The Gastrointestinal Microbiome and the Enteropathogenetic Syndromes

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I. BACKGROUND:
The role of microbiome in human health is increasingly recognized. Diet, antimicrobial therapy, environmental changes (i.e., hospitalization) and alteration in host immunity may contribute to microbiome perturbation. These conditions may help the overgrowth of a single opportunistic pathogen. The importance of intestinal dysbiosis in C. difficile infection (CDI) has been widely studied; similar alterations may be important for colonization, overgrowth and subsequent bloodstream infection (BSI). The term enteropathogenetic infectious syndromes (EISS) is currently used to highlight the common role of gastrointestinal dysbiosis in CDI and BSI caused by Candida, Enterobacteriaceae producing extended-spectrum beta-lactamase (ESBL) and K. Pseudomonas producing carbapenemase (KPC-Kp).

The incidence of candidiasis has increased over the past two decades, as well as CDI which has recently become the most common health-care associated infection. Over the last decade, multidrug-resistant Gram-negative bacteria, including Enterobacteriaceae ESBL and carbapenemase-producing organisms, have been implicated in severe hospital acquired infections (HAIs) and their recurrence has increased steadily.

2. AIM OF THE STUDY:
Given the rising incidence and the difficult management of these infections, aim of this study is to describe the epidemiology and to evaluate risk factors for in-hospital mortality in patients with CDI, candidaemia, KPC-Kp BSI and ESBL BSI.

3. METHODS:
We conducted a single center retrospective study on patients admitted to City of Health and Science Multiservice Hospital, Turin, from January 2013 to April 2015 with CDI or BSI caused by Candida, ESBL-producing Enterobacteriaceae or KPC-Kp. Demographic, clinical and microbiological data were collected for each patient.

Descriptive statistics were used to compare selected categories of pathogens over time (time analysis) and to analyze risk factors for in-hospital mortality (univariate and multivariate analysis).

4. RESULTS:
786 cases were analyzed: 398 CDI (50.6%), 137 Candida BSI (17.4%). In Table 1 demographic data are reported. In-hospital mortality occurred in 23.4%.

Table 1: Characteristics of patients
- N of patients: 786
- CDI: 398
- BSI: 137
- ESBL: 125
- KPC-Kp: 126

5. CONCLUSION:
The gastrointestinal alterations are well recognized key players in promoting intestinal colonization, overgrowthand diseases by opportunistic microorganisms. Our study shows the different epidemiologic features of the four infections, highlighting not only their importance as risk factors, but also as prognostic factors: TPN and antibiotic administration before admission result as independent risk factors for in-hospital mortality. These results may suggest that longer or more severe microbiome perturbations may result in more severe enteropathogenetic infectious syndromes. Thus, to reduce the opportunity of enteropathogenetic infectious syndromes, there is a need of a correct antibiotic use and adequate infection control measures.

6. REFERENCES: