

Category : **Renal: failure**

A157 - Effects of red blood cell transfusions on renal blood flow in critically ill patients with moderate anemia

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Introduction:

The effects of red blood cells (RBC) transfusion on renal circulation are not elucidated yet. The aim of the study is to show the effects of RBC transfusion on renal blood flow, as detected by renal resistivity index (RRI) and renal venous stasis index (RVSI). Moreover, we hypothesized that RBC transfusion could be more significant in patients with higher oxygen extraction rate (O_2ER).

Methods:

Critically ill patients who experienced Hb levels between 7 and 9 g/dL were included in the study. RBC transfusion was decided by physician; in non-transfused patients an equivalent volume of crystalloids (i.e., 250 ml) were given. The peak systolic velocity (V_{max}) and the minimal diastolic velocity (V_{min}) were determined from an interlobar or arcuate artery using a posterolateral approach for kidney ultrasound. The RRI was calculated as $(V_{max} - V_{min})/V_{max}$ and RVSI was calculated as $(\text{cardiac cycle time}/\text{venous flow time})/\text{cardiac cycle time}$. RRI and RVSI were calculated before intervention (T_1) and 2 hours after intervention (T_2) from both kidney and the worst values were used for analysis.

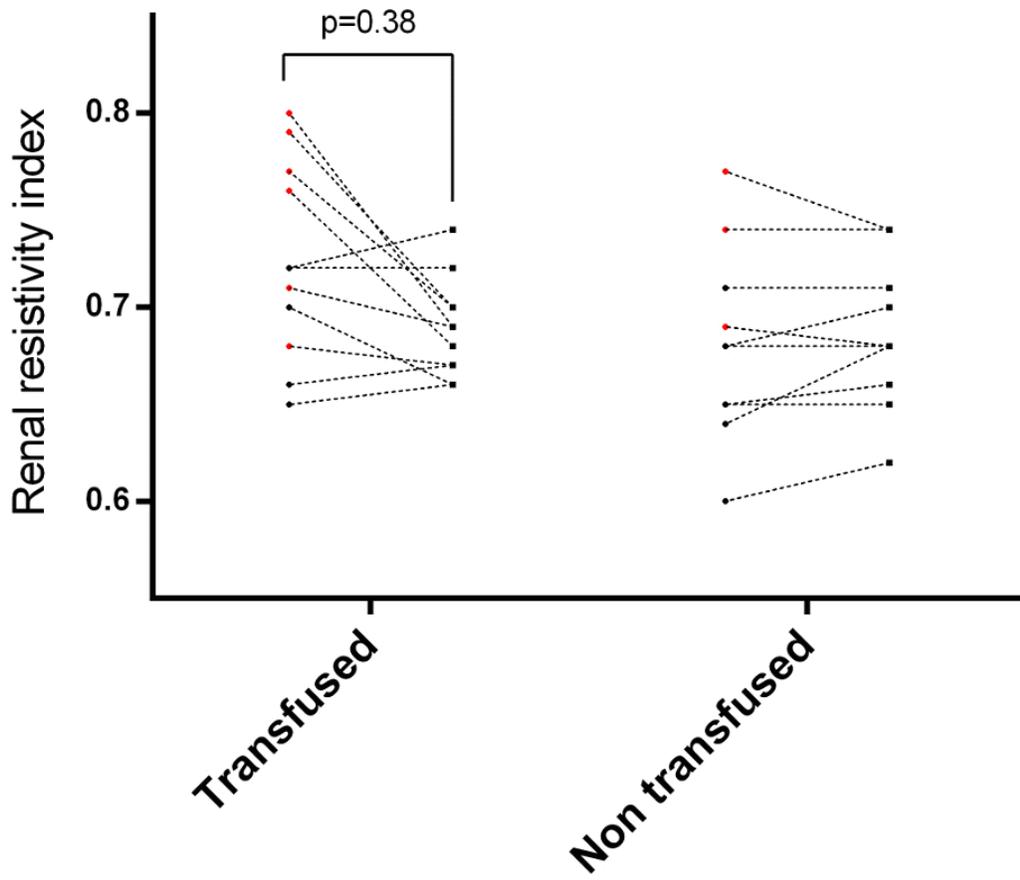
Results:

Twenty-two patients were enrolled in the study. Hb was 8.6 [8-8.7] g/dL and SOFA was 8.5 [5-10]: twelve (55%) were transfused and ten (45%) were not. Median RRI was 0.70 [0.65 – 0.75] at T_1 and 0.68 [0.66 – 0.70] at T_2 ($p=0.39$), while median RSVI was 100 [85 – 100] at T_1 and 100 [94 – 100] at T_2 . From T_1 to T_2 only transfused patients lowered their RRI, from 0.71 [0.66 – 0.76] to 0.68 [0.66 – 0.70], $p=0.38$; in the mixed model analysis RBC transfusion was significantly associated with RRI reduction ($p=0.47$). RSVI did not changed after intervention in both groups. The size of the RBCT effect on RRI was magnified in patients with higher O_2ER ($p=0.01$ for interaction) (Figure 1). AKI occurred in 3/12 transfused patients and 3/10 in non-transfused.

Conclusion:

In patients with moderate anemia RBCT is associated with increased renal blood flow, as detected by RRI. This is particularly evident in patients with higher O_2ER .

Image :



Renal Resistivity Index before and after study intervention. Red points indicate patients with oxygen extraction rate > 30%