

## The risk of post-operative bleeding in patients receiving clopidogrel can be predicted using modified bed-side thromboelastography

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Antiplatelet therapy with aspirin and clopidogrel is an integral part of cardiac surgery perioperative management, due mainly to the extensive use of implantable intravascular devices, and the proven efficacy of antiplatelet therapy in patients with unstable coronary syndromes. However, the use of these drugs in perioperative period carries certain risk. It is associated with a substantial increase in re-exploration rates, chest drain blood loss and blood product usage. Increase of post-operative bleeding caused by platelet dysfunction may have significant impact on morbidity, mortality and utilisation of healthcare resources in cardiac surgery. This is why current clinical guidelines call for the cessation of clopidogrel therapy 5–7 days prior to surgery even in urgent cases, and the withdrawal of aspirin administration 2–10 days prior to elective surgery, even though it may constitute an increased risk of myocardial infarction in patients waiting for surgical myocardial revascularisation.

Although it is widely known that in general population the response to antiplatelet drugs varies, and some patients exhibit resistance to their standard doses, no data were available regarding the prevalence of aspirin and clopidogrel resistance in patients undergoing coronary artery bypass. We hypothesised that the use of modified thromboelastography, point-of-care test designed for the assessment of the degree of inhibition of platelets' aggregation caused by aspirin and clopidogrel, may help in prediction of bleeding tendency in patients undergoing coronary surgery who have received antiplatelet therapy in pre-operative period. We prospectively studied 59 patients undergoing coronary artery bypass treated with aspirin and clopidogrel before the surgery. Twenty-five of these patients received aspirin alone. Modified thromboelastography with platelet mapping was performed immediately before the operation. Its results were concealed from the oper-

ating room staff, the intensive care unit team, and investigator collecting post-operative information.

After statistical analysis we were able to isolate nine patients with excessive post-operative blood loss. These patients also used more blood products and had to stay more time in Intensive Care Unit. Eight out of them were treated by clopidogrel before surgery. However, remaining 26 of 34 patients receiving clopidogrel did not have bleeding tendency. Inhibition of platelet aggregation caused by clopidogrel and diagnosed by modified thromboelastography with platelet mapping discerned between bleeders and non-bleeders with sensitivity of 78% and specificity of 84%. Aspirin-induced platelet dysfunction did not reflect any bleeding tendency. Eighty-five percent of all patients in our study were non-responders to standard dose of clopidogrel, and 44% to aspirin.

The results of our study suggest that quantification of patient response to antiplatelet therapy by means of this point-of-care test may help to individualise the surgical ap-



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proach, facilitating more precise timing of the operation and prediction of the risk of microvascular bleeding. The prevalence of non-responsiveness to antiplatelet therapy including clopidogrel in patients undergoing coronary surgery is higher than in general population.

Platelet mapping device

