Gaseous Micro-Emboli Removal during priming procedure using pulsatile flow with 4 different adult oxygenators with integrated arterial filter and open reservoir.

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The normal physiological way our heart pumps blood throughout our body is using Pulsatile Flow.
Tests *in vitro*: one of each type of oxygenator to know their limits with Pulsatile Flow

Optimal setting for PF with S5 = 45/75/35

Recorded pressures:
4 negative peaks/10sec
Pulsatile Flow during CPB
   => High velocity
   => High amounts of energy
   => Some negative pressures

=> ECC circuit must be stressed before CPB during priming procedure
   => Protection against
      Fluid leakage
      Rupture of the membrane
      Abnormal appearance of air in the circuit
Priming protocol:

- 2 Liters of Plasmalyte A
- 37°C
- 200mmHg
- Dynamic occlusivity
- Continuous flow (CF) - 2 min (Gampt)
- Pulsatile flow (PF) - 2 min (Gampt)
Roller pumps Stöckert S5 - Liva Nova
10 Priming procedures/ oxygenator
4 modern adult oxygenators:

Affinity Fusion® - Medtronic n = 10
Capiox FX25® - Terumo n = 10
Inspire 8F® - Liva Nova n = 10
Quadrox i® - Maquet n = 10
The Gampt BCC200:
Data recorded by the Gampt BCC200:

QF
NumRed %
VolRed%
Number
Volume
GME reduction by oxygenator and flow mode

Comparison between oxygenators: $p$-value < 0.001 for all variables

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GME number and volume by oxygenator and flow mode

**Number IN**
- Continuous: 2080, 7.5, 42, 20.5, 65.5, 92, 47
- Pulsatile: 0, 0.2, 0.4, 0.6, 0.8

**Volume IN**
- Continuous: 0.03, 0.23, 0.05, 0.02, 0.13, 0.18, 0.08
- Pulsatile: 0, 0.03, 0.05, 0.02, 0.04, 0.02, 0.05

**Number OUT**
- Continuous: 51.5, 4.5, 0, 1, 10, 0
- Pulsatile: 0, 0.01, 0, 0.02, 0.02, 0

**Volume OUT**
- Continuous: 0, 0.02, 0, 0.05
- Pulsatile: 0, 0.02, 0.02, 0

Legend:
- Quadrox i n=10
- Inspire 8F n=10
- Terumo FX25 n=10
- Fusion Affinity n=10

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GME volume downstream oxygenator

- Continuous flow
- Pulsatile flow

µL

- Quadrox i n=10
- Inspire 8F n=10
- Terumo FX25 n=10
- Fusion Affinity n=10

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Conclusion:

\textit{In vitro} \neq \textit{In vivo}

Venous reservoir: the more sensitive piece of the circuit?
Gampt: built to be used with continuous flow

$\Rightarrow$ Prospective and randomized study:
to show the airhandling of 5 oxygenators during CPB
comparing continuous and pulsatile flow
Thank you for your attention!