Introduction:
Vitamin C (VC) plays an important role as anti-oxidant agent which could not be synthesized in vivo. The lack of VC results in excessive oxidant leading to multiple organ failure. Serum levels of VC radical/DMSO (VCR/DMSO) could be measured using electron spin resonance apparatus. Serum VCR/DMSO is previously reported to mean serum ascorbic acid concentrations [1]. We hypothesized that patients with severe damage may lack in VC. The aim of this study is to measure the serum VC concentrations from patient with severe damage who have admitted to emergency room.

Methods:
One hundred patients who have admitted to emergency and critical care center in Oita University Faculty of Medicine and fifteen healthy volunteers were enrolled in this study after obtaining written informed consent. Serum VCR/DMSO concentrations were measured using electron spin resonance apparatus (JES-FR30, JEOL Ltd, Japan) on and after admission. The results were expressed as average ± SEM. Intergroup comparisons were done using Student’s t-test or Mann-Whitney U Test. A p<0.05 was considered statistically significant.

Results:
Serum levels of VCR/DMSO were significantly lower in admitted patients (n=100, 0.9345±0.0524) compared with healthy volunteers (n=15, 0.2784±0.0143). The details of admitted patients were as follows; trauma (n=69, 0.2979±0.0159), post cardiac arrest syndrome (n=21; 0.2151±0.0272), sepsis (n=2; 0.1229±0.0131), acute respiratory distress syndrome (n=2; 0.3575±0.3089), stroke (n=3; 0.1833±0.0952), poisoning (n=2; 0.2312±0.0600), gastric hemorrhage (n=1; 0.12235). Serum VCR/DMSO levels decreased after admission (day 2; 0.2180±0.0151, day 3; 0.1777±0.0152).

Conclusion:
Serum VCR/DMSO measurements using the ESR spectrometer is clinically very useful to enable real-time monitoring of serum vitamin C concentrations. Our results showed that serum levels of VC were significantly decreased on admission and over time in severe emergency patients.

References: