Commentary

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Hematogenous Complications of Central Catheter-Associated Bloodstream Infections

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Description

Central Catheter-Associated Bloodstream Infections (CRBIs) can result in serious ramifications such as suppurative thrombophlebitis, endocarditis, and metastatic infections. While the complications stemming from CRBIs attributed to *Staphylococcus aureus* (SA) are widely acknowledged, there exists limited data concerning CRBIs from other bacterial sources. This retrospective study spanning two years, conducted at a tertiary care hospital, scrutinized the hematogenous complications linked with CRBIs across various patient attributes, types of Central Venous Catheters (CVCs), and causative bacteria. In total, 254 patients with confirmed CRBIs were examined, yielding 285 isolated bacteria types, predominantly enterobacteriaceae (n=94), Coagulase-Negative Staphylococci (CNS, n=82), SA (n=45), and non-fermenting Gram-negative Bacteria (NGB, n = 45). Of these patients, 35 experienced at least one hematogenous complication (14%), including suppurative thrombophlebitis (n=15), endocarditis (n=7), and metastatic infections (n=16). Multivariate analysis revealed associations between hemodialysis, persistent bacteremia lasting at least three days, SA-induced CRBIs, and heightened risk of hematogenous complications. Conversely, prior curative anticoagulant treatment was linked to reduced risk. Diabetes, CVC maintenance, and hematogenous complications were correlated with increased three-month mortality. Thus, a comprehensive examination of hematogenous complications is imperative, especially in patients with persistent bacteremia, particularly those afflicted with SA infections and those undergoing hemodialysis.

Bloodstream infections

Central Line-Associated Bloodstream Infection (CLABSI) poses a significant threat to the health of premature infants, often resulting in considerable morbidity and mortality. Given the considerable variability in the effectiveness of existing preventive measures, there is merit in considering additional strategies. Venous Access Device-Related Bloodstream Infection (VAD-BSI) caused by Coagulase-Negative Staphylococci (CoNS) is a frequent complication following allogeneic Hematopoietic Cell Transplantation (alloHCT). The standard treatment for uncomplicated VAD-BSI involving methicillin-resistant CoNS typically entails Intravenous (IV) vancomycin, necessitating hospitalization, establishing new venous access, and exposing patients to potential adverse effects, particularly renal toxicity, and the risk of dysbiosis of commensal flora leading to vancomycin-resistant enterococci selection. At our institution, we have evaluated the use of oral minocycline as an alternative systemic therapy in conjunction with VAD management (either removal or antibiotic locks) for treating uncomplicated VAD-BSIs with CoNS, especially in situations where IV vancomycin is not feasible (due to renal issues or allergy) or when patients decline hospitalization. Here, we present a retrospective analysis of our experience with this minocycline-based approach. In general, successful clearance of bacteremia (as determined by negative surveillance peripheral blood cultures for the same CoNS strain between day +3 and +30 after starting systemic therapy) was achieved in all but one patient with a port who exhibited persistent bacteremia on day +9. No complications such as suppurative thrombophlebitis, endocarditis, distant infections, or bloodstream infection-related mortality were observed within the 3-month follow-up period after initiating treatment. Among the 17 cases of port-related BSI where a conservative VAD strategy was attempted, preservation failure within 3 months occurred in 7 cases, and recurrence of VAD-BSI within 3 months was noted in 3 cases (including one with cellulitis). Treatment with minocycline was generally well-tolerated, with only one patient experiencing a mild skin rash. Oral minocycline was administered at a loading dose of 200 mg, followed by 100 mg twice daily for a duration of 5–14 days, depending on whether the VAD was removed (5–7 days) or retained and managed with antibiotic locks (10–14 days). Minocycline could be initiated as the primary antibiotic therapy or following a brief course (maximum 72 hrs) of IV vancomycin, pending confirmation of minocycline susceptibility via antibiogram data, at the discretion of the treating physician.

In conjunction with systemic therapy, management of Venous Access Device-Related Bloodstream Infections (VAD-BSI) involved either removal of the VAD or salvage treatment using antibiotic locks. The decision between these options was left to the discretion of the treating physician, although VAD removal was typically recommended for non-implanted catheters or when local complications were evident, following institutional guidelines. Antibiotic locks containing either vancomycin or

gentamicin were administered at least three times weekly for a duration of two weeks, either in a day hospital setting or through home nursing services provided by trained nursing teams. These locks did not contain any anticoagulants, although the exact antibiotic concentration of each lock was not retrievable through retrospective analysis.