Introduction:
Every new septic event follows by hemodynamic instability may lead sequentially to decreased organ perfusion, multiple organ failure. Acute renal failure is recognized clinical feature during sepsis (up to 40-50% in all cases). Furthermore, urine output close monitoring is a cornerstone diagnostic clinical tool in each septic critically ill patient. In present study, we analyzed the dynamic minute-to-minute changes in the urine flow rate (UFR) and also the changes in its minute-to-minute variability (UFRV) during new septic event in critically ill patients.

Methods:
Demographic and clinical data were extracted from the 50 critically ill patients who were admitted to the ICU and developed new septic event (followed by fever and leukocytosis) and analyzed. A Foley catheter was inserted into the urinary bladder of each study patient. The catheter was then connected to electronic urinometer, a collecting and measurement system which employs an optical drop detector to measure urine flow. The urine flow rate variability (UFRV) is defined and calculated as the change in UFR from minute to minute.

Results:
UFR and UFRV both decreased significantly immediate after new septic episode until beginning fluid resuscitation (pvalues <0.001) (Figure 1). Statistical analysis by the Pearson method demonstrated a strong direct correlation between the decrease in UFR, UFRV and the decrease in the MAP (R=0.03, p=0.003; R=0.03, p=0.004) (Figure 1), and heart rate (R=0.12, p=<0.001) since systemic pressure starts to drop. UFRV and UFR demonstrated good clinical response to fluid administration despite the fact that systemic blood pressure did not improved (Figure 1).

Conclusion:
We consider that dynamic changes in UFRV and UFR could potentially serve as a more sensitive signals of clinical deterioration during the new septic event in critically ill patients. We also suggest that those parameters might be able to identify the optimal end-point of fluid resuscitative measures in septic critically ill patients.

Image:

Figure 1: Clinical correlation between urine flow rate variability (UFRV) and UFR and mean arterial blood pressure over new septic event (black arrows) and after initial fluid resuscitation (red arrows). Note: The UFRV and UFR decreased progressively in parallel with the falling mean arterial blood pressure and, than, rose again after the administration of fluids.