International Journal of Medical and Pharmaceutical Sciences
Open access peer-reviewed Journal
Volume 2, Issue 9, Page 512-517.
https://doi.org/10.5281/zenodo.22971656

Case Study

Maternal Genital Tract Infection and Neonatal Sepsis: A Challenging Case of Preterm Twin Pregnancy

Dhanalakshmi*, Apeksha N., Vrushank C. Desai

Shree Devi College of Pharmacy, Mangalore

Preterm birth, defined as delivery before completing 37 weeks of gestation, remains a leading cause of neonatal morbidity and mortality worldwide. This report presents a case of 23 years old pregnant woman (G2A1), with a past history of spontaneous abortion of twin babies a year back, who presented with vaginal leaking. Vaginal swab culture and sensitivity showed growth of Candida species as well as E.coli. Ultrasound showed intrauterine twin gestation with cervical funnelling and a short cervix. To prevent preterm labor, a pessary was prescribed along with a cervical stitch. The infections were treated using antibiotics and antifungal drugs according to antimicrobial sensitivity tests which showed resistance to the first line drugs. Further, due to increased vaginal leaking, the twins were delivered by caesarean section. Both babies had extremely low birth weight, stiff and immature lungs, and an open heart vessel causing pulmonary overload. One baby developed feeding intolerance, lethargy, and increased C -reactive protein. The blood culture showed the presence of Pluralibacter gergoviae. Meropenem was initially administered, but as the clinical condition worsened, the antibiotic therapy was escalated to reserved antibiotics. The umbilical central line was removed, and the catheter tip grew Candida, which was treated with IV Amphotericin B. However, extreme prematurity, undeveloped lungs, bacterial sepsis, and invasive fungal infection led to septic shock and death of the baby. The second baby developed cyanosis, which was corrected through ventilation, and subsequently improved. This case highlights the potential relationship between maternal genital tract infection, preterm delivery, low birth weight, and neonatal sepsis. Early identification and appropriate management of maternal infections, antimicrobial therapy, and close neonatal monitoring are essential for improving outcomes.

Keywords: Preterm labor, Neonatal sepsis, Arabin pessary, Cervical insufficiency, Multidrug resistant Escherichia coli, Vaginal candidiasis.

INTRODUCTION

Preterm birth refers to the birth of a baby before 37 completed weeks of pregnancy. Based on gestational age, preterm birth is classified as extremely preterm (<28 weeks), very preterm (28 to <32 weeks), and moderate-to-late preterm (32 to <37 weeks). Preterm birth may occur for several reasons. While many cases occur spontaneously, some are related to maternal infections or other pregnancy complications that might require early induction of labour or caesarean delivery.(1) *Escherichia coli* infection has been commonly associated with Preterm Premature Rupture of Membranes (PPROM), particularly through the spread of infection from the lower genital tract.(2) Maternal urinary and genital tract infections have also been linked with poor neonatal outcomes, which include prematurity, low birth weight, respiratory distress, and neonatal sepsis.(2,3) Vaginal candidiasis is one of the most frequently encountered fungal infections during pregnancy.(4) Although vaginal Candida colonization will not always result in neonatal infection, transmission during delivery can occasionally cause serious infection in newborns, particularly among premature and low-birth-weight infants.(4,5) Invasive Candida infection in premature, low-birth-weight infants lead to significant morbidity and mortality.(5) Neonatal septicemia caused by

Candida species has been treated with antifungal therapy such as amphotericin B successfully.(5) Vaginal pessaries are traditionally used for conditions such as uterine or vaginal vault prolapse.(6) The use of cervical pessaries to prevent spontaneous preterm birth has gained increasing interest after studies reported a lower incidence of preterm birth before 34 weeks in women with a short cervix who received a cervical pessary.(6) Most of the studies have reported improved neonatal outcomes in twin pregnancies with a short cervical length.(6,7) Cervical pessaries are usually considered safe during pregnancy, although a small number of women may develop complications such as chorioamnionitis.(6) A cervical pessary may be a helpful option for preventing preterm birth in selected women.(6) However, its benefits are still unclear, as some studies have not found a significant reduction in preterm birth among either singleton or twin pregnancies.(6,7) Vaginal colonization by potentially pathogenic bacteria can increase the risk of bacterial infections, including neonatal sepsis, which remains an important cause of neonatal morbidity and mortality.(2,8) Bacterial vaginosis and changes in the normal vaginal bacterial balance have been linked to a higher risk of preterm birth during pregnancy. These changes may also increase the likelihood of maternal infection after delivery and late miscarriage.(8) Ascending infection from the vaginal compartment may contribute to neonatal infections such as sepsis and other adverse perinatal outcomes.(2,8) The first month of life is a particularly vulnerable period for newborns, especially those born prematurely.(1) Preterm birth, infections, intrapartum complications, and congenital abnormalities are among the major contributors to neonatal deaths.(1) Therefore, early recognition and appropriate management of maternal infections are important for reducing adverse maternal and neonatal outcomes.(1,2)

Case study:

A 23-year-old woman, gravida 2, abortion 1 (with one prior spontaneous abortion), was under antenatal care for a spontaneously conceived dichorionic diamniotic (DCDA) twin pregnancy. Her previous obstetric history included a spontaneous mid-trimester abortion of a DCDA twin pregnancy at 18 weeks' gestation approximately one year two months earlier, attributed to cervical incompetence. In view of this, a prophylactic cervical cerclage was placed at 13 weeks of the index pregnancy. At 20 weeks 4 days of gestation, she presented with complaints of per-vaginal leaking without associated pain abdomen and was admitted with a diagnosis of threatened abortion with the cervical stitch in situ. On examination, she was conscious, oriented, and hemodynamically stable. Per-speculum examination showed no active leak, and a vaginal swab was sent for culture and sensitivity. Per-vaginal examination revealed a soft, 75% effaced cervix with the stitch in situ and one finger loose os. A fetal medicine ultrasound at 20 weeks 6 days confirmed the DCDA twin gestation with funnelling of the internal os and no measurable residual cervical length, consistent with cervical insufficiency; both fetuses had biometry appropriate for gestational age. The vaginal swab culture isolated heavy growth of multidrug-resistant Escherichia coli, demonstrating resistance to cephalosporins, penicillins, fluoroquinolones, and piperacillin-tazobactam, but maintaining susceptibility to carbapenems, gentamicin, and tigecycline. A subsequent vaginal swab culture on day 24 of admission isolated moderate growth of Candida albicans. The patient was placed on strict Trendelenburg bed rest with an Arabin pessary in place, supplemented by weekly intramuscular progesterone (SUSTEN AQ 25 mg), and targeted pharmacotherapy. Preterm contractions were arrested sequentially using intravenous Isoxsuprine (DUVADILAN 30 mg infusion titrated to 20–30 mL/hr), transitioning to intravenous Atosiban (6.75 mg bolus, followed by 56.25 mg in 100 mL normal saline over 9 hours) paired with oral Nifedipine (DEPIN 10–20 mg 8th-hourly). Serial inflammatory surveillance showed baseline C-reactive protein (CRP) rise from 5.3 mg/L to 14.2 mg/L, before spiking to a peak of 88.6 mg/L (TLC 11,390/cu.mm) at 24 weeks 5 days, prompting culture-directed escalation to intravenous Meropenem (1 g 8th-hourly) alongside Metronidazole and Clindamycin. Fetal lung maturity was accelerated with intramuscular Dexamethasone (6 mg 12-hourly for 4 doses), and neuroprotection was instituted using intravenous Magnesium Sulphate (20 g over 20 hours). This comprehensive regimen achieved critical latency, prolonging the pregnancy by 30 days from 20 weeks 6 days to 25 weeks 1 day.

In the setting of worsening preterm labour unresponsive to tocolysis, the patient underwent an emergency lower-segment caesarean section under general anaesthesia at 25 weeks of gestation. The first twin, a live male infant weighing 700 g, was delivered as breech, followed by the second twin, a live male infant weighing 600 g delivered as breech. Both infants were shifted to the neonatal intensive care unit immediately after birth. The placenta was delivered complete and intact, and the cervical stitch and Arabin pessary were removed intraoperatively. The mother's post-operative course was uneventful, and she was discharged in stable condition on the third post-operative day. Both neonates, born at 25 weeks and 1 day of gestation with extremely low birth weight, required intensive neonatal care and developed respiratory distress requiring ventilatory support. On day 8 of life, the index neonate showed feed intolerance, and increasing respiratory support requirements. Repeat blood investigations revealed a raised C-reactive protein of 50.7 mg/L. Prompting escalation of antibiotics to meropenem and a blood culture, which grew *Pluralibacter gergoviae* (previously classified as *Enterobacter gergoviae*). Antibiotics were accordingly changed to tigecycline and gentamicin. On day 10 of life, the neonate was reintubated following episodes of desaturation and bradycardia. The umbilical venous catheter was sent for tip culture, and a new central line was secured. The catheter tip culture grew Candida species, after which intravenous amphotericin B was started on day 12 of life. Despite this escalating antimicrobial and respiratory support, the neonate succumbed to illness. The cause of death was attributed to culture-positive sepsis with septic shock, severe respiratory distress syndrome, patent ductus arteriosus, extreme prematurity (25 weeks and 1 day), and extremely low birth weight.

Table 1: Antimicrobial susceptibility pattern of Escherichia coli isolated from the vaginal swab

Antimicrobial Agent	Isolate - I	
	Minimum Inhibitory Concentration	Interpretation
Colistin	<=0.5	Moderately Sensitive
Ertapenem	8.0	Moderately Sensitive
Amoxicillin/Clavulanic Acid	.=32	Resistant
Cefepime	16	Resistant
Cefuroxime	>=64	Resistant
Ciprofloxacin	>=4	Resistant
Cotrimoxazole	>=320	Resistant
Cefoperazone - Sulbactam	>=64	Resistant
Piperacillin - Tazobactam	>=128	Resistant
Amikacin	2	Sensitive
Gentamycin	<=1	Sensitive
Fosfomycin	<=16	Sensitive
Imipenem	<=0.25	Sensitive
Meropenem	0.5	Sensitive
Tigecycline	<=0.5	Sensitive

Table 2: Antimicrobial susceptibility pattern of Candida albicans isolated from the vaginal swab

Antimicrobial Agent	Isolate - I	
	Minimum Inhibitory Concentration	Interpretation
Fluconazole	32	Resistant
Amphotericin B	<=0.5	Sensitive
Caspofungin	2.0	Sensitive
Flucytosine	<=1	Sensitive
Micafungin	2.0	Sensitive
Voriconazole	<=0.12	Sensitive

DISCUSSION:

The present case represents a high-risk twin pregnancy complicated by recurrent cervical insufficiency, progressive cervical shortening, vaginal microbial colonization, and extremely preterm birth.(9,10) Twin gestation itself increases the likelihood of spontaneous preterm delivery.(9) This risk becomes even greater when severe cervical shortening develops despite prophylactic cervical cerclage.(10) The presence of funnelling, absent residual cervical length, and cervical dilatation in our patient reflects advanced cervical insufficiency and explains the progression towards very early preterm labour.(10) Maternal infection and inflammation are important contributors to preterm birth because inflammatory mediators promote cervical ripening, weakening of foetal membranes, and uterine contractions.(10) In this case, the progressive rise in CRP from 5.3 mg/L to 88.6 mg/L together with leukocytosis suggested an evolving inflammatory process during pregnancy.(10) Although inflammatory markers alone cannot confirm intrauterine infection, their serial increase supported the decision for close monitoring and culture-directed antimicrobial therapy.(10) Heavy vaginal growth of multidrug-resistant Escherichia coli was a significant finding in this pregnancy. Colonization of the vagina by bacteria that can potentially cause infections in newborns is common during pregnancy, with *E. coli* being one of the organisms frequently found in pregnant women and their newborns. The presence of multidrug resistance highlights the importance of antimicrobial susceptibility testing, especially when resistance limits the effectiveness of commonly used antibiotics. In our case, susceptibility to carbapenems allowed appropriate escalation to meropenem during clinical deterioration.(12) Resistant *E. coli* infections during pregnancy can be associated with severe maternal and obstetric complications, emphasizing the need for early microbiological diagnosis and timely initiation of appropriate antibiotics. However, despite the resistant vaginal isolate in our patient, the mother remained hemodynamically stable and recovered uneventfully after delivery, showing that culture-guided treatment may help prevent progression to severe maternal infection.(13) Genital tract or urinary infection caused by *E. coli* infection has been linked to PPROM, chorioamnionitis, and early pregnancy loss, supporting the possibility that bacterial infection contributes to adverse obstetric outcomes.(14) In the present case, E. coli was isolated from the vaginal swab rather than amniotic fluid, so it cannot be considered the definite cause of preterm labour.(10,14) Instead, it should be interpreted as a possible contributing factor alongside cervical insufficiency and twin pregnancy.(10,14) The subsequent isolation of Candida albicans should also be interpreted cautiously.(4,10) Vaginal Candida colonization is common during pregnancy, and available evidence has not consistently shown that it independently causes preterm birth or premature rupture of membranes.(4) At the same time, cervical fungal infections have also been linked to low birth weight and an increased risk of preterm labour, suggesting that fungal involvement may be clinically relevant in selected high-risk pregnancies.(10) In our case, Candida may have represented colonization rather than the primary initiating factor.(4,10) Mechanical interventions were used to prolong pregnancy, including cervical cerclage, Arabin pessary, progesterone, and bed rest. Evidence suggests that cervical pessary may provide benefit in some pregnancies with a short cervix, although its effectiveness remains variable, particularly in twin gestations. In this patient, these combined interventions achieved an important latency period of approximately 30 days, allowing additional foetal maturation before delivery despite the persistence of severe cervical pathology.(15,16) Bacterial colonization in women with cervical cerclage deserves careful surveillance because infection may coexist with cervical shortening and precipitate preterm labour. Previous reports have demonstrated that infection involving pregnancies with a cervical stitch can complicate management and contribute to early delivery. Although direct infection of the cerclage was not proven in our patient, the coexistence of MDR E. coli colonization and progressive cervical insufficiency supports the need for repeated clinical and microbiological assessment.(17) The 30-day prolongation of pregnancy was clinically valuable because it enabled administration of antenatal dexamethasone for foetal lung maturation and magnesium sulphate for foetal neuroprotection. Nevertheless, delivery occurred at 25 weeks and 1 day, placing both infants in the extremely preterm category with extremely low birth

weight. Extreme prematurity is strongly associated with respiratory distress, neonatal sepsis, prolonged intensive care requirements, and increased neonatal mortality, which closely reflects the clinical outcome observed in this case.(1) The neonatal outcome was multifactorial rather than attributable to a single maternal organism.(1,4,12) The neonatal blood culture grew *Pluralibacter gergoviae*, while Candida species were isolated from the umbilical venous catheter tip, differing from the maternal vaginal isolates.(4,12) Therefore, direct vertical transmission cannot be confirmed.(4,12) Extreme prematurity, extremely low birth weight are important risk factors for severe neonatal morbidity and infection.(1) Invasive procedures, ventilatory support, and catheter-associated infection may have further contributed to the development of severe neonatal infection.(1,12) The eventual neonatal death was therefore likely multifactorial, with extreme prematurity, severe respiratory distress syndrome, patent ductus arteriosus, extremely low birth weight, and culture-positive sepsis all contributing to the outcome.(1,4,12) Overall, this case demonstrates that extremely preterm birth in a DCDA twin pregnancy can result from the combined influence of recurrent cervical insufficiency, twin gestation, infection-related inflammation, and antimicrobial-resistant genital tract colonization.(1,9,11,12) Early recognition of cervical changes is important in pregnancies at high risk of preterm birth.(11) Continuous inflammatory surveillance and microbiological evaluation may assist in identifying possible infection-related complications.(11,12) Culture-directed antimicrobial therapy is particularly important when multidrug resistant organisms are identified.(12,13) Coordinated maternal–foetal–neonatal management remains essential for pregnancies at very high risk of extreme prematurity.(1,9) Although cerclage and pessary could not prevent preterm delivery in this case, the additional 30 days of pregnancy permitted important foetal maturation interventions.(15,16)

CONCLUSION:

This case was reported to highlight the complex and multifactorial nature of extreme preterm birth in a high-risk twin pregnancy. The patient had several significant risk factors, including a previous second-trimester twin loss due to cervical insufficiency, the current DCDA twin gestation, progressive cervical shortening despite prophylactic cerclage, and maternal genital tract colonization with multidrug-resistant E. coli and Candida albicans. The case demonstrates the difficulty of preventing preterm birth when multiple obstetric and infectious risk factors coexist. The case also emphasizes the importance of early identification, continuous monitoring and timely intervention in pregnancies at very high risk of extreme prematurity. Although cervical cerclage, Arabin pessary, progesterone, tocolytic therapy and antimicrobial treatment could not prevent preterm delivery, these interventions helped prolong the pregnancy by 30 days. Importantly, the case illustrates the challenges of antimicrobial resistance and neonatal infection. Culture and sensitivity testing was essential for guiding treatment. At the same time, the subsequent neonatal infections demonstrate the vulnerability of extremely premature, extremely low-birth-weight infants to severe bacterial and fungal infections. Even when extreme preterm birth cannot be prevented, early recognition, appropriate antimicrobial stewardship, careful obstetric management and timely fetal interventions can provide valuable additional gestational time and may influence neonatal preparedness and outcomes.

REFERENCES

1. World Health Organization. Preterm birth [Internet]. Geneva: World Health Organization; 2023 May 10 [cited 2026 Sep 3].
2. Romero R, Gomez-Lopez N, Winters AD, Jung E, Shaman M, Bieda J, Panaitescu B, Pacora P, Erez O, Greenberg JM, Ahmad MM, Hsu CD, Theis KR. Evidence that intra-amniotic infections are often the result of an ascending invasion: a molecular microbiological study. J Perinat Med. 2019;47(9):915-931. Doi:10.1515/jpm-2019-0297.
3. Institute of Medicine (US) Committee on Understanding Premature Birth and Assuring Healthy Outcomes. Preterm birth: causes, consequences, and prevention [Internet]. Behrman RE, Butler AS, editors. Washington (DC): National Academies Press (US); 2007 [cited 2026 Aug 30].

4. Rasti S, Asadi MA, Taghriri A, Behrashi M, Mousavie G. Vaginal candidiasis complications on pregnant women. Jundishapur J Microbiol. 2014;7(2):e10078. doi:10.5812/jjm.10078.
5. Pappas PG, Kauffman CA, Andes D, Benjamin DK Jr, Calandra TF, Edwards JE Jr, Filler SG, Fisher JF, Kullberg BJ, Ostrosky-Zeichner L, Reboli AC, Rex JH, Walsh TJ, Sobel JD; Infectious Diseases Society of America. Clinical practice guidelines for the management of candidiasis: 2009 update by the Infectious Diseases Society of America. Clin Infect Dis. 2009;48(5):503-535. doi:10.1086/596757.
6. Grobman WA, Norman J, Jacobsson B; FIGO Working Group for Preterm Birth. Response: FIGO good practice recommendations on the use of pessary for reducing the frequency and improving outcomes of preterm birth. Int J Gynaecol Obstet. 2022;157(1):218. doi:10.1002/ijgo.14105.
7. Conde-Agudelo A, Romero R, Nicolaides KH. Cervical pessary to prevent preterm birth in asymptomatic high-risk women: a systematic review and meta-analysis. Am J Obstet Gynecol. 2020;223(1):42-65. e2. doi: 10.1016/j.ajog.2019.12.266.
8. Goldenberg RL, Thom E, Moawad AH, Johnson F, Roberts J, Caritis SN; NICHD Maternal Fetal Medicine Units Network. The preterm prediction study: fetal fibronectin, bacterial vaginosis, and peripartum infection. Obstet Gynecol. 1996;87(5 Pt 1):656-60. doi:10.1016/0029-7844(96)00034-8.
9. Charmanidou T, Pagkaki C, Kritsotaki N, Oikonimou E, Kourti V, Tsikouras N, et al. Differential impact of bacterial infection on preterm birth in singleton and twin pregnancies and its association with cervical cerclage or Arabin pessary: a retrospective cohort study. J Clin Med. 2026;15(16):6254. doi:10.3390/jcm15166254
10. Daskalakis G, Psarris A, Koutras A, Fasoulakis Z, Prokopakis I, Varthaliti A, et al. Maternal infection and preterm birth: from molecular basis to clinical implications. Children (Basel). 2023;10(5):907. doi:10.3390/children10050907.
11. Shimeles G, Gedefie A, Motbainor H, Genet C. Vaginal colonization, vertical transmission rate, antimicrobial susceptibility profile, and associated factors of potential neonatal pathogens among pregnant women at public health facilities of Northeast Ethiopia. Front Public Health. 2025; 13:1475357. doi:10.3389/fpubh.2025.1475357.
12. Kokila, Kalaiselvi, Subadhra Devi, Maha Lakshmi. A case of puerperal sepsis due to ESBL E. coli with multi-organ involvement: a clinical challenge. Kauvery Hospital Nightingale. [Internet]. [cited 2026 Sep 3].
13. Tullah FA, Tullah SN, Bhutta F, Sabir S, Kashif S. PPROM and chorioamnionitis following E. coli UTI - a case report. J Liaquat Uni Med Health Sci. 2025;24(3):318-320. doi:10.22442/jlumhs.2025.01207.
14. Oyoun N, Maarouf M. Cervical fungal infection associated with low birth weight and preterm labor. Arab J Pharm Sci. 2022;6(9):719-727.
15. Provinciatto HG, Araujo Júnior E, Callado GY, Hatanaka AR, Santos RAF, Traina E, et al. Pessary for prevention of preterm birth and perinatal mortality in pregnancies with a short cervix: systematic review and meta-analysis of randomized controlled trials. Diagnostics (Basel). 2025 Jun 9;15(12):1466. doi:10.3390/diagnostics15121466.
16. Wang Y, Wu J, Ma D, Sun X, Lin L, Wang B, et al. Effect of cervical pessary on pregnancy outcome in patients with twin pregnancies: a systematic review and meta-analysis. Obstet Gynecol Res. 2023;6(1):31-47. doi:10.26502/ogr0110.
17. Pagkaki C, Tsikouras P, Kritsotaki N, Andreou S, Kotanidou S, Nikolettos N. Preterm labor associated with cervical cerclage infected by Morganella morganii: a case report. Arch Intern Med Res. 2025;8(1):101-106. doi:10.26502/aimr.0201.

Cite: Dhanalakshmi*, Apeksha N., Vrushank C. Desai, Maternal Genital Tract Infection and Neonatal Sepsis: A Challenging Case of Preterm Twin Pregnancy, Int. J. Med. Pharm. Sci., 2026, 2 (9), 512-517. https://doi.org/10.5281/zenodo.22971656