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The clinical implication of computed tomography in predicting severity of acute pyelonephritis associated acute kidney injury

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Objectives : The aim of this study is to investigate the incidence and clinical characteristics of acute kidney injury (AKI) in acute pyelonephritis (APN) and evaluate the usefulness of computed tomography (CT).

Methods : From May 2007 to December 2009, we enrolled 530 patients with APN who underwent a contrast-enhanced CT examination. We evaluated the incidence and clinical characteristics of APN associated AKI using the RIFLE criteria. In addition, we divided these patients into three groups according to renal parenchymal involvement in CT (group 1; less than 25% involvement, group 2; 25% or greater involvement but less than 50%, group 3; greater than 50%), and compared their clinical characteristics, incidence of AKI.

Results : The patients included 499 (94.2%) women and 31 (5.8%) men, with a mean age of 55 years (range, 18-92). The incidence of AKI was 15.3%; of which, 57.3%, 35.4% and 7.3% were classified as Risk, Injury and Failure, respectively. APN grades by patient number were as follows: group 1 (n=296; 55.8%), 2 (n=95; 17.9%), 3 (n=139; 26.2%). When we compared clinical characteristics among groups according to CT findings, the patients in group 3 have longer hospital stay than other groups (group 1: 9±4, group 2: 9±4, group 3: 10±5, p=0.001). Serum sodium level (138±4 vs 137±4 vs 136±5; p=0.001) and albumin concentration (3.9±0.7 vs 3.7±0.5 vs 3.5±0.5; p<0.001) in group 3 were lower than other groups. The incidence of AKI among groups was 13.9%, 8.4% and 23.0%, respectively.
The patients who fell into failure category were more common in group 3 than other groups (group 1; 0%, group 2; 33.3%, group 3; 66.7%).

Conclusions : The incidence of APN-associated AKI was 14.4%. Computed enhanced CT could be helpful to predict severe APN and severe type of APN-associated AKI.

Keywords : acute kidney injury, acute pyelonephritis, RIFLE