Editorial

# Central line associated Bloodstream Infections

**Rabindran[1], Gedam DS[2]**

[1]Dr. Rabindran, Consultant, Neonatologist, Billroth Hospital, Chennai, [2]Dr D Sharad Gedam, Professor of Pediatrics, L N Medical College, Bhopal, MP, India.

**Address for Correspondence:** Dr Rabindran, E mail: rabindranindia@yahoo.co.in

## Abstract

Catheter associated blood stream infections are common entity in ICU setting. Indeed it is having 1-13% prevalence rate in various studies.

**Keywords:** Central line associated blood stream infection, nosocomial infection, bacteremia.

Catheter-associated infection is defined as a semiquantitative culture yielding 15 or more colony forming units in the absence of a positive blood culture. Central lines have a higher infection risk than other indwelling vascular access lines & Central line associated Bloodstream Infections (CLABSI) are the commonest hospital-acquired infections among critically ill patients. Studies have shown a 1 to 13% prevalence rate of positive blood cultures related to Central lines [1] & they increase mortality risk by 25%. Coagulase-negative staphylococci, Staphylococcus aureus, Enterococci, Enterobacteriaceae, Pseudomonas & Candida are the commonest organisms associated with CLABSI [2].

There are various types of central lines like 1) Nontunneled Centralvenous lines (CVC) which are used for longer-term intravenous therapy & are most commonly associated with CLABSI; 2) Pulmonary artery catheters; 3) Peripherally inserted CVC which have lower CLABSI; 4) Tunneled CVC which have a cuff below the skin that prevents migration of organisms & hence have a lower CLABSI, 5) Totally implantable catheters which have the lowest CLABSI; 6) Umbilical catheters [3]. Central lines are used for infusion therapy, hemodynamic monitoring, plasmapheresis, apheresis, hemodialysis, tissue & organ transplantation, administration of liquids, blood products, chemotherapy, antibiotics & parenteral nutrition [4]. Microorganisms reach the tip of Central lines by multiple routes like 1) Extraluminal through migration from patient's skin microflora; 2) Intraluminal migration from infusates; 3) Hematogenous; 4) Contamination during the preparation of fluids for injection; 5) Impaction during insertion due to inadequate asepsis. Predisposing factors for CLABSI include 1) Patient-related factors like increasing severity of illness, granulocytopenia, compromised skin integrity, presence of distant infection, respiratory failure, nonoperative cardio-vascular disease, hospitalization time; intubation time, mechanical ventilation, administration of blood products (3 units or more), cardiac surgery, prolonged use of CVC (7 or more days), use of hydrocortisone for presumed renal failure, leukopenia (< 5.000 cells/ul) [5]; 2) Catheter-related factors like catheter type, number of lumens, duration in situ, antimicrobial coating, type of infusion solution, insertion technique, insertion site, insertion in the ICU; insertion of more than one catheter, time of catheter use [6]; 3) Operator factors like breaks in aseptic technique during placement and maintenance, frequent catheter access [7]. Infection rate is higher with the femoral access as compared to jugular or subclavian access. Patients with CVC are at risk of developing local as well as systemic infectious complications like local insertion-site infection, Catheter Related Blood Stream Infections, septic thrombophlebitis, endocarditis [8]. They are associated with increased hospital length of stay, total hospital costs & mortality.

Preventive measures include catheter maintenance by a skilled infusion-therapy team, daily site review, removal of CVC at earliest opportunity, coating of catheters with antiseptic agents, silver-impregnated cuffs, use of topical antibiotics & disinfectants such as

chlorhexidine, chlorhexidine-impregnated sponge dressing, antiinfective CVC hubs & novel needleless connectors, ultrasound use during CVC placement, using Seldinger technique, routine flushing with saline of the CVC to prevent fibrin buildup, implementation of well-defined protocols & education of doctors and staff about proper handling. Sterile gowns, gloves, masks, caps & large drapes should be used during CVC insertion. Catheters impregnated with antibiotics like Minocycline, rifampin, Chlorhexidine-Silver Sulfadiazine, Silver-platinum, carbon, 5-fluorouracil prevent CLABSI [9]. Disinfection of CVC insertion site with 2% alcohol chlorhexidine lessens risk of infection by 50% compared to 10% by povidone iodine and 70% alcohol [2]. Ethanol locks can eliminate pathogens colonising CVCs and microbial resistance is rare.

Specific therapy with standard antimicrobial agents should be initiated as soon as possible. Most BSI can be treated effectively without catheter removal. However fungemias or bacteremias with Bacillus species, C jeikeium, S aureus, P aeruginosa, or Stenotrophomonas maltophilia and nontuburculous mycobacteria often persist despite appropriate antibiotics and then require catheter removal. Catheter removal should also be considered when blood cultures remain positive after 48 hours of antibiotic treatment if no other site of infection has been identified or if bacteremia recurs shortly after completion of a course of antibiotics. Judicious use of central lines with prompt monitoring and early intervention are mandatory for management of CLABSI. Oberai et al in their study published in this issue discussed that Bloodstream infections related to the use of central venous catheters are an important cause of patient morbidity, mortality, and increased health care costs. Their study highlights the predominance of multidrug resistant gram negative organisms which were also found to be biofilm producers [10].

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