

Cardiopulmonary Recirculation

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Back flow through the vessels that forms a closed circuit between the heart and the lungs (Fig. 1) as distinguished from vascular access recirculation which is back flow through the vascular access itself.

When a saline indicator is introduced into the venous line of vascular access, vascular access recirculation is depicted by the first section (raised or not) of the red arterial dilution curve and CP recirculation is depicted by a second raised section of the arterial flow/dilution curve (see Figs. 3 & 4 below).

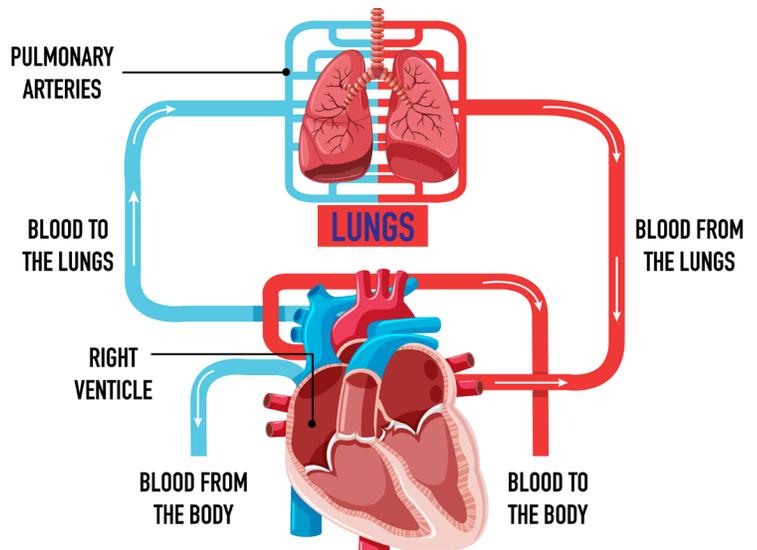


Fig. 1: Cardiopulmonary Circulation: System of blood vessels (pulmonary arteries and veins) that forms a closed circuit between the heart and the lungs, as distinguished from the systemic circulation between the heart and all other body tissues. Reference: https://www.freepik.com/free-vector/diagram-showing-heart-lungs-blood-flow_26161179.htm

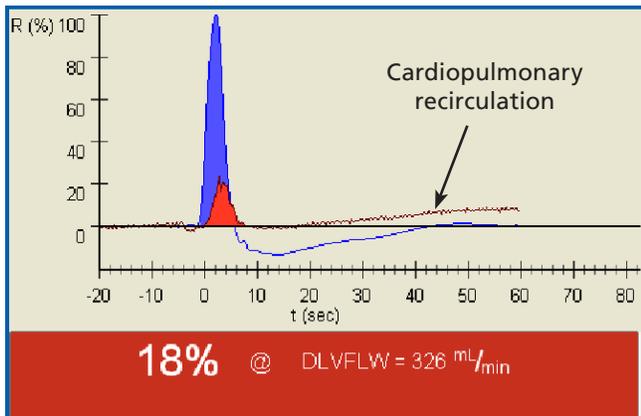


Fig. 2: The blue dilution curve depicts flow as it passes through the venous flow/dilution sensor. It is followed by a red arterial curve that depicts flow passing through the arterial flow/dilution sensor. The ratio of the areas under the curves indicates the percent recirculation, in this instance 18%. The second raised area on the arterial curve represents cardiopulmonary recirculation.

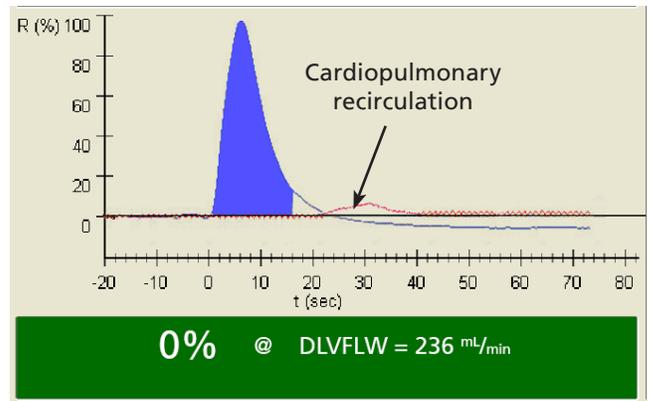


Fig. 3: In this case, the red arterial curve is initially flat indicating 0% recirculation. The raised curve represents cardiopulmonary recirculation.

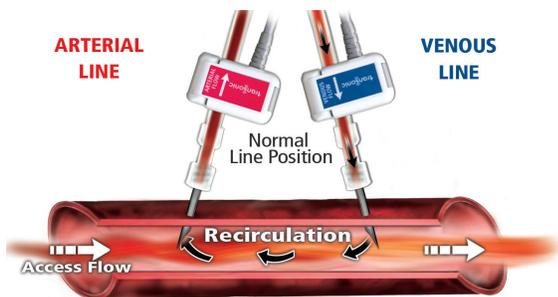


Fig. 4: Recirculation Measurement during Hemodialysis. Saline is introduced into the venous sensor with the dialysis lines in normal position. Access recirculation (back flow) through the vascular access into the arterial needle is measured.

Conclusion

The accuracy and high timing sensitivity of Transonic's Hemodialysis Monitor and Flow/dilution Sensors enable CP recirculation measurement to be separated from vascular access recirculation measurement. Therefore, vascular access recirculation can be measured alone, making 0% recirculation measurement a reality for many HD patients.