Introduction:
We have previously reported that hemoperfusion with polymyxin B immobilized on polystyrene fibers in a cartridge (PMX-DHP) reduces endothelial damage by selective removal of activated neutrophils. Ex vivo perfusion experiments demonstrated that activated neutrophils adhered preferentially to PMX filters and that the remaining neutrophils caused less endothelial damage. There is, however, no report about the effect of PMX-DHP on neutrophil extracellular traps (NETs) formation. The objectives of this study were to investigate the correlations between plasma myeloperoxidase (MPO) conjugated-DNA level with degree of organ dysfunction, disease severity, and ICU mortality in septic shock patients. We also investigated the effect of PMX-DHP on MPO-DNA level.

Methods:
Sixty-five septic shock patients admitted at the ICUs of 35 Japanese hospitals treated with PMX-DHP were enrolled. Septic shock was identified using old definition according to the ACCP/SCCM in 1997. Plasma MPO-DNA was measured by sandwich ELISA with anti-MPO and anti-DNA monoclonal antibodies.

Results:
On day 1, septic shock patients displayed a marked increase of plasma MPO-DNA level compared with the healthy volunteers (p=0.008). Plasma MPO-DNA levels were significantly decreased on days 3 and 7 after PMX hemoperfusion. By correlation study, the MPO-DNA level on 7th day was inversely correlated with both the mean arterial pressure (p=0.048) and P/F ratio (p=0.003) at 7th day. Positive correlation was observed between plasma MPO-DNA level on 7th day and SOFA at 7th day (p=0.017). Using Wilcoxon signed-rank test the high MPO-DNA on 3rd day was found to be associated with the hospital mortality (p=0.019).

Conclusion:
High MPO-DNA levels at 3rd and 7th days of septic shock patients are associated with the degree of organ dysfunction and hospital mortality. The beneficial effects of PMX-DHP may be at least partially due to the inhibition of excessive NETs formation.