Acute kidney injury after minimally invasive lung lobectomy: A retrospective analysis

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Introduction: Acute kidney injury (AKI) is a rare but significant complication after major lung resection. It is unclear what perioperative risk factors are associated with postoperative renal failure. The aim of this study was to investigate the incidence of postoperative AKI after minimally invasive lung lobectomy along with any intraoperative factors that may affect it.

Methods: After IRB approval, we reviewed medical records of patients who underwent minimally invasive lung lobectomy between October 2016 and June 2017. Patients were divided in two groups: AKI, using the Acute Kidney Injury Network (AKIN) definition, and non-AKI. For each patient we retrieved age, gender, comorbidities, surgical and anesthetic duration, and length of stay in the post anesthesia care unit (PACU) and in the hospital. From the anesthetic record we recorded the mean arterial pressure (MAP), fluid totals, vasopressor infusions, and urine output.

Results: We reviewed 200 patient charts. All patients received general anesthesia with fluid restrictive management and were extubated in the operating room (OR). There were 22 patients who met AKIN criteria for AKI. The mean age of the AKI group was 73 Â± 6 years (vs 67 Â± 10, p= 0.01). Of the AKI patients, 18 (82%) had hypertension, 9 (32%) had diabetes mellitus, 6 (27%) experienced nephrotoxic chemotherapy treatment, and 12 (55%) used angiotensin-converting enzyme (ACE) inhibitors. There was no significant difference in surgical duration (214 [189-245] vs 206 [171-246] minutes, p=0.23), intraoperative fluid replacement (2.7 [2.1-3.9] vs 3.5 [2.7-4.4] cc/kg/hr, p=0.15), and vasopressor requirements (80 [10-260] vs 120 [0-280] mcg of phenylephrine, p=0.09; 10 [0-16] vs 5 [0-10] mg of ephedrine, p=0.26) between the two groups. Intraoperative urinary output was also similar between the two groups (293 [213-421] vs 250 [161-343] cc respectively, p=0.26), with no correlation between urine output (cc/kg/hr) and fluid administered (cc/kg/hr) (r=-0.06), MAP (mmHg) (r=-0.33) or dose of vasopressors used (r=0.10). Fourteen of the 200 patients analyzed (7%) had preoperative renal dysfunction which worsened in the postoperative period, accounting for 5 (23%) of the AKI patients. Length of stay in PACU (7 [3-22] vs 7 [5-14] hours, p=0.45) and in the hospital (4 [3-8] vs 3 [2-5] days, p=0.508) were not significant between AKI and non-AKI patients.

Conclusion: Our data showed an 11 % incidence of postoperative AKI after MIS lung lobectomy. Preoperative comorbidities such as hypertension, diabetes and the use of ACE inhibitors may predispose patients to postoperative AKI. However, no correlation was found with changes in MAP, use of pressors or amount of fluids. Further studies are needed to determine what perioperative risk factors can be modified as to further decrease the incidence of AKI among this population.