

Incidence and risk factors for vancomycin-resistant *Enterococcus faecium* bacteraemia in an intensive care unit: a case-control study

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Objectives : Vancomycin-resistant *Enterococcus faecium* (VREF) is currently one of the most important etiologies of nosocomial infections in critically ill patients. In the continuum of VREF infections, bacteremia is of special interest, given that overall mortality rates may reach values higher than 60% with an attributable mortality of around 40%. The aim of our study was to determine incidence and risk factors associated with VREF bacteremia in an intensive care unit (ICU).

Methods: A retrospective case-control study was performed in the ICU of an university hospital in Tunisia from January 2009 to September 2014. Cases were defined as septic patients with VREF isolated from a blood culture (VREF group). Blood isolates were identified according to standard techniques and Vitek2 (bioMerieux). VREF was defined as an *Enterococcus faecium* isolate with an MIC of vancomycin ≥ 32 microgram/mL by the Etest (bioMerieux) according to the standards of the Clinical and Laboratory Standards Institute (CLSI). Control patients were randomly drawn from 55 hospitalized patients with vancomycin-susceptible *Enterococcus faecium* isolated from a blood culture (VSEF group). Medical records of the patients were reviewed. If patients developed several episodes of VREF bacteremia during the study period, only the first episode was investigated. **Results:** A total of 11 case patients (5.01 per 1000 admissions) and 11 control patients with at least one positive *E. faecium* blood culture were identified. The demographic and clinical characteristics of the case and control groups were similar, except for mean duration of length of stay, with values being significantly greater in the case group (66 ± 12 vs 24 ± 8 , $p < 0.001$). In 9 cases, VREF bloodstream infections were related to intraabdominal infections; two cases had catheter-related VREF bloodstream infections. Mortality among these bacteremic patients did not differ significantly between those with VREF (18%) and those with VSEF (9%) isolates ($p=0.58$). In the univariate analysis, the significant risk factors for VREF bloodstream infections included diabetes mellitus, arterial hypertension, end-stage renal disease, prior exposure to immunosuppressive agents notably corticosteroids, prior receipt of vancomycin before VREF identification and a prolonged length of stay in ICU (Table 1).

Table 1 : Risk factors for VREF by univariate analysis.

	Case group, (n=11)	Control group, (n=11)	P value
Length of stay in ICU (mean \pm SD, days)	66 \pm 12	24 \pm 8	<0.001*
Diabetes mellitus	8	1	0.043*
Arterial hypertension	9	1	0.030*
End-stage renal disease	5	0	0.039*
Prior exposure to Corticosteroids	6	0	0.026*
Prior receipt of Vancomycin before VREF identification	9	1	0.030*

Conclusion : The incidence of VREF bloodstream infections was high compared with literature data. Several risk factors have been identified and They should be considered in infection control practice to prevent VREF infection or colonization and to reduce they duration.