224. RARE AORTIC REMODELING IN UNICUSPID AORTIC VALVE: HYBRID STRATEGY AND ADVANCED SURGICAL RECONSTRUCTION

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Introduction. Aortic disease associated with congenital valvular anomalies significantly contributes to pathological aortic remodeling and confers a high risk of acute aortic syndromes. Involvement of the aortic arch and supra-aortic trunks requires complex surgical strategies, and hybrid approaches incorporating debranching allow maintenance of cerebral perfusion while reducing the risk of perioperative neurological complications. This case describes a rare combination of a unicuspid aortic valve, penetrating aortic ulcer with intramural hematoma, and extensive aneurysmal dilation of the ascending aorta and arch, ultimately necessitating comprehensive surgical reconstruction.

Case statement. A 62-year-old hypertensive male presented in February 2025 with severe chest pain and presyncope. Comprehensive echocardiographic assessment demonstrated a unicuspid aortic valve with severe stenosis (Vmax 4.0 m/s, mean gradient 41.4 mmHg), associated aneurysmal dilation of the ascending aorta and aortic arch, and confirmed the presence of a penetrating aortic ulcer with intramural hematoma involving the ascending aorta, aortic arch, and brachiocephalic trunk. On 23 July 2025, a hybrid procedure was performed: aortic valve replacement with a biological Dafodil-Meril N21 prosthesis, supracoronary replacement of the ascending aorta and arch with a Jotec N30 graft, reconstruction of the brachiocephalic trunk with a Jotec N26 graft anastomosed to the arch prosthesis, and reconstruction of the left subclavian artery with a Jotec N10 conduit including anastomosis of the left common carotid artery via debranching. Mild hypothermia (28°C) and brief circulatory arrest were employed with continuous cerebral perfusion. The postoperative course was marked by transient heart failure, SIRS post-CPB, paroxysmal atrial flutter medically converted to sinus rhythm, and right hemilaryngeal paresis. The patient completed a two-week rehabilitation program and was discharged in stable condition with secondary cardiovascular prophylaxis.

Discussions. This case highlights the uncommon coexistence of congenital valvular pathology, extensive aneurysmal remodeling, and involvement of the supra-aortic trunks. The hybrid debranching approach enabled complete arch reconstruction while minimizing cerebral ischemia and neurological risk, representing a superior alternative to conventional techniques in patients with complex anatomy.

Conclusions. A multicomponent hybrid strategy is an effective solution in complex aortic disease associated with a unicuspid aortic valve. Stepwise imaging assessment, accurate differential diagnosis, and multidisciplinary management are essential for optimal outcomes.

Keywords. unicuspid aortic valve, debranching, hybrid approach.

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