

TITLE: OCCURRENCE AND CHARACTERIZATION OF HYBRID *ESCHERICHIA COLI* STRAINS ISOLATES FROM URINARY INFECTION

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ABSTRACT:

Uropathogenic *Escherichia coli* (UPEC) is the main agent in 70%–95% of community-acquired UTI and 50% of all cases of nosocomial infections worldwide. About 40% of women and 12% of men experience at least one symptomatic UTI during their lifetime, and approximately 25% of affected women show recurrent UTI. UPEC possess several virulence factors that contribute to their pathogenicity. Some of the strains may show gene contents previously associated with distinct diarrheagenic *E. coli* (DEC) pathotypes, constituting hybrid strains, which potentially possess a higher capacity to cause disease. The aim of this study was to analyze the frequency of hybrid *E. coli* strains among 453 isolates obtained from urinary tract infections (UTIs) of adults, between August 2018 and March 2019, at Hospital São Paulo, São Paulo, Brazil. The isolates were tested by PCR for the presence of genes encoding the following virulence factors that characterize the distinct DEC pathotypes: Shiga toxins (stx-1 and stx-2), heat-labile and heat-stable toxins (LT and ST, respectively), transcriptional activator of aggregative adherence (*aggR*), and *eae* gene that encodes intimin. The isolates carrying any of the DEC genes were further investigated regarding their phylogroup by PCR and their ability to adhere to HeLa cells. Enterohemolysin production, a characteristic of enterohemorrhagic *E. coli* (EHEC), was searched for in washed blood (5% defibrinated sheep erythrocytes) agar plates, containing 10 mM CaCl₂. Nine of the isolates carried DEC virulence-encoding genes, seven of them had the *aggR* gene, a diagnostic marker of enteroaggregative *E. coli* (EAEC). One of these seven isolates belonged to phylogroup B1 and presented the EAEC aggregative adherence pattern (AA); six isolates, belonging to phylogroups A (3 isolates), B1 (2 isolates) and B2 (one isolate) adhered in an undefined pattern. Enterohemolysin production was detected only in two isolates of phylogroup A. The remaining two DEC positive isolates had the *eae* gene that encodes an outer membrane adhesive protein (intimin), which is fundamental for the establishment of attaching and effacing (AE) lesion by the EHEC and enteropathogenic *E. coli* (EPEC) pathotypes. These strains belonged to phylogroups A and B1 and presented the localized adherence like pattern. Our findings contribute to better understanding the pathogenic potential of hybrid *E. coli* strains, which may be related to most severe cases of urinary infections.

Keywords: urinary infection, *E. coli* hybrid strains, DEC virulence markers, hemolytic activity

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