

Delayed interval delivery in twin pregnancy in Hong Kong: two case reports

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Case reports

Case 1

A 40-year-old nulliparous woman carried the index dichorionic diamniotic (DCDA) twin pregnancy, conceived in 2014 by in vitro fertilisation due to unexplained infertility. Antenatal investigations were all unremarkable.

At 26 weeks and 1 day of gestation she presented to our local delivery suite with signs of preterm labour. Examination revealed the cervix to be fully dilated. Maternal corticosteroids for foetal lung maturation, prophylactic antibiotics and magnesium sulphate infusion for neuroprotection were administered. Twin 1 (T1) was delivered vaginally 4 hours after admission. The baby weighed 800 g, with Apgar scores (AS) of 6 at 1 minute and 8 at 5 minutes. The first blood gas showed a pH of 7.37.

Soon after, uterine contractions subsided spontaneously and the cervix quickly closed. Twin 2 (T2) membranes remained intact. After counselling, the couple opted for delayed interval delivery (DID), aiming to enhance the lung maturity of T2. The cord of T1 was ligated and placed in the vagina. Oral nifedipine was added to maintain uterine quiescence. Twelve hours later, the patient developed regular uterine contractions with fever of 37.8°C. Vaginal examination revealed a fully dilated cervix with bulging membranes and shoulder presentation of T2, converted manually to cephalic presentation following uterine relaxation with the tocolytic atosiban. Twin 2 was born vaginally with a twin-to-twin delivery interval of 14 hours and weighing 780 g with AS of 4 at 1 minute, 5 at 5 minutes and 7 at 10 minutes and arterial cord gas of pH 6.94. A placental swab grew *Escherichia coli* and a high vaginal swab grew *Pseudomonas aeruginosa*. The placenta showed acute chorioamnionitis.

Twin 1 had acute respiratory distress syndrome and was intubated up to day 27 of life. The baby was discharged at 4 months of age with severe bronchopulmonary dysplasia. Mild speech delay at 3 years of age required additional therapy. Twin 2 benefited from antenatal corticosteroid and was weaned off mechanical ventilation on day 17 of life

and discharged home at 3 months of age. Both twins have normal growth and development at the age of 6 years.

Case 2

A 39-year-old woman carried the index monochorionic diamniotic twin pregnancy, conceived naturally in late 2019. Antenatal investigations and ultrasound scans every 2 weeks were unremarkable until 24 weeks and 5 days of gestation when she was admitted with preterm prelabour rupture of membranes. Maternal corticosteroids for foetal lung maturation and prophylactic antibiotics were administered. Maternal leukocytosis of $15.5 \times 10^9/L$ and raised C-reactive protein of 16.3 g/L were noted, but high vaginal swab and mid-stream urine cultures were negative. Three days later, she went into spontaneous labour. Magnesium sulphate infusion was commenced for neuroprotection. Twin 1 was delivered vaginally and weighed 670 g. Apgar scores were 6 at 1 minute and 8 at 5 minutes, and arterial cord gas pH was 7.349.

Uterine contractions subsided afterwards and the cervix closed. In view of extreme prematurity, the couple opted for DID. High ligation of the cord was performed (Fig). The patient continued to receive intravenous ampicillin, metronidazole and oral erythromycin with monitoring of vital signs. There were no signs of sepsis, and serial blood tests revealed that white cell count and C-reactive protein had normalised after delivery of T1. Serial cardiotocography of T2 showed normal foetal heart rate pattern and ultrasound confirmed normal middle cerebral artery peak systolic velocity. Nine days later, at 26 weeks and 4 days gestation, preterm prelabour rupture of membranes of T2 occurred. Labour was induced by syntocinon infusion but fresh per vaginal bleeding was noted 5 hours later. Cardiotocography showed a non-reassuring pattern but the cervix was only 3 cm dilated. Emergency lower segment caesarean section was performed for suspected foetal distress. Twin 2 was delivered weighing 860 g with AS of 6 at both 1 and 5 minutes, and arterial cord gas pH of 7.4.

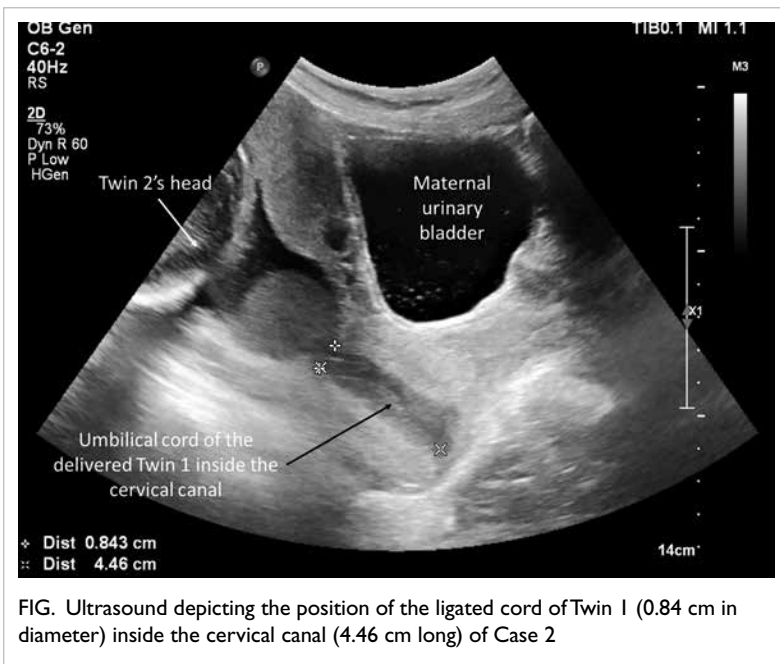


FIG. Ultrasound depicting the position of the ligated cord of Twin 1 (0.84 cm in diameter) inside the cervical canal (4.46 cm long) of Case 2

Apart from severe respiratory distress syndrome, T1 had *E coli* septicaemia, a large left subdural haematoma and right intraventricular haemorrhage, disseminated intravascular coagulopathy, and seizures. Despite intensive treatment, T1 deteriorated and died on day 17 of life. Twin 2 remained stable and was extubated to non-invasive ventilation on day 9. Cranial ultrasounds were normal. Twin 2 was discharged home at 3 months of age and remains well at 1 year of age at the time of writing.

Discussion

To the best of our knowledge these two cases are the first reported DID in Hong Kong. Twin pregnancies are at higher risk of preterm delivery and DID has been proposed to improve survival of the second twin. In a recent systematic review of 492 multifetal pregnancies managed with DID, the reported twin-to-twin delivery interval ranged from 1 to 153 days with a median of 29 days. Delayed interval delivery was associated with significantly improved perinatal survival of the remaining foetus compared with the co-twin (odds ratio=5.22, 95% confidence interval=2.95-9.25).¹ A delay as short as one day may be sufficient for steroid treatment to enhance foetal lung maturation, as illustrated by Case 1: T1 had respiratory distress syndrome and required a longer duration of intubation and hospitalisation than T2. Although T2 had acute foetal distress secondary to in-utero infection and shoulder presentation, T2 recovered rapidly from the acute event with no long-term sequelae.

The beneficial effect of DID is more often described in DCDA twins (odds ratio=14.89, 95% confidence interval=6.19-35.84).¹ Data on monochorionic diamniotic twins are sparse since monochorionicity is often regarded as a contra-indication for DID due to the potential risk associated with vascular anastomoses between the twins.² Nonetheless with complete occlusion of the first twin's umbilical vessels on delivery, the risk of vascular instability for T2 should be minimised, as illustrated in our Case 2.^{3,4} Interestingly in Case 2, only T1 had in-utero infection with consequent *E coli* septicaemia. It is possible that the inter-twin membrane acted as a barrier and prevented or delayed spread of infection to the second twin.

There are several elements to consider when deciding to opt for DID. First, the underlying cause of preterm labour is often unknown at the time of presentation. If there is subclinical infection or placental abruption, leaving the second twin in utero may be detrimental. Second, a secondary ascending infection may occur following delivery of the first twin. Obstetricians should carefully consider the risks and benefits of DID versus those of delivery at perivable or extreme preterm gestation. Extra precautions should be taken before and after opting for DID, including a high ligation of the first twin's cord, antibiotic cover, and close surveillance of maternal and foetal well-being.⁵

Author contributions

Concept or design: All authors.

Acquisition of data: All authors.

Analysis or interpretation of data: All authors.

Drafting of the manuscript: ASY Hui, TY Leung.

Critical revision of the manuscript for important intellectual content: All authors.

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

All authors have disclosed no conflicts of interest.

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Ethics approval

This study was approved by the Joint Chinese University of Hong Kong–New Territories East Cluster Clinical Research Ethics Committee (Ref No.: 2021.159). Both patients provided informed consent for the publication of non-identifiable information.

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Answers to CME Programme

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I. Systematic review and meta-analysis of ketamine-associated uropathy

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|---|----------|---------|----------|----------|----------|
| A | 1. False | 2. True | 3. True | 4. False | 5. True |
| B | 1. True | 2. True | 3. False | 4. False | 5. False |

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II. Recommendations for the management of advanced and metastatic renal cell carcinoma: joint consensus statements from the Hong Kong Urological Association and the Hong Kong Society of Uro-Oncology

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|---|---------|---------|---------|----------|----------|
| A | 1. True | 2. True | 3. True | 4. True | 5. False |
| B | 1. True | 2. True | 3. True | 4. False | 5. True |