Commentary on ‘ABO Blood Type does not Influence the Risk of Cardiovascular Complications and Mortality After Vascular Surgery’

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During the past four decades, ABO blood types has been proposed as one of the prognosticators factors of cardiovascular disease and non-O blood groups have been identified as a risk factor for coronary artery disease and associated mortality.1,2 A similar trend has been described for development of cardiovascular complications in the postoperative period. These interesting observations have been attributed to elevated levels of von Willebrand factor in individuals with non-O blood groups,3 which plays a critical role in subendothelial adhesion of platelets, a process that is considered an initial step in acute clot formation and atherogenesis, especially under high shear stress conditions.

In this issue of European Journal of Vascular and Endovascular Surgery, Bakker and colleagues present a retrospective review of 4679 patients undergoing vascular surgery from 1990 through 2011.4 Cardiac complications occurred in 4.9% of non-O blood type and 5.5% of O blood group patients (P = 0.42) within 30 days after surgery, and there was no significant difference in mortality during a median follow up of 4 years. In multivariate analysis, blood type was not identified as an independent predictor of cardiac complication after major vascular surgery. This is basically a negative study, however the absence of evidence may not be the same as evidence of absence due to some limitations of this study, including its retrospective nature, relatively small number of patients with short follow up compared to previous studies with 24—26 year follow up,2 and not including all perioperative and late thrombotic events (venous thromboembolic, graft occlusion, limb ischemia) in their analysis.

While the results of this study conflict in part with previous observations, the authors observed significantly higher prevalence of ischemic heart disease (p = 0.02) in the non-O group at baseline whereas there were strong trends in the prevalence of cerebrovascular disease (p = 0.08) and hypertension (p = 0.06) in the O group. Multivariate regression analysis was performed adjusting for several demographic variables, as well as ischemic heart disease. Although this is an accepted statistical method to examine the blood type as an independent contributing factor, it eliminates the interaction between the blood type and the prevalence of the ischemic heart disease.

It is quite possible that the previously reported increase in postoperative cardiac complications associated with non-O blood type is simply due to a higher incidence of ischemic heart disease in this population. In a recent epidemiologic metaanalysis by Harvard School of Public Health including 62,073 women from the Nurses’ Health Study (NHS) and 27,428 men from the Health Professionals Follow-up Study (HPFS),2 the investigators found that, when compared with individuals with type O, those with type A blood have a 6% greater risk of heart disease, those with type B have a 15% greater risk, and those with type AB have a 23% greater risk. However, just over 6% of the coronary heart disease cases were attributable to the A, B, or AB blood types. It is important to note that population with A blood group have higher levels of total and LDL cholesterol which may contribute to atherogenesis, a common denominator of coronary heart disease and peripheral arterial disease. No such analysis was done for patients in the study by Bakker et al.4

The clinical significance of this epidemiologic observation is highly questionable,5 and the study by Bakker et al.4 adds to the previous work questioning the clinical significance of blood types on postoperative thrombotic complications and long term mortality.6 As for patients who ask their physicians about blood type concerns, Daniel Levy, MD, director of the Framingham Heart Study, medical officer of the National Heart, Lung, and Blood Institute, and professor of medicine at Boston University School of Medicine offered this response: “Your blood type will be most important on the day you need a transfusion.”6

Although the clinical significance of the association between the ABO blood type and ischemic heart disease is questionable, the risk of ischemic heart disease at baseline seems to be higher in patients with non-O blood groups. Being attentive to this higher risk and appropriate risk adjustment with aggressive lifestyle modification, lipid control, antiplatelet and statin use in these patients with peripheral arterial disease will be crucial in decreasing perioperative and long term cardiovascular morbidity and mortality. Whether patients with non-O blood type groups need more aggressive risk adjustment still remains to be seen.

REFERENCES

