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Rapid Resistance Testing (RRT) protocol for Rapid Detection of Resistance to Carbapenems and Cephalosporins in Enterobacteriaceae Using Liquid Chromatography Tandem Mass Spectrometry V.2

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Manal Tadros¹, Alexander Romaschin²

¹Department of Laboratory Medicine & Pathobiology, University of Toronto, Toronto, ON, Canada;

²Division of Microbiology, St. Michael's Hospital, Toronto, ON, Canada

Manal Tadros

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 consisting 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.

ATTACHMENTS

RRT detailed protocol for
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30.docx

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