Reviewer's report

Title: Impaired renal function impacts negatively on vascular stiffness in patients with coronary artery disease

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Reviewer: Tomasz Zapolski

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In the article entitled: “Impaired renal function impacts negatively on vascular stiffness in patients with coronary artery disease” Authors have demonstrated that even in patients with advanced atherosclerotic disease, concomitant renal impairment is associated with a further increase in vascular stiffness. The manuscript is well written. This is an original and interesting paper providing the reader to new issue of pathogenesis of impaired renal function in arterial stiffness. Nevertheless, to become suitable for publication, the Authors should raise the manuscript profile adding some relevant additional details and comments.

Discretionary Revisions

1. Atherosclerosis is regarded as a combination of too separate diseases: atherosis and sclerosis. The arterial stiffness reflects sclerotic component and means mechanical properties of arterial wall. Calcium overload, which is characteristic feature for deterioration of renal function, is associated with arterial stiffening. Vascular calcification is detected either in the tunica intima or in the tunica media. Calcification in the intima is characteristic of most stages of atherosclerosis. Medial calcification is particularly common in patients with renal dysfunction and may occur independently of atherosclerosis. Medial wall calcification increases vascular stiffness and reduces arterial compliance. That’s way the analysis including markers coexisting with renal impairment as calcium level, calcium phosphorus score etc. is also recommended. This may probably support the finding of the present study that osteopontin is independently associated with vascular stiffness.

2. Endothelial dysfunction is a crucial precursor of the development of cardiovascular disease. The endothelium maintains the balance between vasoconstriction and vasodilatation. The role of the endothelium in controlling the vascular tone, especially vasodilatation, has been shown via the endothelial-derived nitric oxide (NO). Decreased NO production has also been linked to progression of renal dysfunction. Accelerated vascular damage and defective vascular repair have been proposed as a mechanism for premature atherosclerosis and arterial stiffness, common findings among patients with deterioration of renal function. Impairment of NO biosynthesis (e.g., by ADMA) or NO bioactivity (as with oxygen-derived free radicals) causes endothelial vasodilatation dysfunction. Thereby, the correlations between arterial stiffness
and oxygen-derived free radicals promoters such as T-chol, LDL-chol, hs-CRP, should be also included into present study. The deleterious effects of T-chol, LDL-chol and hs-CRP in part a consequence of decreased availability of endothelium cells-derived NO, include smooth muscle proliferation, collagen synthesis, and deterioration of elastin which may impair arterial compliance. Surprisingly the total cholesterol and LDL-cholesterol levels were lower among patients with CAD when compared to control group. Why? Did CAD patient treat with statins? If yes, this may influence the inflammatory status in this group. Similarly in CAD group there were much more patients with diabetes, known inflammatory factor.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

'I declare that I have no competing interests' below.