New insights about quantitative platelet disorders in the cardiac surgery and mechanical circulatory support settings

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VALORIZATION
The occurrence, effects, and complications of platelet impairment and reduction in various cardiac surgical situations are highlighted in this thesis. The various causes behind platelet count decline and malfunction in both ECMO patients and those receiving an aortic bioprosthesis are discussed in detail.

Extracorporeal life support (ECLS) is becoming more common as a salvage technique for severely ill patients. Although thrombocytopenia and a decline in platelet count are important drawbacks of ECLS, they have traditionally been underestimated. Additionally, we were able to show how these phenomena affected veno-venous (V—V) and veno-arterial (V-A) ECMO and that the length of the ECMO run had no bearing on platelet changes and reduction. The two main factors that appear to govern the process are inflammation and mechanical shear stress.

It’s interesting to note that individuals receiving a bioprosthesis may have a decline in platelet count and dysfunction due to these same reasons.

Regardless of the type or implant technique, our in-depth research and meta-analysis showed that transitory peri-procedural thrombocytopenia is frequently seen following bio-prosthetic implant at the aortic position.

We could specifically show that sutureless prostheses are linked to a higher frequency of blood transfusions. We investigated whether implanting a sutureless aortic bioprosthesis for aortic valve replacement (AVR) results in a higher rate of transitory platelet decrease than stented bioprostheses. Additionally, the drop had no impact on the patient’s clinical outcomes. We examined the platelet count variation in all surgical prostheses, including stented, sutureless or rapid deployment, and stentless, in a wider retrospective multicenter study. We were able to show that Bio-AVR causes a large, temporary drop in platelet count. Patients who receive a sutureless or rapid deployment bioprosthesis are more likely to develop clinical adverse effects and a significant platelet count reduction. Regardless of the type of bioprosthesis, thrombocytopenia was discovered to be linked to ischemic strokes.

Even though it is frequently ignored, platelet count change might occur in people undergoing transcatheter aortic valve implantation (TAVI). Regardless of the type of implanted valve (balloon expandable or self-expanding), TAVI is linked to a large but temporary drop in platelet count.

We found that thrombocytopenia after TAVI increases the risk of complications, including greater blood transfusion rates, lengthier hospitalizations in intensive care units and
hospitals, and higher rates of in-hospital mortality. TAVI is always rising, thus it would be unwise to underestimate this disadvantage. Two main possibilities to explain the occurrence are platelet activation by an inflammatory response and mechanical shear stress of the platelet flowing through the prosthesis. Future research is required to explain the underlying molecular mechanisms of the process.