Pacemaker implantation after cardiac surgery: a contemporary analysis

A. Taha¹, A. David¹, S. Ragnarsson², P. Szamlewski¹, S. Jamaly¹, A. Jeppsson¹, A. Martinsson¹
¹Sahlgrenska University Hospital, Gothenburg, Sweden
²Yale School of Medicine, New Haven, United States of America

Funding Acknowledgements: Type of funding sources: Public grant(s) – National budget only. Main funding source(s): County councils concerning economic support of research and education of doctors (ALF agreement, ALFGBG-977905 to AM and ALFGBG-966204 to AJ)

Background: Cardiac surgery entails an increased risk for bradyarrhythmias. Currently known rates for permanent pacemaker (PPM) implantation after cardiac surgery are derived from non-contemporary studies.

Purpose: We sought to explore the one-year incidence and indications for PPM implantation after different cardiac surgical procedures in the modern era.

Methods: All patients in Sweden from 2006 to 2020 who underwent first-time cardiac surgery without previous PPM or implantable cardioverter-defibrillator (ICD) were included in this nationwide population-based study using data from three national registries (SWEDEHEART, National Patient Registry and Swedish ICD & Pacemaker Registry). Patients who received an ICD (n=1,714) and patients undergoing heart transplantation (n=376) were excluded. Sex- and age-matched controls from the general population were used for comparison.

Results: A total number of 83,484 patients and 82,921 controls were included. Median follow-up was 6.3 years (range 0-15 years). A PPM was implanted in 8.0% (n=6,707) of the patients, out of these 46.2% (n=3,101) had pacemaker implanted during the first postoperative year. Atrioventricular block was the main indication in 1,988 (64.1%) of the patients and 1,113 (35.9%) received a PPM due to sinoatrial disease. The incidence rate per 100 patient-years for PPM implantation during the first postoperative year was 1.4 (95% confidence interval 1.3-1.5) for those who underwent coronary artery bypass grafting (CABG), 15.8 (14.6-18.4) following mitral valve surgery, 7.0 (6.6-7.5) after aortic valve surgery and 9.6 (8.6-10.3) for those with combined CABG and valve surgery. The median time from surgery to PPM implantation was 10 days (IQR 7–28, Figure 1A and Figure 1B). Compared to the control population, the risk for PPM implantation after cardiac surgery was higher even beyond the first post-operative year.

Conclusions: The need for PPM after cardiac surgery is highest during the first 30 postoperative days and mostly due to atrioventricular block. The incidence rate for PPM implantation after mitral valve surgery was higher than that following CABG, aortic valve, or combined CABG and/or valvular surgery.
Figure 1A
Figure 1B