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LETTER TO EDITOR

Catheter-related bloodstream infection suspected by microscopic examination of blood smears

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Dear Editor,

The need for totally implantable central venous access port (TICVAP) has increased in chemotherapy and parenteral nutrition. Major complications of TICVAP placement such as infection, thrombosis, catheter obstruction, extravasation, and catheter migration have been reported [1], among which TICVAP-related infection, a type of catheter-related bloodstream infection (CRBSI), is the most prevalent complication that results in device removal [1].

An 83-year-old woman suffering from sequelae of cerebral infarction such as dysphagia, aphasia, and hemiplegia was admitted to our hospital for fever and dehydration. Infection such as aspiration pneumonia or urinary tract infection was considered, and she had been unsuccessfully treated with antibiotics via home-visit medical service. Medication and nutritional solutions were provided to the patient via TICVAP. Upon admission, laboratory findings indicated a white blood cell count of 9,530/μL (basophils, 0.3%; eosinophils, 3.3%; neutrophils, 64.2%; lymphocytes, 20.3%; and monocytes, 11.9%), and C-reactive protein levels of 7.69 mg/dL. No abnormal findings suggestive of infection were found in the chest roentgenogram, but urine analysis showed pyuria. Blood samples were collected via the TICVAP and by venipuncture which we observed tentatively under the microscope. Using 2 mL of the blood sample collected via the TICVAP, a peripheral blood smear was prepared, which revealed neutrophils phagocytosing bacteria and bacterial aggregation (**Figure 1A-1D**). However, a peripheral blood smear collected by venipuncture revealed neither neutrophils phagocytosing bacteria nor bacterial aggregation. The presence of neutrophils phagocytosing bacteria and bacterial aggregation in the peripheral blood smear via the TICVAP immediately raised suspicions of TICVAP-related infection, resulting in prompt TICVAP removal. In blood samples obtained via TICVAP, 12.0 h of aerobic culturing was required to detect methicillin-resistant *Staphylococcus epidermidis* bacteria, whereas in those obtained by venipuncture, 48.3 h of aerobic culturing was required to detect the same bacteria. Similarly, the same bacteria were also detected in the TICVAP catheter tip. On the other hand, 2 days after urine culture, *Enterococcus faecium* were detected. Based on these findings, the patient was diagnosed with TICVAP-related infection and urinary tract infection.

CRBSI is defined as bacteremia presence originating from an intravenous catheter. In situations where the catheter cannot be removed, paired blood cultures obtained simultaneously from a catheter lumen and a peripheral vein meet the CRBSI criteria by quantitative blood cultures (a colony count 3 times greater in a sample drawn through the catheter than from the peripheral vein) or differential time to positivity (blood culture positivity obtained through the catheter ≥120 min before those obtained from the peripheral vein) [2].

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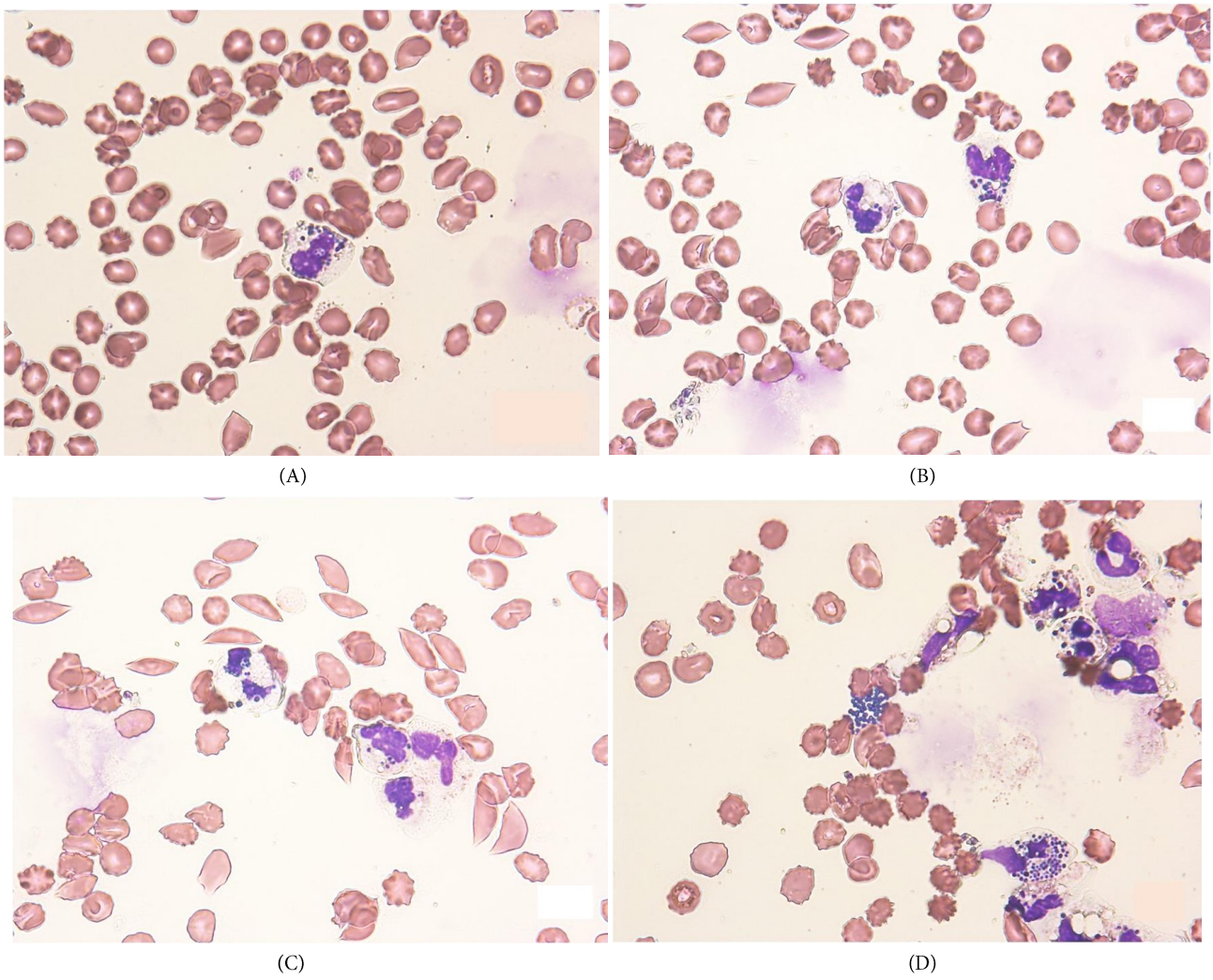

Figure 1. (A) A peripheral blood smear reveals a neutrophil phagocytosing bacteria; (B) A peripheral blood smear reveals neutrophils phagocytosing bacteria; (C) A peripheral blood smear reveals neutrophils phagocytosing bacteria; (D) A peripheral blood smear reveals neutrophils phagocytosing bacteria and bacterial aggregation (1,000x, Wright-Giemsa stain). (Source: Peripheral blood)

In the present case, CRBSI diagnosis was also consistent with the above-mentioned criteria. However, observing the blood samples collected via the TICVAP under the microscope may also provide useful clinical evidence to raise immediate suspicion of CRBSI.

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Data sharing statement: Data supporting the findings and conclusions are available upon request from the corresponding author.

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