Risk and Impact of Renal Impairment of Locally Advanced Head and Neck Squamous Cell Carcinoma (HNSCC) Patients Who Received Chemoradiotherapy (CRT) with Cisplatin

Thana Patimarattananan a, Poompis Pattaranutaporn b, Nattawut Unwanatham c, Chuleeporn Jiarpinitnun b, Arkom Nongnuch d, Nuttapong Ngamphaiboon a

a Division of Medical Oncology, Department of Medicine
b Division of Radiation Oncology, Department of Radiology
c Section for Clinical Epidemiology and Biostatistics
d Division of Nephrology, Department of Medicine

Ramathibodi Hospital, Faculty of Medicine, Mahidol University, Bangkok, Thailand

Background: Risk factors of cisplatin induced acute kidney injury (AKI) patients has been well described. In HNSCC, an incidence of cisplatin induced AKI was observed in 34.2%. Most studies reported AKI as a surrogate endpoint. However, delayed cisplatin induced nephrotoxicity and long term renal outcomes were not well studied.

Methods: Locally advanced HNSCC patients treated between 1/2007 and 12/2018 who underwent definitive or post-operative chemoradiotherapy (CRT) with cisplatin were identified. Patient characteristics, treatments, creatinine at baseline, during, 3-, 6-, and 12 months after CRT completion were retrospectively reviewed. Acute kidney disease (AKD) was defined by (i) estimated glomerular filtration rate (eGFR) <60 ml/min/1.73 m2 for <3 months, or (ii) decrease in eGFR by ≥35 %, or (iii) increase in serum creatinine by >50 % for <3 months.

Results: A total of 509 patients were analyzed. Overall AKD occurred in 27.9% patients. Most patients (95%) had prophylaxis feeding. ECOG of 0 was more prominent in AKD patients (p=0.017), diabetes (p=0.044), and hypertension (p<0.001). Most patients received definitive CRT (83%) with mean cumulative dose of cisplatin during CRT and entire treatment of 189, and 399.57 mg/m2, respectively. There was no statistically different in cumulative dose, delay, dose reduction, termination, and hospitalization. In AKD patients, eGFR started to decline significantly during CRT (-36%) and worsening at 3 months (-39%) after CRT. The eGFR started to improve at 12 months after CRT (-29%), but not recovered to baseline nor non-AKD patients. In multivariate analysis, ECOG of 0 (OR=1.77), and hypertension (OR=2.25) were a significant predictive factor for AKD.

Conclusions: Almost one third of locally advanced HNSCC patients who underwent CRT with cisplatin developed AKD with the peak incidence at 3 months after CRT. After 1 year, eGFR of patients with AKD did not recovered, and remained at -30% decline from baseline. ECOG 0 and hypertension were a predictor for AKD, while cumulative dose of cisplatin was not. Physician's awareness of AKD and underestimation of potential complications in fit patients might have explained these findings.