

Platelet Reactivity in Patients with a History of Obstructive Prosthetic Valve Thrombosis

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Background: One of the most serious complications of mechanical valves is obstructive prosthetic valve thrombosis (OPVT –"stuck valve"). Some patients develop OPVT despite an international normalized ratio (INR) in the therapeutic recommended range. We hypothesized that patients who develop OPVT have hyper-reactive platelets. We, therefore, aimed to examine platelet reactivity in patients who developed OPVT, despite therapeutic or near-therapeutic INR, compared with a matched control group.

Methods: We compared platelet reactivity between patients who had an OPVT episode, despite therapeutic or near-therapeutic INR, during the years 1996-2007 (n=19), and a matched group of patients with similar mechanical valves who did not develop this complication (n=19). Platelet reactivity was evaluated by platelet aggregation in response to various agonists, platelet deposition under flow conditions in the Impact-R system and plasma levels of platelet activation markers (soluble CD40-L and P-Selectin).

Results: In the OPVT group the average INR during the index episode was 3.1 ± 1.5 , and 42.9 ± 39 months have elapsed from the index episode to the current study. Both groups had similar clinical characteristics (mean age 55-57 years, 63.2% women, 15.8% diabetes). Patients with OPVT history had higher aggregation in response to collagen, higher platelet deposition in the Impact-R system, and tended to have higher levels of sP-selection and sCD40L than their control counter-parts (Table).

Conclusion: Patients with a history of OPVT appear to have increased platelet reactivity, which may contribute to an elevated risk of thrombotic complications. These patients would, therefore, likely benefit from the addition of anti-platelet therapy to standard anti-coagulant treatment.

Platelet reactivity tests in the study vs. control groups

TEST	STUDY GROUP (N=19)	CONTROL GROUP (N=19)	P VALUE
Aggregation Collagen 1 µg/ml	67.2±26	49.1±29	0.045
Aggregation ADP 10 µmol/L	68.5±14	65.5±15	0.5
Impact-R: surface coverage %	9.1±3.3	6.5±2.4	0.001
Impact-R: average size (µm ²)	43.8±12	36.5±10	0.04
sCD40-L – (pg/ml)	193.3±199	60.8±64	0.06
sP-Selectin – (ng/ml)	3.0±2.3	1.95±0.5	0.07