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Delayed Interval Delivery Following Previable Rupture of Membranes in Twin Pregnancy

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Abstract

In twin pregnancies, previable rupture of membranes is often complicated by spontaneous preterm delivery, significantly increasing the risks of morbidity and mortality to both fetuses. Delayed-interval delivery, while not a standard approach, is a unique management strategy that can allow the remaining fetus to reach viability in-utero, increasing the chance for neonatal survival. We report a case of delayed-interval delivery in a dichorionic diamniotic twin pregnancy following previable rupture of membranes of twin A at 18 weeks and 5 days (18W5D). Pregnancy was successfully prolonged for 29 days from delivery of twin A to delivery of twin B at 23W3D gestation. This case highlights the potential of delayed-interval delivery to prolong gestation and improve neonatal outcomes, although thorough patient counseling, individualized management, and careful monitoring for detection of maternal and fetal complications are crucial for success.

Keywords

Preterm Premature Rupture of the Membranes, Twin Pregnancy, Perinatal Mortality, Fetal Viability, Gestational Age, Chorioamnionitis

1. Introduction

Multifetal pregnancy is associated with a higher risk of preterm premature rupture of membranes (PPROM) and preterm birth, which is among the top 5 leading causes of infant mortality in the United States [1]. In twin pregnancies, PPROM results in inevitable delivery of the first fetus followed by subsequent delivery of the second fetus shortly thereafter, with some reports of median latency to delivery period as short as 1.1 days [2]. With the rise in assisted reproductive technologies, multifetal pregnancies have increased, accompanied by an increased inci-

dence of PPROM and preterm birth encountered by physicians [3] [4].

Delayed-interval delivery, defined as >24-hours between the delivery of the first and second infant, is a topic gaining increased clinical interest as a potential management strategy for increasing gestational age, fetal development, and thus the likelihood of survival of the second born infant. Given the increased risk of both maternal and fetal infection that can occur with pregnancy prolongation in the setting of PPROM, this management strategy is relatively rare and not routinely implemented. Some considerations that make delayed-interval delivery a favorable option include dichorionic diamniotic pregnancy, delivery of the first fetus before 30 weeks' gestation, intact membranes of the second fetus, absence of intra-amniotic infection, and absence of additional maternal or fetal complications that would require pregnancy termination [5].

While several case reports have shown success in delayed-interval delivery in multifetal pregnancies [5] [6], a standard management protocol has yet to be defined. Conservative management implemented in delayed-interval delivery is similar to that of PPROM with singleton pregnancies including hospitalization for maternal and fetal monitoring, steroids, latency antibiotics, tocolysis, and magnesium sulfate for fetal neuroprotection [6]. If successfully implemented, this management strategy could prolong in-utero fetal development, significantly increasing the infant's likelihood of survival.

2. Case History

A 39-year-old gravida 3 para 0-0-2-0 with a dichorionic diamniotic twin pregnancy, conceived via in vitro fertilization, was transferred to our department at 22W3D gestation for management of twin B in the setting of previable preterm premature rupture of membranes of twin A at 18W5D. Additional obstetric history was significant for ectopic pregnancy in G1 managed with methotrexate and spontaneous abortion in G2 managed with suction dilation and curettage. Medical history is otherwise significant for gastric band surgery, hypothyroidism, asthma, and uterine fibroids.

PPROM of twin A occurred at an outside hospital, where the patient was treated with IV ampicillin for 3 days. On subsequent transabdominal ultrasound, evaluation of twin A revealed cardiac activity with a fetal heart rate of 159 bpm. No discernable amniotic fluid pocket was visualized, a finding highly suspicious for PPROM. Evaluation of twin B revealed a fetal heart rate of 155 bpm and a normal amount of amniotic fluid with a maximum vertical pocket (MVP) of 3 cm (N: 2 - 8 cm).

3. Methods (Differential Diagnosis, Investigations and Treatment)

Four days following PPROM of twin A, twin A was vaginally delivered at 19W2D while the patient was home. Immediately after delivery, she was readmitted to the outside hospital where she received IV ceftriaxone for 3 days, underwent umbili-

cal cord shortening, and continued antibiotic therapy with oral metronidazole and cephalexin to complete a 7-day course.

At 22W3D gestation, the patient relocated to our facility for continued management of the pregnancy. She presented without any symptoms and denied abdominal pain, fever, chills, loss of fluid, or vaginal bleeding since delivery of twin A 3 weeks prior. Vital signs were stable and physical exam revealed a soft, nontender abdomen and gravid uterus. The patient emphasized that she did not wish to undergo induction of labor for twin B, as this was a highly desired pregnancy. She had trialed in vitro fertilization (IVF) and wished to pursue every option to bring twin B to viability. The patient was a favorable candidate for delayed-interval delivery, as this was a dichorionic diamniotic pregnancy, the first fetus was delivered prior to 30 weeks gestation, membranes were intact for the remaining fetus, and there were no fetal or maternal indications for prompt delivery. The patient was counseled on expectant management options, including the risks and potential benefits of cerclage and tocolysis. Utilizing shared decision making, the plan was made to pursue no interventions.

Lab work obtained on admission was unremarkable and unconcerning for infection. The patient's initial white blood cell count (WBC) was 9.3 k/cmm (N: 4 - 15 k/cmm). Latency antibiotics, comprised of intravenous (IV) ampicillin at a dose of 2000 mg every 6 hours and oral amoxicillin at a dose of 875 mg every 12 hours, were initiated. Two doses of intramuscular (IM) betamethasone, 12 mg every 24 hours, were administered. Initial transabdominal ultrasound confirmed twin B's gestational age of 22W3D. FHR was 149 bpm, fetal movements were visualized, and 3 vessels of the umbilical cord were seen with normal insertion. Amniotic fluid level was within normal limits with MVP of 4.8 cm. Estimated fetal weight was 577 g (61%) and no anatomical abnormalities were noted. Umbilical artery doppler assessment was unremarkable. Fetal growth was monitored via ultrasound biweekly, whereas amniotic fluid levels and doppler studies were assessed weekly. Fetal heart rate was assessed daily, and at 23 weeks' gestation, monitoring took place via an external fetal monitor (EFM) for 1 hour every 12 hours. Maternal vital signs were obtained every 4 hours.

4. Conclusions and Results (Outcome and Follow-Up)

Following 6 days of expectant management at our hospital, the patient had spontaneous rupture of membranes (SROM) of twin B at 23W2D. Bedside ultrasound revealed minimal fluid around the fetus. On EFM, Twin B's heart rate tracing was reassuring, and no contractions were visualized on tocodynamometry. A 6g bolus of magnesium sulfate at 2 g/hr was administered intravenously for fetal neuroprotection. Approximately 7 hours following SROM, the patient developed lower abdominal pain and increased vaginal discharge. A sterile speculum examination was performed and revealed clear fluid and notable purulent drainage from the external cervical os. The patient was afebrile and not tachycardic. There was no fetal tachycardia on EFM, and ultrasound confirmed twin B to be in a cephalic

position. The decision was made to proceed with induction of labor given the interval delivery with long term rupture of membranes (twin A), new rupture of membranes for twin B, and the concern for chorioamnionitis given the purulent cervical discharge on exam. Antibiotic therapy was escalated for suspected chorioamnionitis with IV ampicillin at a dose of 2000 mg every 6 h and IV gentamycin at a dose of 300 mg infused over 30 min. Induction of labor was initiated with 20 units of IV oxytoxin. Within the next few hours, the patient developed a fever of 101.7 F despite 1000 mg of acetaminophen, became tachycardic with a heart rate of 108 bpm, and experienced significant abdominal pain secondary to contractions. WBC count was 7.4 k/cmm (N: 4 - 15) and lactic acid was 1.8 mmol/L (N: 0.7 - 2.10). The patient felt contractions and EFM showed a baseline fetal heart rate of 150 bpm with minimal variability, rare accelerations, several variable decelerations, and occasional late decelerations. Oxytocin was increased to 24 units and IV clindamycin at a dose of 900 mg every 8 h was added for additional antimicrobial coverage. After 3 hours, the patient's fever resolved, heart rate improved to 88 bpm, and her abdominal pain had improved with butorphanol.

Twenty-four hours after SROM, the patient vaginally delivered a viable male infant (VMI) at 23W3D gestation, 29 days after delivery of twin A. There was difficulty with delivery of the placenta, secondary to fibroids, and exploration of the entire uterine cavity was unsuccessful. The patient remained on triple antibiotic therapy with ampicillin, clindamycin, and gentamycin. The neonatal intensive care unit team was present at bedside for delivery and noted the infant to be non-vigorous with a birthweight of 600 g and Apgar scores of 1, 3, 5, 6, 9 at 1, 5, 10, 15, and 20 minutes of age, respectively. The neonate was initially bradycardic with a heart rate of 42 bpm which increased after endotracheal (ET) intubation and surfactant administration. Umbilical venous catheter and umbilical artery catheter were placed at 10 minutes of life, and the infant was given 0.1 mL of epinephrine and 5 mL bolus of normal saline with significant improvement of heart rate to greater than 100 bpm.

Placental pathology report verified a dichorionic diamniotic twin second trimester placenta that weighed 256.6 grams. Twin A accounted for approximately 20% of the placental disc while twin B (VMI) accounted for approximately 80%. Specimens from the umbilical cord, fetal membranes, and placental parenchyma were analyzed and reported for each twin. Twin A's umbilical cord was nonviable, and three vessels were visualized. Fetal membranes were nonviable with abundant acute inflammation and necrosis. For twin B (VMI), mild acute vasculitis was present on the three-vessel umbilical cord. Acute chorioamnionitis was apparent on fetal membranes. Placental culture grew a large amount of Klebsiella pneumoniae that was sensitive to gentamycin.

The patient's highest documented WBC was 18.4 k/cmm two hours post-delivery and continued to trend downwards over the next 2 days. She remained afebrile and vital signs were otherwise stable with no further tachycardia. The patient's lochia and abdominal pain continued to improve each day following delivery. She

continued triple antibiotic treatment for an additional 5 days after delivery until fundal tenderness resolved and was discharged on the 6th postpartum day. The patient was closely followed in the outpatient setting, and from a physical standpoint, her postpartum recovery was unremarkable with no signs of infection, hemorrhage, or further indications for readmission. However, the patient experienced significant postpartum depression, and appropriate management with close follow-up, medication, and counseling were initiated.

The surviving infant received approximately 4 months of intensive care treatment with diagnoses including bronchopulmonary dysplasia (BPD), necrotizing enterocolitis (NEC), sepsis, and gastroesophageal reflux disease (GERD). Immediately following birth, he required pressor support with dopamine, dobutamine, and epinephrine for hypotension, which were successfully weaned and discontinued by day 3 of life. A culture from ET tube secretions grew a large amount of Klebsiella and a 7-day course of cefepime was added to the infant's antimicrobial regimen of ampicillin and ceftazidime. Following respiratory support with high frequency oscillatory ventilation (HFOV), inhaled nitrous oxide (iNO), maintenance caffeine, 2 surfactant doses, and synchronous intermittent mandatory ventilation (SIMV), the infant was extubated with noninvasive positive pressure ventilation (NIPPV) on day 14 of life. He had appropriately tolerated feeds of donor breast milk and formula. Initial echocardiogram revealed small patent ductus arteriosus (PDA) with no evidence of valvular abnormalities or biventricular systolic dysfunction that was treated with Tylenol for medical closure in the NICU. Follow-up echocardiogram revealed closure of the PDA and he was cleared from routinely following with pediatric cardiology.

At his 15 month (chronological) pediatric appointment, the infant screened low risk on the Baley Infant Neurodevelopmental Screen with a score of 13/13. Neuromuscular exam was unremarkable and he was receiving regular physical therapy and speech therapy, given the high risk for developmental delay.

5. Discussion

Delayed-interval delivery is a unique management strategy that can be implemented in certain cases of previable PPROM in multifetal gestations to allow the remaining fetus to reach viability in-utero**,** increasing the chance for neonatal survival. For our patient who had undergone IVF to achieve pregnancy, this pregnancy was highly desired, and she wished to pursue every option to bring twin B to viability. Given the highly individualized nature of delayed-interval delivery in weighing the potential benefits against both maternal and fetal risks, standardized management guidelines do not exist, and inclusion criteria implemented in practice have been derived from case series and systematic reviews. These inclusion criteria include delivery of the first fetus before 30 weeks' gestation, intact membranes of the remaining gestational sac, and the absence of any maternal or fetal indications for delivery [7]. Our patient met these criteria and was deemed an optimal candidate for delayed-interval delivery.

Existing literature on delayed-interval delivery with dichorionic diamniotic twin pregnancies demonstrates a broad range of latency intervals reported from 1 to 152 days [3] with 91% delivering within 7 days [2] [3]. In our case, a latency interval of 29 days between delivery of twin A to delivery of twin B was achieved. In one report of two dichorionic diamniotic twin pregnancies, preterm labor occurred at 17W5D and 22W1D, respectively. Latency intervals of 64 days and 16 days were achieved through expectant management consisting of latency antibiotics, vaginal progesterone, tocolysis when indicated, corticosteroids, and frequent monitoring for early detection of chorioamnionitis [8]. Similarly, another report described delayed-interval delivery following PPROM at 22W with subsequent death of the first fetus of the dichorionic diamniotic twin pregnancy. Through similar measures including close monitoring for chorioamnionitis, antibiotic therapy, corticosteroids, and tocolytics, a latency interval of 65 days was achieved [9]. The primary goal of tocolysis in cases of PPROM is to prolong gestation for corticosteroids to take effect on fetal lung maturation. Type II pneumocytes, which are responsible for surfactant secretion, are not completely formed until 24 weeks gestation, thus the use of tocolytics as maintenance therapy prior to 24 weeks has not been proven to be beneficial [8]. Another reason for the initiation of tocolysis in PPROM is in the presence of uterine contractions. In our case, the gestational age of the second fetus was less than 24 weeks, and the patient did not experience uterine contractions until labor was medically induced, thus we did not feel the use of tocolytics in management of this patient was indicated. Furthermore, potential increased latency from use of tocolytics carries a significant risk of maternal chorioamnionitis in cases of PPROM, and given membranes of twin A had been ruptured for 26 days when the patient presented to us, we did not feel the potential benefits of tocolysis outweighed the risks.

Another option discussed in the literature for management of delayed-interval delivery is the placement of cervical cerclage. The benefit of cerclage placement appears to be a longer latency period [3]. However, this treatment could potentially increase the risks of infection and rupture of membranes for the remaining twin [3] [4]. After extensive counseling and discussion on the management options, including cerclage placement, our patient was strongly against any interventions that carried the possibility of accelerating labor of the remaining fetus. Through shared decision-making taking risks, benefits, and maternal wishes into account, we did not pursue cerclage placement as a management strategy for delayed-interval delivery.

Delayed-interval delivery remains controversial primarily due to the maternal risk of chorioamnionitis and sepsis that can accompany prolonged latency periods. Unfortunately, our patient developed signs of chorioamnionitis including fever, leukocytosis, and purulent cervical drainage that was confirmed on placental pathology. She was appropriately treated with delivery and antibiotics, and her course remained uncomplicated without progression to sepsis or any further infectious complications. Her infant's hospital course was more complex requiring

4 months of NICU treatment for extreme prematurity, BPD, sepsis, NEC, and GERD. Results from one retrospective study analyzing neonatal morbidity and mortality from delayed-interval delivery report significantly increased rates of infant exposure to chorioamnionitis in delayed-interval deliveries compared to other multiples of similar gestational age and birthweight that were not born by delayed-interval delivery [10]. These outcomes emphasize the need for delayed-interval delivery to occur at a tertiary facility with NICU capabilities.

In our case, delayed-interval delivery with conservative management served as a lifesaving intervention for the second twin to reach viability in this highly desired pregnancy. Given the increased risk of maternal intrauterine infection and sepsis, delayed-interval delivery remains controversial, making its implementation rare. This report contributes to the existing literature available regarding the benefit of delayed-interval delivery in the setting of previable PPROM in twin pregnancies, which has the potential to significantly increase the likelihood of survival for the second born twin.

Authorship List

EY: Made substantial contributions to case report history, drafting and revising manuscript, has given final approval for publication, and will be accountable for all aspects of the work.

JC: Made substantial contributions to case report history, drafting and revising manuscript, has given final approval for publication, and will be accountable for all aspects of the work.

Informed Consent

The patient provided written informed consent for the publication and presentation of their clinical details and medical images.

Key Clinical Message

Delayed-interval delivery after previable PPROM is a reasonable option to improve neonatal survival rates in twin pregnancies and can be successfully implemented with good patient counseling and individualized management dependent on gestational age, fetal viability, and maternal health.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Centers for Disease Control and Prevention (2024) Maternal Infant Health. U.S. Department of Health and Human Services. https://www.cdc.gov/maternal-infant-health/infant-mortality/index.html

[2] Mercer, B.M., Crocker, L.G., Pierce, W.F. and Sibai, B.M. (1993) Clinical Characteristics and Outcome of Twin Gestation Complicated by Preterm Premature Rupture

of the Membranes. *American Journal of Obstetrics and Gynecology*, **168**, 1467-1473. https://doi.org/10.1016/s0002-9378(11)90783-2

[3] Park, M., Jung, Y.W., Park, J., Song, S.Y., Lee, G.W., Yoo, H.J., *et al.* (2022) Successful Delayed Delivery of the Second Twin by Evacuating the Cord Prolapsed First Fetus and Emergent Cerclage: A Report of 2 Cases. *BMC Pregnancy and Childbirth*, **22**, Article No. 113. https://doi.org/10.1186/s12884-022-04438-z

[4] Aydin, Y. and Celiloglu, M. (2012) Delayed Interval Delivery of a Second Twin after the Preterm Labor of the First One in Twin Pregnancies: Delayed Delivery in Twin Pregnancies. *Case Reports in Obstetrics and Gynecology*, **2012**, Article ID: 573824. https://doi.org/10.1155/2012/573824

[5] Canu, A., Giannini, A., Ghirri, P., Malacarne, E., Pancetti, F., Simoncini, T., *et al.* (2019) Delayed Delivery of the Second Twin: Case Report and Literature Review of Diamniotic Dichorionic Twin Pregnancy with Very Early Preterm Premature Rupture of Membranes. *Case Reports in Women's Health*, **22**, e00104. https://doi.org/10.1016/j.crwh.2019.e00104

[6] Sela, H.Y. and Simpson, L.L. (2011) Preterm Premature Rupture of Membranes Complicating Twin Pregnancy: Management Considerations. *Clinical Obstetrics & Gynecology*, **54**, 321-329. https://doi.org/10.1097/grf.0b013e318217d60d

[7] de Frias, C.A.S., Queirós, A.S.P.A.d.F. and Simões, H.T.F. (2020) Delayed-Interval Delivery in Dichorionic Twin Pregnancies: A Case Report of 154 Latency Days. *Revista Brasileira de Ginecologia e Obstetrícia*, **42**, 61-64. https://doi.org/10.1055/s-0040-1701468

[8] Cozzolino, M., Seravalli, V., Masini, G., Pasquini, L. and Di Tommaso, M. (2015) Delayed-Interval Delivery in Dichorionic Twin Pregnancies: A Single-Center Experience. *Ochsner Journal*, **15**, 248-250.

[9] Văduva, C.C., Constantinescu, C., Ţenovici, M., *et al.* (2016) Delayed Interval Delivery in Twin Pregnancy—Case Reports. *Romanian Journal of Morphology and Embryology*, **57**, 1089-1098.

[10] Bouey, N.J., Saha, S., Wilson-Costello, D.E., Rysavy, M.A., Walsh, M., Wyckoff, M.H., *et al.* (2022) Delayed-Interval Delivery in Multiple Gestation Pregnancies: Neonatal Mortality, Morbidity, and Development. *Journal of Perinatology*, **42**, 1607-1614. https://doi.org/10.1038/s41372-022-01462-x