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Septicemia caused by *Enterococcus coli* in a pregnant woman after cerclage—A case report

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Abstract

The objective of this case report is to discuss a case of septicemia caused by *Escherichia coli* following cervical cerclage. The study described a case of a 42-year-old female patient who visited the Ante-natal Clinic for a follow-up appointment during the 8th week of gestation. The patient had previously undergone successful in vitro fertilization treatment following 16 years of primary infertility. A routine ultrasound scan revealed cervical dilatation of 2–3 cm. The patient was advised to undergo cervical cerclage insertion. Two days after the surgery, she presented with pneumonia and also experienced vaginal bleeding, necessitating the removal of the cervical cerclage. Unfortunately, the patient suffered a stillbirth. Her condition deteriorated the following day, leading to septic shock and multiple organ dysfunction. After receiving the treatment, the patient was discharged; 2 days after being discharged the patient's blood culture and sensitivity results indicated a significant growth of *Escherichia coli* and a diagnosis of toxic myocarditis. Following 2 months of intensive treatment, the patient showed significant improvement; however, there was the presence of some mild renal impairment and he was ultimately discharged home. Maternal sepsis poses a significant risk to the health and lives of pregnant women. *Escherichia coli* stands out as a primary causative agent after cervical cerclage.

Keywords

Cervical cerclage, *E. coli*, pneumonia, pregnancy, septicemia

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Introduction

Women are particularly susceptible to infections during pregnancy. During pregnancy, bloodstream infections are frequently caused by a bacterium called *Escherichia coli* (*E. coli*). This particular bacterium is commonly found in the intestinal tract of individuals of all ages. Recently, a study found the role of infections in pregnancy and the susceptibility of pregnant women to the infections. It was found that women with SARS-CoV-2 pauci-symptomatic infection had an increased rate of malposition of the fetus and gestational diabetes.[1] However, there is limited knowledge regarding *E. coli* bacteremia specifically in pregnant women after cervical cerclage. None of the previous case studies have reported about women who contract *E. coli* bacteria after they went through cervical cerclage surgery. The present case report aims to describe the microbiological and clinical characteristics of bacteremia during pregnancy. Furthermore, we explore the potential association between cervical cerclage (a procedure involving the stitching of the cervix) and *E. coli* bacteremia in pregnant females.

Case presentation

A 42-year-old gravida presented herself for consultation at the Ante-natal Clinic during the 8th week of gestation. The patient had previously undergone successful in vitro fertilization treatment following 16 years of primary infertility.

During the 18th week of gestation, the patient complained of symptoms indicative of increased pressure. A pelvic speculum examination and pelvic ultrasound were performed,

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which confirmed cervical dilatation measuring 2–3 cm and a cervical length of 2.4 cm. No signs of local infection were observed.

Considering the patient's advanced maternal age and prolonged history of infertility, she was provided with counseling regarding the potential benefits and risks associated with the insertion of an emergency cervical cerclage. The patient expressed her preference for the immediate placement of an emergency cervical cerclage.

To minimize the risk of infection, the patient was prescribed intravenous cefuroxime before the surgery. Under general anesthesia, the cervical cerclage procedure was successfully performed using Mersilene tape (MERSILENE™ Polyester Fiber Suture, J&J MedTech) Ethicon Inc.(Parent organization: Johnson & Johnson), Raritan, New Jersey, United States. Following the surgery, the patient was discharged in satisfactory condition on the same day. Two days post-surgery, the patient, a primigravida at 22 weeks gestation with a history of bronchial asthma, presented to the hospital with complaints of high fever, lower abdominal pain, and vomiting.

The random blood sugar level was measured at 97 mg/dl. The patient exhibited a body temperature of 40 , blood pressure of 112/80 mmHg, pulse rate of 105/min, and oxygen saturation of 95%. The cardiovascular system appeared intact with no audible murmurs. To address the patient's symptoms, Perfalagan and Zinoximor were administered, following which the patient was admitted to the medical ward.

Subsequently, a vaginal swab was taken, and urine and blood analyses were conducted for further evaluation. In addition, the patient was referred to a chest consultant. Following the assessment, the consultant diagnosed the patient with pneumonia and prescribed the appropriate antibiotics to address the infection. Furthermore, the patient experienced vaginal bleeding, necessitating the removal of the cervical cerclage. Approximately an hour later, the patient unfortunately experienced a stillbirth, with the fetus being spontaneously expelled before the removal of the cervical cerclage.

However, on the following day, the patient exhibited signs of restlessness, dyspnea, and orthopnea while remaining conscious. Additionally, there was a decline in the patient's level of consciousness, accompanied by a decrease in oxygen saturation. The intensive care unit consultant promptly performed intubation to secure the patient's airway and initiated mechanical ventilation by connecting them to a ventilator. Due to the severity of the patient's condition, it was deemed necessary to transfer them to a different hospital with a highly equipped intensive care unit, as septic shock and multiple organ dysfunction had developed. Following the patient's transfer to the intensive care unit, her vital signs were closely monitored to assess her physiological status. Continuous monitoring revealed fluctuations in vital parameters, including persistent high fever, increased respiratory rate, and fluctuating blood pressure. Laboratory tests were conducted regularly to track markers of infection, organ function, and overall systemic health. The patient's complete blood count, inflammatory markers, and coagulation profile were closely scrutinized to gauge the severity of the infection and its impact on various organ systems.

Under the guidance of the cardiology consultant, the patient's treatment plan included the administration of Triaxone, Tavanic, Zithromax, and normal saline at a rate of 100 ml/h. The patient was already receiving various medications, including D5 normal saline at 100 ml/h, Lasix 20 mg intravenously every 6 h, Tazocin 4.5 g intravenously every 8 h, Tavanic 500 mg intravenously every 24 h, Vancolon 500 mg every 8 h, Tamiflu 75 mg orally every 12 h, nebulization with Atrovent and Pulmicort, human albumin 100 ml intravenously three times a day, Methylprednisolone 20 mg intravenously every 8 h, and Omacor (capsule) twice daily orally. Additionally, the patient received a stat dose of sodium bicarbonate 100 ml and potassium chloride 60 ml. Requests were made for fresh frozen plasma every 8 h for 2 min and 10 units of platelets.

Two days after being discharged, the patient's blood culture and sensitivity results indicated a significant growth of *E. coli*, necessitating an intensive course of antibiotics. Further investigation revealed a diagnosis of toxic myocarditis. Following 2 months of intensive treatment, the patient showed significant improvement, although there was some mild renal impairment present, and was ultimately discharged home.

Discussion

The susceptibility of pregnant women to invasive systemic infections caused by a range of prenatal pathogens poses significant risks, including congenital invasions and elevated mortality rates.[2–4] These infections can have profound consequences on both maternal and fetal health, highlighting the importance of understanding and addressing such cases.

Maternal infection during pregnancy has a significant impact on the occurrence of early preterm births, accounting for approximately 50% of cases that occur before 28 weeks of gestation. Furthermore, nearly all instances of early-onset neonatal sepsis can be attributed to maternal infections during pregnancy. In low- and middle-income countries, maternal infection serves as a crucial and modifiable factor contributing to stillbirths. These findings have been highlighted in various studies conducted by researchers such as Page et al.[5]

E. coli is frequently identified as the predominant cause of maternal sepsis and bacteremia during pregnancy. This bacterium is known to be the most common pathogen responsible for such infections during this period.[6] A recent examination of suture-based bacteria linked with high-risk preterm birth in pregnancies after cervical cerclage. The study included 196 pregnant women in Australia. Vaginal swabs were gathered between 14 and 16 weeks gestation period, pre- and post-cerclage insertion. It was found that *E. coli* was associated with

cerclage, and 43% of women had *E. coli* growth.[7] Another retrospective study conducted in Paris from 2005 to 2009, which examined 347 cases among live births, also found *E. coli* to be the most common cause of maternal bacterial infection.[8] The association between *E. coli* infection, post-cervical cerclage, and toxic myocarditis highlights the complex association between infections and cardiovascular complications. Cervical cerclage, while crucial for preventing preterm birth, carries infection risks, especially in immunocompromized individuals or those with predisposing conditions. *E. coli*, a bacterium normally residing in the gastrointestinal tract, can opportunistically cause infections when introduced into other bodily systems. In the context of cervical cerclage, the disruption of the cervical barrier and potential compromise of the local immune defense mechanisms might have facilitated the entry of *E. coli* into the reproductive system, triggering an infectious cascade. Toxic myocarditis, a condition characterized by inflammation of the heart muscle, often arises as a consequence of systemic infections. In this scenario, the bacterial invasion likely triggered an exaggerated immune response, leading to the release of inflammatory mediators that not only targeted the infection but also inadvertently affected the myocardium.

According to the latest World Health Organization (WHO) Global Maternal Sepsis study, known as GLOSS, urinary tract infections have been identified as the most prevalent source of maternal infection and sepsis during pregnancy.[9] Surgers et al.,[8] found that *E. coli* was involved in approximately 44% of all cases of bacteremia during pregnancy. *E. coli*, as a species, is classified into at least seven phylogenetic groups, namely A, D, C, B2, B1, E, and F.[10] Typically, extra-intestinal virulent strains of *E. coli* belong to the phylogenetic groups B2 and, to a lesser extent, D.

In the management of maternal sepsis, the timely and appropriate administration of antibiotics is crucial. It has been observed that for every hour of delay in initiating proper antibiotic treatment, the mortality rate in the general population increases by approximately 7.6%.[11,12] Regarding the sensitivity of *E. coli* to different antibiotics, it has been found that imipenem demonstrated the highest sensitivity at 92.3%, followed by ciprofloxacin and gentamycin, both at 84.6%. Ceftazidime and cefotaxime showed a sensitivity level of 76.9%. On the other hand, the sensitivity of amoxicillin with clavulanic acid and nitrofurantoin was relatively lower at 38.5%.[13]

The limitation of the current study is that the research did not record information regarding the follow-up of the patient; however, it is recommended that future studies include post follow-up records for better outcomes of the study.

Implications

Early detection and management

The current case highlights the importance of early detection and treatment of potential infections like Urinary Tract Infection (UTIs) in pregnant women. Prompt diagnosis and intervention can help prevent complications like preterm birth and ascending infections.

Individualized care

Each pregnancy and situation are unique; the current study emphasizes the need for individualized care and tailoring management strategies based on specific patient factors and medical history.

Strict hygiene

While a causal link cannot be established in this single case, it underlies the importance of strict hygiene practices, especially for women with cervical cerclage, to minimize the risk of bacterial infections like *E. coli*.

Conclusion

It is concluded that women who undergo cervical cerclage are at higher risk of contracting *E. coli* bacteria. Therefore, they should take maximum precautions to reduce the risk of complications and death.

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Author contributions

This is a single author paper; M.H.D. contributed to all aspects of the manuscript creation.

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Ethics approval and consent to participate

This study was conducted per the Declaration of Helsinki. The patient was informed about the study, and informed consent was obtained before participation in this case report.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. Oral informed consent was obtained from the patient for publication of this case report.

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References

1. Libretti A, Troìa L, Cappello AM, et al. Pregnancy and neonatal outcomes of SARS-CoV-2 infection discovered at the time of delivery: a tertiary center experience in North Italy. *J Perinat Med* 2024; 52: 215–221.
2. Arenas-Gamboa AM, Rossetti CA, Chaki SP, et al. Human brucellosis and adverse pregnancy outcomes. *Curr Trop Med Rep* 2016; 3: 164–172.
3. Craig AM, Dotters-Katz S, Kuller JA, et al. Listeriosis in pregnancy: a review. *Obstet Gynecol Surv* 2019; 74: 362–368.
4. Yockey LJ, Lucas C and Iwasaki A. Contributions of maternal and fetal antiviral immunity in congenital disease. *Science* 2020; 368: 608–612.
5. Page JM, Thorsten V, Reddy UM, et al. Potentially preventable stillbirth in a diverse U.S. cohort. *Obstet Gynecol* 2018; 131: 336–343.
6. Ali A and Lamont RF. Recent advances in the diagnosis and management of sepsis in pregnancy. *F1000Res* 2019; 8: 1546.
7. Jin W, Hughes K, Sim S, et al. Abnormal vaginal flora and spontaneous preterm birth in high-risk singleton pregnancies with cervical cerclage. *J Matern Fetal Neonatal Med* 2022; 35: 9983–9990.
8. Surgers L, Valin N, Carbonne B, et al. Evolving microbiological epidemiology and high fetal mortality in 135 cases of bacteremia during pregnancy and postpartum. *Eur J Clin Microbiol Infect Dis* 2013; 32: 107–113.
9. World Health Organization (WHO) Global Maternal Sepsis Study (GLOSS) Research Group. Frequency and management of maternal infection in health facilities in 52 countries (GLOSS): a 1-week inception cohort study. *Lancet Glob Health* 2020; 8: 661–671.
10. Clermont O, Christenson JK, Denamur E, et al. The clermont *Escherichia coli* phyllo-typing method revisited: improvement of specificity and detection of new phylogroups. *Environ Microbiol Rep* 2013; 5: 58–65.
11. ACOG Committee on Practice Bulletins-Obstetrics. ACOG practice bulletin, no. 211: critical Care in Pregnancy. *Obstet Gynecol* 2019; 133: 303–319.
12. Kumar A, Roberts D, Wood KE, et al. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. *Crit Care Med* 2006; 34: 1589–1596.
13. Nteziyaremye J, Iramiot SJ, Nekaka R, et al. Asymptomatic bacteriuria among pregnant women attending antenatal care at Mbale Hospital, Eastern Uganda. *PLoS One* 2020; 15: 0230523.