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Resistance in Gram-negative Bacteria in Cardiac ICU – Risk Factors and Outcome.

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OBJECTIVE: To determine risk factors and outcome of Health Care Associated Infections (HAI) with antibiotic (ATB) resistant Gram negative bacteria (GNB) in cardiac intensive care unit (ICU) in India.

STUDY DESIGN: Prospective cohort study.

SETTING: Surgical ICU of EHIRC, New Delhi, India.

MEASUREMENT and MAIN RESULTS: Of all the patients (n=3,161) admitted to the ICU during the study period, 130 patients (4.11%) developed HAIs with GNB and were included in the cohort study. *Pseudomonas aeruginosa* (37.8%) was the most common organism isolated followed by *Klebsiella* species (24.2%), *Escherichia coli* (22.0%), *Enterobacter* species (6.1%), *Stenotrophomonas maltophilia* (5.7%), *Acinetobacter* species (2.2%), *Serratia marcescens* (0.8%), *Weeksella virosa* (0.4%) and *Burkholderia cepacia* (0.4%). On uni-variate analysis, the following variables were significantly associated with ATB resistant GNB, females (p=0.018), re-exploration (p=0.004), valve surgery (p=0.003), duration of central venous catheter (p<0.001), duration of mechanical ventilation (p<0.001), duration of intra-aortic balloon counter-pulsation (p=0.018), duration of urinary catheter (p<0.001), total number of ATBs used before the resistance developed (p<0.001), duration of ATB before the resistance developed (p=0.014), acute physiology age chronic health evaluation score (APACHE II), receipt of anti-pseudomonal penicillins (piperacillin, tazobactam) (p 0.002) and receipt of carbapenems (p<0.001). On multi-variate analysis, valve surgery (adjusted OR=2.033; 95% CI = 1.052 to 3.928; p=0.035), duration of mechanical ventilation (adjusted OR = 1.265; 95% CI=1.055-1.517; p=0.011) and receipt of total number of ATBs before the resistance developed (adjusted OR=1.381; 95% CI 1.030-1.853; p=0.031) were identified as independent risk factors for HAIs with resistant GNB. The mortality rate in patients with resistant GNB was significantly higher as compared with those with sensitive GNB (13.9% vs 1.8%; p=0.03).

CONCLUSION: HAI with resistant GNB, in ICU following cardiac surgery, are independently associated with the following variables: valve surgeries, duration of mechanical ventilation and receipt of total number of ATBs administered before the resistance developed, and the mortality is significantly higher among patients with resistant GNB.