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Title: Multilocus sequence typing of clinical ESBL-producing E. coli strains

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Abstract: Background: Extended-spectrum beta-lactamase (ESBL) producing Enterobacteriaceae is now a major problem in many hospitals in Malaysia especially in the critical care settings and E. coli is one of the most common organisms associated with ESBL production. Currently, CTX-M is the most common type of ESBLs with CTX-M-15 being the most prevalent genotype found in many parts of the world except for Asia. The wide distribution of CTX-M-15-producing E. coli strains globally has been partially contributed by the dissemination of the E. coli O25-ST131 clone. Therefore, the objective of this study was to detect the presence and prevalence of the E. coli O25-ST131 clone in our Malaysian strains and to determine the sequence types of CTX-M positive strains via MLST analysis.

Methods: PCR was used to detect and further subgroup the CTX-M genes of 20 ESBL-producing E. coli clinical isolates using established published primers. Specific detection of E. coli O25-ST131 clone targeting the specific pabB gene was carried out. For CTX-M producing-isolates that did not yield positive amplification for pabB gene, MLST was carried out using 7 housekeeping genes to determine their sequence types.

Results: Among the 20 ESBL-producing E. coli isolates, 17 harbored CTX-M-15 genes and 2 harboured CTX-M-14. Four ESBL-producing E. coli were positive for pabB gene indicating the presence of E. coli O25-ST131 clone. Using MLST, another common sequence type was observed for the ESBL-producing E. coli: ST354 (n=3). Three O25-ST131 clones were CTX-M-15 positive while another ST131 clone carried CTX-M-14. All three ST354 were CTX-M-15 positive. Other sequence types such as ST10, ST46, ST57, ST117, ST224, ST349, ST405, ST533, ST602 and ST617 (n=1) were also identified.

Conclusion: CTX-M-15 is the most common CTX-M genotype found in this study and this is the first report on the emergence of O25-ST131 clones in Malaysian E. coli isolates. Another common sequence type (ST354) for ESBL-producing E. coli was observed which has been reported. Other ESBL-producing E. coli isolates were genetically diverse as they shared different sequence types.