Coronary lesion characteristics in patients with impaired renal function

Böbrek fonksiyon bozukluğu olan hastalarda koroner lezyon özellikleri

Cardiovascular diseases are responsible for about half of the deaths in patients with renal failure. Coronary artery disease (CAD) is one of the common cardiac involvements in these patients and is an important predictor of long-term outcome. Compared to general population CAD is 5-20 times more common in patients with renal failure, shows more diffuse involvement, has more complicated lesions and exhibits a rapid progression (1,2).

Data indicates that many patients with renal failure have advanced atherosclerotic cardiovascular disease before the initiation of dialysis therapy. Joki et al. (3) reported that CAD is present in 72.7% of patients having angina, and 53.8% those free of angina in subjects with end-stage renal disease (ESRD) at the first month of dialysis therapy.

Why is CAD much more common and has more complex lesions in patients with renal failure and what are the risk factors, mechanisms proposed to play role? The exact pathophysiology of accelerated coronary atherosclerosis is not known in these patients, but a multifactorial process seems to be responsible. Besides the higher prevalence's of traditional atherosclerotic risk factors and comorbid conditions; renal failure patients have many other factors that contribute to the rapidly evolving atherosclerotic cardiovascular disease. Uremic milieu, inflammation, calcium-phosphate abnormalities, oxidative stress, prothrombotic state, decreased fibrinolytic activity, increased plasma homocysteine and lipoprotein (a) levels, abnormal platelet function, malnutrition, anemia are among these risk factors. Vascular remodeling that occurs in response to volume overload and increased arterial blood flow are also among the mechanisms suggested to be responsible in development of ischemic heart disease in uremic patients.

In general interventional cardiology practice we see more and more patients with renal insufficiency of varying degrees. A study revealed that of 3334 patients who underwent percutaneous coronary interventions, 11% had renal insufficiency (creatinine >1.5mg/dL) (4). Patients with impaired renal function undergoing coronary angiography or percutaneous coronary intervention constitute a high-risk group who consequently experience high procedure related complications and less favorable short and long term outcomes. Autopsy findings reported by Schwarz et al. (5) showed that coronary plaques in patients with ESRD are characterized by increased media thickness and marked calcification. This shows that the coronary lesions in these patients are significantly severe according to Stary classification based on the composition and structure of the plaques (6). Study by Joki et al. (7) revealed that severity of coronary atherosclerosis defined by Gensini score is a predictor of mortality in the first year of dialysis therapy.

In the current issue of The Anatolian Journal of Cardiology Çay et al. (8) examined the association between renal functional impairment and severity of coronary artery lesions. Angiographically detected coronary stenoses were classified according to Gensini scoring system. This classification, although currently not commonly used in daily practice, is useful in that a quantitative assessment of coronary lesions can be done. Of note, patients with diabetes mellitus were excluded. They showed that patients with impaired renal function compared to those with normal renal function have higher Gensini scores, demonstrating more severe coronary lesions. It is of further note, Çay et al. reported that as the Gensini score increases there is a linear decrease in glomerular filtration rate (GFR). The authors discussed the possible risk factors and mechanisms responsible from the increased prevalence and severity of coronary artery disease in these patients.

However, this study has some weak points. First, the number of patients enrolled is small. Second, as mentioned in the limitations, patients with ESRD and those with mild-moderate renal functional impairment were evaluated as impaired renal function group. Patients with mild renal insufficiency are different in many ways from those who are on maintenance dialysis. It is known that ESRD patients have a stronger association with cardiovascular diseases than that those with mild renal functional impairment. In other words, as the renal function deteriorates the risk of cardiovascular disease increases. So a larger study dividing patients into 5 subgroups (9) based on the severity of renal insufficiency (stage 1-4: those with varying degrees of renal insufficiency, stage 5: ESRD receiving dialysis therapy) would provide us more valuable data. Third, GFR was not calculated from collected 24 hour urine. Additionally, methods that are more sophisticated could be used for the assessment of coronary stenosis. For example intravascular ultrasonography would give us more detailed information about the severity, as well as the nature-complexity of the coronary lesions. Calculation of coronary flow reserve would provide the exact hemodynamic severity of the lesions.

In conclusion, as the authors reported, there is a correlation between the severity of coronary stenosis and renal functional impairment independent of the other risk factors. Further trials involving higher number of patients and employing sophisticated methods for the assessment of coronary lesions are required.

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