CARDIOLOGY 2024

EUROSET: CHOP EXPERIENCE

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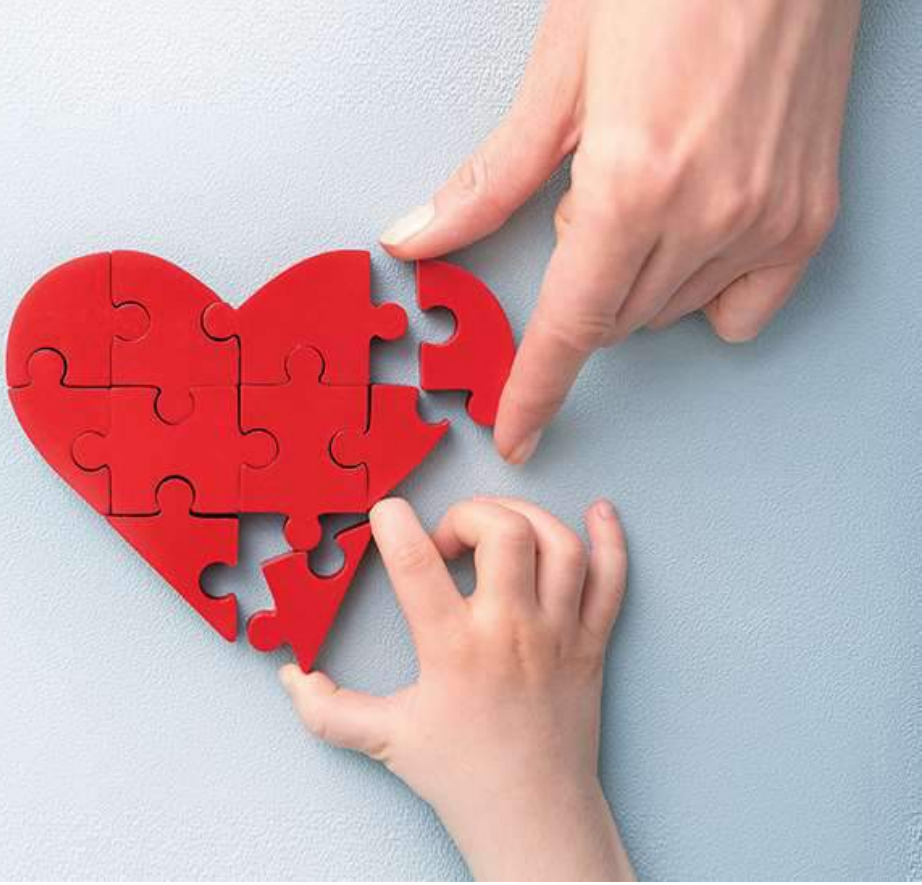


Children's Hospital of Philadelphia
Cardiac Center


NEW IS ALWAYS
BETTER

EVOLUTION OF THE ECMO CIRCUIT

- Need for change
  - Adequate drainage/flow
  - Clot formation
  - Patient care
- Better-Bladder/Compliance Chamber
- Roller pump vs Centrifugal pump
- Oxygenators

EVOLUTION OF THE ECMO CIRCUIT

Recently changed oxygenators

- Sometimes change is forced!
- COVID production issues
- Items discontinued

EVOLUTION OF THE ECMO CIRCUIT

- Need for change
  - Adequate drainage/flow
  - Clot formation
  - Patient care
- ~~Better Bladder/Compliance Chamber~~
- Roller pump vs Centrifugal pump
- Oxygenators
  - What's available this week???

CHANGES DUE TO LOSS OF BETTER BLADDER

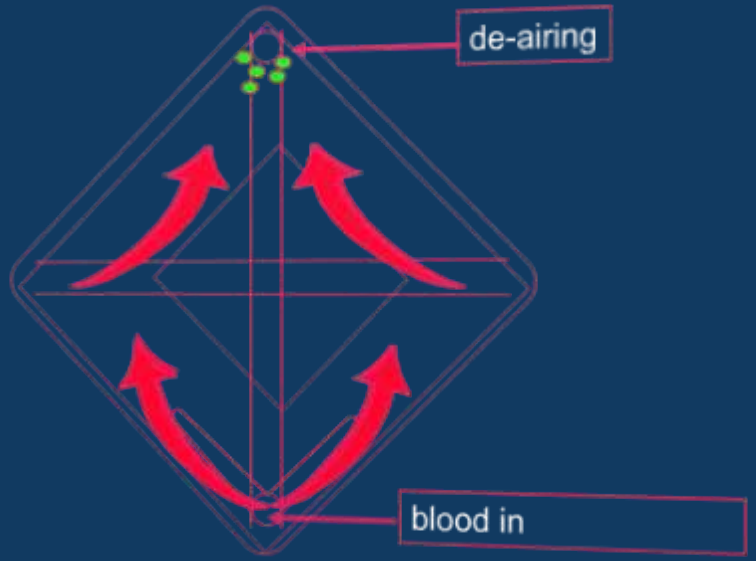
- 3/8” piece of tubing added to place where bladder was
    - Roller pump still needs a vessel of compliance!
- Roller circuit now only used up to 8 kg
    - Previously used up to 13 kg
- Constant open bridge with more flow through entire circuit
    - We did this for both the loss of the bladder and change in Oxygenator

EVOLUTION OF THE ECMO CIRCUIT

- 2008 Maquet Quadrox-iD
  - Polymethylpentene
  - Pediatric and Adult
- Low pressure drop
- Decrease surface area
- Standard of practice

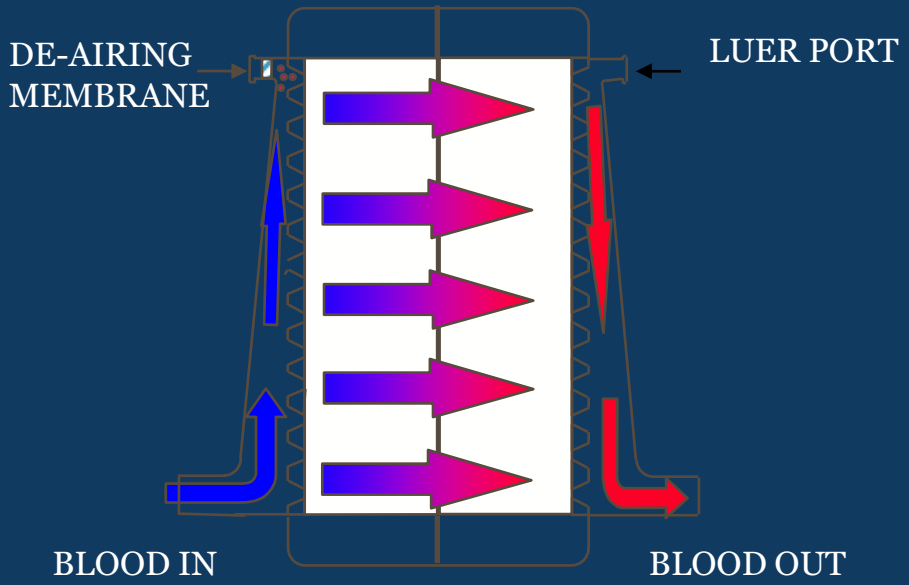
OXYGENATORS: QUADROX BLOOD FLOW

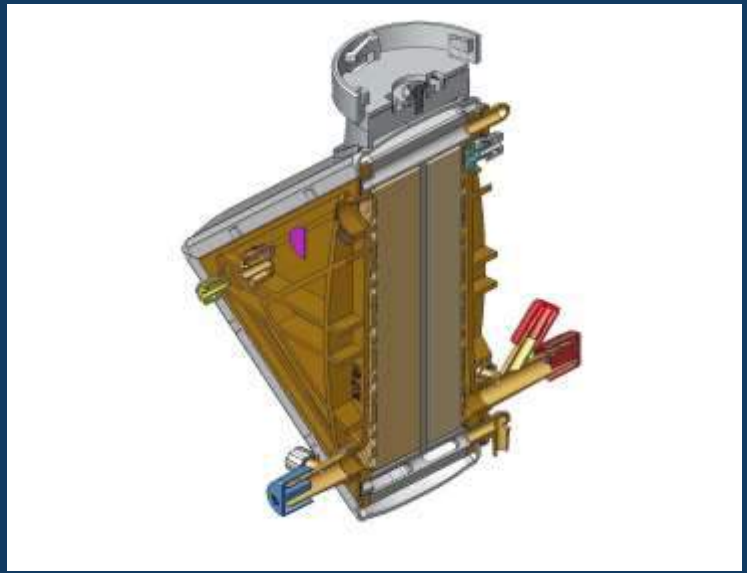
Front view of Maquet QUADROX



OXYGENATORS: QUADROX

QUADROX® - OXYGENATION PRINCIPLE

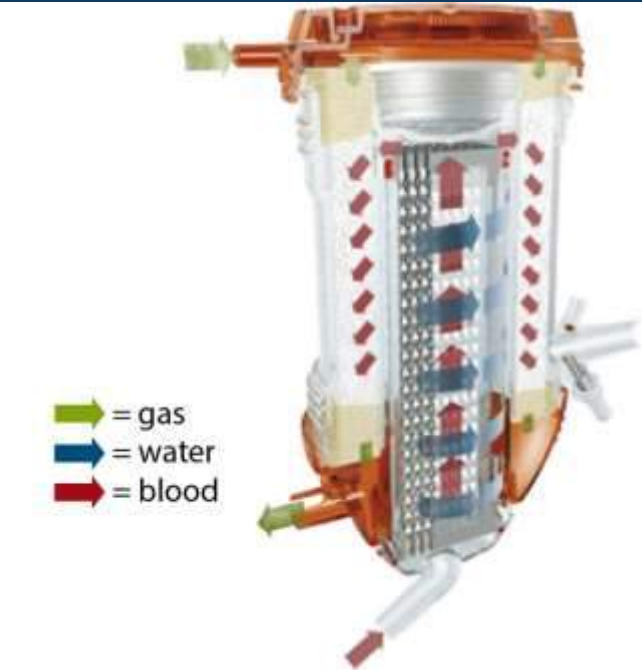




ABBOTT OXYGENATOR

Technical Specifications			
	AMG PMP Adult Oxygenator	AMG PMP Pediatric Oxygenator	AMG PMP Infant Oxygenator
Maximum Blood Flow Rate	7 L/min	4 L/min	1.5 L/min
Priming Volume	220 mL	190 mL	90 mL
Residual Blood Volume	< 200 mL	100 mL	41 mL
Membrane Surface Area	1.81 m^2	1.35m^2	0.69m^2
Heat Exchanger Surface Area	0.08 m^2	0.08m^2	0.04m^2
Heat Exchanger Performance Factor	0.64 at 4 L/min	0.64 at 4 L/min	0.77 at 1.5 L/min
Max Gas Pressure	0.14 PSI (7 mmHg)	0.14 PSI (7 mmHg)	0.07 PSI (3.5 mmHg)
Venous Inlet and Arterial Outlet	3/8" barbed connectors	3/8" barbed connectors	1/4" barbed connectors
Membrane Material	PMP with PC coating		
Heat Exchanger Type	Stainless steel		
Max Water Pressure	29 PSI (1,500 mmHg)		
Max Blood Pressure	14.5 PSI (750 mmHg)		
Water Inlet and Outlet	1/2" Hansen® quick couplings		
Gas Inlet	1/4"		

EUROSET FLOW PATH



ABBOTT PEDIATRIC EUROSET VS QUADROX-I PEDIATRIC

	Quadrox-I Pediatric	AMG PMP Pediatric Oxygenator
Maximum Blood Flow Rate	2.8 LPM	4 LPM
Priming Volume	81 mL	190 mL
Membrane Surface Area	0.8 m^2	1.35 m^2
Heat Exchanger Surface Area	0.15 m^2	0.08 m^2
Venous Inlet and Arterial outlet connector size	¼"	3/8”
Membrane Material	Polymethylpentene (PMP) +/- Bioline coating	Polymethylpentene (PMP) with PC coating
Heat Exchanger type	Polyurethane (TPU)	Stainless Steel
Pressure drop average	10-18 mmHg	15-25 mmHg
Average Gas Flow : Blood Flow Ratio	0.9:1	0.8:1

PATIENT EXPERIENCE

- 31 Total Euroset Runs (Through 2/1/24)
  - 7 with 3/8” tubing Better-Bladder
  - 23 with 3/8” tubing replacing the Better-Bladder
  - 1 with Spectrum centrifugal ECMO circuit
- Average Weight of Patients: 4.7 kg
  - Target flows 120-150 kg
    - Euroset rated up to 4 LPM!
- Average Run Length: 8.5 Days
- Oxygenator Changeouts: 7 (6 Patients)

OXYGENATOR CHANGEOUTS

6 total patients received oxygenator changeouts

1) 6.2 kg pt ECPR s/p OHT
   - Day 3 emergent oxygenator changeout from Euroset to Quadrox
   - Day 4 emergent oxygenator changeout back to Euroset
   - Day 5 emergent oxygenator changeout back to Quadrox
   - Day 6 successful decannulation
   - Minimal heparin used during this run
2) 4 kg pt circuit electively changed post CPB for shunt revision
3) 4.5 kg pt s/p ASO
   - Circuit emergently changed at 42 hour mark of run
   - No anticoagulation due to bleeding
   - Flow was 120-135 ml/kg

OXYGENATOR CHANGEOUTS

6 total patients received oxygenator changeouts

4) 4.7 kg pt s/p CPB
   - Oxygenator changed at 48 hour mark
   - No Heparin
5) 4.5 kg TOF/AVSD patient
   - Circuit electively changed on day 4 during sternal chest closure
6) 3.0 kg HLHS s/p CPB
   - Circuit changed at 54 hour mark
   - No Heparin

CONCLUSIONS

- “It is a safe and acceptable replacement for the Quadrox”
- No anticoagulation changes were made for the ECMO Circuit changes
- Many changes were made in the past two years leading to difficulty truly comparing oxygenators
- Sweep and FiO2 stayed with 10% between oxygenators
- We’re excited for the next chapter and believe that the spectrum pump will help us further evaluate and compare the two oxygenators!!

QUESTIONS?