Commentary on the association of blood group antigens with post-implant thrombosis of mechanical heart valves

We read with great interest the report entitled "ABO blood types: impact on development of prosthetic mechanical valve thrombosis" by Astarcıoğlu et al. (1) published in this current issue of The Anatolian Journal of Cardiology. ABO antigens are ubiquitously expressed on wide variety of eukaryotic cells, as well as erythroid/myeloid cell lineages of human bone marrow. Relevant to their involvement in the process of coagulation, endothelial cells and platelets also express these antigens on their surface (2). Accordingly, more studies are focusing on extended implications of ABO antigen system beyond transfusion of blood products and tissue transplantation. Particularly the association of ABO blood group with cardiovascular conditions has gained recent interest (3). ABO blood group is considered a determinant of von Willebrand factor (vWF), which is functionally linked to antihemophilic factor VIII. Lack of both A and B antigens, as in individuals with O blood group, is associated with 25% reduction in expression of vWF on the surface of endothelial cells, which could theoretically translate to excessive bleeding (4). Expression of either A and/or B antigens is described as one of the most common risk factors for venous thromboembolism (5). ABO antigens have been associated with risk of coronary artery disease and even risk of in-stent restenosis (6, 7). Authors of a study of patients admitted with warfarin over-anticoagulation identified blood group type O as an independent predictor of morality (8). Considering these reports, Astarcıoğlu et al. have hypothesized that ABO blood group could be associated with occurrence of prosthetic valve thrombosis (PVT). They compared a relatively large group of patients with PVT with study participants with normal functioning mechanical valves. They report non-O blood groups, sub-therapeutic international normalized ratio (INR), spontaneous echocardiographic contrast (SEC) in left atrium, and higher functional class to be independently associated with presence of PVT.

Though these findings are interesting, a few concerns arise. Left atrial diameter, atrial fibrillation, and length of time since implantation are among risk factors for PVT (9). These factors probably needed to be included in the multivariate regression model a priori, instead of functional status or SEC, which are more outcome variables than predisposing factors. Additionally, the "odds ratio" for sub-therapeutic INR is 28.7, which denotes a much larger effect compared to odds ratio of "1.35" for non-O blood groups. This also needs to be kept in mind, as the size of effect is extremely different. It would have been interesting to examine INR as continuous rather than binary variable. Furthermore, association between non-O blood groups and prevalence of sub-therapeutic INR (dependent variable) is worthy of scrutiny. In closing, the study poses an interesting question, yet as stated, it is accompanied by a few shortcomings. Prospectively designed studies that take into account all known risk factors for PVT could provide more information on potential role of ABO blood groups and development of PVT.

Leili Pourafkari, Nader D. Nader
Department of Anesthesiology, University at Buffalo; Buffalo, NY-*USA*

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Address for correspondence: Nader D. Nader, MD, PhD, FACC, FCCP, Department of Anesthesiology
University at Buffalo, Chief of Perioperative Care & Anesthesiology
VAWNY Healthcare System, New York-*USA*
Phone: +1 (716) 345-7909 Fax: +1 (716) 862-6723 E-mail: nnader@buffalo.edu
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