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Risk Factors of Development of Acute Kidney Injury in Orthopedic Surgery

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Objectives : Postoperative acute kidney injury (AKI) is major concern to surgeons, which leads the increasing postoperative morbidity and mortality. Perioperative risk factors for development of AKI are well known such as underlying chronic kidney disease, exposure of iodine contrast and low hemoglobin in bypass cardiac surgery. However, there is little known about development of postoperative AKI after orthopedic surgery.

Methods : Patients underwent total hip or knee replacement surgery were enrolled from January 2011 to December 2015 in this retrospective study. A number of variables was assessed such as age, gender, preoperative glomerular filtration rate, drugs (NSAIDs, ACE inhibitor or ARB, statins), albumin, hemoglobin, type of anesthesia, amount of bleeding and infused fluid, presence of diabetes, hypertension, contrast use and chronic kidney disease (CKD). AKI was defined when postoperative creatinine increased more than or equal to 0.3 mg/dL and CKD was defined when glomerular filtration rate was under 60 ml/min/1.73m² by CKD-EPI equation.

Results : Overall, AKI was developed in 13 among 351 cases (3.7%). Among the examined variables, presence of hypertension (11 out of 193 cases), CKD (9 out of 66 cases), low level of albumin (3.3 g/dL vs. 3.6 g/dL), hemoglobin (11.3 g/dL vs. 12.4 g/dL) and total CO₂ (24.27 mmol/L vs. 26.53 mmol/L) content were related to AKI significantly. In subgroup analysis with CKD group, AKI was developed in 8 out of 63 cases. Low albumin (3.3 g/dL vs. 3.6 g/dL) and hemoglobin (10.58 g/dL vs. 11.7 g/dL) were related risk factor in CKD patients. Use of crystalloid fluid only or combined with colloid fluid did not have any significant meanings. Among perioperative crystalloid fluid, 2 AKI case in 5 unbalanced fluid (40%) and 6 AKI cases in 58 balanced fluid (10%) were developed.

Conclusions : We should monitor the renal function closely after orthopedic surgery if the patients have hypertension, CKD and low level of albumin, hemoglobin and total CO₂ content. The correction of albumin and hemoglobin level is needed before orthopedic surgery in CKD patients. In addition, use of balanced fluid is helpful to prevent AKI in CKD patients if there are no

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electrolyte abnormalities.

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