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Outcome in Patients with Acute Renal Failure after Trauma when Continuous Renal Replacement Therapy is applied Early vs. Late

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Abstract

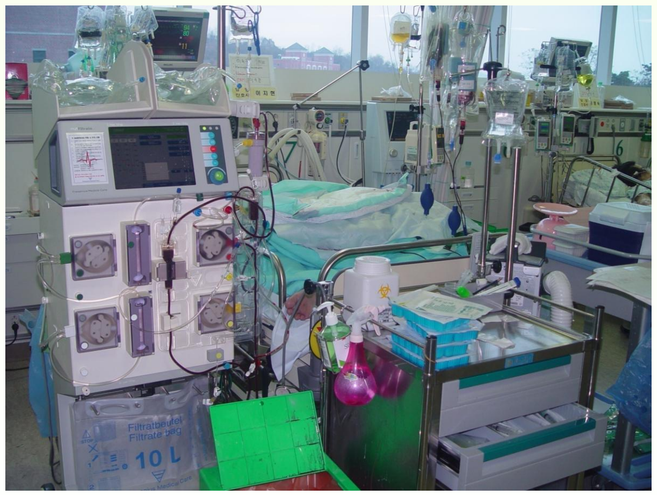
Purpose: This study's aim is to determine whether the timing of start of a continuous renal replacement therapy (CRRT) affects mortality in patients with ARF after a severe injury, and whether early start of CRRT affects restoration of damaged kidney function.
Methods: We reviewed the electronic medical records of 195 severely injured patients who underwent a CRRT from February 2007 to December 2012. We compared survival, 30 day survival and RRT free rate between early start and late start groups stratified by blood urea nitrogen, serum creatinine and RIFLE criteria.
Results: There is any differences between early start group and late start group in sex, age, mechanism of injury, Injury severity score (ISS) and an amount of blood products in 48hours from the time of ER arrival. The survival rate was 29.23% and 30-day survival rate after initiating CRRT was 43.08%. The number of patients who survived without renal replacement therapy was 84.21%. The RRT free rate in survivors was significantly higher in the early start group, whose laboratory results categorized by BUN (p=0.023)
Conclusion: The patients who required CRRT after severe trauma had a high mortality rate. An early initiation of CRRT showed no significant difference in mortality.

Objectives

According to a tri-modal distribution of trauma deaths curve, the third peak occurs in days or weeks post injury, with patients dying of multi-organ failure or sepsis. In this phase, acute renal failure is considered as an important clinical feature of multi-organ failure and independent factors of mortality. Therefore, it is very important to conduct **a** proper Renal replacement therapy at a proper time. Some studies have reported that an earlier implementation of RRT improved the survival rate significantly, when blood urea nitrogen or serum creatinine was still low level. However, most of those studies were conducted for the patients in a general ICU, not the trauma patients. Thus, we narrowed down the objects of this study to trauma patients.

Methods

We reviewed the electronic medical records of 195 severe trauma patients who underwent a CRRT from February 2007 to December 2012. We compared survival, 30 day survival and RRT free rate between early start and late start groups stratified by blood urea nitrogen, serum creatinine and RIFLE criteria. CRRT was set up followed by a standardized institutional protocol. Briefly, a double-lumen, 11.5-French catheter was positioned in femoral vein. Multifiltrate generator (Fresenius Medical Care; Bad Homburg, Germany) and Prisma machine (Gambro USA, Lakewood, Colo., USA) were used.



Results

We stratified patients according to the median values of blood urea nitrogen(33.5), serum creatinine(2) and RIFLE criteria(Risk versus Injury, Failure) at the time of initiation of the CRRT, where early represented initiation at values below the median and late at values above the median. There was no differences between early start group and late start group in sex, age, mechanism of injury, Injury severity score (ISS) and transfusion amount in 48 hours from ER arrival. The survival rate was 29.23% (57/195) and 30-day survival rate after the initiating CRRT was 43.08% (84/195). The number of patients who survived without a renal replacement therapy was 84.21% (48/57). There were no significant differences between two groups in mortality (p=0.167). However, a RRT free rate in survivors was significantly higher in the early start group which categorized by BUN (p=0.023)

	Total	Early Start BUN ≤ 33.5	Late Start BUN > 33.5	Early Start Cr ≤ 2	Late Start Cr > 2
Age(yr)	53.8	51.2	56.4	48.3	59.3
Sex male (no. patients)	156	84	72	78	78
Injury Severity Score (mean)	25.3	23.8	26.8	24.1	26.5
APACHE II Score (mean)	26.2	27.4	24.9	26.9	25.5
SOFA score (mean)	15.2	14.6	15.8	16.7	13.7
Drug Use (no. patients)					
Lasix	138	72	66	54	84
Inotropics	156	90	66	102	54
Mannitol	36	15	21	24	12
Mechanical Ventilator (%)	88.0	87.8	88.1	89.3	86.7
pRBC Transfusion during first 48hr (mean of unit count)	21.2	23	19.5	18.7	23.7
Urine output (ml/hr) during 6hr before CRRT*	21.4	16.4*	26.4*	14.3*	28.5*
Survival rate (%)	29.23	27.27	31.25	25.08	32.35
30-day survival rate after start a CRRT (%)	43.08	39.39	46.87	45.16	41.18
RRT free rate in survivors (%)	84.21	100*	70*	87.5	81.81

* Statistically significant

Conclusions

The timing of initiating of CRRT seems to affect the RRT free rate in survivors after severe trauma patients

References

1. Morris JA, Mucha P, Ross SE et al. (1991) Acute posttraumatic renal failure: a multicenter perspective. J Trauma 31:1584-1590