A patient undergoing major thoracic surgery has a urine output of 0.2 mL/kg/h. According to a recent study defining oliguria as a urine output less than 0.3 mL/kg/h, which of the following statements BEST describes the impact of urine output on the risk of postoperative acute kidney injury (AKI)?

- (A) Oliguria was a sensitive predictor of AKI.
- (B) Oliguria was not a risk factor for AKI.
- (C) Average urine output was similar for patients who did and who did not develop AKI.

Postoperative AKI is defined as a serum creatinine increase of at least 0.3 mg/dL within 48 hours after surgery or at least 1.5-fold within seven days after surgery. AKI occurs in approximately 13% of patients after major surgery and is associated with a longer hospital stay and increased mortality. There have been multiple reports identifying patient risk factors for AKI and seeking intraoperative events that predict AKI. Most reports have found associations between intraoperative oliguria and the development of AKI. It has been suggested that if oliguria is observed, fluid or other therapy could be initiated intraoperatively to decrease the risk of AKI. However, studies have used differing thresholds to define oliguria.

In a recent retrospective study, physicians at an academic hospital in China analyzed data for 3,862 patients undergoing major thoracic surgery from February 2008 to May 2018 to examine the association between intraoperative oliguria and AKI. The patients were adults with an average age of 59 years. Approximately 5% (n = 205) of the patients developed AKI; this is notably lower than other reported rates. The mean intraoperative urine output was 1.35 mL/kg/h (interquartile range [IQR], 0.76-2.23 mL/kg/h) in patients with postoperative AKI and 1.42 mL/kg/h (IQR, 0.89-2.25 mL/kg/h) in those without postoperative AKI. The null hypothesis of equal urine output between groups could not be rejected; a difference of 0.07 mL/kg/h would have no clinical relevance.

Using nonlinear statistical techniques, the optimal urine output threshold separating patients with or without AKI was determined to be 0.3 mL/kg/h. The specificity (true negative rate) of urine output as a predictor of postoperative AKI using this threshold was very good (98%). However, this threshold had a low sensitivity (5.9%); of the 205 patients who developed AKI, only 12 had oliguria, defined as a urine output of less than 0.3 mL/kg/h. Thus, oliguria was not a sensitive predictor of AKI in this study.

Multivariable logistic regression was used to model multiple risk factors for postoperative AKI. Oliguria and various other variables, such as hypertension and diabetes, were identified as risk factors. However, oliguria by itself contributed little to the overall risk estimation of AKI (i.e., it added very little to the discrimination of AKI, as indicated by the area under the receiver operating characteristics curve).

The researchers also performed a meta-analysis, combining the results of their study and six previously published studies to assess the predictive ability of oliguria for AKI. No single definition of oliguria was used in this meta-analysis. Oliguria was associated with an increased odds ratio for AKI (OR, 2.20; 95% CI, 1.63-2.96). However, even with these combined data, oliguria had very limited ability to discriminate between AKI and non-AKI patients.

In conclusion, even with a large patient cohort, intraoperative oliguria does not appear to be useful for predicting postoperative AKI. The authors also noted that no intraoperative intervention for oliguria has been identified to reduce the risk of AKI.

Bibliography:

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