



ATEROTROMBOSI E TROMBOEMBOLISMO ARTERIOSO:
ASPETTI DI LABORATORIO

HEMOSTATIC AND FIBRINOLYTIC PROFILES IN PATIENTS UNDERGOING TAVI: PRELIMINARY RESULTS ON HOMOCYSTEINE, D-DIMER, AND CLOT LYSIS TIME

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Background and aims. Transcatheter Aortic Valve Implantation (TAVI) is the treatment of choice for patients with severe symptomatic aortic stenosis, particularly those with high frailty and multiple comorbidities. Despite its minimally invasive nature, TAVI induces systemic inflammation and mechanical stress, potentially altering haemostatic and fibrinolytic balance during the peri procedural period. The identification of biomarkers capable of predicting thrombotic or haemorrhagic complications remains an unmet clinical need. This study aims to assess peri procedural changes in the coagulation and fibrinolysis profiles of a patient cohort undergoing TAVI. Specifically, we focus on plasma levels of homocysteine, clot lysis time (CLT)—as markers of fibrinolytic potential—and D-dimer levels, to investigate the impact of the procedure on haemostatic activation and the body's capacity for clot resolution.

Methods. This study presents preliminary data from a cohort of 61 patients (mean age 82 ± 4 years; 55.7% female) undergoing TAVI at the AOU Careggi hospital. Plasma levels of homocysteine (HCY), D-dimer (DD), and clot lysis time (CLT) were analysed at two time points: pre-procedure and post-procedure. Between group comparisons were performed using the Mann-Whitney U test, while associations between categorical variables were assessed using the Chi square test. Spearman's rank correlation coefficient was

used to explore relationships between biomarkers and clinical variables.

Results. Post procedural homocysteine levels were significantly reduced compared with baseline (median 15.1 $\mu\text{mol/L}$ [IQR 12.9-20.2] vs 14.2 $\mu\text{mol/L}$ [IQR 11.0-17.2]; $p < 0.001$). In contrast, a significant increase in D-dimer levels was observed, rising from a pre-procedural mean of 997 ng/mL, IQR 632-1348, to 1508 ng/mL, IQR 962-2416, post-TAVI. CLT values remained relatively stable with a slight upward trend (65 min, IQR 57-77, to 69 min, IQR 56-78). Significant Spearman correlations were found between D-dimer levels and both age ($\rho = 0.27$; $p = 0.035$) and homocysteine ($\rho = 0.33$; $p = 0.010$). Contingency tables, where variables were categorized based on specific cut-offs (HCY: Males $< 19 \mu\text{mol/L}$, Females $< 13 \mu\text{mol/L}$; CLT: 39-89 min), revealed a strong association between pre- and post-procedural HCY categories ($p < 0.001$), while for CLT, the association between pre- and post-procedural status was also statistically significant ($p = 0.042$).

Conclusions. These preliminary results indicate that TAVI is associated with dynamic and multifaceted alterations in haemostatic and metabolic pathways, extending beyond simple coagulation activation. The observed biomarker variations and their correlations with patient profiles highlight the need for a comprehensive monitoring approach to optimize post-operative management.