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A case of Non immune hydrops fetalis incidentally found on routine obstetric sonography

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ABSTRACT

Non-immune hydrops fetalis is a severe condition that is uncommon and usually associated with a poor prognosis. It is characterized by abnormal accumulation of fluid in two or more fetal body compartments, along with generalized soft tissue edema. Before 1968, hydrops fetalis was secondary to maternal-fetal Rh incompatibility, but today most cases are non-immune origin due to the widespread use of Rhesus-D-alloimmunisation. A long list of aetiologies is found with non-immune hydrops fetalis, which varies from genetic abnormalities to cardiac conditions, infections, hematological and autoimmune causes, each with the potential to affect the fetus severely. We report a case of 24-year-old female, Gravida 2 para 1, who presented to our hospital for a regular antenatal check-up at 28 weeks of gestation for fetal well-being. Routine antenatal ultrasound findings revealed gross ascites with abdominal wall edema, mild pleural effusion, pericardial effusion, and generalized fetal edema. The first baby is alive and healthy, delivered at 39 weeks. History of previous pregnancy and previous studies exclude the causes of immune hydrops fetalis, making this case most likely suggestive of the non-immune type.

Keywords: Hydrops fetalis, non-immune, fetal imaging, sonography

1. INTRODUCTION

Hydrops fetalis is a fetal condition characterized by the accumulation of abnormal fluid collection in two or more cavities or compartments, mainly ascites, pericardial effusion, pleural effusion, and skin edema. Hydrops fetalis with red cell alloimmunization is immune hydrops fetalis. This is a condition in which a mother with a Rh-negative blood type makes antibodies to her fetus's Rh-positive blood cells, and the antibodies cross the placenta and react with fetal antigen, resulting in fetal hemolysis. Otherwise, it is considered non-immune hydrops fetalis.

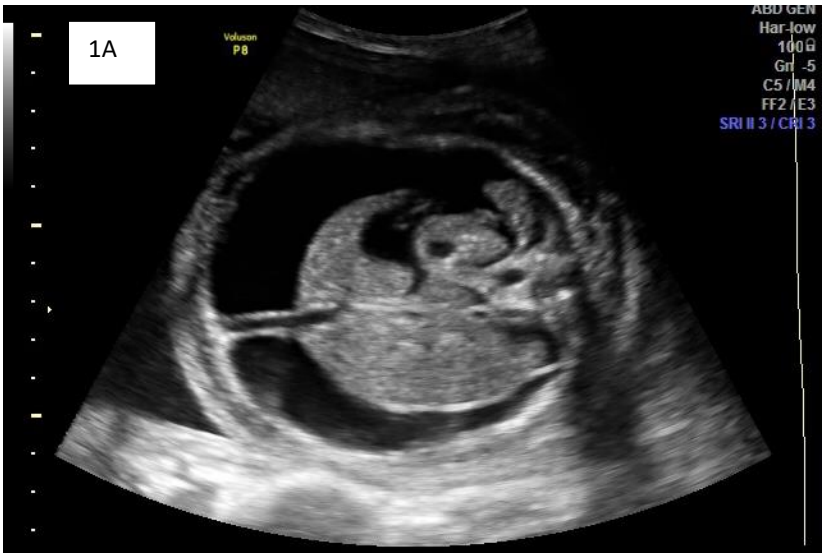
Non-immune hydrops fetalis is a fetal condition characterized by the accumulation of interstitial fluid in two or more fetal body compartments

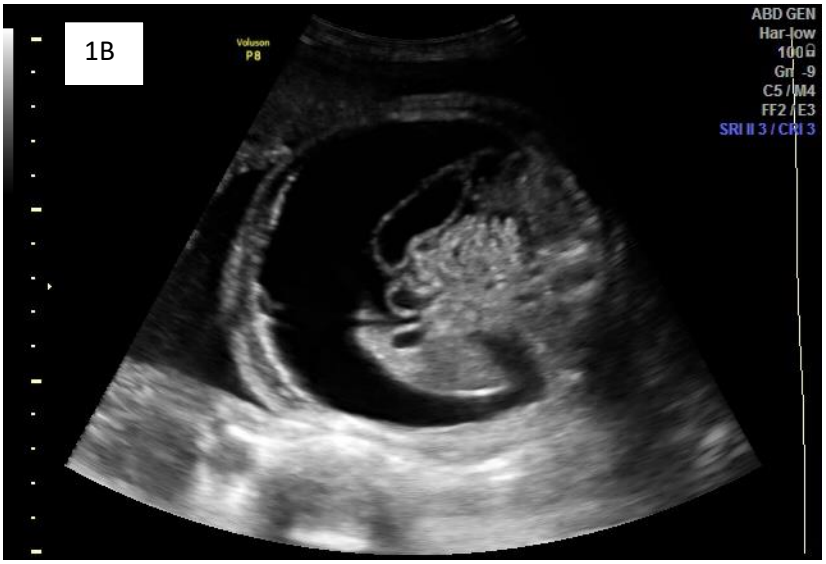
(pleura, pericardium, and peritoneal cavity). Non-immune hydrops fetalis can be easily diagnosed with the help of ultrasound prenatally. (Vanaparthy et al., 2023; Singla et al., 2010). The prevalence of non-immune hydrops fetalis (NIHF) affects between 1 in 1500 and 1 in 4000 births. After 1968, the widespread use of anti-D immunoglobulin drastically decreased RhD alloimmunization and associated hydrops prevalence (Steurer et al., 2017). Hence, today, more than 90% of cases are non-immune hydrops fetalis (Carvoeiro et al., 2017).

2. CASE REPORT

A 24-year-old female, Gravida 2 para 1, presented to our hospital for a regular antenatal check-up at 28 weeks of gestation. The patient has no history of fever or any infections during this pregnancy. The patient reports no congenital anomalies in the family. The patient underwent a cesarean section at 39 weeks in her first pregnancy, and the baby boy was delivered healthy and alive. There is no related or relevant medical, surgical, or gynecological history. All routine blood investigations were regular. On routine antenatal ultrasound imaging, there is evidence of gross fetal ascites (Figures 1A, 1B), pleural effusion (Figure 1C), mild pericardial effusion (Figure 2), and generalized fetal body edema anasarca (Figure 3). Otherwise, the fetal brain, spine, kidney, and urinary bladder are normal. Doppler evaluation of the umbilical artery and middle cerebral artery was within the standard limit.

IMAGING FINDINGS





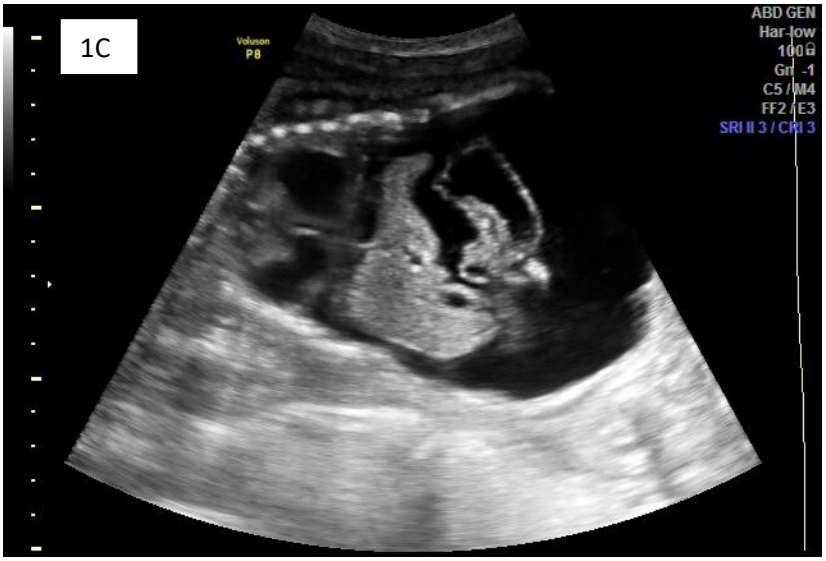


Figure 1 Two-dimensional B-mode grayscale ultrasound images show gross ascites fluid isolating the ligamentum teres, liver, spleen, and bowel with abdominal wall edema (Figures 1A, 1B) and hydrothorax (Figure 1C).

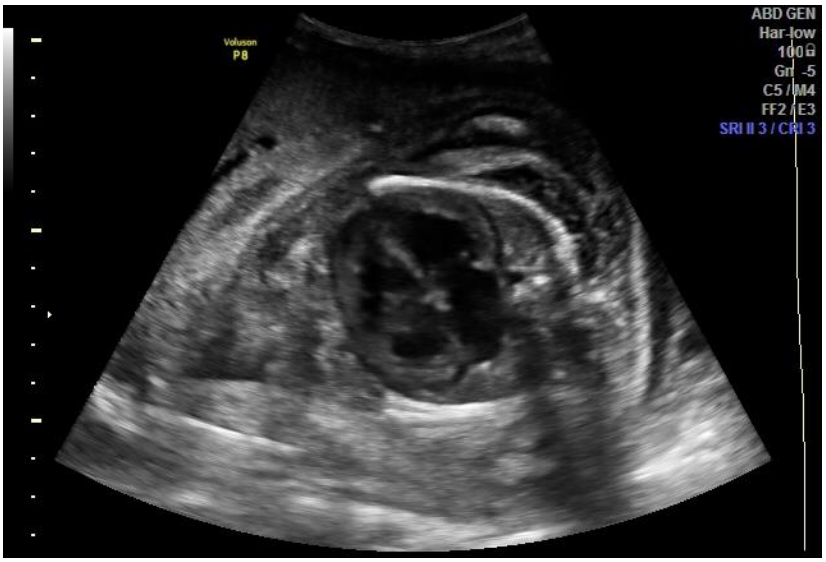
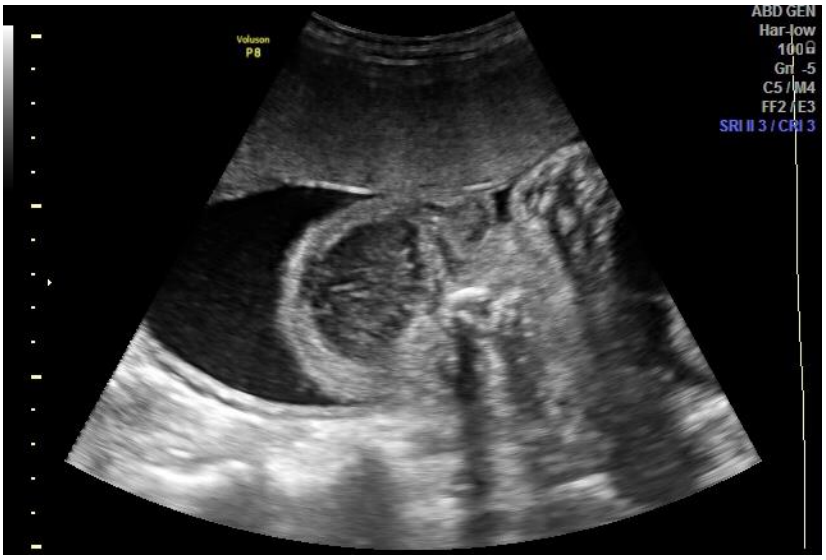


Figure 2 Two-dimensional B-mode grayscale ultrasound image shows mild pericardial effusion.



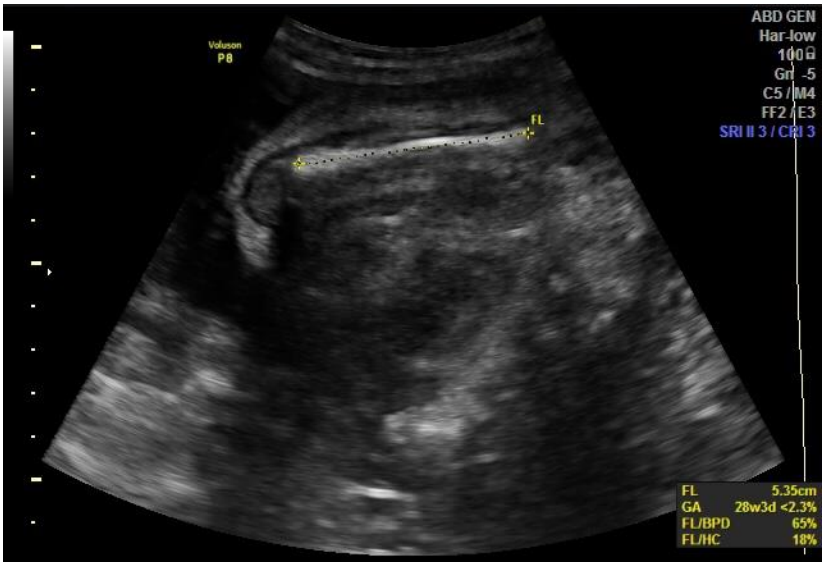


Figure 3 Two-dimensional B-mode grayscale ultrasound images show scalp edema and subcutaneous edema in the lower limb.

3. DISCUSSION

Hydrops fetalis is a fetal condition characterized by the accumulation of interstitial fluid in two or more fetal body compartments (pleura cavity, pericardium, and peritoneal cavity). An alternative definition refers to effusion at one place and anasarca and liquid accumulation in two fetal anatomical regions. Hydrops fetalis contains a broad spectrum of disorders; however, there are two main types (Vanaparthy et al., 2023; Has, 2001; Abrams et al., 2007; Hartge et al., 2015).

1. Immune hydrops fetalis: It is caused by isoimmunization, including ABO incompatibility, Rh isoimmunization, Duffy antibodies antic, C, e, E, and Kell-alloimmunization.

2. Non-immune hydrops fetalis: It is the most common type; almost 80 - 90 percent of all cases of hydrops fetalis fall into this category. It is associated with a variety of underlying causes, such as congenital disabilities or genetic conditions (Down syndrome, Turner syndrome, and Edward syndrome), cardiac causes (such as congenital pulmonary airway malformation, paroxysmal supraventricular tachycardia, and endocardial cushion defects), and infections (like cytomegalovirus, parvovirus B19 (fifth disease), and syphilis infections in pregnancy).

Non-immune hydrops fetalis (NIHF) prevalence ranges from 1 in 1500 to 1 in 4000 births. After 1968, the widespread use of anti-D immunoglobulin drastically decreased the prevalence of RhD alloimmunization and associated hydrops (Steurer et al., 2017). Hydrops fetalis can be diagnosed by conventional 2D sonographic examination during first-detail antenatal ultrasonography between 18 and 22 weeks. To diagnose non-immune hydrops, fluid accumulation in more than one body compartment should be involved, either as pleural effusion, pericardial effusion, ascites, or generalized skin edema. In most severe cases, the fetal abdomen shows free-floating and compressed bowels. The lung/thoracic cavity ratio is used to evaluate and quantify persistent pleural effusion, seems to influence the degree of subsequent lung hypoplasia.

The most common findings during early pregnancy are generalized skin edema in the fetal thorax (>5 mm in thickness), abdomen, back of the neck, fetal head, and ascites. The nuchal translucency value was elevated in early scans of the fetus and is associated with a higher risk of other aneuploidies. Pleural and pericardial effusions in fetus are uncommon before 15 weeks of gestational age, although polyhydramnios and placental edema are most frequently encountered before 20 weeks. Polyhydramnios and increased placental thickness are commonly observed.

However, if only one body cavity is affected and no further supporting findings, it should not be labeled as a hydrops. In such cases, only the involved cavity is specified as an isolated pleural effusion or ascites. Some instances with these secret findings might progress to hydrops. Other fetal parameters like fetal heart rate, umbilical artery pulsatility index, middle cerebral artery peak systolic velocity (MCA-PSV), and end-diastolic flow are also helpful in identifying the underlying causes of hydrops (Vanaparthy et al., 2023; Hata et al., 1999; Bianchi et al., 2000; Berger et al., 2018).

4. CONCLUSION

Fetal ultrasound has been in practice all over the world for the last four to five decades. Antenatal ultrasound remains the gold standard for detecting all fetal anomalies. Ultrasonographic detection of hydrops fetalis is uncomplicated and easy to diagnose. This

case has been reported to create awareness among radiologists and enhance knowledge about a rare and severe disorder associated with an overall poor prognosis related to non-immune hydrops. A detailed prenatal diagnostic investigation and history allow early identification of conditions that may be amenable to proper diagnosis and treatment, avoiding unnecessary invasive fetal interventions in situations with bad outcomes.

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Authors' contribution

Murugan G: Conceptualization, Supervision, Methodology, Resources, Data Collection, Writing and Formal analysis
Asokan Aradhana Shanmughan: Writing, Investigation, Resources, Analysis, Draft preparation, Review and Editing
Shalmol Thomas M: Writing, Investigation, Analysis, Review and Editing
All authors have read and agreed to submit the manuscript.

Informed consent

Not applicable.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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