Neurological outcomes in minimally invasive mitral valve surgery: risk factors analysis from the Mini Mitral International Registry (Mini-Mitral-IR)

Objective. To examine the incidence and predictors of stroke in a large cohort of patients undergoing minimally invasive mitral valve surgery (mini-MVS) and to assess the role of preoperative CT-scan on surgical management and neurological outcomes.

Methods. A total 6186 consecutive patients undergoing mini-MVS between 2015 and 2021 were enrolled in the Mini-Mitral International Registry (Mini-Mitral-IR), an independent registry involving 15 international Heart Valve Centres that aims at reporting short- and long-term outcomes following mini-MVS performed in patients with different indications and risk profiles using all currently available approaches and prosthetic materials. Clinical, operative and in-hospital outcomes were collected according to the MVARC definitions and then analysed. Univariable and multivariable regression analyses were used to identify predictors of post-operative stroke. Finally, the impact of preoperative CT scan on surgical management and neurological outcomes was assessed.

Results. The overall incidence of perioperative stroke was 1.48% (n=92/6186). Stroke patients had a higher in-hospital mortality (12% vs 1.7%, p<0.001), intubation time [median 27 hours (IQR 9-148) vs 8 (5-13)], ICU stay [median 121 hours (IQR 48-294) vs 24 (20-60)] and hospital stay [median 14 days (IQR 9-26) vs 8 (6-12)]. The univariable predictors of stroke included age, diabetes, dyslipidemia, atrial fibrillation, active endocarditis, history of neurological injury, eGFR, CAD, previous cardiac surgery, LVEF <50%, critical preoperative state, urgent/emergent status, Euroscore II, mitral valve replacement, associated procedures (table 1). Age (odd ratio 1.039, CI 95% 1.017-1.062, P<0.001) and mitral valve replacement (odd ratio 1.753, CI 95% 1.102-2.790, P=0.02) emerged as independent predictors of stroke in the multivariable analysis. A pre-operative CT-scan was made in the 28.9% of cases. These selected patients had a higher risk profile and a higher Euroscore II [median 1.62 (IQR 0.92-3.14) vs 1.14 (0.75-2.17) p<0.001]. It influenced the choice of cannulation site, being axillary artery (1.1% vs 0.7%, p=0.2) and ascending aorta (1.5% vs 0.5%, p=0.003) more frequent in CT-group and femoral artery more frequent in no CT-group (97.8% vs 96.4%, p=0.01). The incidence of stroke was not different in CT group (1.9%, 24/1282) vs. no CT group (1.7%, 52/3144) (p=0.6).

Conclusions. This study showed that mini-MVS is associated with a low incidence of perioperative stroke, but when it occurs it has an ominous impact on mortality. Our findings showed that preoperative CT-scan performed in selected higher-risk patients affected surgical cannulation strategy and likely led to improved neurological outcomes.

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