

## Case Report

### **Maternal sepsis caused by *Clostridium perfringens*: A Case Report**

SS Jayasena<sup>1</sup>, WD Galagedara<sup>1</sup>, S Pathirage<sup>2</sup>, S Akmeemana<sup>1</sup>, NS Chandrasiri<sup>1</sup>

*Sri Lankan Journal of Infectious Diseases 2021 Vol.11(2):114-117*

DOI: <http://dx.doi.org/10.4038/sljid.v11i2.8405>

#### **Abstract**

Anaerobic pathogens are rarely isolated from infections due to many reasons including difficulties in accessing anaerobic transport media and anaerobic culture facilities. Of anaerobic pathogens isolated from uterine infections, *Clostridium perfringens* is reported more than other anaerobes. We describe a case of maternal sepsis following incomplete miscarriage without trauma in a previously healthy female. Her initial percutaneous blood culture signaled positive, and Gram stain revealed Gram positive large bacilli which failed to grow on standard culture media after 48 hours of aerobic incubation. However, a pure growth of *C. perfringens* was isolated after anaerobic incubation. The patient improved rapidly following evacuation and antibiotic combination of ceftriaxone and doxycycline. The usefulness of anaerobic culture, especially where anaerobic pathogens are likely to be the causative agents, is illustrated in this case report.

**Keywords:** *Clostridium perfringens*, maternal sepsis, ceftriaxone, doxycycline.

#### **Introduction**

*Clostridium perfringens* sepsis is a rare occurrence in current obstetric practice compared to the past. Most previously reported intrauterine clostridial infections were related to septic abortions.<sup>1</sup> We present a case of *C. perfringens* sepsis following infected retained products of conception without any preceding intervention or trauma.

#### **Case report**

A 22-year-old woman in her second pregnancy presented with vaginal bleeding for three days. Her last regular menstruation date was uncertain and around eight weeks prior to admission. She had high grade fever and abdominal pain. Her urine pregnancy test was positive. She did not have any urinary or gastrointestinal symptoms. Her first pregnancy was uneventful, and the past medical history was unremarkable.

---

<sup>1</sup> Colombo South Teaching Hospital, Kalubowila, Sri Lanka

<sup>2</sup> Medical Research Institute, Colombo 8, Sri Lanka

---

Address for correspondence: Dr RSS Jayasena, 125, First Crossroad, Polhena, Kelaniya, Sri Lanka

Telephone: +94718448508 email: [saumyasjayasena@gmail.com](mailto:saumyasjayasena@gmail.com)

 <https://orcid.org/0000-0002-9587-1743>

---

Received 10 June 2021 and revised version accepted 10 September 2021.



This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

On admission she was febrile but haemodynamically stable and vital signs were normal. Sterile speculum examination revealed a healthy cervix with a smelly discharge. There was no evidence of trauma. Transvaginal scan done on admission revealed retained products of conception without fetal heartbeat.

The patient was managed as a case of incomplete miscarriage. Initial transvaginal scan showed 2.7cm thickness product of conception at the fundal area. Intravenous (IV) ceftriaxone 1g 12hourly was started immediately after drawing percutaneous blood for culture.

Initially she had leukocytosis with neutrophil predominance. Her C-reactive protein was raised (80mg/dL). Blood culture signaled after 3hours of incubation in Bactec™ blood culture system. Gram stain showed Gram positive large bacilli. No visible growth was seen on blood agar, chocolate agar and MacConkey agar plates even after 48 hours of aerobic incubation at 35 °C. The blood culture bottle was sent for anaerobic culture to the reference laboratory (Medical Research Institute (MRI), Borella). Ceftriaxone was continued as the patient was responding and oral doxycycline 100mg 12hourly was added. Medical termination of pregnancy with pervaginal insertion of misoprostol was done while continuing antibiotics. Since source control was quickly achieved and the patient clinically improved, metronidazole was not added. She was discharged home after completion of 8 days of antibiotics as the inflammatory markers returned to normal. At the time of discharge culture identification was not available.

At the reference laboratory, the positive blood culture was inoculated onto Brucella blood agar, Bacteroides bile esculin agar (BBEA) and blood agar and incubated anaerobically in an anaerobic cabinet at 37°C for 48hrs. After aerotolerance test of the positive culture, further identification was carried out. Gram stain (Figure 1A), double haemolysis on blood agar, positive lecithinase test on egg yolk medium and RapID ANA 11 (Remel) system were used for identification (Figures 1B and 1C). The identification of the isolate obtained on anaerobic culture was received as *C. perfringens* from the reference laboratory 2 days after discharge of the patient.

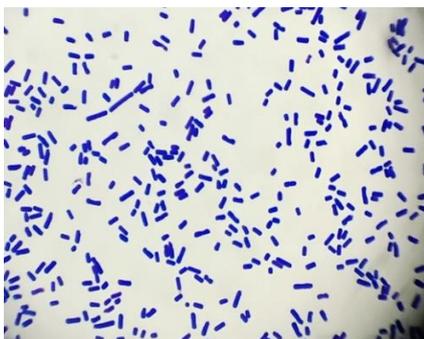


Fig. 1A: Gram stain of isolate oil immersion (x 1000)



1B: *C. perfringens* growth on blood agar plate (anaerobic incubation)



1C: *C. perfringens* growth on BBEA plate

The timeline of the illness is shown in Figure 4

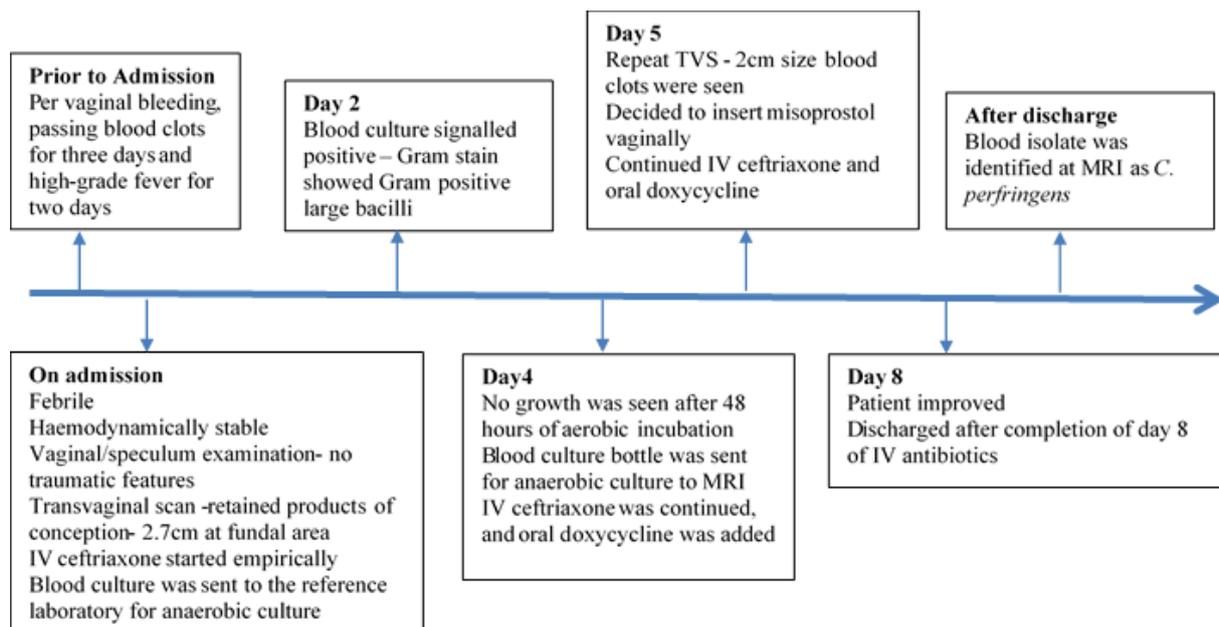


Figure 4: Timeline of illness

## Discussion

A breach in the mucocutaneous layer of the gastrointestinal and urogenital tracts allows normal flora, including anaerobes residing on these surfaces to enter the body. The majority of published clinical data on *C. perfringens* infections are limited to retrospective series and case reports, with the high proportion of *C. perfringens* infections originated from the gastrointestinal tract or genitourinary tract.<sup>2,3</sup>

Obligate anaerobic bacteraemia is infrequently detected from blood cultures, but clostridia account for approximately 0.5-2% of all positive blood cultures. *C. perfringens* is reported as the commonest *Clostridium* species isolated from blood cultures amounting to 21.7%.<sup>4</sup>

Approximately 4%-10% of women are colonized with *C. perfringens* which rises up to 19%-29% during the post abortion period.<sup>1</sup> Post abortion and postpartum infections caused by clostridia need prompt diagnosis and treatment as they have a high mortality rate of 70% or more.<sup>5</sup>

Under the favorable anaerobic environment of the female genital tract, these microorganisms multiply and cause disease by toxin production. *C. perfringens* can produce five major lethal toxins (A-E). The alpha toxin or lecithinase is the most common and most lethal toxin because it destroys lecithin in human cell membranes, which results in severe haemolysis, jaundice, haemoglobinuria and disseminated intravascular coagulation. Our report describes *C. perfringens* sepsis following infected retained product of conception, probably from ascending vaginal flora.

To the best of our knowledge, there are no published data on *C. perfringens* bacteraemia in Sri Lanka. Unavailability of anaerobic culture facilities and starting antibiotics with anaerobic cover before taking samples for microbiological investigations due to the severity of the condition in maternal care centres are the most likely reasons for the infrequent isolation of anaerobic pathogens.

In the world literature, uterine infection due to *C. perfringens* bacteraemia leading to maternal sepsis is reported following intervention/traumatic injury that breaches the mucous membrane of the female genital tract.<sup>6</sup> However, we describe a patient who developed *C. perfringens* bacteraemia without any obvious trauma or intervention of genitourinary tract.

Adequate surgical debridement combined with prompt administration of IV antibiotics with anaerobic coverage is usually essential in management of *C. perfringens* bacteraemia. The patient was started initially with IV ceftriaxone which is effective against *C. perfringens*.<sup>7</sup> Doxycycline too has anaerobic cover and adds coverage for chlamydia. The Food and Drug Administration of USA has approved doxycycline for clostridial infections.<sup>7</sup> Following complete evacuation of infected retained products of conception, our patient recovered fully even without metronidazole, which is the traditional empiric choice.

## Conclusion

The value of following up blood cultures which signaled positive but failed to grow aerobically with anaerobic cultures are highlighted with our findings. This is important in clinical settings where anaerobic microorganisms are likely pathogens. Scarcity of anaerobic culture facilities are a deterrent for isolation of anaerobic pathogens which needs improvement. Prompt surgical intervention and antibiotic treatment are important factors in reducing morbidity and mortality.

## Declarations

**Conflicts of interest:** There were no conflicts of interest.

**Ethics statement:** Ethical approval was not required for this manuscript.

**Acknowledgements / Funding source:** No funding and other support was from any source.

**Statement on author contributions**

All the authors contributed in patient management and preparing manuscript.

Dr. Pathirage S., Dr. Akmeemana S.P, and Dr. Chandrasiri N.S. corrected the manuscript.

## References

1. Dylewski J, Wiesenfeld H, Latour A. Postpartum uterine infection with *Clostridium perfringens*. *Reviews of Infectious Diseases* 1989; 11(3):470-473 doi: <https://doi.org/10.1093/clinids/11.3.470>.
2. Lopez-Fabal F, Sanz N, Ruiz-Bastian M et al. *Clostridium perfringens* bacteraemia, an analysis of 28 cases over 10 years in a university hospital of Madrid. *Enfermedades infecciosas y microbiologia clinica (English ed.)* 2018; 36(4):225-228. doi: <https://doi.org/10.1016/j.eimc.2017.02.002>.
3. Yang CC, Hsu PC, Chang HJ et al. Clinical significance and outcomes of *Clostridium perfringens* bacteraemia - a 10-year experience at a tertiary care hospital. *International Journal of Infectious Diseases*. 2013; 17(11):955–960. doi: <https://doi.org/10.1016/j.ijid.2013.03.001>.
4. Fujita H, Nishimura S, Kurosawa S et al. Clinical and epidemiological features of *Clostridium perfringens* bacteraemia: A review of 18 cases over 8 year-period in a tertiary care center in Metropolitan Tokyo area in Japan. *Internal Medicine* 2010; 49: 2433–2437. doi: <https://doi.org/10.2169/internalmedicine.49.4041>.
5. Hendrix N, Mackeen A, Weiner S. *Clostridium perfringens* sepsis and fetal demise after genetic amniocentesis. *American Journal of Perinatology*. 2011; 1(1): 025–028. doi: <https://doi.org/10.1055/s-0030-1271221>.
6. Cypher LR, Sullivan C, Jones R et al. *Clostridium perfringens* bacteraemia with acute hemolytic anemia in the setting of endometrial malignancy. *Academic Forensic Pathology* 2019; 9(1-2):127-133. doi: <https://doi.org/10.1177/1925362119851240>.
7. U.S. Food and Drug Administration. Available at: [https://www.accessdata.fda.gov/drugsatfda\\_docs/nda/2005/050795s000\\_DoryxTOC.cfm](https://www.accessdata.fda.gov/drugsatfda_docs/nda/2005/050795s000_DoryxTOC.cfm). Created on 21.04.06