

Transcatheter aortic valve implantation: the role of transcranial Doppler monitoring

Przecewnikowa implantacja zastawki aortalnej: rola monitorowania doplerem przezczaszkowym

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Transcatheter aortic valve implantation (TAVI) is an effective treatment option of severe aortic stenosis (AS) in inoperable and high-risk patients. However, the use of large-bore delivery catheters and the presence of diffuse atherosclerosis in the aortic arch, as well as calcifications of the aortic annulus, may pose a substantial risk of ischaemic stroke during balloon predilatation, bioprosthesis delivery and deployment. Transcranial Doppler (TCD) monitoring is a well established method of detecting cerebral embolic load during invasive procedures. We present three patients who underwent TAVI from transfemoral, transaortic and transapical access. During the entire procedure, patients were monitored with TCD and the results were analysed by an experienced neurologist. Patient no. 1: 67-year-old male with AS (ejection fraction [EF] 40%, mean pressure gradient [PG] 45 mm Hg, aortic valve area [AVA] 0.6 cm²) with severe chronic obstructive pulmonary disease and logistic Euroscore of 11.1%. Self-expandable 29 mm Corevalve was implanted via transfemoral route with two post-dilatations. TCD monitoring lasted for 135 min and consisted of 111 high intensity transient signals (HITS) most of which occurred during deployment of the device (Fig. 1). Patient no. 2: 63-year-old patient with AS (EF 65%, mean PG 80 mm Hg, AVA 0.73 cm²) and recent history of lymphoma accompanied by chronic severe anaemia (logistic Euroscore of 5%). Self-expandable 26 mm Corevalve was implanted via direct transaortic access (hemisternotomy). TCD monitoring lasted for 80 min and consisted of 134 HITS. The majority of signals occurred during deployment of the device (Fig. 2). Patient no. 3: 76-year-old male with AS (EF 65%, mean PG 40 mm Hg, AVA 0.66 cm²) with porcelain aorta and logistic Euroscore of 19.9%. The patient underwent successful implantation of 26 mm self-expandable Engager valve via transapical route. TCD during 104 min revealed 294 HITS. Ischaemic stroke or transient ischaemic attack (TIA) is reported in approximately 5% of cases after TAVI and is associated with poor clinical prognosis. According to the PARTNER trial, although equal in longer-term observation, stroke and TIA occur significantly more frequently in the perioperative period after TAVI than after conventional surgery. Recent studies with vascular filters have proved that embolic debris consists of aortic wall, valve and collagenous tissue as well as thrombus. However, data from pilot studies with cerebral embolic protection devices (deflectors and filters) shows that these devices reduce only the total volume of new cerebral lesions, but not the proportion of patients with new lesions or the number of new lesions. Therefore, prospective studies with TCD and diffusion-weighted magnetic resonance imaging investigating the impact of different delivery routes and procoagulant status (e.g. platelet reactivity) on cerebrovascular events and silent ischaemia are warranted.

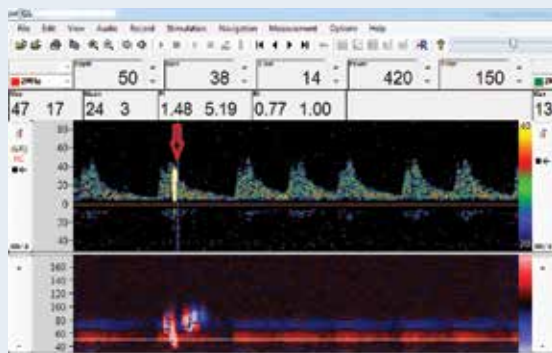


Figure 1. Single high intensity signal (HITS) obtained during transcranial Doppler (TCD) monitoring (red arrow)

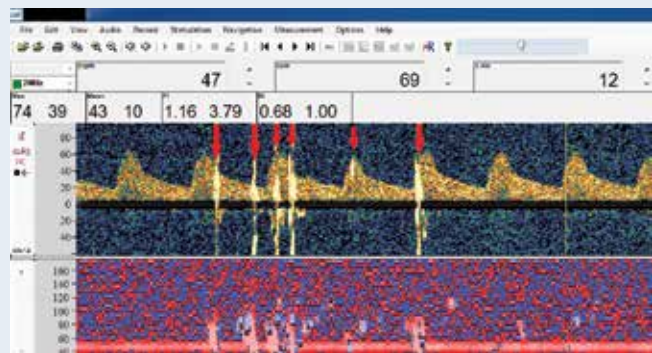


Figure 2. Multiple high intensity signals (HITS) obtained during transcranial Doppler (TCD) monitoring (red arrows)

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