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Incidence and Clinical Course of Non-typhoidal Salmonella Enterocolitis induced Acute Kidney Injury

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Case Study

Background
Renal impairment has been often observed during Salmonella infection. Acute kidney injury (AKI) is thought to be mainly due to shock, dehydration, or rhabdomyolysis. However, the mechanism of AKI in non-typhoid salmonella infection and impact on kidney function remains unclear. We investigated clinical course and incidence of renal function deterioration in adult patients with Salmonella infection.

Methods
We retrospectively reviewed the data of hospitalized adult patients for acute diarrhea from April 2021 to September 2021. Patients underwent stool multiplex PCR testing. Diarrhea onset for more than 2 weeks, underlying chronic GI diseases (IBD or GI cancer), outpatients, and use of contrast dye for CT imaging were excluded. A total of 303 patients who conducted PCR testing, only 79 patients (26%) were included. Biologic parameters, incidence of AKI and clinical outcomes were compared between patients infected with Salmonella and patients with other gastrointestinal infections. AKI was defined according to the creatinine criteria of KDIGO classification, based on the level of initial serum creatinine level upon admission and baseline.

Results
A Total 79 patients, 25 (31%) patients were proven salmonella infection. AKI, defined according to KDIGO guideline (increase in serum creatinine by 0.3mg/dL or more, increase in serum creatinine to 1.5 times baseline) was observed in 13 (52%) patients infected by Salmonella but only 13 (24.1%) in non-salmonella group ($p=0.014$). The proportion of AKI stage was severe in Salmonella group, with higher initial and peak creatinine level. Incidence of bacteremia ($p=0.014$) and dialysis ($p=0.035$) were significantly higher in Salmonella group compared with non-salmonella group.

Conclusion
Salmonella infection was associated with increased AKI incidence and more severe clinical course. It may induce bacteremia and require renal replacement therapy. Therefore, early detection of salmonella pathogen and prompt treatment are important to avoid devastating effect on the renal system.

Fig.1. Incidence of AKI in salmonella infection.

Clinical finding	Salmonella (n=25)	Non-Salmonella (n=54)	*p-value*
Initial sCr, mg/dL	2.3±2.2	1.3±1.4	0.040*
Peak sCr, mg/dL	2.3±2.3	1.3±1.4	0.037*
FENa (%) (n=24)	0.6 (0.1-2.8)	0.83 (0.01-2.8)	
Urine s.g ≥1.020 (n=71)	14 (63.6)	32 (65.3)	0.892
AKI_1	14 (56.0)	17 (31.5)	0.038*
AKI_2	13 (52.0)	13 (24.1)	0.014*
Dialysis	2 (8.0)	0 (0)	0.035*

Fig.1. Incidence of AKI in salmonella infection.
A total of 79 patients, 25 (31%) patients were proven salmonella infection. AKI-1 was based on KDOQI guideline MDRD 75 equation. AKI-2 was defined according to KDIGO guideline (increase in serum creatinine by 0.3mg/dL or more, increase in serum creatinine to 1.5 times baseline)

Abbreviations: AKI, acute kidney injury; MDRD, modification of diet in renal disease ; KDOQI, kidney disease outcomes quality initiative ; KDIGO, kidney disease improving global outcomes

Fig.2. AKI stage and clinical outcomes of salmonella infection.

Clinical finding	Salmonella (n=25)	Non-Salmonella (n=54)	*p-value*
Pre-admission diarrhea day	2.5±2.2	2.9±2.5	0.533
Total diarrhea day	6.8±3.1	6.5±3.2	0.676
Duration of hospital stay, day	5.8±1.6	5.6±1.9	0.572
Bacteremia (same pathogen as stool study)	7 (28.0)	4 (7.4)	0.014*
Dialysis	2 (8.0)	0 (0)	0.035*

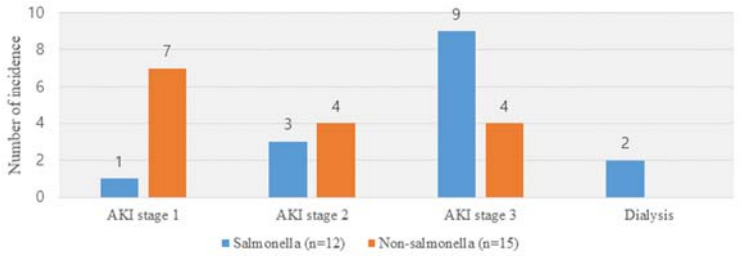

Fig.2. AKI stage and clinical outcomes of salmonella infection.

The proportion of AKI stage was severe in Salmonella group. Incidence of bacteremia (p=0.014) and dialysis (p=0.035) were significantly higher in Salmonella group compared with non-salmonella group.

Abbreviations: AKI, acute kidney injury