An evaluation of the Mast D69C AmpC Detection Disc Set for the detection of inducible and derepressed AmpC β-lactamases

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Sir,
The emergence of Enterobacteriaceae that can produce AmpC β-lactamases is a major worldwide concern. They have arisen through acquisition of a plasmid-mediated ampC gene or hyper-production of an inducible chromosomal AmpC enzyme, either by induction or derepression. These organisms are resistant to penicillins, first-, second- and third-generation cephalosporins and β-lactamase inhibitor/β-lactam combinations. Therapeutic options to treat these infections are severely limited and often not included in empirical therapy guidelines for serious infections. Rapid detection of AmpC-producing Enterobacteriaceae is therefore essential in order that patients can be optimally managed at an early stage without indiscriminate use of broad-spectrum antibiotics.

Methods available for the detection of AmpC producers are relatively unsatisfactory and there are no established guidelines, as there are for the detection of extended-spectrum β-lactamase (ESBL)-producing organisms.

We evaluated the commercial D69C AmpC Detection Disc Set (Mast Group Ltd, UK). This system is based on a combination disc method that incorporates cefpodoxime (CPD10) as the screening agent in the presence of AmpC-inducing or -inhibiting agents (exact formulations undisclosed), enabling the detection of both plasmid-mediated and chromosomal AmpC, whether inducible or derepressed. An ESBL inhibitor is additionally included to unmask and minimize interference from any ESBL that may be present on the AmpC detection system. Three discs are used: A (CPD10+AmpC inducer), B (CPD10+AmpC inducer+ESBL inhibitor) and C (CPD10+AmpC inducer+ESBL inhibitor+AmpC inhibitors).

A total of 103 previously characterized isolates (comprising 80 AmpC+, 15 AmpC−/ESBL+, 1 AmpC−/KPC+ and 7 AmpC−/ESBL− strains) were blindly tested using the detection kit. These isolates were a combination of reference strains and clinical isolates that had been characterized by genotypic or disc diffusion methods, and included strains with chromosomal derepressed, inducible and plasmid-mediated AmpC resistance mechanisms. The Enterobacteriaceae represented were Escherichia coli, Klebsiella pneumoniae, Morganella morganii, Citrobacter freundii, Enterobacter cloacae, Enterobacter aerogenes and Serratia marcescens.

Testing and interpretation were performed according to the manufacturer’s instructions. Isolates were sub-cultured onto Mueller–Hinton agar to achieve semi-confluent growth. The three discs were placed on the plate as far apart as possible, and the plate was incubated at 37°C in air for 18–24 h. The organisms were interpreted as ‘AmpC negative’ if both zone sizes of discs A and B exceeded those of disc C by at least 5 mm and as ‘AmpC positive’ if the zone size of disc C exceeded both discs A and B by at least 5 mm. If zone sizes of both discs B and C exceeded that of disc A by at least 5 mm and the zone sizes of discs B and C had a difference of <5 mm, the isolate was classified as ‘AmpC negative, but exhibits a different resistance mechanism’.

As shown in Table 1, The D69C kit correctly determined the AmpC status of all 80 AmpC+ and 23 AmpC− isolates tested. Amongst the 23 AmpC− isolates, 12 out of the 15 AmpC−/ESBL+ isolates and the 1 AmpC−/KPC+ isolate were correctly classified as ‘AmpC negative, but exhibits a different resistance mechanism’. All seven AmpC−/ESBL− isolates were correctly identified as ‘AmpC negative’.

The kit failed to detect the presence of a different resistance mechanism in 3 out of 15 AmpC−/ESBL+ isolates—they were...
References


Audit of Staphylococcus aureus bacteraemia management in NHS Tayside and comparison with European Antibiotic Strategies study group international quality standards

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Sir,

Staphylococcus aureus bacteraemia (SAB) remains a significant cause of morbidity and mortality. National emphasis on SAB prevention has been successful in reducing the incidence, but there were still >14,000 episodes in the UK in 2007. The European Antibiotic Strategies (ABS) study group (http://www.abs-international.eu/index.php?id=1265) proposed SAB management indicators to investigate quality of care and tested these in five European countries.

Our study is the first in the UK to compare current clinical practice for SAB management against the proposed ABS quality indicators, which are not yet in use in the study hospital.

We performed a retrospective medical case note audit of all adult patients with SAB in Ninewells Hospital, Dundee, over a 12 month period (December 2009 to December 2010). The ABS quality indicators are as follows: (i) echocardiogram within 10 days; (ii) intravascular device removal within 10 days; and (iii) appropriate antibiotic (determined by local policy) for ≥14 days. Additional data included the following: demographics; whether the isolate was methicillin-susceptible S. aureus (MSSA) or methicillin-resistant S. aureus (MRSA); if microbiology (phone call within 24 h) and/or infectious disease (ID) team (ward visit within 48 h) review was documented; mortality (30 day); and readmission within 2 weeks (deaths excluded) from the time of discharge. An episode of SAB was defined as isolation of S. aureus from at least one blood culture bottle. Patients with more than one episode were included if the time between episodes was >2 weeks.

Exclusion criteria for each indicator were as follows: patients who died before microbiology (within 24 h) or ID team (within 48 h) review was possible, before an echocardiogram could be performed (within 10 days) or before an intravascular device could be removed (within 10 days); and when case notes were unavailable or incomplete.

Three SAB episodes were excluded due to insufficient information in the medical notes, leaving 95 eligible SAB episodes in 92

Transparency declarations
None to declare.