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## **INFLUENCE OF VENOUS RESERVOIR LEVEL ON MICROBUBBLES IN CARDIOPULMONARY BYPASS**

**BACKGROUND:** Patients undergoing open heart surgery may post-operatively suffer from neurological disorders due to microbubbles created during extracorporeal circulation. Venous air is not completely removed in open HardShell Venous Reservoirs. We therefore investigated the relationship between venous reservoir blood level and the amount of microbubbles in different commercially available reservoirs for comparison and determination of safe level.

**METHODS:** An in-vitro flow loop with a heart-lung-machine was used to compare three different reservoirs (Maquet, Sorin and Medtronic) at different levels. Microbubbles were measured after the reservoir and after the arterial filter with a GAMPT BCC200 detector.

**RESULTS:** Microbubble count and volume were significantly higher with decreasing reservoir level ( $p=0.014$ ), but not as much as earlier studies have shown. Reducing the level from 1000ml to 250ml resulted in a 12.4% increase in bubble volume after the reservoir, and 40.2% after the arterial-filter. There was an almost linear trend towards more bubble volume with decreasing reservoir level ( $R^2=0.98-0.83$ ).

There was a significant difference in microbubbles between the 3 tested reservoirs, up to 32.6%,  $p<0.001$  measured after reservoir. Bubble volume from the Sorin reservoir was markedly lower after arterial filter, than the Medtronic and Maquet reservoirs (up to 60 times  $P<0,001$ ).

**CONCLUSIONS:** A lower reservoir level results in a moderate rise in microbubbles passing the reservoir. The minimum levels recommended by the manufacturers are safe. There was a significant difference in bubbles between the different reservoirs, especially after the arterial filter.