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Case Report

Conjoined Thoracopagus Twins with Shared Heart and Unique Umbilical Cord Configuration: A Case Report

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Abstract: Thoracopagus twins, a rare and complex form of conjoined twins joined at the thorax, present significant challenges and medical considerations. This abstract reviews the ultrasound imaging findings of thoracopagus twins at 27 weeks of gestation, focusing on prenatal diagnosis and potential clinical implications. Detailed ultrasound examinations reveal shared thoracic structures, including the heart and major blood vessels, as well as individual variations in organ development. Understanding these imaging findings aids in prenatal counselling, delivery planning, and postnatal care coordination, emphasizing the multidisciplinary approach necessary for optimal maternal and fetal outcomes.

Keywords: Thoracopagus twins, Conjoined twins, Ultrasound imaging, Prenatal diagnosis, Shared heart.

INTRODUCTION

Conjoined twins are a rare congenital anomaly resulting from the incomplete division of a monozygotic twin embryo, with an estimated incidence of 1 in 50,000 to 1 in 100,000 live births [1]. These twins are classified based on the site of anatomical union, with thoracopagus twins, joined at the chest, being the most common type, comprising approximately 40% of cases [2].

Embryologically, most authorities favour a late fission model (division of the embryo at 12–15 days post-fertilization). Alternatively, some propose fusion of two originally separate blastocysts via undifferentiated stem cells. All conjoined twins share one chorion, placenta, and amniotic sac; early gestational clues include only one yolk sac with two embryos or absent dividing membranes on ultrasound [3].

The prognosis for conjoined twins is heavily influenced by the extent of shared organs, particularly the heart. In cases where the hearts are significantly conjoined, especially at the ventricular level, surgical separation is often not feasible, leading to a poor survival rate [4]. Prenatal imaging, including ultrasound and magnetic resonance imaging (MRI), plays a critical role in diagnosing and characterizing the anatomy of conjoined twins, facilitating informed management decisions and parental counselling [5]. This case report presents a rare instance of conjoined thoracopagus twins diagnosed prenatally at 27 weeks of gestation, with a shared thoracic cavity, a single structurally abnormal heart, and a unique umbilical cord configuration.

CASE REPORT

A 27 year old gravida 2 para 1 presented for a fetal ultrasound at 27 weeks of gestation with no previous imaging. The ultrasound revealed a monochorionic, monoamniotic twin gestation in which the fetuses were inseparable at the chest. Two heads and necks were visible, each with normal cephalic anatomy, but the thoraces were fused. The twins shared a single large thoracic cavity and upper abdomen. A solitary cardiac silhouette was identified centrally in the fused chest, with echogenicity and motion suggesting a single structurally abnormal heart. Both fetuses had conjoined lung fields, appearing as fused pulmonary tissue across the midline. Diaphragmatic contours could not be clearly delineated between twins. Below the fusion level, each twin had a separate set of abdominal viscera: two stomachs, two sets of bowel loops, two kidneys, and two bladders were seen, indicating no gross abdominal organ fusion. Each fetus had four limbs (two arms and two

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legs), all of which moved spontaneously. No neural tube or extremity anomalies were noted. Color Doppler confirmed a single umbilical cord with three arteries and one vein, coursing cephalad into the placenta. The placenta was singleton, consistent with monochorionicity, and a dividing amniotic membrane was absent, confirming monoamniotic status.

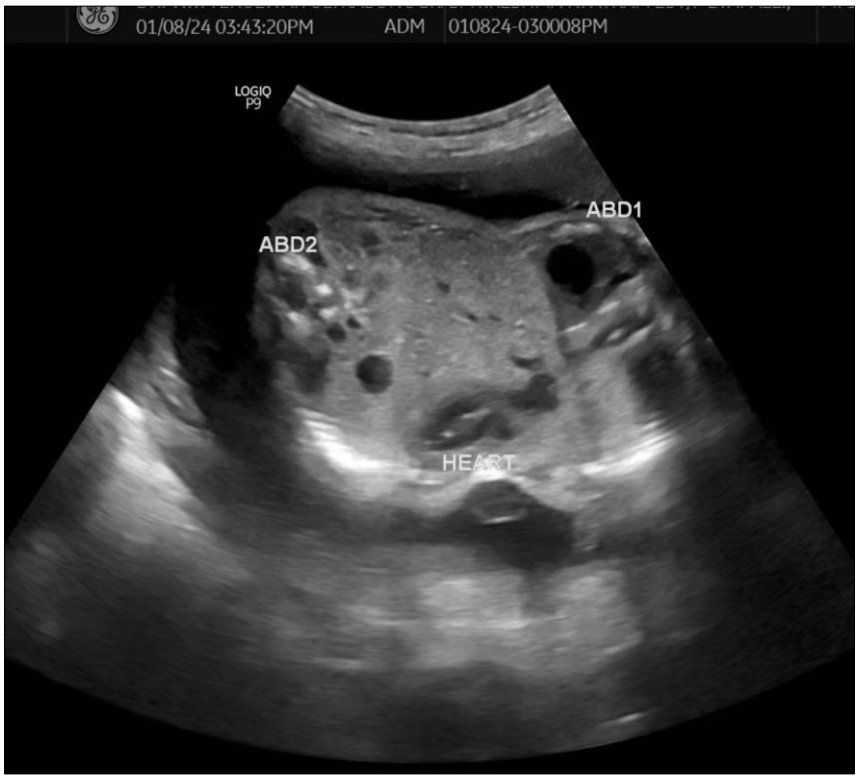

Fig. 1: Ultrasound Axial section shows a shared upper abdomen with a single heart

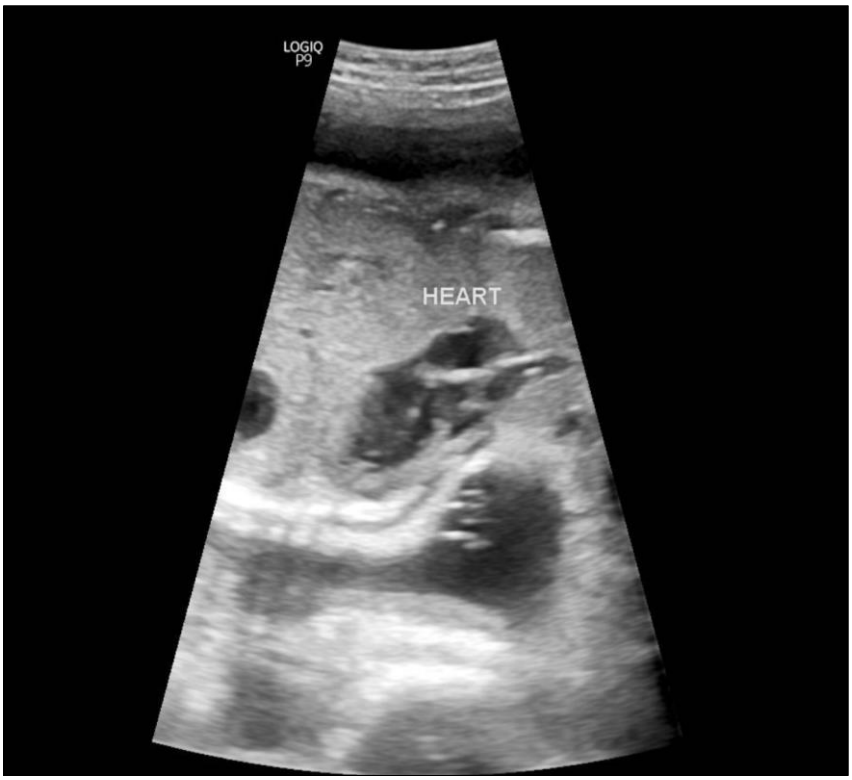

Fig. 2: USG Shows a single structurally abnormal heart

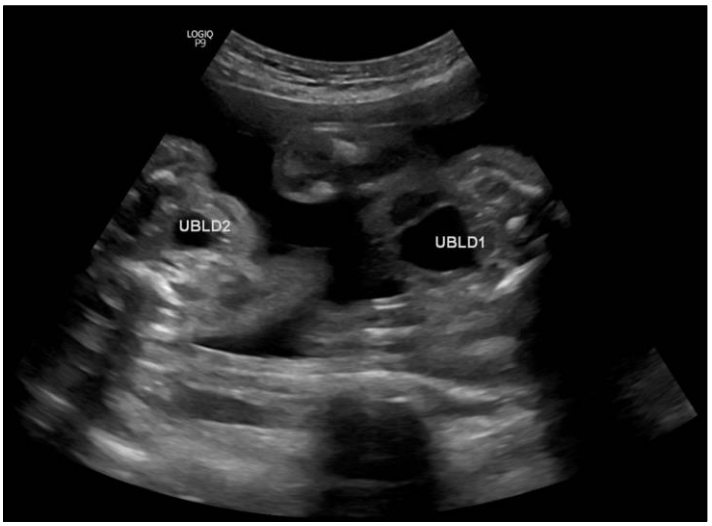

Fig. 3: USG shows two separate bladders in the lower abdomen

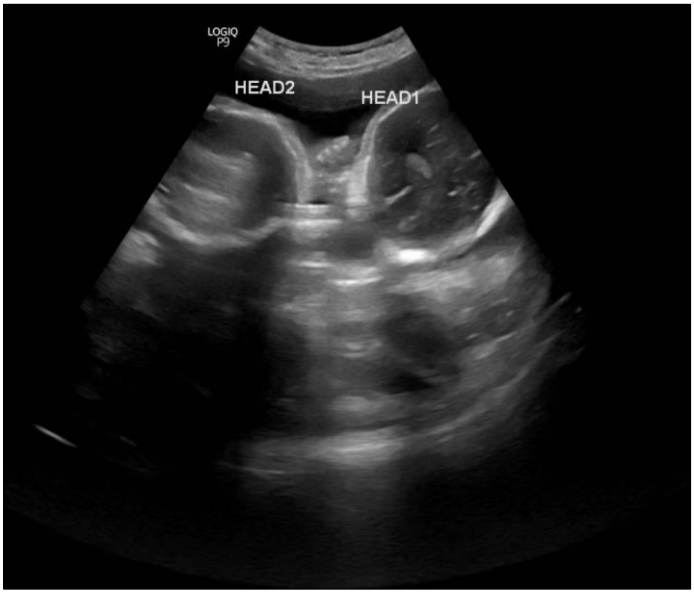

Fig. 4: USG shows two separate fetal heads

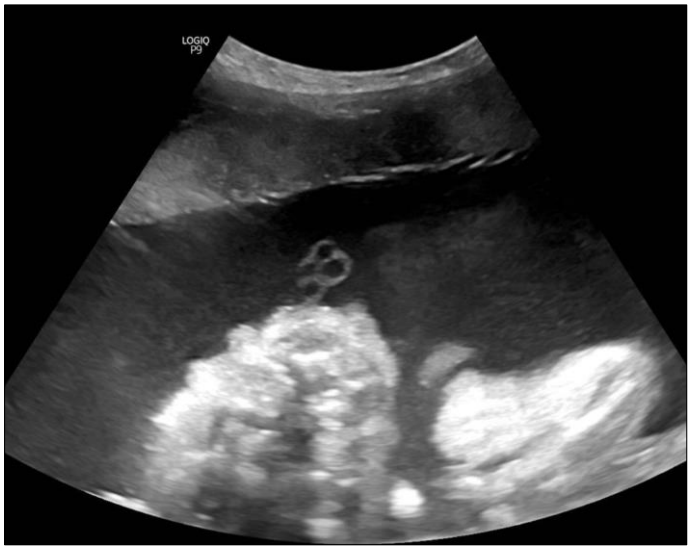

Fig. 5: USG shows a single placenta and a umbilical cord containing four vessels (3 arteries and 1 vein)

DISCUSSION

This case represents conjoined thoracopagus twins with shared thoracic viscera and a single heart and fused lungs. Conjoined twins are classified by the site of fusion [3-6]. Ventral unions (fused face-to-face) include thoracopagus (joined at chest, often sharing a heart) and omphalopagus (joined at abdomen without shared heart). Thoracopagus is the most common type (20–40% of cases) [3]. Prognosis is universally poor: overall survival is cited as only ~25% [6]. Many are stillborn or die in the first day of life. When thoracopagus twins share a single heart and vascular system, survival of both is generally not possible.

By convention, thoracopagus twins are face-to-face ventral unions at the chest with frequently shared cardiac structures. The finding of two separate heads and four limbs confirms a symmetrical (non-parasitic) thoracopagus, rather than a heteropagus (parasitic) twin. The presence of fused lungs suggests near-continuous pulmonary tissue across both twins, which, together with a single heart, is exceedingly rare. The placenta was monochorionic-monoamniotic, as expected in all conjoined twin gestations. The single umbilical cord with an unusual 3-artery/1-vein pattern reflects the union of what would ordinarily have been two separate cords; multiple vessels in the cord is a known sonographic clue to conjoined twins [3-7].

Embryology:

Conjoined twins arise from monozygotic twinning gone wrong. The classic view is incomplete fission of a single blastocyst around days 12–15 post-fertilization. This timing is after the establishment of distinct organ primordia, leading to duplication of most structures but fusion at regions where separation failed. Alternative fusion theories posit that two initially separate embryonic discs may reconnect by stem-cell homology. The exact mechanism in any given case is not certain. In this patient's twins, the shared thoraco-abdominal region suggests an error at the ventral midline. All conjoined twins share a single chorionic sac; monoamniotic status here is not a coincidental finding but inherent to conjoinment [6].

Prenatal imaging is essential for the diagnosis and characterization of conjoined twins, enabling detailed assessment of shared organs and guiding clinical decision-making [5]. Ultrasound, often complemented by MRI, can detect conjoined twins as early as the first trimester, with detailed evaluation of visceral fusion possible by 20 weeks of gestation [5]. In this case, the ultrasound provided critical information about the extent of organ sharing and the vascular configuration, which was vital for prognostic assessment and counselling.

Management options for conjoined twins with significant cardiac conjunction are limited. When separation is not feasible, as in this case, parents may choose to continue the pregnancy with supportive care post-delivery or consider termination, depending on local regulations and personal beliefs. The gestational age of 26 weeks and 6 days suggests that the pregnancy is beyond the typical threshold for termination in many regions, necessitating preparation for delivery and postnatal care. The high rate of stillbirth (approximately 60%) and neonatal mortality (up to 35% within the first 24 hours) in conjoined twins underscores the need for early and accurate prenatal diagnosis to inform parental counseling and management planning [8].

CONCLUSION

This case highlights a rare and devastating form of conjoined twinning: thoracopagus twins with a single heart and fused lungs. Such prenatal diagnosis by ultrasound underscores the importance of detailed anatomic survey and Doppler assessment in suspected monoamniotic twins. Embryologically, the case illustrates incomplete embryonic division and resultant fusion of thoracic structures. Prognosis is essentially fatal once severe cardiac and pulmonary fusion are present. Obstetric management must balance maternal safety with fetal outcome; early detection allows counseling regarding options, including pregnancy termination. If pregnancy is continued, intensive monitoring and planned preterm delivery at a specialized center are warranted. Ultimately, most such cases result in either in utero demise or death at delivery, reflecting the high perinatal mortality of conjoined twins.

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