

**The effects of passive leg raising may be detected by the plethysmographic oxygen saturation signal in critically ill patients.**

Beurton A(1)(2), Teboul JL(3)(4), Gavelli F(3), Gonzalez FA(3), Giroto V(3), Galarza L(3), Anguel N(3), Richard C(3), Monnet X(3)(4).

Crit Care. 2019 Jan 18;23(1):19. doi: 10.1186/s13054-019-2306-z.

Author information:

(1)Service de réanimation-médecine intensive, Centre Hospitalier Universitaire de Bicêtre, Hôpitaux universitaires Paris-Sud, Assistance publique - Hôpitaux de Paris, 78, rue du Général Leclerc, F-94 270, Le Kremlin-Bicêtre, France.  
alex.beurton@gmail.com.

(2)Inserm UMR S\_999, Université Paris-Sud, Le Kremlin-Bicêtre, France.  
alex.beurton@gmail.com.

(3)Service de réanimation-médecine intensive, Centre Hospitalier Universitaire de Bicêtre, Hôpitaux universitaires Paris-Sud, Assistance publique - Hôpitaux de Paris, 78, rue du Général Leclerc, F-94 270, Le Kremlin-Bicêtre, France.

(4)Inserm UMR S\_999, Université Paris-Sud, Le Kremlin-Bicêtre, France.

**BACKGROUND:** A passive leg raising (PLR) test is positive if the cardiac index (CI) increased by > 10%, but it requires a direct measurement of CI. On the oxygen saturation plethysmographic signal, the perfusion index (PI) is the ratio between the pulsatile and the non-pulsatile portions. We hypothesised that the changes in PI could predict a positive PLR test and thus preload responsiveness in a totally non-invasive way.

**METHODS:** In patients with acute circulatory failure, we measured PI (Radical-7) and CI (PiCCO2) before and during a PLR test and, if decided, before and after volume expansion (500-mL saline).

**RESULTS:** Three patients were excluded because the plethysmography signal was

absent and 3 other ones because it was unstable. Eventually, 72 patients were analysed. In 34 patients with a positive PLR test (increase in CI  $\geq 10\%$ ), CI and PI increased during PLR by  $21 \pm 10\%$  and  $54 \pm 53\%$ , respectively. In the 38 patients with a negative PLR test, PI did not significantly change during PLR. In 26 patients in whom volume expansion was performed, CI and PI increased by  $28 \pm 14\%$  and  $53 \pm 63\%$ , respectively. The correlation between the PI and CI changes for all interventions was significant ( $r = 0.64$ ,  $p < 0.001$ ). During the PLR test, if PI increased by  $> 9\%$ , a positive response of CI ( $\geq 10\%$ ) was diagnosed with a sensitivity of 91 (76-98%) and a specificity of 79 (63-90%) (area under the receiver operating characteristics curve 0.89 (0.80-0.95),  $p < 0.0001$ ).

**CONCLUSION:** An increase in PI during PLR by 9% accurately detects a positive response of the PLR test.