Efficacy of Atorvastatin in Prevention of Contrast-Induced Nephropathy (CIN) in High-Risk Patients Undergoing Angiography

CIN is a common cause of acute renal dysfunction. It's defined as an increase in serum creatinine concentration of 0.5 mg/dL or 25% above the baseline within 48 hr after contrast administration[1].Serum creatinine usually peaks 48–72 hours following contrast media use and returns to the baseline within 14 days .The CIN is an important cause of mortality and morbidity in high-risk patients such as patients with chronic renal impairment, diabetes mellitus (DM), congestive heart failure, and old age undergoing angiography. After contrast exposure, there is medullary hypoxia because of adenosine production from the macula densa, release of angiotensin, vasopressin, and endothelin-1, and decreased synthesis of nitric oxide (NO) [2].Statins may decrease inflammation and improve endothelial function, decreasing expression of endothelial adhesion molecules, and increasing NO bioavailability [345]

A prospective, double-blind, randomized, two-arm, parallel group, controlled, clinical trial, published in 2017, aimed to evaluate the efficacy and safety of atorvastatin 80 mg in the prevention of CIN in high-risk patients undergoing angiography. The select standards were patients of either gender, between 18 and 65 years of age, who had serum creatinine between 1 and 1.5 mg/dL or estimated glomerular filteration rate (eGFR) >60 mL/min/1.73 m^2 and suffering from controlled DM or hypertension . The exclusion criteria were patients with history of known structural heart disease, severe heart failure, eGFR < 60 mL/min/1.73 m^2 or requiring hemodialysis, severe hepatic disease, exposed to iodinated contrast media within 7 days, or hypersensitivity to study medication. 188 patients enrolled to the department of cardiology of a tertiary health-care center in Aurangabad for coronary angiography were recruited from January 2013 to December 2013 assigned randomly (by using a list of computer-generated numbers). The enrolled patients were divided into two treatment groups . Patients in group A received tablet N-acetylcysteine (NAC) 1200 mg once daily, and patients in group B received tablet atorvastatin 80 mg + NAC 1200mg once daily, for 3 days before, and 2 days after angiograph . The efficacy of treatment was evaluated primarily on the basis of prevention of CIN occurrence. The secondary outcome parameters included mean change in serum creatinine and mean change in eGFR values from baseline.[6]

As a result, postprocedure, nine and two CIN cases were found in group A and B, respectively, levels of serum creatinine were significantly lower in group B as compared to group A, the mean change in serum creatinine was 0.086 ± 0.168 in group A and 0.021 ± 0.083 in group B, which was statistically significant (P = 0.0289) and the eGFR was reduced by 19.52 in group A and 13.55 in group B (P = 0.003), which means that there was significantly less decrease in eGFR in group B as compared to group A. [6]

In conclusion, the findings of this study indicate the positive role of statins in preventive strategy against CIN by using high dose atorvastatin along with NAC. The study had small sample size so, further studies should be conducted with larger sample size .

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