Rapid Resistance Testing (RRT) protocol for Rapid Detection of Resistance to Carbapenems and Cephalosporins in Enterobacteriaceae Using Liquid Chromatography Tandem Mass Spectrometry

Version 2

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ABSTRACT

Carbapenemase producing *Enterobacteriaceae* (CPE) are becoming a global healthcare concern. Current laboratory methods for the detection of CPE include screening followed by confirmatory phenotypic and genotypic tests. These processes would generally take >/= 72 hours, which could negatively impact patient care and Infection Control practices. To this end, we developed a protocol for rapid resistance testing (RRT) to detect hydrolysis in a panel of beta lactam antibiotics consisiting of ampicillin, cefazolin, cefotaxime and imipenem, using liquid chromatography tandem mass spectrometry. Ninety-nine beta lactamase producing *Enterobacteriaceae* isolates were used to evaluate the RRT method, 54 isolates were CPE and 45 isolates were Class A or AmpC beta lactamase producing *Enterobacteriaceae* but not carbapenemase producers. We also tested 10 *E.coli* isolates that were susceptible to ampicillin, cefazolin, cefotaxime and imipenem. Receiver Operating Characteristic (ROC) Curves analysis showed that imipenem had a sensitivity and a specificity of 100% for carbapenemase detection at hydrolysis cut off values that are greater than 50% and less than or equal to 80%. The RRT protocol can be conducted in a time frame of less than 2 hours. This preliminary study shows that the rapid resistance testing protocol might have utility for the rapid detection of CPE. Additional work with a greater number and a variety of beta-lactamase producing *Enterobacteriaceae* isolates is required to validate these preliminary findings.

EXTERNAL LINK

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RRT detailed protocol for PLOS ONE Final July 30.docx

PROTOCOL STATUS

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1