**Introduction:**
There is an increasing awareness on the consequences of fluid administration in patients leading to the development of methods that evaluate the effects of fluids loading on the cardiocirculatory system. However, most of methods used in the clinical practice investigate the effects of fluids on the cardiac function, instead of investigating those on the determinants of venous return. Besides volume of fluids, the determinants of fluid loading are the blood volume distribution and the availability of vascular bed. In this study we aimed to test non-invasively the effects of fluids administration on the venular compartment in the skeletal muscle. In addition to the mean systemic filling pressure (msfp), we calculated changes in the stressed and unstressed volumes (Vs, Vu) and the venular bed availability.

**Methods:**
We enrolled 10 critically ill patients in our Intensive Care Unit. We assessed volumes and pressures by the Near Infra-Red Spectroscopy on the forearm using graded venous occlusions in steps of 5mmHg from 50 to 0 mmHg. The msfp, Vu and Vs were measured as previously reported(*Microcirculation*. 2014; 21:606–614). The vascular bed availability was measured by changes in the volume recruited from the occlusion maneuvers. All the measures were done at baseline and after a fluid load ranging from 250 to 500 ml. Values were expressed as median and interquartile range. Wilcoxon test was used to compare data and a p< 0.05 was considered as significant.

**Results:**
Vascular bed recruited was 33.6% (22.8–42.2) at baseline and 23.9% (19.0–33.4) after a fluid load (p=0.002). The Vs was 0.5mL (0.3 – 0.7) at baseline and 0.6 mL (0.5–0.9) after fluids (p=0.620). The Vu was 1.9mL (1.7-2.5) at baseline and 2.3mL (2.0-2.4) after fluids (p=0.193).

**Conclusion:**
Following fluid administration the only variable that decreased in all subjects was the vascular bed recruited. This was possibly related to changes in the interstitial pressure due to fluid leakage.