

# ELSA Publication Brief: (ELS9679AHKörper)

## Quantification of recirculation as an adjuvant to transthoracic echocardiography for optimization of dual-lumen extracorporeal life support

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### OBJECTIVE

To present three representative cases with which to illustrate the benefits of ultrasound dilution technique to quantify recirculation in addition to transthoracic echocardiography during venovenous extracorporeal life support (VV-ECLS).

### METHOD

- Transthoracic echocardiography images were taken of cannula positioning in three VV-ECLS patients.
- One flow/dilution sensor was placed on the arterial inlet of a double-lumen catheter, the second on the venous outlet of the catheter.
- Recirculation was measured in three patients by a 10 mL saline bolus into the outlet port of the oxygenator. Ultrasound velocity changes were detected by the flow/dilution sensors and were displayed as a dilution curve and percent recirculation.

### RESULTS

- In the first case a 2% recirculation by ultrasound dilution confirmed proper cannula positioning as displayed on the transthoracic echocardiography screen.
- In the second case a 45% recirculation by ultrasound dilution confirmed a suboptimal cannula positioning as displayed on the transthoracic echocardiography screen.
- In the third case, ultrasound dilution registered a 38% recirculation, although the transthoracic echocardiography images showed good positioning of the cannula. The ultrasound dilution recirculation prompted repositioning of the cannula that permitted a decrease in mechanical ventilation and increased arterial saturation.

### CONCLUSION

Cannula migration can cause suboptimal VV-ECLS, but resultant recirculation may remain undetected using transthoracic echocardiography alone. Ultrasound dilution proved to be a valuable tool to monitor dual-lumen cannula position during VV-ECLS. We therefore suggest quantification of recirculation in addition to image guidance to prompt interventions that improve oxygenation and decapneization, and provide optimal VV-ECLS.

### DISCUSSION

Although transesophageal echocardiography can verify cannula positioning during dual-lumen VV-ECLS, recirculation and resultant inadequate lung assist may still occur due to cannula migration. The ultrasound dilution technique's ability to quantify recirculation may be crucial in correctly (re)positioning a double-lumen cannula for maintaining optimal VV-ECLS.

### REFERENCE

Körper EP, Ganushchak YM, Simons AP, Donker DW, Maessen JG, Weerwind PW. "Quantification of recirculation as an adjuvant to transthoracic echocardiography for optimization of dual-lumen extracorporeal life support." *Intensive Care Med.* 2012; 38(5): 906-9.

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