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Evaluation on effectiveness of colloidal gold immunochromatography assay for rapid detection of carbapenemase-producing *Enterobacteriaceae*

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BACKGROUND

The identification, treatment, and control of carbapenem-resistant *Enterobacteriaceae* (CRE) infections are a major challenge for health care institutions and diagnostic laboratories worldwide. A simple and rapid test able to provide sensitive and specific identification of CRE and also the carbapenemase present is critical in any strategy aimed at addressing this problem. Recently, a novel Carbapenemase-producing Bacteria Test Kit (Lateral Flow Assay) from Dynamiker Biotechnology (Tianjin) Co., Ltd. was released as a detecting test of CRE. It is a qualitative test that was easy to operate and can be widely accepted by clinical and primary medical. Results can be read in just 15 minutes using colloidal gold immunochromatography, which can detect not only single carbapenemase type, but also double and multiple carbapenemase types (Fig. 1). We analyzed the effectiveness of Dynamiker carbapenemase-producing bacteria test kit for rapid detection of CRE carbapenemase.

METHOD

A total of 120 strains of Enterobacterales in blood culture were collected, including 80 strains of CRE and 40 strains of CSE (carbapenem-susceptibility *Enterobacteriaceae*). PCR was used to detect KPC, NDM, IMP, VIM and OXA-48 genes as gold standard. Dynamiker carbapenemase-producing bacteria test kit was used to detect the carbapenemase produced by CRE, which was conducted by the performance evaluation combined with PCR results.

RESULT

The 80 strains of CRE expressing carbapenemase genes were all positive for the detection of carbapenemasstre by Dynamiker carbapenemase-producing bacteria test kit, which includes 39 strains producing KPC, 26 strains producing NDM, 8 strains producing IMP, 5 strains producing VIM and 2 strains producing OXA-48 enzymes; the 40 strains of CSE were negative and no carbapenemase were detected. Compared with the PCR results, the sensitivity and specificity of the four enzymes by Dynamiker carbapenemase-producing bacteria test kit were both 100% (Fig. 2).

CONCLUSION

Dynamiker carbapenemase-producing bacteria test kit can be applied as a simple, rapid, sensitive and specific diagnostic method for the detection of different CRE carbapenemase types, which is of great value for the accurate use of clinical anti-infective therapy.

KEY WORDS

Carbapenemase-resistant *Enterobacteriaceae*; Carbapenemase; Colloidal gold immunochromatography

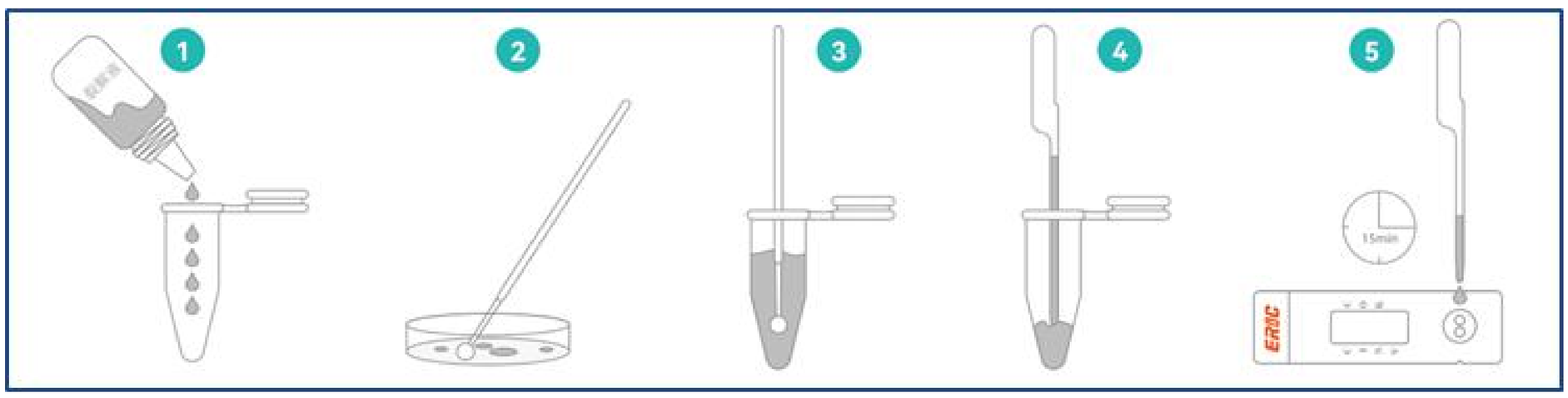

Fig. 1 Operating procedures of colloidal gold immunochromatography

Fig. 2 Results of Dynamiker carbapenemase-producing bacteria test kit
C: Control, K: KPC, N: NMD, I: IMP, V: VIM, O: OXA-48

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