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Timely intervention following prenatal detection of cord compression in MCMA twins: A case report from an LMIC

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ABSTRACT

Monochorionic monoamniotic (MCMA) twins are rare and high-risk, accounting for only ~1 % of twin pregnancies. They carry the highest perinatal mortality of all twin types due largely to complications like cord entanglement. In our case, a 29-year-old woman with MCMA twins was monitored at our hospital. Serial ultrasounds showed no issues until 31 weeks' gestation, when Doppler imaging revealed tight cord entanglement with markedly increased umbilical venous velocity and repetitive variable decelerations in one twin. The patient was counseled and given antenatal corticosteroids and magnesium sulfate. An urgent cesarean delivery was performed the same day, yielding two live male infants (≈1.66 kg each) who required brief NICU care for prematurity. Both survived without apparent injury. This report highlights how vigilant ultrasound surveillance enabled timely intervention in a rare MCMA pregnancy, preventing likely fetal demise. It underscores that even in resource-constrained settings, close monitoring and prompt action can lead to favorable outcomes in monoamniotic twins.

Introduction

Monoamniotic twins arise when a single fertilized egg splits 9–13 days after conception.[1] The result is a shared placenta and amniotic sac, making this a very rare type of twin pregnancy (~1 % of all twins).[2,3] They occur in approximately 1 in 10,000 total gestations and comprise about 5 % of all monochorionic twin pregnancies.[4] MCMA gestations carry disproportionately high risk: up to 15–25 % of such fetuses have congenital anomalies (especially cardiac),[1,5] and the perinatal mortality rate can exceed 30 % without intensive care.[6,7] Historically, perinatal mortality in MCMA twins was reported as high as 50–70 %. However, with the advent of intensive fetal surveillance (including serial Doppler studies), early diagnosis, and planned delivery between 32 and 34 weeks, survival has improved markedly.[8]

In modern cohorts of MCMA twins who reach viability (≥ 24 weeks), perinatal survival rates now typically range from 80 to 90 %.[2] A large multicenter cohort in England reported overall perinatal mortality of ~14.7 %, with rates declining to as low as 4.5 % for fetuses born at ≥ 33 weeks.[2] Furthermore, a Swedish single-center study documented 97 % survival among fetuses reaching ≥ 24 weeks of gestation, reflecting a 3 % perinatal mortality rate in that cohort.[6] In summary, although MCMA pregnancies still carry a notably higher risk than other twin types, current medical management has reduced perinatal mortality.

Complications are largely due to unique features of MCMA placentation: extensive vascular anastomoses can cause twin-twin transfusion or acute fetal hemodynamic shifts, and the absence of an intertwining membrane means the umbilical cords are almost always entangled.[1,9] In fact, Doppler ultrasound can detect cord entanglement in the vast majority (up to 100 %) of MCMA pregnancies.[9] Although entanglement is "universal" in monoamniotic twins,[5,9] it only becomes dangerous if it causes compression, cord knotting, or hemodynamic compromise.

Because of these risks, MCMA twin pregnancies warrant very close surveillance. Recommended management includes early diagnosis and serial ultrasounds (often Doppler flow studies).[1,10,11] Some guidelines advocate inpatient monitoring from viability onward, with elective delivery by 32–34 weeks to minimize sudden intrauterine death.[7,12]

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However, the evidence on inpatient versus outpatient care is mixed. A recent multicenter study found no definitive mortality benefit of routine hospitalization,[13] and intensive surveillance (whether inpatient or frequent outpatient) has been shown to improve live birth rates.[1,12] In practice, management must balance the risk of very preterm birth against the risk of unexpected fetal demise.

Few reports of MCMA twins originate from low-resource settings. Twin pregnancies in LMICs already carry markedly higher maternal and perinatal mortality compared to high-resource areas.[14] In these settings, access to continuous monitoring or tertiary care may be limited. This makes it essential to detect complications early using available tools (e.g., ultrasound) so that timely intervention, usually cesarean delivery, can be undertaken. In this context, our case exemplifies how vigilant ultrasound follow-up and prompt response can safely manage a high-risk MCMA pregnancy.

Case presentation

A 29-year-old gravida 3, para 1 woman with a history of cesarean section for non-reassuring fetal heart rate and one prior spontaneous abortion presented to our hospital for routine antenatal follow-up. She had no significant past medical or surgical history aside from the previous cesarean delivery. The current pregnancy was confirmed by a positive urine test after one month of amenorrhea. Early first-trimester ultrasonography revealed a multiple gestation with a monochorionic monoamniotic (MCMA) configuration. She initiated antenatal care at a private maternal-child health clinic before being referred to our tertiary facility at 28 weeks for specialized fetal surveillance.

On initial evaluation, she was clinically stable, with normal vital signs (BP 110/64 mmHg, pulse 81 bpm) and an unremarkable systemic examination. Obstetric palpation revealed a 36-week-sized uterus with multiple fetal parts and positive heartbeats for both fetuses. Ultrasound at 28 + 2 weeks confirmed MCMA twins, both in cephalic presentation, with normal fetal heart rates, adequate amniotic fluid, and normal umbilical vein velocities (Twin A: 16 cm/s; Twin B: 14 cm/s). No evidence of cord entanglement was noted at that time. She received routine antenatal care, including two doses of tetanus toxoid, prenatal vitamins, and aspirin 81 mg daily. A full course of antenatal corticosteroids (dexamethasone) was also administered.

The patient was followed with weekly ultrasonography. At 31 weeks, during a routine visit, color Doppler revealed newly developed cord entanglement with significant cord compression (Fig. 1). The umbilical venous velocity in Twin A had increased to 43 cm/s, and cardiotocography demonstrated repetitive variable decelerations (Fig. 2). Estimated fetal weights were 1450 g (Twin A) and 1477 g (Twin B). Given these findings, an emergency delivery was recommended.

The patient was counseled extensively regarding fetal risks and underwent magnesium sulfate infusion for neuroprotection. A cesarean section was performed under spinal anesthesia. Intraoperative findings confirmed a single placenta with two centrally inserted cords, absence of an intertwin membrane, and marked cord entanglement with true knots (Fig. 3a and 3b). Two live male neonates were delivered: Twin A weighed 1660 g (Apgars 8/9), and Twin B weighed 1663 g (Apgars 7/8). Both infants were admitted to the NICU for management of prematurity and mild respiratory distress. The mother's recovery was uneventful.

Discussion

This case illustrates the critical role of timely intervention in a rare MCMA pregnancy with cord entanglement. Monoamniotic twins, though rare and inherently precarious, now have markedly improved survival compared with historical rates.[8] Our patient's outcome was favorable because the impending crisis was detected and managed rapidly. Ultrasound monitoring identified the cord entanglement only when it began causing harm (marked blood flow changes and variable decelerations), prompting immediate delivery. Notably, studies show that when ultrasound (especially Doppler) is used vigilantly, cord entanglement can be seen antenatally in virtually all monoamniotic twins.[5,9,11] In our case, the dramatic rise in umbilical venous velocity and decelerations signaled compression, allowing us to act before fetal demise occurred.

Our approach was guided by current knowledge but adapted to resource constraints. Guidelines typically recommend inpatient monitoring for MCMA twins in late gestation.[1,6] However, reliable evidence shows that either intensive outpatient or inpatient care can achieve similarly high survival rates.[1,12] We managed this pregnancy primarily as an outpatient with weekly ultrasounds, given our limited ability to hospitalize the patient long-term. The good outcome supports findings that structured outpatient surveillance, if done diligently, can be safe.[1,10,12] Importantly, this case underscores that even in a low-resource setting, effective use of available technology (standard ultrasound) can substitute for more advanced monitoring.[15] For example, color Doppler flow assessment, which our hospital could perform, proved decisive in identifying cord compression, a finding

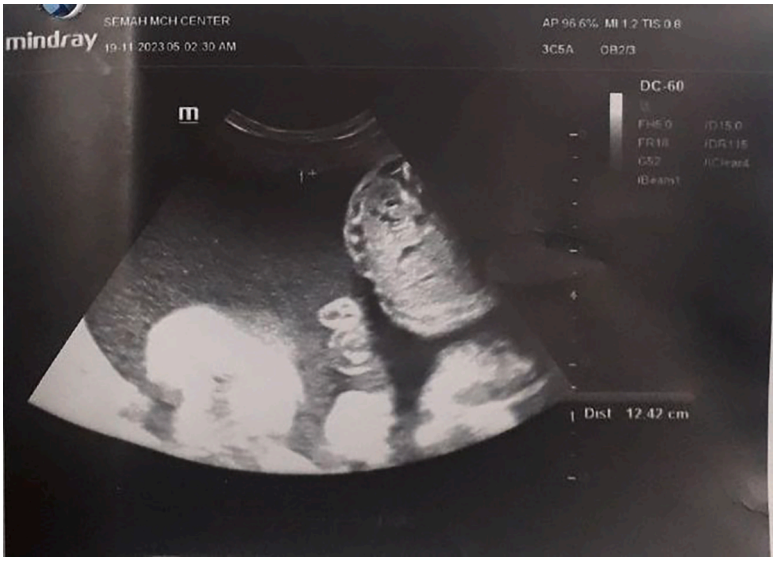


Fig. 1. Ultrasound at 31 weeks' gestation showing both fetuses in a shared amniotic cavity with visible cord-like structures suggestive of umbilical cord entanglement.

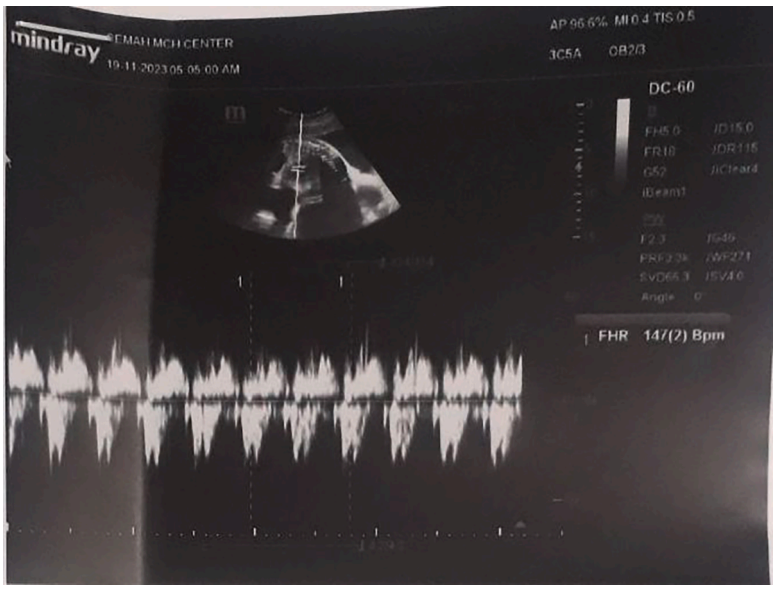


Fig. 2. Pulsed-wave Doppler ultrasound of twin A, recorded during evaluation for increased umbilical venous velocity and variable decelerations.

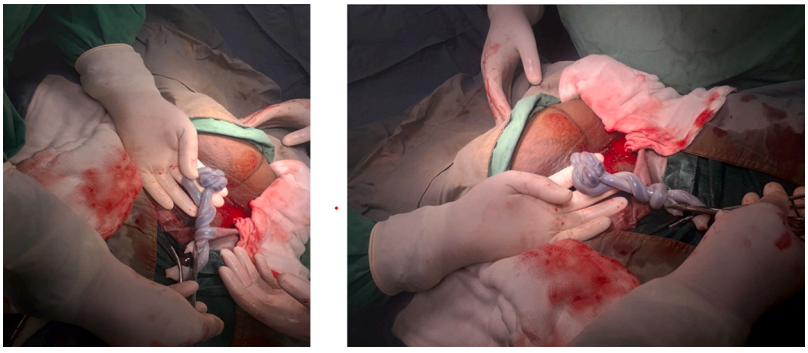


Fig. 3. (a) Intraoperative image showing cord entanglement with true knots. (b) Single placenta with centrally inserted cords and no dividing membrane, confirming monochorionic monoamniotic pregnancy.

supported by prior reports.[5,9]

The case also highlights the delicate balance of delivery timing. Consensus is that uncomplicated MCMA twins should be delivered around 32–34 weeks to optimize survival and reduce neonatal morbidity.[7,12] However, this patient developed signs of acute compromise at 31 weeks, mandating earlier delivery. This aligned with a study showing that waiting beyond 33–34 weeks increases the risk of sudden intrauterine death.[6] A recent meta-analysis suggested a sharp decline in neonatal complications when MCMA twins are delivered between 33 and 34 weeks.[10] Our team's decision to deliver at 31 weeks, slightly earlier than "elective" timing, was justified by the Doppler evidence of cord entrapment and variable decels. The excellent Apgar scores and survival of both babies suggest this was the right call.

Resource limitations added challenges but did not preclude success. In many LMICs, twin gestations suffer disproportionate mortality due to limited access to high-quality care.[14] Studies in low-resource settings emphasize that insufficient monitoring and delayed cesarean delivery are major contributors to poor twin outcomes.[14,16,17] Our experience echoes recommendations from global surveys: improving obstetric care for twin pregnancies, particularly ensuring timely C-section when needed, can save lives. It also reinforces recent expert opinion that both inpatient and outpatient surveillance are valid options, provided that clinical teams are vigilant and can intervene quickly.[1,12]

In summary, this case shows that even in a resource-limited context, adherence to key principles of MCMA management can yield positive results. Early and regular ultrasound surveillance allowed us to detect cord entanglement before catastrophic fetal injury. Rapid administration of steroids and magnesium, followed by immediate cesarean delivery, resulted in healthy neonates despite prematurity. No sophisticated technology beyond ultrasound was needed. We emphasize that monoamniotic twins should be managed by experienced teams that can respond without delay to signs of fetal distress. Centralizing such high-risk pregnancies to specialized centers (as we do at our institution) may further improve outcomes by concentrating expertise.[6]

Conclusion

Monoamniotic twin gestation is a rare and high-risk condition, but timely prenatal detection of complications can be life-saving. In our case, vigilant ultrasound monitoring identified umbilical cord compression early, enabling prompt cesarean delivery of two healthy preterm infants. This successful outcome in a resource-limited setting illustrates that, when continuous fetal monitoring is not feasible, meticulous ultrasound surveillance and readiness for expedited delivery can still help mitigate the risks posed by cord entanglement. The key lessons are clear: MCMA twins require meticulous antenatal care, and any ultrasound sign of cord compromise mandates immediate action. Improving access to ultrasound and prompt surgical delivery, especially in resource-constrained environments, can markedly reduce the historically high morbidity and mortality of these pregnancies.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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Ethical approval

IRB review and approval were waived for this case report.

CRediT authorship contribution statement

Abirham A. Minayehu: Writing – original draft, Resources, Conceptualization. **Chernet T. Mengistie:** Writing – original draft, Data curation, Conceptualization. **Biruk T. Mengistie:** Writing – review & editing, Writing – original draft. **Dagmawit M. Tasew:** Writing – review & editing, Visualization, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data Availability

The data underlying the results presented in this work are available within the manuscript.

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