Introduction:
Red blood cell transfusion (RBCT) increases global oxygen delivery (DO$_2$) and may improve microcirculation. However, the effects on blood flow have been found to be conflicting.

Methods:
We studied ICU patients with stable hemodynamic status (mean arterial pressure (MAP) ≥ 65 mmHg for at least 6 hours) and without active bleeding, who received a RBCT. Skin blood flow (SBF) was determined (Periflux System 5000, Perimed, index finger; perfusion unit, PU) together with MAP, heart rate (HR), hemoglobin (Hb), lactate levels and ScvO$_2$ before and after RBCT. SBF was measured before RBCT (T0) and after (T1) for each 3 min. According to previous data indicating the lowest SBF value founded in non-infected ICU patients was 151 PU, all patients were analyzed according to the baseline SBF (i.e. <151 PU - low SBF vs. ≥151 PU – high SBF). The relative change of SBF (ΔSBF) was calculated after RBCT and the responders were defined by the function of >10%.

Results:
63 ICU patients were studied. RBCT was associated with increases in MAP and ScvO$_2$ but no change in SBF. At baseline, ScvO$_2$ was lower in the responders than in the non-responders (p=0.04) and lower in patients with low SBF than in the high SBF (p=0.04). There was no difference in Hb, MAP, and lactate, between the patients with low and high SBF. After RBCT, MAP rose in the responders (p<0.01) and in the non-responders (p=0.03), SBF (p<0.01) rose in patients with low SBF, and SBF (p=0.02) decreased in patients with high SBF. There was a negative correlation between baseline ScvO$_2$ (r= -0.363, p<0.01) or baseline SBF (r= -0.560, p<0.01) and the relative increase in SBF after RBCT.

Conclusion:
RBCT increases skin blood flow only when it is impaired at baseline.