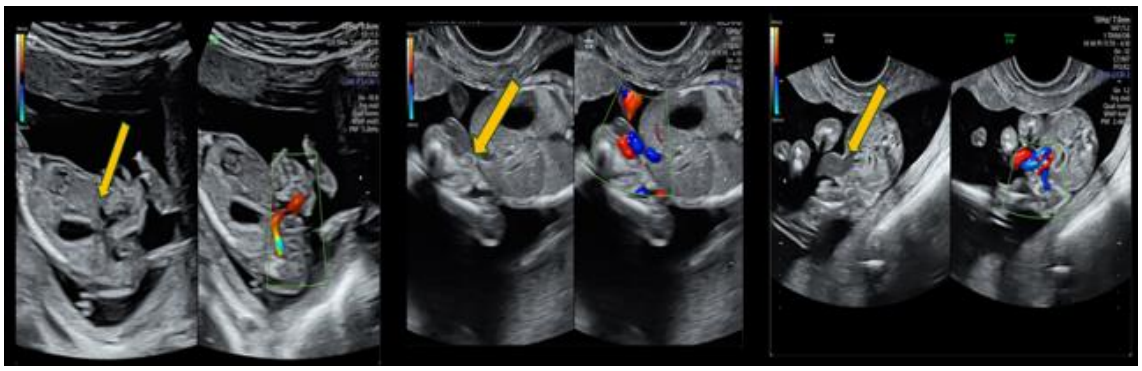
2. Aims & Objectives

To study the role of prenatal ultrasound in detecting various types of fetal abdominal wall defects and to know the significance of early detection.

3. Materials & Methods

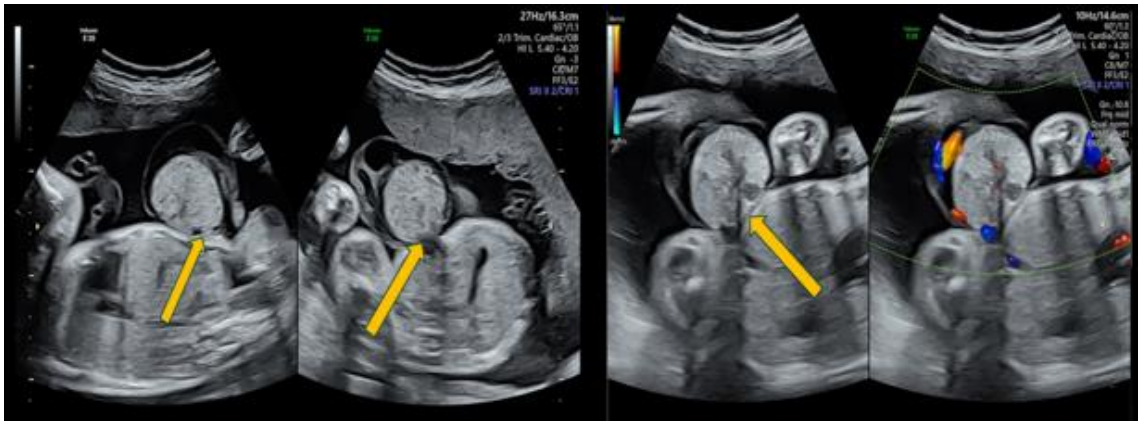
Medical records and imaging findings of antenatal mothers who presented to our institution for TIFFA scan/ prenatal ultrasound.

Image Gallery:



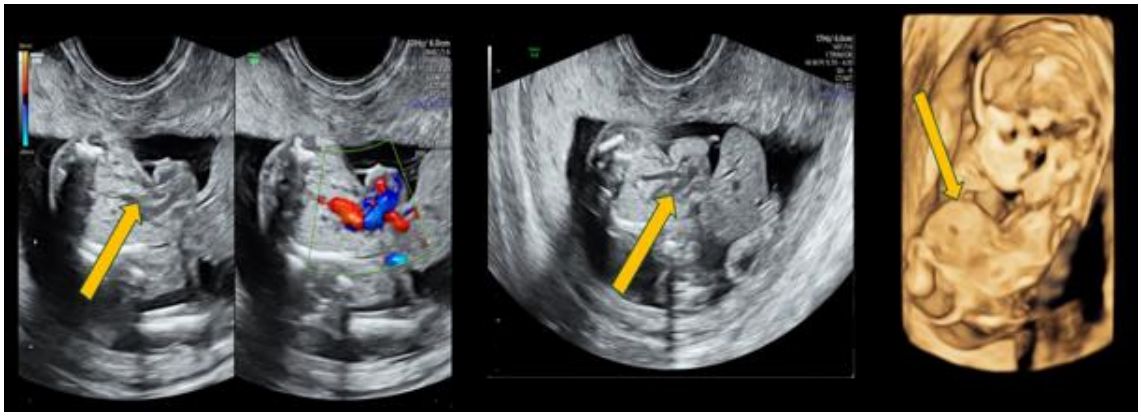
Case No.1: A case of GASTROSCHISIS in a 18yr old primigravida with 17 weeks GA

Extra abdominal herniation of fetal bowel loops in to amniotic cavity without a surrounding membrane through a para umbilical anterior abdominal defect.



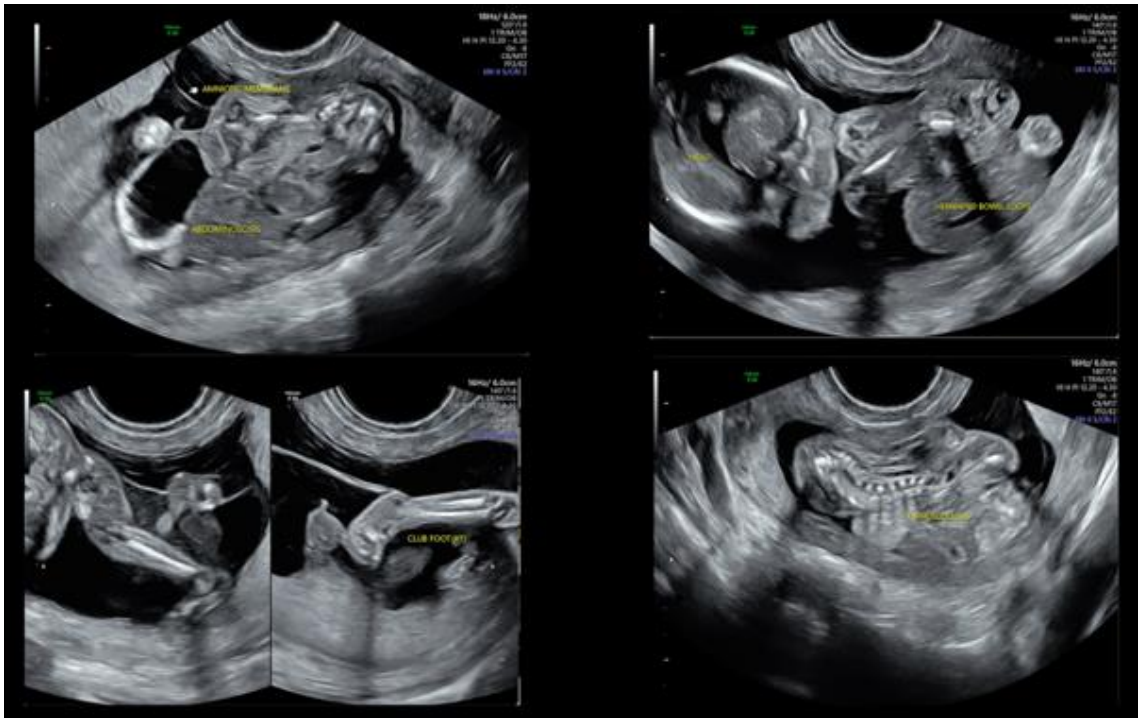
Case No.2: A case of OMPHALOCELE in a 18 year old primigravida with 25 weeks GA

Multiple bowel loops herniate into a membrane covered defect and seen as echogenic content (nonfluid filled bowel) with umbilical cord insertion directly into the omphalocele.



Case No.3: A case of Ectopia cordis in a 20yr old primigravida with 21 weeks GA

It is an extremely rare congenital malformation where heart is located partially or totally out of thoracic cavity.



Case No.4: A case of limb body wall complex in a 19year old primigravida with 20 weeks GA

Limb body wall complex is a variable group of congenital limb and body wall defects (involving chest and abdomen)

4. Discussion

Abdominal wall defects (AWDs) are a diverse and complex group of anomalies that frequently lead to misdiagnoses. Accurate assessment of the defect's relationship to the umbilical cord insertion site is essential for a correct diagnosis. The most prevalent AWDs include:

- Gastroschisis: Characterized by a defect on the right side of the normally inserting umbilical cord with free - floating bowel loops.
- Omphalocele: Identified by the cord inserting on a membrane - covered midline defect, which may be part of a more intricate anomaly.
- Cloacal Exstrophy: This defect extends downward with bowel loops extruding between two bladder halves, creating an "elephant trunk" appearance.
- Pentalogy of Cantrell: The defect extends upward and is typically associated with ectopia cordis.
- Bladder Exstrophy: A lower abdominal defect marked by the absence of a fluid - filled bladder, with the cord insertion site being normal to low.

Body stalk anomaly and abdominoschisis due to amniotic bands: involve the extrusion of solid organs and the bowel. The body stalk anomaly can be identified by the lack of a free - floating umbilical cord.

5. Conclusion

Foetal AWDs represent a complex array of conditions that encompass a wide range of associated multisystem anomalies and clinical manifestations. Accurate characterization and classification of these defects are crucial for effective parental counselling during pregnancy and ensuring timely referral to a multidisciplinary management team. The physician responsible for interpreting ultrasound examinations is pivotal in identifying these anomalies and aiding the management team in planning both the delivery and postnatal care.

References

[1] Revels JW, Wang SS, Nasrullah A, Revzin M, Iyer RS, Deutsch G, Katz DS, Moshiri M. An algorithmic approach to complex fetal abdominal wall defects. American Journal of Roentgenology.2020 Jan; 214 (1): 218 - 31
[2] Victoria T, Andronikou S, Bowen D, Laje P, Weiss DA, Johnson AM, Peranteau WH, Canning DA, Adzick NS. Fetal anterior abdominal wall defects: prenatal imaging by magnetic resonance imaging. Pediatric radiology.2018 Apr; 48: 499 - 512.
[3] Matos AP, Duarte LD, Castro PT, Daltro P, Werner Júnior H, Araujo Júnior E. Evaluation of the fetal abdomen by magnetic resonance imaging. Part 2: abdominal wall defects and tumors. Radiologia brasileira.2018 May 21; 51: 187 - 92.
[4] Pakdaman R, Woodward PJ, Kennedy A. Complex abdominal wall defects: appearances at prenatal imaging. Radiographics.2015 Mar; 35 (2): 636 - 49.
[5] Torres US, Portela - Oliveira E, Braga FD, Werner Jr H, Daltro PA, Souza AS. When closure fails: what the radiologist needs to know about the embryology, anatomy, and prenatal imaging of ventral body wall defects. InSeminars in Ultrasound, CT and MRI 2015 Dec 1 (Vol.36, No.6, pp.522 - 536). WB Saunders.
[6] Drăgușin RC, Șorop - Florea M, Pătru CL, Zorilă L, Marinaș C, Cernea N, Neamțu C, Iliescu DG. Fetal abdominal wall defects. InCongenital Anomalies - From the Embryo to the Neonate 2017 Dec 20. IntechOpen.
[7] Agarwal R. Prenatal diagnosis of anterior abdominal wall defects: Pictorial essay. Indian Journal of Radiology and Imaging.2005 Jul 1; 15 (3).

.