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Epidemiology of 802 patients with infective endocarditis and clinical profile due to Enterobacteriaceae in Rio de Janeiro (Brazil) since 1975

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Background: The incidence of infective endocarditis (IE) in developed countries is 4-10 per 100,000 per year. However, there is little data regarding IE in developing countries. In Rio de Janeiro, Brazil, IE is the 10th leading cause of hospital admission in infectious diseases departments. In this study, the aim is to assess the epidemiologic characteristics of 802 patients with IE and to present the clinical profile Enterobacteriaceae infective endocarditis since 1975.

Material/methods: It was a retrospective study of IE. The diagnosis of IE was based on the modified Duke criteria. Patients were classified into two groups: Community Associated Infective Endocarditis (CAIE) and Health Associated Infective Endocarditis (HAIE). The patients were recruited from the cohort of the Hospital Universitário Clementino Fraga Filho (HUCFF-UFRJ) initiated in 1975 and from

the Hospital Universitário Pedro Ernesto (HUPE) that started in 2009. From these two teaching hospitals, records of 802 patients with IE were analyzed. All statistical analysis was performed by using Stata® program (version 9.2 StataCorp®).

Results: Of the included 802 patients, 735 belonged to the HUCFF cohort and 67 to the HUPE cohort. The mean ages were 48 (77.1% male) and 47 years (64% male), respectively. The prevalence of CAIE was 30% and 66%, at HUCFF and HUPE, respectively. HUPE had more cases of HAIE than HUCFF. The most prevalent bacteria causing IE was *Staphylococcus aureus*. At HUCFF, *Viridans streptococci* (26.1%) was the second most prevalent bacteria and at HUPE, *Enterococcus spp.* (22.3%). Of all 802 IE cases, 24 patients were identified with Enterobacteriaceae Endocarditis (EE). The prevalence of EE was 2.9%, which was higher than other gram negative bacillus (0.8%) or HACEK (0.7%). Most prevalent bacteria in the Enterobacteriaceae caused EE were *Klebsiella pneumoniae* (29.2%), *E.coli* (25.0%) and *Enterobacter spp.*(16.7%). The overall mortality rate of IE was significantly higher in EE patients (54%) compared to all IE patients (36%) ($p= 0.05$). In our EE cohort, 54.4% developed heart failure and 31% was necessary cardiac surgery for treatment. The prevalence of 3rd generation cephalosporin resistance in 24 Enterobacteriaceae strains was 12.5%, with less resistance against ceftriaxone than to cefotaxime and ceftazidime. All samples were sensitive to ciprofloxacin, cefepime and carbapenems. So far, one *E.coli* was analyzed by WGS, this strain belongs to ST-69. It was resistant to ampicillin, trimethoprim and trimethoprim/sulfamethoxazole and has different virulence genes associated with iron uptake systems (*aer*, *chuA*, *fepA* *fhuA*, *fhuE*, *fyuA*, *irp2* and *sitA*) and genes associated with adhesion (*fimH* and *fimA*).

Conclusions: The principal agent of IE in Rio de Janeiro is *Staphylococcus aureus*. We observed different mortality rates in EE when compared to all 802 patients with IE ($p= 0.05$). We reported a higher resistance in 3rd generation cephalosporin in EE.