

CASE STUDIES

Second-Trimester Findings Associated With Nonimmune Hydrops

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Nonimmune hydrops fetalis (NIHF) is a fetal condition in which an overaccumulation of fluid in the interstitial tissues of the fetus occurs. NIHF is a separate condition from fetal immune hydrops caused by Rh incompatibility. There are multiple etiologies associated with NIHF, such as genetic disorders, fetal anemia, infectious diseases, twin-to-twin transfusion syndrome, and cardiovascular abnormalities. NIHF is an uncommon, predominantly fatal finding. The obstetric patient may present large-for-gestational age but is Rh compatible. Fetal anatomy may demonstrate multiple findings, including gross skin thickening, polyhydramnios, pleural or pericardial effusions, fetal ascites, and thickened placenta.

Key words: nonimmune hydrops, skin edema, sonography, pleural effusion, fetal ascites

Case Report

An obese woman in her early 30s, gravida 7, para 5, who had one spontaneous abortion, presented to her physician for her first prenatal visit at 19 weeks' gestation by her last menstrual period. The patient had no complaints and reported some fetal movement.

On physical examination, the patient's weight was 236 pounds; her height was 5'2", and the fundal height measured 30 cm. The patient was referred for sonography after being given a large-for-gestational-age diagnosis. Her Rh factor was negative, and other routine lab values were within normal limits. She was not diabetic but was previously diagnosed with neurocysticercosis, which has no known significance to pregnancy.

The initial sonogram was performed transabdominally using a Philips HD11 (Bothell, Washington) with a 5- to 2-MHz curved-array transducer. The

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DOI: 10.1177/8756479308315225

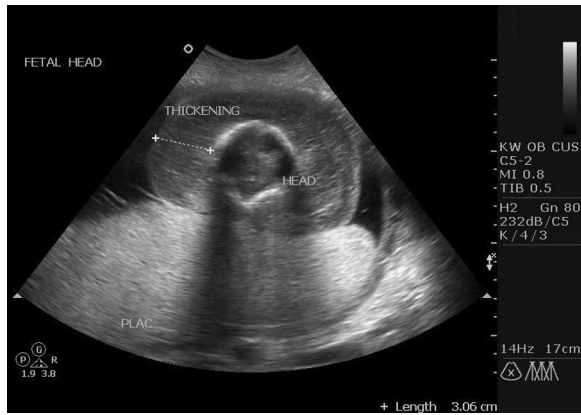


FIGURE 1. Transverse view of fetal skull with massive skin thickening.

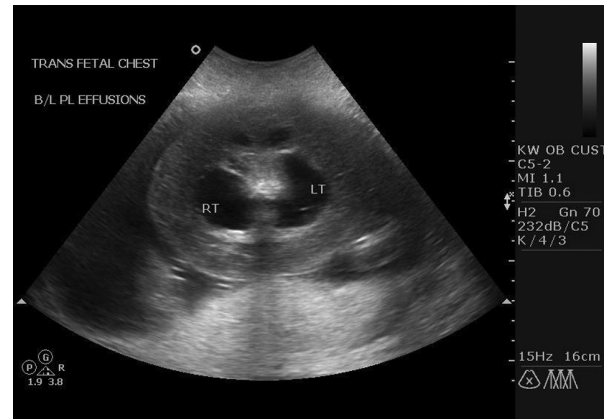


FIGURE 3. Transverse view of bilateral pleural effusions.

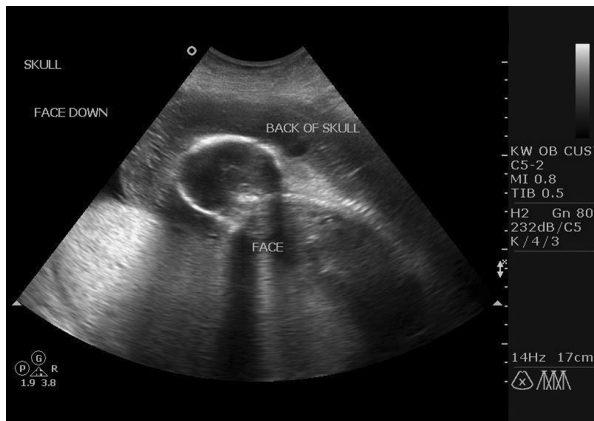


FIGURE 2. Parasagittal view of head, neck, and thorax with gross edema.



FIGURE 4. Sagittal view of thoraces with bilateral pleural effusions.

fetus was in a breech position with fetal movement present. Multiple abnormal sonographic findings were seen, including axillary and inguinal fluid and large, bilateral pleural effusions. There was a massive gross subcutaneous edema especially surrounding the head, neck, thorax, and abdomen (Figures 1–4). The right kidney was not visualized well, the left kidney was abnormally echogenic, and the bladder was empty at the time of the examination. The fetal heart was extremely difficult to image so no morphologic assessment could be made relating to the presence of pericardial effusion. The heart rate, however, was normal. The placenta was posterior, grade 0, and thickened at 7.5 cm. There was also an incomplete fusion of the amnion and chorion.

Fetal long bones, head, and abdominal circumference measurements were proportional, with an estimated gestational age of 19 weeks, 3 days, and estimated fetal weight of 311 g. Polyhydramnios was noted with composite four-quadrant amniotic fluid index (AFI) of 24 cm. All fetal biometric measurements correlated with the patient's last menstrual period. Sonographic findings and Rh-negative factor suggested nonimmune hydrops fetalis (NIHF). Sonographic results and associated mortality rates were discussed with the patient and her spouse, who both desired to continue the pregnancy without intervention.

Three weeks later, the patient returned to the clinic complaining of a lack of fetal movement for three days and was again referred for sonographic



FIGURE 5. Anterior view of postmortem fetus. Note massive gross skin edema.

evaluation. The second sonogram revealed absent fetal heart tones consistent with an intrauterine fetal demise. Fetal biometric measurements corresponded to an estimated gestational age of 21 weeks, 0 days. Again seen were the abnormal findings presented on the initial sonogram, except the AFI was reported as normal. The recommendation of prompt induction was made, and the patient was sent to the hospital that same day. After vaginal delivery of a demised fetus, the patient required treatment for a uterine infection, likely secondary to retained products of conception, a complication of premature birth in the second trimester. Postmortem autopsy (Figure 5) was performed; the pathologist was able to identify both kidneys and fetal heart and reported extramedullary hematopoiesis of both organ systems, leading to a hypothesis that the NIHF in this case was probably due to fetal anemia. Rh negativity combined with autopsy findings confirmed the diagnosis of NIHF. The patient and her spouse declined genetic testing, so the possibility of chromosomal abnormalities remained in question.

Discussion

Nonimmune hydrops fetalis is a rare, usually fatal condition that occurs in 1/1500 to 1/4000 births, most of which die in utero.¹ NIHF, a separate condition from fetal immune hydrops, is caused by Rh incompatibility that results in an overaccumulation of fluid in the interstitial tissues

of the fetus. NIHF is suspected when there are at least two of the following sonographic findings: skin edema, pleural effusion, pericardial effusion, fetal ascites, and polyhydramnios.² Although NIHF is predominantly fatal, the literature states that the mortality rate ranges from 50% to 100% depending on the etiology. Some of the many disorders associated with NIHF include aneuploidy, abnormalities of the cardiovascular system, arrhythmias, chorioangiomas, vascular abnormalities, thoracic abnormalities, fetal anemia, and twin-to-twin transfusion syndrome. Infectious disease processes, including toxoplasmosis, rubella, cytomegalovirus, and herpes, may also result in NIHF.³⁻⁵

Laboratory tests that can help screen for NIHF include red blood cell count, blood type and antibody screen, and IgM and IgG tests to assess whether the infection is acute or chronic for cytomegalovirus, toxoplasmosis, and parvovirus.⁶

Conclusion

In the presence of a large-for-gestational-age diagnosis, potential findings may include polyhydramnios, fetal abnormalities, poor dating, multiple gestations, and fetal hydrops. In the absence of a positive Rh screen, finding fetal hydrops may have a number of etiologies. Detailed sonography of fetal gross anatomy and biometric measurements are excellent screening tools for most fetal pathologies. The noninvasive nature of the examination, combined with prompt availability and low cost, make sonography the best imaging modality in the antenatal patient. Because medical management of NIHF is limited, early sonographic diagnosis assists with timely counseling, change in clinical management, and support, which may be offered earlier to help cope with outcome and prognosis.

Acknowledgments

The author offers special thanks to the following people: Sally Weaver, MD, Family Health Center, Waco, Texas; Alan Northcutt, MD; Jose R Yau, BS, CT (ASCP) for fetal autopsy photos; Charlotte Litton, RDMS, RVT, RT(r), Family Health Center,

Waco, Texas; and Kim Whitehead, RDMS, RT(r), Family Health Center, Waco, Texas.

References

1. Wy CA, Sajous CH, Loberiza F, Weiss MG: Outcome of infants with a diagnosis of hydrops fetalis in the 1990's. *Am J Perinatol* 1999;16:561–567.
2. Callen, P: *Ultrasonography in Obstetrics and Gynecology*. 4th ed. Philadelphia, W. B. Saunders, 2000.
3. Kessel, I, Makhoul, IR, Sujov, P: Congenital hypothyroidism and nonimmune hydrops fetalis: associated? *Pediatrics* 1999;103:E9.
4. Barron SD, Pass RF: Infectious causes of hydrops fetalis. *Semin Perinatol* 1995;19:493–501.
5. Arcasoy MO, Gallagher PG: Hematologic disorders and nonimmune hydrops fetalis. *Semin Perinatol* 1995;19:502–515.
6. American Academy of Pediatrics and the American College of Obstetricians and Gynecologists: *Guidelines for Perinatal Care*. 5th ed. Elk Grove Village, IL, AAP/ ACOG, 2002.