Duration of antibiotic therapy for critically ill patients with bloodstream infections: A retrospective observational in Saudi Arabia

Sir,

Bacteremia in patients admitted to the intensive care unit (ICU) carries a high mortality rate and increases the overall expense.[1] Limited data exist about the appropriate duration of antimicrobial therapy for adult critically ill patients with bacteremia, and no randomized controlled trial currently exists.[2] Adequate duration of antimicrobial therapy is critical for preventing infection relapse.[3] However, prolonged antimicrobial therapy is associated with increased resistance. Antimicrobial resistance in bacteria is emerging and spreading rapidly worldwide. Therefore, in 2015, the World Health Organization launched the global action plan on antimicrobial resistance; this plan was signed off by Saudi Arabia, and one of its components was to optimize the use of antimicrobial agents.[4] We searched MEDLINE for studies to learn current practices about the duration of antimicrobial therapy in Saudi Arabia using keywords (antimicrobial, duration, antibiotics, and ICU) and found no related study. The objectives of the current study were to describe the current practice of antibiotic treatment duration for bloodstream infections in critically ill patients in Saudi Arabia and to describe the characteristics of bacteremia patients, pathogens, and infectious syndrome characteristics to inform a large randomized controlled trial (NCT03005145, BALANCE) planned to be conducted in Canada and Saudi Arabia.

In this retrospective study, we included 30 randomly selected critically ill patients with bacteremia (from 2014 to 2015) from King Abdulaziz Medical City, Riyadh. We

Table 1: Baseline characteristics, duration of antibiotic therapy and outcomes of study cohort

Variable	Saudi cohort (*n*=30)	Canadian cohort[1] (*n*=100)
Age, years (mean±SD)	63.1±20.2	66±17
Male sex, *n* (%)	17 (56.7)	71 (71)
APACHE II score (mean±SD)	23.6±6.6	NR
Admission category, *n* (%)		
Medical	18 (60)	39 (39)
Surgical	6 (20)	40 (40)
Neurological	1 (3.3)	NR
Other	5 (16.7)	NR
Comorbid condition, *n* (%)		
Diabetes	15 (53.6)	25 (25)
Congestive heart failure	3 (10.7)	13 (13)
Hematological malignancy	3 (10.7)	6 (6)
Solid organ malignancy	4 (14.3)	17 (17)
Immunosuppressive therapy	3 (10.7)	8 (8)
Chronic renal failure	5 (17.9)	9 (9)
Cirrhosis	2 (7.1)	2 (2)
Pathogen groups, *n* (%)		
Gram-negative bacteria	15 (50)	55 (55)
Other Gram-positive bacteria	5 (16.7)	57 (57)
Staphylococcus aureus	3 (10)	25 (25)
Coagulase negative staphylococci	1 (3.3)	44 (44)
Other bacteria	1 (3.3)	0
Yeast	8 (26.7)	0
Mechanical ventilation, day 1, *n* (%)	16 (53.3)	NR
Glasgow Coma Score, day 1 (mean±SD)	9.5±4.4	NR
Mean arterial pressure, day 1, mmHg (mean±SD)	74.2±19.3	NR
Laboratory findings, day 1 (mean±SD)		
Platelet count, $\times 10^3/\mu L$	171.8±145.9	NR
Creatinine, μmol/L	188.9±185.7	NR
Bilirubin, μmol/L	88.1±152.2	NR
White blood cell, $\times 10^9/\mu L$	15.0±7.4	NR
Central venous pressure (mmHg)**	15.2±6.2	NR
Temperature, °C (mean±SD)	37.7±1.3	NR
Heart rate, beats/min (mean±SD)	111.5±23.0	NR
Urine output, mL/days (mean±SD)	2763.6±2419.9	NR
ICU mortality, *n* (%)	20 (66.7)	22 (22)
Hospital mortality, *n* (%)	25 (83.3)	39 (39)

**Thirteen patients. NR=Not reported, APACHE II=Acute Physiology and Chronic Health Evaluation II, SD=Standard deviation, ICU=Intensive care unit

included adult ICU patients 18 years and older with positive blood cultures. We excluded those patients with endocarditis, septic arthritis, undrainable abscesses, and unremovable prosthetic material, for which the need for antibiotic treatment exceeding 2 weeks is well-established.

Table 1 shows the main results. The mean age was 63.1 ± 20.2 years; the majority 17 (56.7%) were males, with 60% admitted to ICU for a medical indication; 18 (60%) were diabetic. Mean APACHE II score was 23.6 ± 6.6 and the majority had Gram-negative bacteria 15 (50%) [Table 1]. The median treatment duration was 15 days (interquartile range 9.5–20.5), excluding patients who did not receive antimicrobials and those who died within 10 days of bacteremia detection and were still receiving antimicrobials [Table 1]. Nine patients with pneumonia underlying their bacteremia received the treatment for a median of 15 days (interquartile range 10, 21). Five patients with catheter-related infections received the treatment for a median of 14 days (interquartile range 2–15). ICU mortality among all patients was 66.7% (*n* = 20), and hospital mortality was 83.3% (*n* = 25). We compared our cohort with data from a Canadian cohort [Table 1]. Diabetes was much more prevalent in the Saudi cohort (53.6%) compared to the Canadian cohort (25%). The average duration of antimicrobial therapy was shorter 11 days (interquartile range 4.5–17) in the Canadian cohort. Furthermore, the overall hospital mortality rate for the Canadian cohort was lower at 39%.[1]

This cohort highlights the high mortality associated with bacteremia in Saudi Arabian ICU patients

and the importance of ongoing research, including the BALANCE trial, to inform evidence-based decision-making and improved quality of care for these patients.

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Conflicts of interest
There are no conflicts of interest.

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