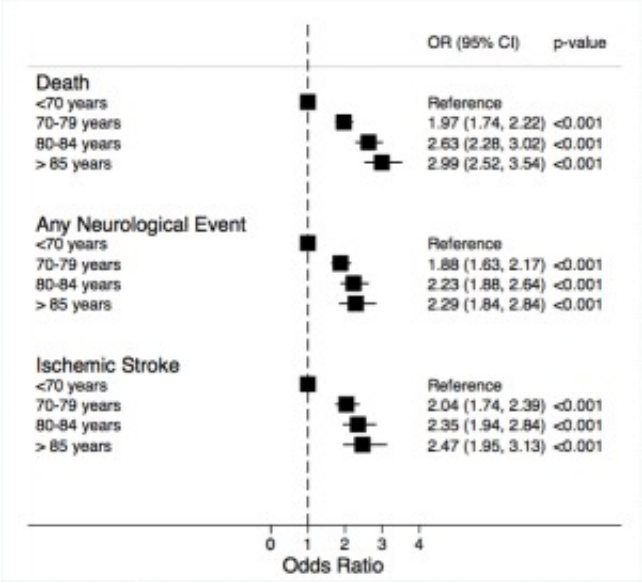
Death and stroke risks after surgical aortic valve replacement: A real world perspective

With a rapidly rising proportion of aging population, aortic stenosis (AS) represents one of the most common valvular heart diseases affecting adults in the US and accounts for at least 92,000 aortic valve replacements (AVR) annually in the US. Surgical AVR has been traditionally regarded as the treatment of choice for patients with severe symptomatic AS, who do not have a prohibitive risk for open heart surgery due to advancing age or other concomitant comorbidities. The current literature provides heterogeneous rates of adverse complications including in-hospital death and stroke following surgical AVR. This heterogeneity encountered in the literature especially from the clinical trials raises an issue whether real life stroke rate after surgical AVR in high-risk patients might as well be different from what is encountered in the trial setting. To that end, we aimed to assess the incidence of in-hospital death and adverse neurological events (including stroke and transient ischemic attacks) following surgical AVR (with or without coronary artery bypass grafting surgery), especially among the elderly and the high-risk patients, utilizing a large representative nationwide population sample of hospital discharges.



Adjusted comparison of study outcomes among the various age groups for isolated AVR. Comparisons have been made using odds ratio (OR), which represent the ratio of odds of an outcome in a particular age category compared to the reference group (less than 70 years old)

Over a 10-year study period (2002-2011), a total of 104699 admissions occurred with AVR during the period of hospitalization. The current study is one of the largest studies to meticulously characterize the incidence rates of in-hospital death and adverse neurological events among

patients undergoing surgical AVR, especially among the elderly and the high-risk patients. The incidence of in-hospital death was 3.0% and 5.1% among patients undergoing isolated AVR and AVR+ bypass surgery respectively. The incidence of any adverse neurological event was 2.0% and 2.9% among patients undergoing isolated AVR and AVR+ bypass surgery respectively. The incidence of in-hospital mortality was as high as 5.7% and 7.4% among patients aged $\geq$ 85 years undergoing isolated AVR and AVR+ bypass surgery respectively. Similarly, the incidence of any adverse neurologic event was 3.2% and 3.6% among patients aged $\geq$ 85 years undergoing isolated AVR and AVR+ bypass surgery respectively. In this large real-world study of patients undergoing AVR, we demonstrated a progressive increase in hospital death and neurological events with increasing age (Figure). In our study, we were able to calculate predicted mortality on all patients based on age, gender, concomitant comorbidities and important hospital characteristics available in the database. We demonstrated a significantly higher risk of adverse neurological events among the high-risk cohort as compared to the low-risk cohort. Among patients undergoing isolated AVR, the incidence of any adverse neurological event was 1.8% and 4.8% in the low-risk and the high-risk cohorts respectively. Similarly, among patients undergoing AVR+ bypass surgery, the incidence of any adverse neurological event was 2.7% and 5.4% in the low-risk and the high-risk cohorts respectively. Furthermore, we observed that high volume centers demonstrated better outcomes compared to low volume centers.

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