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eComment: Factors related to bioprosthetic valve calcification in the elderly

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We read with interest the report by Alvarez and his colleagues regarding the outcome of a type of pericardial bioprosthetic aortic valve replacement in the elderly patients [1]. There is a trend towards increasing the use of bioprosthetic valves, particularly with newer commercially available models, due to advancing prevention of valve calcification progressively in younger patients. However, calcification is the principal cause of clinical failure of these devices.

Although the term elderly is used to define very large and different populations, the mean age of this cohort is quite higher. However, many scoring methods consider age as a risk factor for mortality and morbidity. So, the increase of age means the increase of risks. Elderly patients suffer from different systemic diseases leading to calcification such as increased renal dysfunction, osteoporosis – particularly in female patients, increased rate of diabetes mellitus and metabolic syndrome which is associated with

coronary atherosclerosis [2]. An impaired renal function may lead to more advanced cardiovascular disease with increased levels of inflammatory mediators, endothelial dysfunction, arterial stiffness or calcification [3]. Valvular calcification is common in chronic renal disease, and is closely associated with findings of intimal arterial disease. The presence of inflammation and the duration of dialysis treatment contribute to this complication [4].

One of the issues is osteopontin which is found to be related to calcification of bioprosthetic valves. Osteopontin is a heavily phosphorylated and acidic pro-inflammatory glycoprotein with strong calcium-binding properties that stimulates differentiation of myofibroblasts and regulates the deposition of calcium by osteoblasts. Increased levels of plasma osteopontin are found to be associated with the presence of aortic valve calcification and stenosis [5]. This finding suggests that osteopontin might play a functional role in the calcification of bioprosthetic valves as well as native calcific valves.

It should be clarified whether bioprosthetic valve calcification is related only to the valve itself or to other factors. We know that bioprosthetic valve preservation is essential for the prevention of calcification. Various pretreatment methods of bioprosthetic valves are being applied with different chemicals. In this paper [1], it is not clear whether the total valve deterioration and the structural valve dysfunction are subjected to only the valve itself or to a comorbid condition. On the other hand, it would be better to know whether survival of this cohort is fairly different than the expected survival of a normal population at this advanced age. This cohort consisted of almost all aortic stenosis (97%) [1]. Hence, it should be kept in mind that patients with aortic stenosis have a higher tendency to calcification than the normal population.

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