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Preoperative and intraoperative risk factors of nosocomial infections in patients undergoing delayed sternal closure

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Background: The sternal closure after cardiac surgery is one of the most important moments, due to the surgical approach of edges can cause serious deterioration of cardiac function. It is relevant in patients with hemodynamic instability during surgery. The objectives of this study are to identify risk factors associated with nosocomial infection in the pre and intraoperative periods.

Material/methods: Observational cohort study, from 1st January, 1993 to 31st December, 2012 of all patients that needed delayed sternal closure (DSC) during cardiac surgery and developed a nosocomial infection (NI).

Results: 78 patients out of 130 patients requiring DSC, developed a NI, more frequent respiratory (51.51%), followed by genitourinary (13.13%) and catheter-related bacteremia (13.1%). 62.5% were women and the mean age was 66.4 (SD 11.6) years. In 65.57%, surgery was urgent and 61.53% had a Charlson index > 5. The 90.90% of patients were diagnosed with chronic liver disease, 77.7% of chronic renal failure, diabetes 68.75% of the 77.77% were smokers and 80% had hypoalbuminemia. The 62.91% of patients had previous heart valve surgery, 65.38% were anticoagulated before surgery and 80% of patients were diagnosed with an infection in the two weeks prior to surgery. Surgical indications were: thoracic aneurysm (76.19%), endocarditis (80%), cardiac transplantation (70%), valve replacement (54.76%) and coronary artery bypass graft (36.36%). The most common in this group of patients valvular surgery was aortic valve surgery (66.03%), especially biological (66.66%). Patients who

were infected most often received antibiotic prophylaxis for ≥ 3 days (72.36%). The total operating time was 320 minutes in upper 66.66% of cases, the extracorporeal circulation time was greater than 140 minutes at 69.23%, and ischemia time > 95 minutes 75.75% of the series. The 64.60% of patients required a transfusion during surgery. The reason for deferring the sternal closure was bleeding (68.83%), cardiac compression (53.48%) and arrhythmias (20%). The more heavily involved mediastinal insulation used were chiffons (68.04%). In multivariate analysis, risk factors for nosocomial infection were: hypoalbuminemia (OR 7.18, $p < 0.01$), the diagnosis of infection in the two weeks prior to surgery (OR 10.53, $p < 0.01$), and especially if it was a respiratory infection (OR 3.57, $p < 0.01$), administration of antibiotic therapy prior to surgery (OR 18, $p = 0.01$), the indication for surgery for aneurysm (OR 5.61, $p < 0.01$) or endocarditis (OR 7, $p < 0.01$), antibiotic prophylaxis ≥ 3 days (OR 2.96, $p < 0.01$) in ischemia duration > 95 minutes (OR 2.31, $p < 0.01$), duration of mediastinal and pleural drains > 3 days (OR 5.86, $p < 0.01$ and OR 9.29, $p < 0.01$), transfusion of blood products (2.92, $p < 0.01$) and delayed closure for bleeding (OR 8.83, $p < 0.01$).

Conclusions: Risk factors of NI after DSC are related to hospitalization. We found preoperative risk factors for NI: the presence of an infection in the two weeks prior to surgery, along with receiving antibiotic therapy within 30 days prior to surgery, Intraoperative risk factors for NI were: indication of surgery for aneurysm or endocarditis, prolonged ischemia (greater than 2 hours), duration of mediastinal drainage and increased pleural drainage > 3 days, blood transfusions and the indication of DSC because of bleeding.