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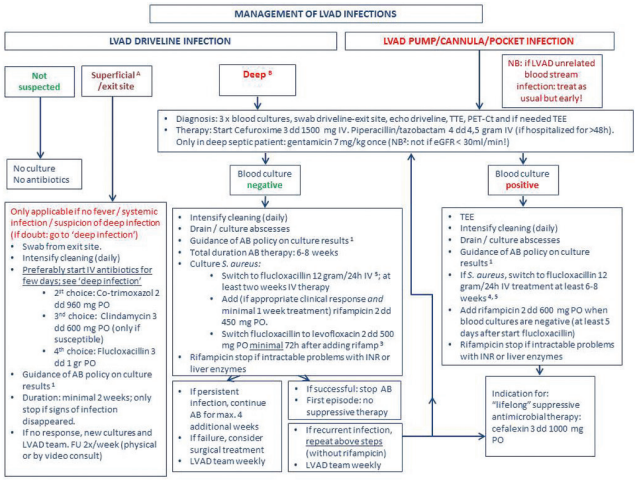
Session: 37. Bacteremia, CLABSI, and Endovascular Infections
Thursday, October 3, 2019: 12:15 PM

Background. Left ventricular assist device (LVAD) implantation has become an effective treatment option for patients with severe heart failure. However, infections remain a substantial risk. Therefore, the aim of this study was to gain insight in the incidence and outcome of LVAD infections in our center and develop an up-to-date flowchart for the management of LVAD-related infections.

Methods. A retrospective study was performed which included all patients with an LVAD implanted between 2006 until 2019, along with a rigorous review of the current literature. Clinical records and microbiological laboratory results of all patients were reviewed. In view of local infectious complications, a flowchart was developed for the contemporary management of LVAD-related infections (Figure 1).

Results. Overall, 106 patients (median age 54 years [IQR 47–60], 78% male) were included, of whom 92 (87%) as bridge-to-transplantation/decision and 14 (13%) as destination therapy. LVAD-related infections occurred in n = 30 (28%) of the patients. The median time until first infection was 308 days [IQR 115–528], and the median duration of hospital stay was 16 days [IQR 4–29]. Eighty percent of LVAD-related infections were driveline-related. The most common causative pathogen was *Staphylococcus aureus*, which was present in almost half of the cases (40%). Patients who experienced infections were younger (46 [IQR 37–57] vs. 56 [IQR 52–62]; $P < 0.001$).The survival rate at 3 years was 76% in the infected vs. 94% not infected patients; $P = 0.037$). A secondary infection occurred in 10 patients (33%). At 3 years of follow-up, 31 patients were successfully transplanted. Six patients with deep *S. aureus* driveline infections were treated according to the standardized protocol of whom 2 with suppressive therapy by cephalexin, with clinical success so far.

Conclusion. LVAD infections occur frequently and lead to prolonged periods of hospital admissions and death. The lack of standardized treatment regimens complicates the treatment of LVAD-related infections. A comprehensive flowchart to treat future LVAD-related infections in a protocolized fashion was developed, based on our single-center experience. While the preliminary results look promising, more follow-up time of the treated patients is needed.



Definitions

A Superficial VAD-specific Percutaneous Driveline Infection
- Involvement of tissues superficial to the fascia and muscle layers of the incision documented
- Purulent discharge from the incision but not involving fascia or muscle layers or erythema spreading around the exit site

B Deep VAD-specific Percutaneous Driveline Infection
- Involves deep soft tissue (eg, fascial and muscle layers) on direct examination or during re-operation
- An abscess is found on direct examination during or re-operation

Additional guidance

1 If bacterial culture is negative, consider non-infectious causes (allergy), or other infectious causes (fungi, nontuberculous mycobacteria (NTM) or slow-growing or unculturable micro-organisms. Consult medical microbiologist.
2 If GFR<30 ml/min, do not give gentamicin, start in septic patient with meropenem 2 dd 1 gram IV
3 Do not introduce levofloxacin and rifampicin at the same time (in case of allergic reaction, it is clear to which drug)
4 Consider outpatient iv treatment after 1-2 weeks stable period
5 If non-IgE mediated penicillin allergy, start cefazolin 6 g IV/24 h; If IgE-mediated penicillin allergy, start meropenem 3 dd 1 gram IV

Abbreviations

AB	antibiotics
Dd	times daily
TEE	trans-esophageal echocardiography
TTE	trans-thorecal echocardiography
Gr	gram
IV	Intravenously
Mg	milligram
PO	per os

Remarks:
- Always take into account earlier culture results
- Dosages of antibiotics are based on a normal GFR. Check if dosage needs to be adjusted in case of abnormal GFR.

Disclosures. **All authors:** No reported disclosures.

128. Adequacy of Commonly Prescribed Antimicrobials for Empiric Coverage of Gram-Negative Bacterial Pathogens Recovered from the Bloodstream of Patients Attending Emergency Rooms in Canada: Analysis of Data from the CANWARD Study, 2007 to 2018

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Background. Inadequate empiric antimicrobial therapy for Gram-negative bacteremia is associated with adverse clinical outcomes. The purpose of this study was to evaluate the proportion of Gram-negative bacterial isolates recovered from the bloodstream of patients attending Canadian emergency rooms (ERs) that remain susceptible to commonly prescribed antimicrobials.

Methods. Annually from 2007 to 2018, sentinel hospitals across Canada collected bloodstream isolates from patients attending ERs as part of the CANWARD study. Susceptibility testing was performed using broth microdilution as described by CLSI (data analysis limited to Gram-negative bacteria in the top 10 pathogens), with current CLSI breakpoints applied. Extended-spectrum β-lactamase (ESBL)-producing isolates were confirmed using the CLSI disk diffusion method.

Results. Gram-negative bacteria among the top 10 bloodstream pathogens for patients seen at ERs across Canada were: *Escherichia coli* (n = 2,414), *Klebsiella pneumoniae* (n = 573), *Pseudomonas aeruginosa* (n = 211), *Proteus mirabilis* (n = 119), and *Enterobacter cloacae* (n = 114). Aggregate susceptibility of these isolates to common antimicrobials was as follows (% susceptible [S]): meropenem 99.4% S, piperacillin–tazobactam 98.5% S, gentamicin 93.3% S, ceftriaxone 88.1% S, ciprofloxacin 81.4% S, TMP-SMX 73.5% S. The most active antimicrobials evaluated vs. *E. coli* were meropenem (100% S), piperacillin–tazobactam (98.8% S), and ceftriaxone (93.3% S). Ceftriaxone susceptibility among *E. coli* isolates declined from 95.4% in 2007 to 89.8% in 2018. The average proportion of *E. coli* isolates that harbored an ESBL enzyme increased from 3.4% in the first three study years to 8.4% in the last three study years. The most active antimicrobials evaluated vs. *K. pneumoniae* isolates were meropenem (99.7% S), piperacillin–tazobactam (98.8% S), gentamicin (97.7% S), and ceftriaxone (96.9% S).

Conclusion. The most consistently active antimicrobials for empiric treatment of patients at Canadian ERs with Gram-negative bacteremia are meropenem and piperacillin–tazobactam. Ceftriaxone susceptibility among *E. coli* has declined over the last 12 years, mostly related to an increase in ESBL-producing isolates.

Disclosures. **All authors:** No reported disclosures.

129. Antimicrobial Activity of Ceftazidime–avibactam and Comparator Agents Tested against Gram-Negative Organisms Isolated from Patients with Bloodstream Infections in United States Medical Centers (2017–2018)

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Session: 37. Bacteremia, CLABSI, and Endovascular Infections
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Background. We evaluated the antimicrobial susceptibility of *Enterobacterales* (ENT) and *P. aeruginosa* (PSA) causing bloodstream infections (BSIs) in the United States (US) hospitals.

Methods. A total of 3,317 ENT and 331 PSA isolates were consecutively collected (1/patient) from patients with BSI in 68 US medical centers in 2017–2018 and tested for susceptibility (S) by reference broth microdilution methods in a central laboratory as part of the International Network for Optimal Resistance Monitoring (INFORM) Program. β-Lactamase screening was performed by whole-genome sequencing on ENT with decreased S to broad-spectrum cephalosporins (ESBL phenotype).

Results. The most common ENT species isolated from BSI were *E. coli* (EC; 41.9% of ENT), *K. pneumoniae* (KPN; 24.4%), and *E. cloacae* (ECL; 8.7%), and the most active agents against ENT were ceftazidime–avibactam (CAZ-AVI; 99.9%S), amikacin (AMK; 99.6%S) and meropenem (MEM; 99.3%S). CAZ-AVI was active against all EC and KPN isolates (100.0%S). Only 2 ENT isolates (0.06%) were CAZ-AVI resistant, 2 NDM-1-producing ECL isolated in the New York City area. Ceftolozane–tazobactam (C-T) and piperacillin–tazobactam (PIP-TAZ) showed good activity against EC and KPN (92.2–98.9%S; Table), with limited activity against ECL (81.9–83.7%S). The most common ESBLs were CTX-M-type, which was observed in 93% of ESBL producers (mainly CTX-M-15 [64% of ESBL producers] and CTX-M-27 [13%]), and OXA-1/OXA-30 (42%); 42% of ESBL producers (n = 333, excluding carbapenemase producers) displayed ≥2 ESBL genes, mainly CTX-M-15 and OXA-1/OXA-30 (40% of ESBL producers). The most active agents against ESBL producers were CAZ-AVI (100.0%S), imipenem (99.4%S), and colistin (COL; 99.1%S). Only CAZ-AVI (99.4%S), AMK (96.2%S) and MEM (92.8%S) were active against >90% of multidrug-resistant (MDR) ENT. Among 19 carbapenem-resistant ENT (CRE; 0.6% of ENT), 9 produced a KPC-like, 2 an NDM-1, and 2 an NMC-A; carbapenemase genes were not found in 6 CRE isolates. COL (100.0%S), CAZ-AVI (98.5%S), AMK (98.5%S), C-T (98.1%S), and tobramycin (97.0%S) were very active against PSA.