

## Polymicrobial Blood Stream Infection: Consensus Definition is Required

Sir,

While managing a 45-year-old male of carcinoma pancreas who underwent six cycles of chemotherapy 2 years back and thereafter placement of metallic stent to relieve the obstructive jaundice, now presented with septic shock due to multiple liver abscess, we encountered a situation where there was need to answer specific question whether this patient's bloodstream infection should be labelled as polymicrobial or not?

Broadly speaking polymicrobial bloodstream infection may be defined as isolation of more than one organism. In adults, it is associated with increased morbidity, mortality, length of hospital stay and costs.<sup>[1,2]</sup> On the initial suspicion of infectious etiology, blood cultures were taken and antibiotics including meropenem and fluconazole given. There was growth of extended spectrum  $\beta$ -lactamase-*Escherichia coli* which was sensitive only to carbapenam and aminoglycosides so meropenem was continued. On the 3<sup>rd</sup> day, follow-up blood culture sent. Again on the 4<sup>th</sup> day, he developed high-grade temperature with rise in white blood cell count and reinitiation of noradrenaline, aminoglycoside was added to meropenem in view of sensitivity report. Later in the day, microbiologist informed that second blood culture is growing Gram-positive cocci, and hence, vancomycin was added to ongoing regimen but only after third sets of blood culture. Second blood culture finally turned out to be *Enterococcus avium* which was sensitive to ongoing antibiotics, so amikacin was stopped. The patient finally responded to given antibiotics. In third blood culture, Gram-negative bacilli grew in anaerobic bottle while no growth in aerobic. Further identification of this organism was not possible at our center. Meanwhile, for the further management, patient was shifted to another hospital.

Whether it was polymicrobial bloodstream infection (BSI) or merely separate episodes of monomicrobial infections or superinfection needs consideration. Literature was searched, and there were varying definitions available. A polymicrobial BSI was defined as the isolation of more than one pathogen from the same blood sample or from two consecutive blood samples within 24 h.<sup>[3]</sup> According to another definition "A BSI was considered to be polymicrobial if two or more pathogens were isolated from cultures of blood samples obtained within 48 h after the initial evaluation, irrespective of whether the isolate came from the same or different blood culture bottle."<sup>[4]</sup> In our patient, we grew different organisms over the period of 5 days so as per definitions our case does not fit into these definitions. As far as different episodes of monomicrobial bacteremia due to multiple sources, it was unlikely in our patient as there was no other source. Moreover, multiple

liver abscess are mainly pyogenic in nature and usually polymicrobial. Superinfections were ruled out on the basis of the sensitivity of subsequent organisms to meropenem.

Another definition mention "in which more than one different species of organisms were isolated in a single or in a separate blood culture specimen within the same infectious episode irrespective of time duration."<sup>[5]</sup> The patient fits in this definition. When there is the growth of the single organism in initial blood culture, then there are chances of antibiotic de-escalation. Multiple space-occupying lesions on liver ultrasonography, not clearly abscess, was initially mistaken for metastasis.

Definition of polymicrobial BSI should include a single infectious source of polymicrobial nature, extending defined period much longer time than 48 h but should simultaneously exclude hospital-acquired infections. Patients infected with polymicrobial BSI will get most appropriate management only when single consensus definition will be in place.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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