

Bacteriological aspects implicated in abdominal surgical emergencies

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Abstract

The purpose of the present study was to establish the microbial etiology of abdominal surgical emergencies as well as the relationship between the bacterial etiology and the virulence factors produced by the respective isolated strains. 110 bacterial strains were isolated from 100 randomized clinical cases, operated during 2009-2010 in the First Surgical Clinic of the University Hospital of Bucharest. The clinical cases (sex ratio 52 M/48F aged between 22-85 years old) were classified into three risk groups, as related to their severity. The isolated strains were characterized by cultural, microscopic and biochemical methods. After identification, the bacterial strains were investigated for their virulence potential (adherence to abiotic surface and production of soluble virulence factors). Results: The specimens were collected from different clinical pathologies: diffuse acute peritonitis, biliary duct infections, severe acute pancreatitis followed by septic processes etc. The 110 bacterial (72 aerobic and 38 anaerobic) strains were isolated only in 70 out of 100 cases. Out of these 70 cases, in 45 already submitted to pre-operative empiric broad spectrum antibiotic therapy, there were isolated 74 strains, whereas in 25 cases without any treatment, there were isolated 36 strains. The etiology was either mono-specific or multi-specific (aerobic-anaerobic associations, especially in old persons). Out of the 30 negative culture cases, 16 were already submitted to pre-operative parenteral empiric antibiotic therapy at the moment of specimen collection. The aerobic etiology was dominated by Enterobacteriaceae. The most frequent anaerobic species belonged to Clostridium, Peptococcus and Bacteroides genera. It is to be mentioned that the isolation of Bifidobacterium and Veillonella spp. in 11 (10%) severe cases of the studied abdominal surgical emergencies is pleading for the fact that in certain conditions, bacteria belonging usually to commensal gut flora can turn to pathogenic becoming responsive for life-threatening cases. All aerobic and anaerobic strains exhibited some of the following virulence factors: mucinase, esculinase, pore-forming toxins (lecithinase), proteolytic enzymes, adherence ability (slime factor). The presence of these virulence factors (VF) could explain the severity of the clinical aspects.

Conclusions: The bacterial etiology of the abdominal surgical emergencies exhibited a very large spectrum, the highest number of strains being of endogenous origin (Enterobacteriaceae and anaerobic strains). It was demonstrated that the isolated strains produced (cell associated and soluble) VF proving in this way their role as important virulence sources in the hospital environment and explaining the large diversity and severity of the clinical abdominal pathology. The results of the present study are also pleading for periodical readjustments of the pre-operative empiric antibiotic therapy.

Key words: diffuse acute peritonitis, severe acute pancreatitis, virulence factors, pre-operative empiric antibiotic therapy, risk groups

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