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Thinking Outside the Bowel: Clostridium difficile Bacteremia Case Series

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1032. A Case Series of *Clostridium septicum* Aortitis

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Session: 131. Bacteremia and Endocarditis

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Background. *Clostridium septicum* is an anaerobic, motile, spore forming, toxin-producing Gram-positive bacillus (GPB) that has been associated with colon and hematologic malignancies. Despite the low incidence of infection, it is a virulent organism leading to rapidly progressive gas gangrene. Only 51 cases of *C. septicum* related aortic aneurysms have been reported. 100% mortality is reported in patients without surgical intervention vs. 79% undergoing surgery. The primary aim of this study was to determine the incidence and clinical outcomes of patients treated at our institution with *C. septicum* aortitis.

Methods. In this IRB-approved retrospective case series, we reviewed our microbiology laboratory's blood and tissue cultures from January 2005 to 2018 to identify cases of *C. septicum* infection. All patients >18 years of age who had positive cultures were reviewed to provide radiographic or histopathologic correlation.

Results. Among 50 patients with *C. septicum* in blood and tissue cultures, seven patients were identified with aortitis. Underlying malignancy was found in four cases and included colon cancer (three cases) and prostate cancer (one case). The most common location for infection was the infrarenal aorta (four cases). Previous vascular surgery had been performed in three cases. Five of the seven patients underwent surgical repair with pathology revealing GPB in three patients and acute inflammation in the other two patients. *C. septicum* grew in tissue cultures from these patients. Four of the seven patients (all of whom underwent surgery) had positive blood cultures. The two patients that did not undergo surgery died which is consistent with the 100% mortality described in the literature. All patients were treated with β-lactam therapy. The median duration among the five who completed treatment was 7.5 weeks. Among the five patients who underwent surgery, two are alive (one at 1 year and another at 5 months postoperatively), two died within the first year after surgery, and one patient was lost to follow-up.

Conclusion. A small percentage of patients with *C. septicum* aortitis survived over 1 year. Earlier recognition and emergent surgery with appropriate antimicrobial therapy are needed to improve the outcome of patients diagnosed with this rare infection.

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1033. Thinking Outside the Bowel: *Clostridium difficile* Bacteremia Case Series

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Background. While *Clostridium difficile* gastrointestinal infection (CDI) is the most common hospital-acquired infectious disease, *C. difficile* bacteremia (CDB) is exceedingly rare and its risk factors, mortality rate, and modalities of treatment are not well defined.

Methods. We conducted a retrospective, IRB approved, chart review of adult patients with a diagnosis of CDB admitted to our institutions from 2011 through 2017. Variables catalogued included previous antibiotic and proton pump inhibitor (PPI) use, co-morbid conditions, prior history of CDI, diarrhea at the time of CDB, active malignancy, and gastrointestinal (GI) disruption (e.g., perforated viscous, GI bleeding, abdominal malignancy). Treatment courses and outcomes for CDB were also gleaned.

Results. Seven patients with CDB were identified, with ages ranging from 35 to 81 years (median 65 years). Six (85.7%) patients had evidence of GI disruption and three (42.9%) were noted to have active cancer. Three (42.9%) patients had previous CDI by testing and three (42.9%) had complaints of diarrhea at the time of diagnosis. Six (85.7%) patients had exposure to PPIs before CDB diagnosis, and five (71.4%) had prior antibiotic exposure in the past 30 days. Five (71.4%) patients had a polymicrobial bloodstream infection, with the majority of organisms being enteric in nature. In terms of CDB treatment, the majority of patients received intravenous (IV) metronidazole and/or IV vancomycin in addition to broad-spectrum antibiotics due to the polymicrobial nature of their infection. Three (42.9%) patients died during their hospitalization, only one who had polymicrobial bacteremia.

Conclusion. CDI is the most common cause of hospital acquired infection, although rarely causes bacteremia. Notable findings in our population included older age, concomitant malignancy, evidence of GI disruption, and prior exposure to PPIs and antibiotics. Antibiotics chosen to treat CDB were IV metronidazole and/or IV vancomycin, with other broad-spectrum antibiotics utilized due to polymicrobial bacteremia. CDB is associated with a high mortality rate and is commonly manifested as a polymicrobial bloodstream infection. This is one of the larger case series that adds to the scant literature characterizing patients diagnosed with CDB.

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1034. "Four-Leaf Clover Sign" as a Rapid Identification of Coagulase-Negative Staphylococci Species by Gram Stain of Blood Culture

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Background. Gram-positive coccus (GPC) in cluster bacteremia is associated with high mortality and morbidity. Although laboratory technologists note morphological characteristics such as the size and number of cells help distinguish *S. aureus* and Coagulase-negative staphylococci (CoNS), there are few studies that explored the optimal findings to distinguish between them by Gram stain. Here, we analyze some findings in Gram stain contributing to identify *S. aureus* or CNS.

Methods. This study was conducted at St. Luke`s International Hospital from November 2016 and September 2017. Broths for which a Gram stain showed GPC cluster were included in our study. Two infectious diseases fellows examined direct Gram stains of blood culture within 24 hours of positivity. We defined the sign as follows: four-leaf clover (FLC) sign if four GPCs gather like four-leaf clover (Figure 1) and three-dimensional (3D) sign if GPCs resemble big grapes. They counted the number of fields that have FLC and 3D signs out of 10 fields per each slide. We performed logistic regression analysis to assess whether these signs are the contributable factors to identify SA or CNS. The predictive ability of these signs was evaluated on the basis of the sensitivity (Sen), specificity (Spe), positive predictive value (PPV), and negative predictive value (NPV) for CoNS with receiver operating curve (ROC) analysis.

Results. In total, 106 blood cultures in which a direct Gram stain showed GPC in cluster were examined. Cultures revealed 46 (43%) were SA and 66 (57%) were CoNS. A multivariate logistic analysis showed that FLC sign was statistically significant variable of CoNS with odds ratio (OR) 1.20 (95% CI 1.09–1.35, $P < 0.05$). In aerobic bottles, Sen, Spe, PPV, and NPV were 0.67, 0.91, 0.92, and 0.65, respectively (Table 1) and area under the curve (AUC) was 0.79 (95% CI 0.67–0.91) (Figure 2). Cut-off fields were 6.5 out of 20.

Conclusion. This is the first study to show FLC sign could be a rapid and useful finding of Gram stain to identify CoNS rather than SA in aerobic bottles. In the presence of FLC sign, clinicians should highly suspect of CoNS with PPV of 92% before the final identification.

Figure 1. Four-leaf clover (FLC) sign.

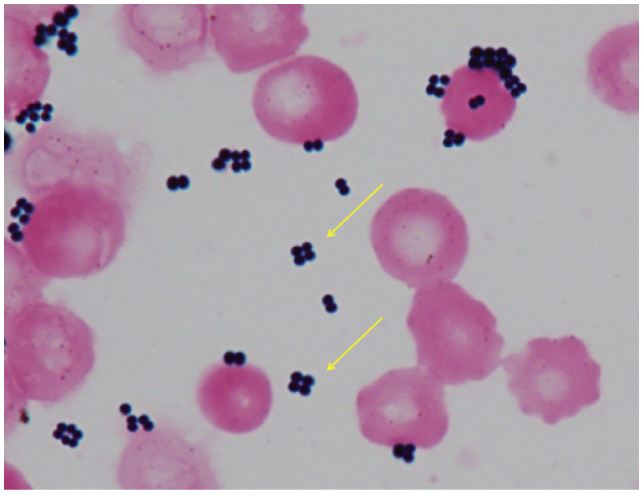

Table 1: Logistic regression analysis of FLC sign.

	Sensitivity	Specificity	PPV	NPV	AUC (95% CI)
Aerobe	0.67	0.91	0.92	0.65	0.79 (0.67-0.91)
Anaerobe	0.74	0.54	0.65	0.65	0.62 (0.46-0.78)
Overall	0.70	0.72	0.76	0.65	0.72 (0.62-0.82)