Cerebrospinal fluid procalcitonin to reduce patients’ exposure to antibiotics

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Argomento: Neuroanestesia e neurorianimazione

Appropriate prescription and reduced duration of antibiotic treatment may contain multidrug-resistant bacteria emergence in intensive care unit. We aimed to establish the effectiveness of a treatment strategy based on cerebrospinal fluid (CSF) procalcitonin levels to reduce patients’ exposure to antibiotics in neurosurgery-associated bacterial meningitis (NABM). All adult patients who underwent neurosurgery or ventricular shunt device positioning and presenting with fever and clinical features suggestive of central nervous system infection were included. CSF and blood samples were collected on the day of fever onset, as well as on day 2 and 5 post fever development if diagnosis was confirmed, and, therefore, empirical antibiotics started. CSF-procalcitonin and lactates, as well as serum-procalcitonin, were subsequently analyzed. To date, 9 patients have been enrolled. In patients with positive CSF culture confirming NABM, mean CSF-procalcitonin was 1,86 ng/ml ± 0,65 at fever onset; 0,3 ng/ml ± 0,15 after 48 hours of antibiotics; and 0,1 ng/ml ± 0,03 after 5 days, proving treatment effectiveness. Median of the ratio between CSF procalcitonin and serum procalcitonin (CSF-PcT/serum-PcT) was 0,76 (IQR 0,56 – 3,17), 0,45 (IQR 0,29 – 1,15) and 1,67 (IQR 1,14 – 2,33) respectively. In patients with NABM associated bacteremia and in those with other source of infection and associated bacteremia, CSF-PcT/serum-PcT was significantly lower ($p<0,05$). In patients in whom infection was excluded, both CSF-PcT and serum-PcT were negative, whilst, CSF lactates levels were higher due to the fact that red blood cells were detected in the CSF. Patients with a significant CSF-PcT clearance and a lower CSF-PcT/serum-PcT had a good outcome (GOS 1-4) ($p<0,05$), whilst, a slower CSF-PcT clearance and a higher CSF-PcT/serum-PcT were correlated with a worse outcome (GOS 5-6) ($p<0,05$). CSF-PcT and CSF-PcT/serum-PcT may be valuable tools in diagnosing NABM being effective especially in guiding antibiotic treatment and, finally, improving patients’ outcome