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CASE REPORT

Challenges in Determining Chorionicity and Diagnosing Selective Fetal Growth Restriction in Multifetal Pregnancies with Suspected Twin-Twin Transfusion Syndrome: A Case Report

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Introduction: Chorionicity is a key determinant of perinatal outcomes in twin pregnancies, with monochorionic gestations carrying greater risks due to complications such as twin-to-twin transfusion syndrome (TTTS) and selective fetal growth restriction (sFGR). Although first-trimester ultrasound can determine chorionicity with near-perfect accuracy, assessment becomes less reliable in late gestation, increasing the risk of misclassification. Such diagnostic errors may lead to inappropriate management strategies, particularly when distinguishing between TTTS and sFGR, which require different clinical approaches.

Case Presentation: A 38-year-old woman underwent routine antenatal assessment at 34–35 weeks' gestation, where ultrasound suggested a monochorionic diamniotic pregnancy with suspected TTTS based on the presence of T-sign and discordant amniotic fluid volumes. The diagnostic turning point occurred at delivery, when postnatal evaluation revealed a dichorionic diamniotic placenta, clarifying that the findings were consistent with sFGR rather than TTTS. The first neonate weighed 2610 g with a normally sized placenta (20 × 20×2 cm), while the second weighed 510 g with a markedly smaller placenta (10 × 10×1.5 cm). According to the Delphi criteria, the diagnosis of sFGR was confirmed, as the smaller twin had an estimated fetal weight below the 10th percentile and intertwin weight discordance exceeded 25%.

Conclusion: This case illustrates how late-gestation assessment of chorionicity can lead to diagnostic misclassification, resulting in management strategies that may not align with the underlying pathology. Early and regular ultrasound surveillance—ideally beginning in the first trimester and continued every 2–4 weeks—remains essential for accurate diagnosis and appropriate monitoring of complications such as TTTS and sFGR.

Keywords: chorionicity, multiple pregnancy, sFGR, twin-to-twin transfusion syndrome

Introduction

Determining chorionicity—the classification of placental structure as either monochorionic or dichorionic—is fundamental in managing multifetal pregnancies, as it significantly influences antenatal surveillance and perinatal outcomes.[1] Monochorionic twins, sharing a single placenta, are at heightened risk for complications such as twin-twin transfusion syndrome (TTTS) and selective fetal growth restriction (sFGR).[2] Accurate determination of chorionicity is optimally performed in the first trimester using ultrasonographic markers like the lambda (λ) or T-signs.[3] However, challenges arise when these markers are ambiguous or when prenatal care is initiated beyond the first trimester, complicating the accurate assessment of chorionicity.

Diagnosing sFGR in the context of suspected TTTS presents additional complexities. sFGR is characterized by significant intertwin discrepancies in estimated fetal weights, typically defined as a difference of 25% or more, with one twin's weight falling below the 10th percentile for gestational age.[4] Conversely, TTTS is identified by discordant amniotic fluid volumes—polyhydramnios in the recipient twin and oligohydramnios in the donor twin—resulting from

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unbalanced intertwin blood flow.[5] Distinguishing between these conditions is critical, as their management strategies differ; however, overlapping clinical presentations can obscure accurate diagnoses.

The timing and frequency of ultrasonographic evaluations are pivotal in monitoring multifetal pregnancies at risk for TTTS and sFGR.[6] Current guidelines recommend initiating ultrasound surveillance at 16 weeks of gestation for monochorionic-diamniotic twin pregnancies, with follow-up assessments at least every two weeks until delivery. This regimen facilitates the early detection of complications, enabling timely interventions.[7,8] Nonetheless, implementing such intensive monitoring can be logistically challenging, particularly in resource-limited settings or for patients with restricted access to specialized maternal-fetal medicine services.

Case Presentation

A 38-year-old woman referred for a routine antenatal check-up at approximately 34–35 weeks of gestation with a twin pregnancy. The first fetus (Baby I) was in a breech position, while the second fetus (Baby II) was diagnosed with polyhydramnios and intrauterine fetal demise (IUFD). The pregnancy was suspected to be complicated by Twin-Twin Transfusion Syndrome (TTTS), classified as Quintero Stage V. The patient denied experiencing increasing frequency or intensity of uterine cramps and reported no excessive fluid leakage from the birth canal. She was first informed of her twin pregnancy during an obstetric consultation at two months of gestation. There was no reported family history of twin pregnancies or congenital abnormalities. While the patient admitted to taking medication during pregnancy, she was unable to recall the specific drugs. She denied the use of herbal medicine and had no history of chronic conditions such as hypertension, diabetes, asthma, or heart disease. The patient has had two previous full-term spontaneous vaginal deliveries. Her first child was delivered in 2003 at term, weighing 3000 grams, and was born healthy. The second child was also delivered at term in 2011, weighing 3000 grams, and was similarly in good health. This is her third pregnancy.

Upon physical examination, the patient was fully conscious (compos mentis) with stable vital signs: blood pressure of 135/82 mmHg, pulse rate of 96 beats per minute, respiratory rate of 18 breaths per minute, and body temperature of 36.5°C. Her height was recorded at 157 cm, and her current weight was 70 kg, with a pre-pregnancy weight of 62 kg. On abdominal examination, the abdomen was convex and soft. The symphysis-fundal height (TFU) measured 41 cm, and the abdominal circumference (LP) was 101 cm. No uterine contractions (His) were observed. Fetal heart rate auscultation (BJA) revealed a heart rate of 152–156 beats per minute for the first fetus, while no heart sounds were detected for the second fetus. The CTG results were classified as Category I. The patient's complete blood count showed hemoglobin (Hb) of 12.9 g/dL, hematocrit (Ht) of 39.5%, leukocyte count of 10,150/mm^3, and platelet count of 200,000/mm^3. Coagulation profile results were within normal limits, with prothrombin time (PT) of 13.1 seconds, activated partial thromboplastin time (APTT) of 28.10 seconds, and an international normalized ratio (INR) of 0.95. The fibrinogen level was 415.0 mg/dL, and D-dimer was elevated at 1.52 µg/mL.

Ultrasound Examination Result

The ultrasound confirmed an intrauterine twin pregnancy with notable fetal growth discordance and findings consistent with advanced-stage Twin–Twin Transfusion Syndrome (TTTS) (Figure 1). The imaging demonstrated marked amniotic fluid discrepancy between the fetuses, with one twin appearing compressed within a reduced fluid space while the co-twin was surrounded by excessive amniotic fluid. The ultrasound also showed a clear T-sign at the intertwin membrane attachment, supporting the diagnosis of a monochorionic diamniotic gestation. Additionally, the sonographic appearance revealed differences in bladder size and fetal positioning that further supported the suspicion of progressive TTTS.

Fetus A was in a breech presentation, with biometric measurements corresponding to 35–36 weeks of gestation (TCD consistent with 36–37 weeks). The estimated fetal weight (TBBJ) was 2759 grams, placing it in the 41st percentile for gestational age. Fetal heart pulsations were present. Facial structures appeared normal, with a clearly visualized nasal bone and nostrils, and no evidence of cleft abnormalities. Cardiac assessment showed a normal four-chamber view (4CV), a cardiothoracic area ratio (CTAR) of 24%, and a cardiac axis of 51.05 degrees. The stomach and urinary bladder were normally filled, and both kidneys appeared normal in structure. The amniotic fluid level was within normal limits, with a single deepest pocket (SDP) measuring 5.22 cm. Doppler velocimetry for Fetus A demonstrated: Umbilical artery: PI 0.89, S/D ratio 2.40, Middle cerebral artery (MCA): PI 1.36, S/D ratio 3.58, Uterine arteries: Right uterine artery PI 0.57; Left uterine artery PI 0.73.

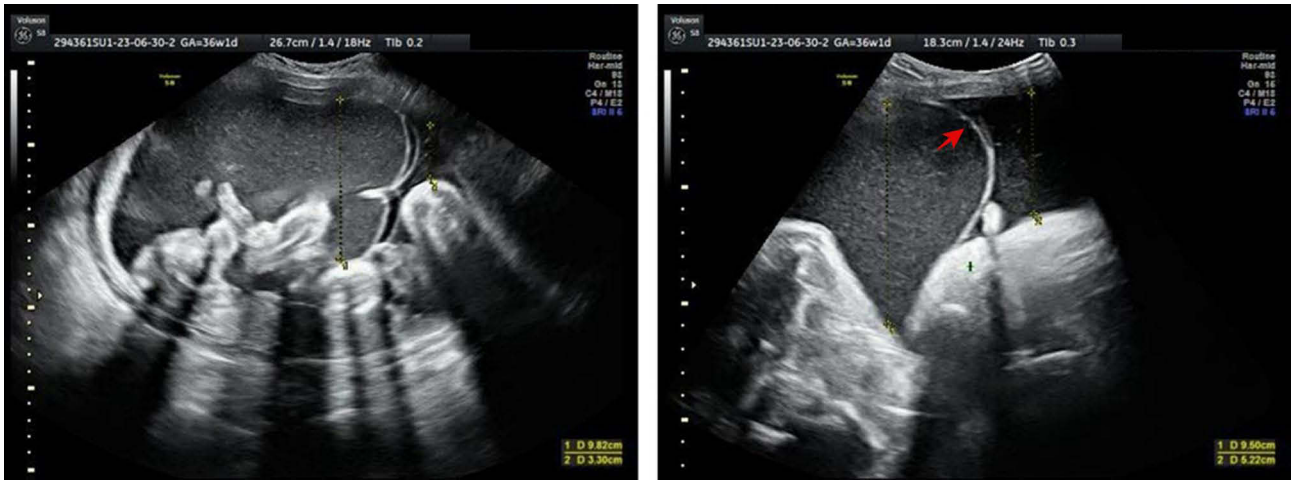

Figure 1 Fetomaternal ultrasound images showing a monochorionic diamniotic twin pregnancy with marked amniotic fluid discordance, fetal size discrepancy, and a visible T-sign (red arrow), consistent with twin–twin transfusion syndrome (TTTS).

Fetus B was in a cephalic presentation with biometric measurements corresponding to 22–23 weeks of gestation. The estimated fetal weight (TBBJ) was 512 grams, placing it below the 1st percentile, indicative of severe growth restriction. No fetal heart activity was detected, and a positive Spalding sign confirmed intrauterine fetal demise (IUFD). Thoracic and abdominal structures were difficult to evaluate due to technical limitations. Amniotic fluid volume was elevated, with an SDP of 9.50 cm, consistent with polyhydramnios.

Placental and Chorionicity Assessment

The placenta was located in the posterior corpus, with the presence of a clear zone suggesting dichorionicity. A positive T-sign, the presence of a septum, and a single-lobe placenta were observed. The discordance in estimated fetal weight between the twins was 81%, significantly exceeding the threshold for severe selective fetal growth restriction (sFGR). These findings were suggestive of a dichorionic monoamniotic twin pregnancy, despite the initial suspicion of monochorionic diamniotic TTTS.

Impression

The ultrasound findings indicated a 35–36-week twin pregnancy complicated by severe growth discordance, polyhydramnios in Fetus B, and intrauterine fetal demise. The presentation was consistent with TTTS, Quintero Stage V, though the marked growth discordance also raised considerations for selective fetal growth restriction (sFGR).

Neonatal Outcomes

A male infant (Baby I) was delivered with a birth weight of 2610 grams and a body length of 47 cm. The Apgar scores were 7 at 1 minute and 9 at 5 minutes, indicating a stable postnatal adaptation. The neuromuscular and physical maturity assessment (New Ballard Score) corresponded to approximately 36 weeks of gestation. The neonate is currently receiving postnatal care in the Anturium unit without the need for respiratory support, suggesting a good initial adaptation to extrauterine life.

The second twin (Baby II), also male, was delivered with a birth weight of 510 grams and a body length of 30 cm. Unfortunately, there were no signs of life at birth, and the infant exhibited Grade III maceration, indicating prolonged intrauterine fetal demise. The findings further support the diagnosis of severe selective fetal growth restriction (sFGR) and complications related to Twin-Twin Transfusion Syndrome (TTTS).

The Placenta

Postnatal gross examination of the placenta revealed a dichorionic diamniotic configuration, confirmed by the presence of two separate placental masses with distinct chorionic plates and a thick intertwin membrane insertion (Figure 2). The placental discs

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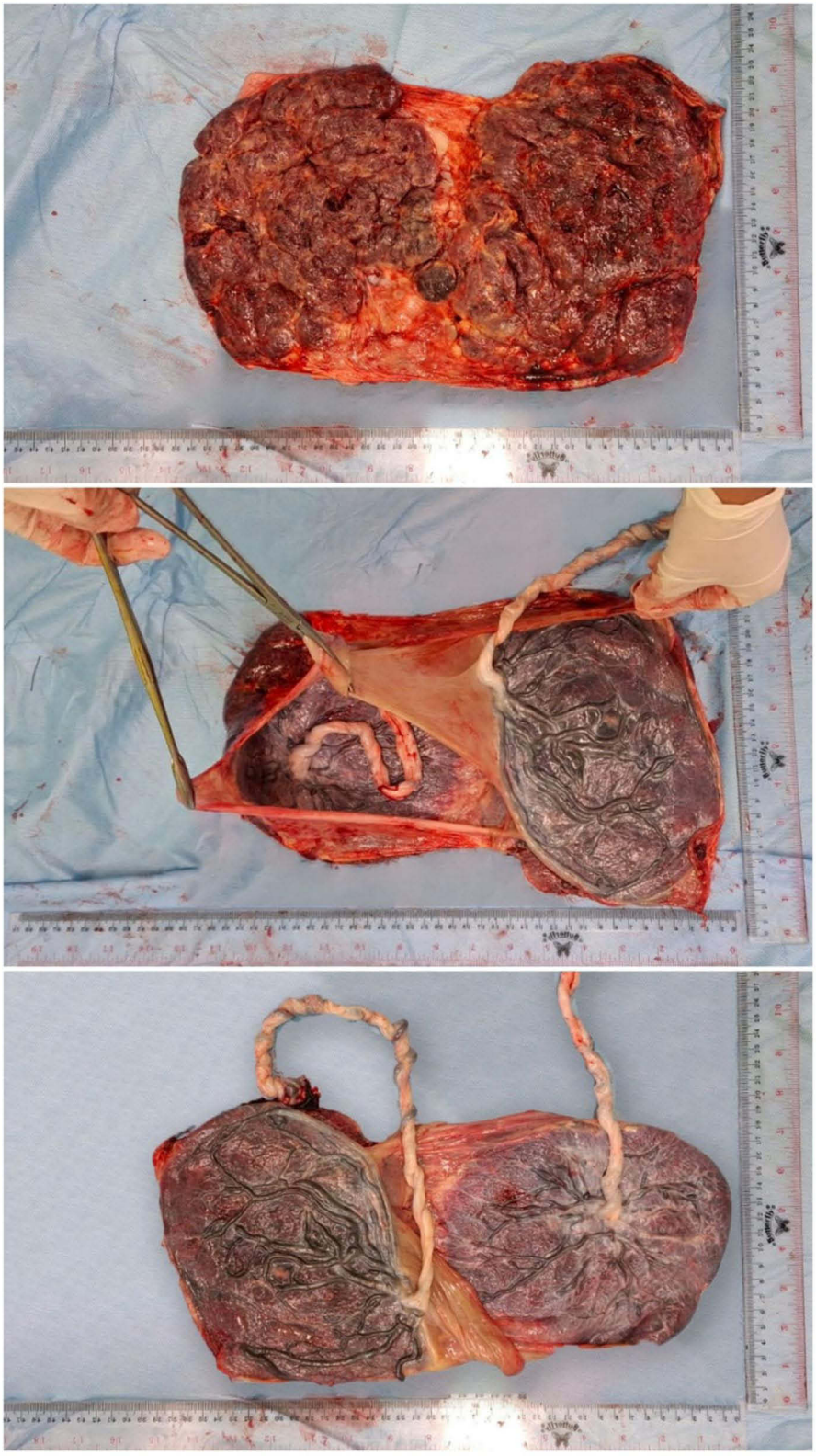

Figure 2 Postnatal gross examination of the placenta from a dichorionic diamniotic twin pregnancy initially suspected as twin-to-twin transfusion syndrome (TTTS), later diagnosed as selective fetal growth restriction (sFGR).

were markedly different in size, with one disc noticeably smaller, consistent with unequal placental sharing—a feature compatible with selective fetal growth restriction (sFGR). The cotyledonary architecture of both discs appeared intact, with no gross evidence of infarction, intervillous thrombi, or extensive villous edema. Careful inspection of the chorionic surface did not reveal large-caliber superficial vascular anastomoses, such as arterio-arterial or veno-venous connections, which are typically associated with twin-to-twin transfusion syndrome (TTTS). These findings supported the diagnosis of sFGR rather than TTTS, correlating with the clinical course and postnatal outcomes.

Discussion

Accurate determination of chorionicity—the classification of placental structure as either monochorionic or dichorionic—is a fundamental aspect of managing twin pregnancies, as it dictates surveillance strategies and clinical decision-making.[6,9] Monochorionic twins, who share a single placenta, face significantly higher risks of complications such as TTTS and sFGR, necessitating close monitoring and timely interventions.[10,11] Ideally, chorionicity is assessed in the first trimester using ultrasonographic markers like the lambda (λ) or T-signs, which help differentiate between dichorionic and monochorionic placentation.[6] However, diagnostic limitations can arise due to suboptimal imaging conditions, the operator's expertise, and the timing of the initial assessment. When prenatal care is initiated later in pregnancy, the ability to accurately determine chorionicity diminishes, increasing the risk of misclassification and leading to inappropriate management strategies that may adversely affect neonatal outcomes.

This case highlights the profound impact of delayed prenatal assessment on diagnostic accuracy and clinical management. The patient, whose first ultrasound was conducted only in the third trimester, was initially diagnosed with monochorionic diamniotic TTTS. However, postnatal examination of the placenta confirmed a dichorionic diamniotic pregnancy, and the clinical presentation was more consistent with sFGR rather than TTTS. This misdiagnosis underscores the challenges associated with late ultrasound assessment, where distinguishing between these two conditions becomes increasingly difficult as gestation advances.[12] The lack of early ultrasonographic assessment likely led to erroneous assumptions about placentation and pathophysiology, illustrating the critical need for first-trimester chorionicity determination to guide appropriate antenatal care.[13]

Early and precise determination of chorionicity facilitates individualized surveillance protocols and timely medical interventions, ultimately improving perinatal outcomes. Current guidelines from The International Society of Ultrasound in Obstetrics and Gynaecology (ISUOG) recommend that monochorionic pregnancies undergo ultrasound surveillance starting at 16 weeks of gestation, with follow-up evaluations every two weeks until delivery.[8,14] This rigorous monitoring schedule ensures early detection of complications such as TTTS and sFGR, allowing for prompt intervention strategies like laser photocoagulation of placental anastomoses in TTTS or close growth surveillance and delivery planning in sFGR. Conversely, delayed or inaccurate assessment of chorionicity may result in inappropriate monitoring intervals, leading to undiagnosed or mismanaged complications that significantly heighten the risk of perinatal morbidity and mortality.[15,16]

Distinguishing TTTS from sFGR is particularly critical, as each condition requires a distinct management approach. TTTS is caused by unbalanced intertwin blood flow due to placental vascular anastomoses, resulting in discordant amniotic fluid volumes, with polyhydramnios in the recipient twin and oligohydramnios in the donor twin.[5,17] By contrast, sFGR is characterized by significant intertwin discrepancies in estimated fetal weights, typically defined as a weight difference of 25% or more, with one twin's estimated weight below the 10th percentile for gestational age.[4,18] While TTTS often necessitates fetal therapy such as fetoscopic laser surgery, sFGR management relies primarily on optimizing intrauterine growth conditions and timing delivery appropriately.[18] The inability to differentiate between these conditions due to late diagnosis can lead to incorrect treatment approaches, which may not address the underlying pathology effectively.

This case also underscores the potential consequences of misclassification and delayed diagnosis on maternal and neonatal outcomes. The initial assumption of TTTS led to a management plan that may not have been optimal for an actual case of sFGR, thereby potentially impacting fetal growth and perinatal prognosis. Misdiagnosis can lead to unnecessary or even harmful interventions, such as laser therapy in cases misidentified as TTTS or insufficient monitoring in cases of overlooked sFGR.[5,6,19] The importance of a structured approach to the early diagnosis of

chorionicity and fetal growth abnormalities cannot be overstated, as failure to do so can result in suboptimal outcomes. This report is limited by its single-case design, which restricts the generalizability of the findings, and by the absence of histopathological examination of placental vascular anastomoses that could have provided additional confirmation of the underlying pathophysiology.

In addition to the diagnostic challenges highlighted above, this case also reflects broader systemic issues relevant to regions with limited healthcare infrastructure. In such settings, delayed referral and inadequate antenatal surveillance commonly contribute to missed or late diagnoses of chorionicity-related complications. To address these gaps, strengthening continuous medical education for frontline antenatal care providers—such as midwives, general practitioners, and primary-level obstetric staff—is essential. Educational initiatives should emphasize the importance of first-trimester ultrasound for accurate chorionicity determination, the need for early referral to tertiary obstetric centers when multifetal gestations are suspected, and adherence to guideline-based serial ultrasound monitoring. Enhancing provider awareness and competence in these areas may help prevent misclassification, improve detection of conditions such as TTTS and sFGR, and ultimately reduce adverse perinatal outcomes, particularly in low-resource healthcare environments.

Conclusion

The optimal time for determining chorionicity in twin pregnancies is during the first-trimester, as it provides the highest diagnostic accuracy, approaching 100% when using ultrasonographic markers such as the lambda (λ) sign for dichorionic twins and the T-sign for monochorionic twins. Early determination of chorionicity is crucial, as it guides appropriate surveillance strategies and management decisions, significantly impacting perinatal outcomes. However, in this case, the first ultrasound was not performed until the third trimester, making an accurate diagnosis of chorionicity challenging. Late gestational assessment is less reliable due to placental fusion, fetal growth disparities, and reduced amniotic fluid volume, which obscure key ultrasonographic markers. Given the higher risks associated with twin pregnancies, current guidelines recommend ultrasound monitoring every 2–4 weeks, ensuring stepwise evaluation of fetal anatomy, growth patterns, and potential complications such as sFGR and TTTS to optimize maternal and fetal outcomes. In resource-limited settings or in patients who present late for antenatal care, careful reassessment of chorionicity using all available clinical and ultrasonographic clues—ideally supported by multidisciplinary review—is essential to avoid misclassification and ensure appropriate surveillance and management.

Informed Consent Patient Statement

No formal ethical clearance was required for the publication of this case. No institutional approval was required for the publication of this case. The authors confirm that written informed consent for publication of this case report and any accompanying images was obtained from the patient and her spouse. The patient was informed in detail about the case content and agreed to its publication. All personal identifiers have been removed to ensure patient anonymity.

Disclosure

The author(s) report no conflicts of interest in this work.

References

1. Liu J, Liu Q, Zhao J, Li D, Zhou Y. The controversies and challenges in the management of twin pregnancy: from the perspective of International Federation of Gynecology and Obstetrics Guidelines. *Maternal-Fetal Med*. 2022;4(4):255–261. doi:10.1097/FM9.0000000000000170
2. Groene SG, Tollenaar LSA, Slaghekke F, et al. Placental characteristics in monochorionic twins with selective intrauterine growth restriction in relation to the umbilical artery Doppler classification. *Placenta*. 2018;71:1–5. doi:10.1016/j.placenta.2018.09.006
3. Maruotti GM, Saccone G, Morlando M, Martinelli P. First-trimester ultrasound determination of chorionicity in twin gestations using the lambda sign: a systematic review and meta-analysis. *Eur J Obstetrics Gynecol Reprod Biol*. 2016;202:66–70. doi:10.1016/j.ejogrb.2016.04.023
4. Huang N, Chen W, Jiang H, et al. Metabolic dynamics and prediction of sFGR and adverse fetal outcomes: a prospective longitudinal cohort study. *BMC Med*. 2023;21(1):455. doi:10.1186/s12916-023-03134-9
5. Miller JL. Twin to twin transfusion syndrome. *Transl Pediatr*. 2021;10(5):1518–1529. doi:10.21037/tp-20-264
6. Townsend R, Khalil A. Ultrasound surveillance in twin pregnancy: an update for practitioners. *Ultrasound*. 2018;26(4):193–205. doi:10.1177/1742271X18794013
7. Khalil A, Sotiriadis A, Baschat A, et al. ISUOG practice guidelines (updated): role of ultrasound in twin pregnancy. *Ultrasound Obstet Gynecol*. 2025;65(2):253–276. doi:10.1002/uog.29166

8. Lee HS, Abbasi N, Van Mieghem T, et al. Guideline No. 440: management of monochorionic twin pregnancies. *J Obstet Gynaecology Canada*. 2023;45(8):587–606.e8. doi:10.1016/j.jogc.2023.05.018
9. Blumenfeld YJ, Momirova V, Rouse DJ, et al. Accuracy of sonographic chorionicity classification in twin gestations. *J Ultrasound Med*. 2014;33 (12):2187–2192. doi:10.7863/ultra.33.12.2187
10. Chalouhi GE, Stirnemann JJ, Salomon LJ, Essaoui M, Quibel T, Ville Y. Specific complications of monochorionic twin pregnancies: twin–twin transfusion syndrome and twin reversed arterial perfusion sequence. *Semin Fetal Neonatal Med*. 2010;15(6):349–356. doi:10.1016/j.siny.2010.09.003
11. Borse V, Shanks AL. Twin-to-twin transfusion syndrome; 2025.
12. Baud D, Windrim R, Van Mieghem T, Keunen J, Seaward G, Ryan G. Twin–twin transfusion syndrome: a frequently missed diagnosis with important consequences. *Ultrasound Obstet Gynecol*. 2014;44(2):205–209. doi:10.1002/uog.13328
13. Wang Y, Zhang A, Stock T, Lopriore E, Oepkes D, Wang Q. The accuracy of prenatal diagnosis of selective fetal growth restriction with second trimester Doppler ultrasound in monochorionic diamniotic twin pregnancies. *PLoS One*. 2021;16(8):e0255897. doi:10.1371/journal.pone.0255897
14. Hoskins IA, Combs CA. Society for maternal-fetal medicine special statement: updated checklists for management of monochorionic twin pregnancy. *Am J Obstet Gynecol*. 2020;223(5):B16–B20. doi:10.1016/j.ajog.2020.08.066
15. Zaami S, Masselli G, Brunelli R, Taschini G, Caprasecca S, Marinelli E. Twin-to-twin transfusion syndrome: diagnostic imaging and its role in staving off malpractice charges and litigation. *Diagnostics*. 2021;11(3):445. doi:10.3390/diagnostics11030445
16. Gratacós E, Ortiz JU, Martinez JM. A systematic approach to the differential diagnosis and management of the complications of monochorionic twin pregnancies. *Fetal Diagn Ther*. 2012;32(3):145–155. doi:10.1159/000342751
17. Khalil A, Prasad S, Cruz-Martínez R. Atypical twin–twin transfusion syndrome. *Ultrasound Obstet Gynecol*. 2022;60(4):461–469. doi:10.1002/uog.24899
18. El Emrani S, Groene SG, Verweij EJ, et al. Gestational age at birth and outcome in monochorionic twins with different types of selective fetal growth restriction: a systematic literature review. *Prenat Diagn*. 2022;42(9):1094–1110. doi:10.1002/pd.6206
19. Sorrenti S, Khalil A, D'Antonio F, et al. Counselling in fetal medicine: complications of monochorionic diamniotic twin pregnancies. *J Clin Med*. 2024;13(23):7295. doi:10.3390/jcm13237295