DIABETES MELLITUS DOES NOT INCREASE THE INCIDENCE OF ACUTE KIDNEY INJURY AFTER CARDIAC SURGERY IN PATIENTS WITH CHRONIC KIDNEY DISEASE; A NESTED CASE-CONTROL STUDY

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INTRODUCTION AND OBJECTIVES

Cardiac surgery, commonly associated with the onset of acute kidney injury (AKI) [1]. Renal function deterioration after such operations is associated with significant increase in all-cause hospital mortality [2]. The heterogeneous definitions used for AKI in relevant literature resulted in high variance of incidence rates. Diabetes mellitus (DM) is present in about 20-25% of individuals undergoing cardiac surgery [1,2] and has been associated with increase in post-surgery cardiovascular events in some [1], but not all studies [3]. As data on the effect of DM on AKI incidence in this setting are scarce and contradictory, we aimed to evaluate in comparison the incidence of AKI, (defined by the AKIN, RIFLE and KDIGO criteria) in matched patients with and without DM undergoing cardiac surgery and to directly examine the effect of DM on AKI development.

This is a nested case-control study from a cohort of patients undergoing cardiac surgery (coronary artery bypass grafting, aortic or mitral valve replacement, thoracic aortic aneurysm repair, aortic dissection repair, atrial septal defect closure or combination of these procedures) during a six-month period in a single center. The exclusion criteria were: Type-1 diabetes, end-stage renal-disease, death during surgery and ongoing AKI prior to surgery. A total 199 type-2 diabetics were identified to represent the cases and were matched to 199 non-diabetic individuals for gender, age and estimated glomerular filtration rate (eGFR). Diagnosis of AKI was made separately with the use of RIFLE, AKIN and KDIGO criteria. The incidence of AKI was compared between the two groups in the total population and in subgroups according to preoperative eGFR. Univariate and multivariate logistic regression analysis were conducted to identify factors associated with AKI.

METHODS

Baseline demographic and clinical characteristics of the patients are presented in Table 1. The incidence of AKI after cardiac surgery in the population studied was 23.6% based on the AKIN and the KDIGO criteria and 25.4% based on the RIFLE criteria (Figure 1). The incidence of AKI was moderately high, but similar between the two study groups (Table 2). A trend towards increased incidence of AKI from eGFR subgroup 1 to subgroup 3a was noted in diabetic patients (Figure 2). No significant differences were detected between the two groups within any eGFR subgroup studied with regards to AKI occurrence. In multivariate analysis, age and duration of cardiopulmonary bypass were associated with AKI occurrence. Diabetes was not related with AKI development in the regression analysis (Table 3).

RESULTS

Baseline demographic and clinical characteristics of the patients are presented in Table 1. The incidence of AKI after cardiac surgery in the population studied was 23.6% based on the AKIN and the KDIGO criteria and 25.4% based on the RIFLE criteria (Figure 1). The incidence of AKI was moderately high, but similar between the two study groups (Table 2). A trend towards increased incidence of AKI from eGFR subgroup 1 to subgroup 3a was noted in diabetic patients (Figure 2). No significant differences were detected between the two groups within any eGFR subgroup studied with regards to AKI occurrence. In multivariate analysis, age and duration of cardiopulmonary bypass were associated with AKI occurrence. Diabetes was not related with AKI development in the regression analysis (Table 3).

CONCLUSIONS

• Incidence of AKI after cardiac surgery remains relatively high
• DM does not constitute a separate risk factor for AKI development in cardiac surgery
• This is in contrast to other settings (e.g. percutaneous coronary angioplasty) where DM increases the incidence of AKI significantly
• Among patients with DM, baseline renal function is a parameter related inversely with the incidence of AKI
• Age and cardiopulmonary bypass time are factors associated with AKI development in all patients.

REFERENCES


Table 1: Baseline demographic and clinical characteristics of the patients

Table 2: Incidence of AKI in eGFR subgroups in patients with and without DM

Table 3: Univariate and multivariate regression analysis for occurrence of AKI defined by KDIGO criteria in the total studied population.