CASE REPORT

Challenges in Antenatal Diagnosis of Conjoined Twins in Primary Care Setting: A Case Report.

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Abstract
Conjoined twins (CT) represent a rare embryologic anomaly with an uncertain aetiology. Although uncommon, this condition is associated with a high perinatal mortality rate. Early detection during the first trimester is therefore crucial to enable timely intervention and referral to a tertiary care centre. First-trimester dating scans in primary care are essential not only for confirming viability and determining gestational age but also for identifying multiple pregnancies. However, anomalies in twin pregnancies-such as conjoined twins-may be overlooked during these early scans due to various challenges. This case report discusses the difficulties in detecting CT and explores factors that may contribute to missed diagnoses.

Keywords: *Conjoined twin, Siamese twin, thoracophagus.*

Introduction

Conjoined twins (CT), also known as 'Siamese twins', are a rare embryologic anomaly of uncertain aetiology. This condition is thought to result from an abnormality during the division of a single zygote, typically occurring between 13- and 15-days post-fertilisation [1]. In such cases, incomplete separation of inner cell mass leads to fusion at various sites during embryonic development.

CTs are classified based on their most prominent point of union for diagnostic and prognostic purposes. The abnormality is described using the suffix -pagus, meaning "fixed", and is divided into ventral and dorsal types, with prevalence rates of 87% and 13%, respectively [1]. Ventral unions may involve the thorax (thoracopagus – 19%), abdomen (omphalopagus – 18%), or pelvis (ischiopagus – 11%). Dorsal unions include the skull (craniopagus – 5%), sacrum (pygopagus – 6%), or spine (rachipagus) [1]. Each type presents unique complications and prognostic challenges, largely dependent on the vital organs involved and the feasibility of future surgical separation.

Early detection of CT is crucial to prevent unnecessary surgical delivery and reduce psychological distress for the expectant parents. Historically, CT was commonly diagnosed in the second trimester. However, with advances in ultrasound imaging, first-trimester detection is now possible. Despite this, diagnosing CT in primary care settings—particularly in Malaysia—remains challenging due to multiple contributing factors. This report presents a case in which an early diagnosis of conjoined twins was missed during a routine first-trimester ultrasound.

Case report

A 25-year-old primigravida at 19 weeks' gestation presented for a post-COVID-19 follow-up. Her symptoms had resolved, and she reported no new complaints. A routine antenatal ultrasound revealed two foetal heads at the same level, within the same plane, and facing each other, along with fused chests and abdomens. Only a single foetal heart was visualized (Figure 1).

An earlier dating scan performed at 9 weeks' gestation had shown a viable singleton pregnancy (Figure 2). During her first antenatal appointment, she was well with a normal BMI. History revealed no family history of twins. This was her first pregnancy, a spontaneous conception with no history of assisted reproductive techniques. Her next routine ultrasound appointment in primary care was scheduled for the 20 weeks' gestation. However, she was reviewed earlier, at 19 weeks, in conjunction with her post-infection assessment. She was subsequently referred to a maternal–foetal medicine (MFM) specialist for further evaluation of suspected thoracopagus conjoined twins.

The diagnosis of conjoined twins was confirmed by the MFM specialist. The parents were counselled regarding the poor prognosis of thoracopagus twins, primarily due to the shared vital organs. As this was her first pregnancy and she was already in the second trimester, the mother initially chose to continue with the pregnancy, influenced by cultural and personal beliefs. However, following further discussion and comprehensive counselling, the parents ultimately agreed to terminate the pregnancy.

Labour was induced with prostaglandin at 21 weeks' gestation. Six days post-induction, a stillborn female thoracopagus conjoined twin pair, weighing 750 grams, was delivered without complications (Figure 3). Lactation suppression and psychological support was provided throughout the postnatal period.

Discussion

Conjoined twins (CT) are an exceedingly rare congenital anomaly, with early detection primarily reliant on ultrasonography (USG). While most cases are identified by the second trimester, first-trimester diagnosis remains challenging, particularly in primary care settings due to various limitations.

There have been reports of CT diagnosed as early as seven weeks of gestation. However, the global prevalence of undiagnosed or missed prenatal CT remains undocumented. Despite technological advances, some cases are not identified until as late as 29 weeks' gestation [3]. In the presented case, CT was diagnosed at 19 weeks, which is considered relatively late, and the pregnancy was terminated—an outcome that may contribute to significant psychological distress for the parents.

CT are classified according to the most prominent point of fusion, which directly influences prognosis and mortality. Thoracopagus twins are the most common type, accounting for up to 19% of cases [1]. This subtype typically involves cardiac and hepatic fusion, leading to a poor prognosis due to limited feasibility of surgical separation. Most thoracopagus twins die *in utero* or shortly after birth. Thus, early diagnosis is vital to facilitate timely counselling and, where appropriate, termination of pregnancy—mitigating emotional and psychological impacts on parents and optimising obstetric outcomes.

Ultrasound plays a central role in diagnosing CT. First-trimester ultrasonography is essential for managing multiple pregnancies, determining chorionicity, and assessing obstetric risks. Studies have shown that the identification of chorionicity based on placental number between 11 -14 weeks' gestation has a sensitivity of 100% and a specificity of 99.8% [4]. In addition, early ultrasound helps establish gestational age and assists in accurate labelling of twins [4].

However, delayed CT diagnosis remains a significant challenge in primary care. Contributing factors to missed early detection include small foetal size, suboptimal foetal positioning, operator inexperience, and limited ultrasound resolution. In this case, the operator's inexperience likely contributed to the missed diagnosis.

Identifying the sonographic features of CT can be difficult for inexperienced primary care clinicians. Features that support a diagnosis include the absence of a dividing membrane between foetuses, visible fusion of body parts, persistent alignment of foetal body planes, fixed positions of the foetuses, and bifid or inseparable appearances despite changes in position [5]. However, in the early first trimester, these features may be subtle or obscured, particularly if foetal positioning is unfavourable, thereby limiting visibility.

Given the stage of foetal development, the risk of missing a CT diagnosis is substantial, especially in resource-limited settings. Research suggests that ultrasounds conducted before 10 weeks of gestation may not reliably detect structural anomalies such as CT, as detection depends on foetal position and image clarity [2].

In this case, the resolution of the ultrasound machine also played a critical role. The initial dating scan at 8 weeks' gestation revealed a single crown–rump length (CRL) with shared cardiac activity, mimicking a singleton pregnancy. Features suggestive of conjoined anatomy, such as fixed foetal positions and shared structures, were overlooked.

To reduce missed or delayed CT diagnoses in primary care, greater emphasis must be placed on foetal anatomic assessment, in addition to viability and gestational age confirmation. If uncertainty exists regarding foetal structure during early scans, follow-up ultrasounds should be scheduled to reassess suspicious findings. Failure to perform follow-up assessments may delay diagnosis until 18-20 weeks' gestation.

In addition, continuous training of primary care practitioners is essential to enhance recognition of atypical features suggestive of CT. Equally crucial is the availability of high-resolution ultrasound equipment with appropriate

magnification in healthcare clinics to improve image quality and diagnostic precision.

In conclusion, this case underscores several key considerations: the importance of adequate training in interpreting first-trimester ultrasounds, the impact of technological advancements on diagnostic capabilities, and the need for clinicians to maintain a high index of suspicion during routine scans. By addressing these elements, the case provides valuable insights into current practice and highlights the importance of vigilance in prenatal screening, especially in primary care settings. Establishing clear referral pathways for suspected foetal anomalies can optimise outcomes by ensuring timely specialist intervention.

Conflict of interest
None

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Authors' contribution:
NFS led the manuscript preparation, data collection, and revisions. NAJ and RH contributed to the manuscript review and final approval.

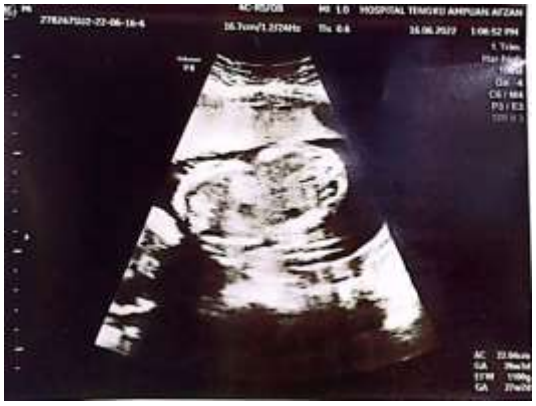

Figure 1. Ultrasound at 19 weeks of gestation

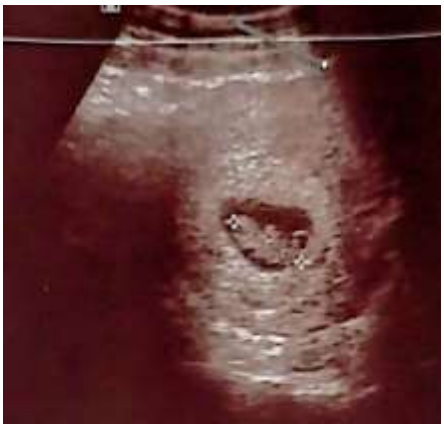

Figure 2. Ultrasound at 9 weeks of gestation

Figure 3. Thoracopagus conjoined twins

References

[1]. Dias, T., Arcangeli, T., Bhide, A., Napolitano, R., Mahsud-Dornan, S., & Thilaganathan, B. (2011). First-trimester ultrasound determination of chorionicity in twin pregnancy. *Ultrasound in Obstetrics and Gynecology*, 38(5), 530–532. https://doi.org/10.1002/uog.8956

[2]. Osmanağaoğlu, M. A., Aran, T., Güven, S., Kart, C., Ozdemir, O., & Bozkaya, H. (2011).

Thoracopagus conjoined twins: A case report. ISRN *Obstetrics and Gynecology*, 2011, Article 238360. https://doi.org/10.5402/2011/238360

[3]. Sabih, D., Ahmad, E., Sabih, A., & Sabih, Q. (2010). Ultrasound diagnosis of cephalopagus conjoined twin pregnancy at 29 weeks. *Biomedical Imaging and Intervention Journal*, 6(4), e38. https://doi.org/10.2349/biij.6.4.e38

[4]. Salomon, L. J., Alfirevic, Z., Bilardo, C. M., Chalouhi, G. E., Ghi, T., Kagan, K. O., Lau, T. K., Papageorghiou, A. T., Raine-Fenning, N. J., Stirnemann, J., Suresh, S., Tabor, A., Timor-Tritsch, I. E., Toi, A., & Yeo, G. (2013). ISUOG practice guidelines: Performance of first-trimester fetal ultrasound scan. *Ultrasound in Obstetrics and Gynecology*, 41(1), 102–113. https://doi.org/10.1002/uog.12342

[5]. Taner, M. Z., Kurdoglu, M., Taskiran, C., Kurdoglu, Z., Himmetoglu, O., & Balci, S. (2009). Early prenatal diagnosis of conjoined twins at 7 weeks and 6 days' gestation with two-dimensional Doppler ultrasound: A case report. *Cases Journal*, 2(7), 8330. https://doi.org/10.4076/1757-1626-2-8330