

Contrast induced acute kidney injury prevention during angiographic procedure with early renal replacement therapy

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Background and purpose: Post-angiography renal replacement therapy (RRT) has shown protective effects from Ci-AKI (contrast induced acute kidney injury) in patients with pre-existing advanced renal dysfunction. We analysed a series of 1095 consecutive patients who underwent coronary or peripheral angiography in our center. In non-haemodialyzed patients with eGFR $<20\text{ml/min/1.73m}^2$ or with poor renal reserve we performed an “early” RRT, starting during angiography procedure and applied for at least 6 h after procedure, thus diverging from previous literature data based only on post-procedure hours delayed RRT application. The RRT modality chosen was CVVHDF (continuous veno-venous hemodiafiltration).

Methods: We considered following subjects variability: age, sex, weight, presence of hypertension, dyslipidaemia, diabetes, smoking habitude, left ventricular ejection fraction, amount of contrast media given and shock or infection occurrence during hospital stay. We evaluate statistic significance of serum creatine (SCr) variation in patients receiving RRT from pre-procedure time (T0), at 24h (T1), 48h (T2), 72h (T3) after procedure and at 3–8 weeks follow-up (T4). Quantitative data were compared with Student T test, qualitative data with Chi Square test, considering statistically significant p value <0.05 with two tails. Ci-AKI was defined as serum creatinine rise $\geq 0.3\text{ mg/dL}$ at 48h from contrast media administration, following KDIGO (kidney disease improving global outcomes) guidelines definition.

Results: 26 patients received RRT. Medium SCr at T0 was 3.37 mg/dl and showed a significant reduction (see figure) at T1 ($-0.88\text{mg/dl} = -20.6\%$, $p=0.003$) and T2 ($-0.96\text{mg/dl} = -18.33\%$, $p=0.029$) and a trend towards reduction at T3 (-0.78mg/dl , $p=0.174$) and at T4 (-0.28mg/dl , $p=0.568$).

Between 26 pts, 6 pts (23%) developed Ci-AKI. Only contrast media amount significantly diverge between two groups (183 ml in the group with Ci-AKI vs 162 ml in pts with no Ci-AKI, $p=0.03$), showing also a trend towards significance for infection occurrence (83.3% pts Ci-AKI vs 40% pts no Ci-AKI, $p=0.06$) and shock onset (33.3%pts Ci-AKI vs 5% pts no Ci-AKI, $p=0.06$).

Average SCr diverge at T2 (3.18mg/dl Ci-AKI vs 2.04mg/dl no Ci-AKI, $p=0.01$) and at T3 (3.33mg/dl Ci-AKI vs 2.31mg/dl no Ci-AKI, $p=0.06$); we also found a trend towards progressive increase of SCr for Ci-AKI pts (T0-T1: $+0.17\text{mg/dl}$, $p=\text{ns}$; T0-T2: $+0.41\text{mg/dl}$, $p=\text{ns}$; T0-T3: $+0.57\text{mg/dl}$, $p=\text{ns}$; T0-T4: $+1.35\text{mg/dl}$, $p=\text{ns}$) and a significant reduction in SCr for no Ci-AKI pts (T0-T1: $-1.23\text{mg/dl} = -29.32\%$ $p=0.001$; T0-T2: $-1.46\text{mg/dl} = -30.78\%$, $p=0.01$; T0-T4: $-0.41\text{mg/dl} = -15.5\%$, $p=0.05$).

Conclusions: Early RRT with CVVHDF modality results effective in 77% of patients in avoiding Ci-AKI, with a significant SCr reduction at 24 and 48h. An increased amount of contrast media is significantly related to Ci-AKI incidence. Ci-AKI development could also possibly be related to shock and infection occurrence.

