

Title: Characteristics of virulence and antimicrobial resistance of *Escherichia coli* isolated from patients with neurogenic bladder presenting symptomatic or asymptomatic bacteriuria.

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Abstract:

Neurogenic bladder is a risk factor for urinary tract infection, in which *Escherichia coli* is considered the most frequent pathogen associated to both symptomatic (UTI) or asymptomatic (ABU) urinary tract infection. This study aimed at investigating patients with neurogenic bladder with UTI or ABU caused by *E. coli* in regard to the association of clinical/epidemiological findings with virulence gene profiles, as well as their antimicrobial resistance patterns and associations with bacterial virulence properties and phylogenetic distribution. Multiplex PCR was carried out with specific primers for 1) virulence genes (*papC*, *fimH*, *sfa*, *iha*, *prf*, *draE2*, *cnf*, *sat*, *ompT*, *usp*, *hlyA*, *iuc*, *iroN*, *iucD*, *fyuA*, *flic*, *kpsMTII*, *flu*, *lux*, *kpsM481*); 2) phylogenetic grouping (*chua*, *yjaA*, *TspE4.C2*), and antimicrobial resistance genes (*aadA1*, *aac3*, *sul1*, *dfrA1*, *qnr*, *bla_{CITM}*, *bla_{TEM}*, and *bla_{SHV}*). Antimicrobial resistance was also evaluated by MIC determination using VITEK 2 System. Chi square test was used when distribution was considered normal. Of 195 patients we obtained 200 *E. coli* isolates, of which 36 were related to UTI and 164 to ABU cases. Repeat urinary tract infections occurred in 29% and 53% for ABU to UTI, respectively. *papC*, *sfa*, and *usp* genes presented a higher prevalence in UTI than in ABU patients. Phylogenetic groups B2 and D were more common than B1 and A. No significant difference was observed in antimicrobial resistance patterns to antibiotic in isolates of both groups. However, *E. coli* strains presented resistance frequently to ampicillin (73%), sulfamethoxazole/trimethoprim (68%), nalidixic acid (51%) and quinolones (41%). On the other hand, a remarkable sensitivity was observed to nitrofurantoin (91%) and amikacin (99%). The most prevalent resistance genes were *dfrA1* (55%), *bla_{TEM}* (39%), *sul1* (32%) without difference in the groups. Due the prevalence of genes *papC*, *sfa*, and *usp*, we concluded that *E. coli* strains associated to UTI or ABU may present specific virulence markers, but we did not observe significant differences regarding antibiotic resistance. Antibiotic resistance detected may be related to previous antibiotic therapy, since both groups are continuously exposed to antimicrobials agents.

Keywords: neurogenic bladder, *Escherichia coli*, urinary tract infection, asymptomatic bacteriuria.

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