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Platelet reactivity changes following transcatheter aortic valve implantation

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Introduction: Although recent studies described changes in platelet reactivity (PR) in days following transcatheter aortic valve implantation (TAVI), precise time course and duration of these changes have not been fully investigated.

Purpose: To investigate PR changes during and after TAVI.

Methods: Study included 42 consecutive patients with severe and symptomatic aortic stenosis undergoing TAVI procedure in our institution. Patients' clinical characteristics were collected from medical records. All patients who did not have chronic dual antiplatelet therapy received loading dose of aspirin and clopidogrel (300 mg) one day before the procedure followed by their standard maintenance doses for next three months. PR was measured in six time points: just before induction of anaesthesia (T1), after heparin administration (T2), at the end of procedure (T3), and on 3rd, 6th and 30th postoperative day (T4–6). PR was measured using impedance aggregometer (Multiplate® analyzer, Roche, Munich, Germany) in response to three platelet aggregation agonists: arachidonic acid (ASPItest), ADP (ADPtest) and thrombin receptor activating peptide-6 (TRAPtest).

Results: Mean patient age was 82.1 years with majority of patients being male 57.1% (N=24). Mean valve area and mean transvalvular gradient prior to procedure were 0.71 ± 0.21 cm² and 49.1 ± 18.7 mmHg, re-

spectively. All patients underwent successful TAVI procedure using either self-expandable (N=25, 59.5%) or balloon-expandable valve. Two patients (4.7%) underwent transapical TAVI, while transfemoral approach was used in all other patients. Mean postimplantation gradient was 10.2 ± 7.1 mmHg. Mean PR on T1 was 24.3 ± 23.1 U for ASPItest, 41.6 ± 26.5 U for ADPtest and 90.1 ± 33.3 U for TRAPtest. There was no significant difference in PR on T2. However, on T3, significant reduction of PR in all 3 tests was observed (ASPI 9.4 ± 10.1 U ($p=0.001$), ADP 23.1 ± 15.0 U ($p<0.001$) and TRAP 64.5 ± 27.3 U ($p<0.001$)). Lowest PR values for all tests were reached on T4, after which incline in PR has been observed. On T5, value of ASPItest reached levels not significantly different to those on T1 (15.1 ± 17.2 U, $p=0.13$), while ADPtest and TRAPtest remained significantly lower (27.3 ± 18.5 U, $p=0.007$ and 68.6 ± 33.2 U, $p=0.003$, respectively). All PR values returned to initial levels on T6 (figure 1).

Conclusions: Our results show that successful TAVI procedure induces transient decrease in PR regardless of the platelet activation pathway. These findings add new knowledge in understanding complexed relations in intravascular milieu following TAVI. Further research on a larger number of patients is needed to confirm and assess clinical significance of these results.

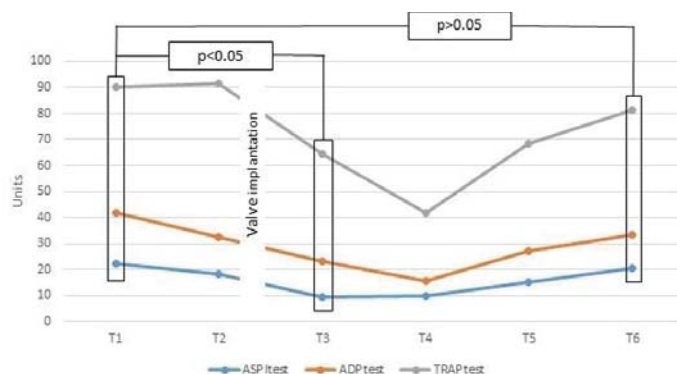


Figure 1. Changes in platelet reactivity in studied time points. T1 - just before induction of anaesthesia; T2 - after heparin administration; T3 - at the end of procedure; T4-6 - 3rd, 6th and 30th postoperative day.