Measurement of gaseous micro emboli in the prime before initiating cardiopulmonary bypass

Inger Marie Husebråten.  
1xxxx (NO).

The use of cardiopulmonary bypass (CPB) is associated with risk of neurocognitive deficit caused by gaseous micro emboli (GME). Flushing the empty CPB circuit with carbon dioxide (CO2), which is more soluble than air, may reduce the amount of GME in the priming solution.

Method: We have measured the amount of GME in twenty circuits before initiating CPB. Ten circuits were flushed with CO2, and ten circuits were not flushed and contained room air. The duration of flushing with CO2 was 20 minutes. The concentration of CO2 was measured at three different places to ensure a high content in the whole circuit. Priming solution was crystalloid in both groups, and flow rate during recirculation was set to 3L/min. The GME was measured minute by minute for 20 minutes with the Gampt® BCC200 bubble counter.

Results: The median numbers of GME were highest during the first minute, with a median value of 397.5 (245/772) (25/75 percentiles) in the group flushed with CO2 versus 1900 (1742/2477) counts in the non-flushed group (p<0.05). In the 20th minute the median values of GME were 0.5 (0.375/2.75) and 10.75 (4.125/18.625) in the flushed and non-flushed groups, respectively (p<0.023). The micro embolic count in the CO2-flushed group remained lower than in the non-flushed group when tested throughout the whole measuring period.

Conclusion: Flushing the bypass circuits with CO2 before priming decreased the number of GME in the fluid significantly (p<0.05).

Keywords: Gaseous micro emboli; GME; CO2 flushing; priming; carbon dioxide; bubbles; extracorporeal circulation