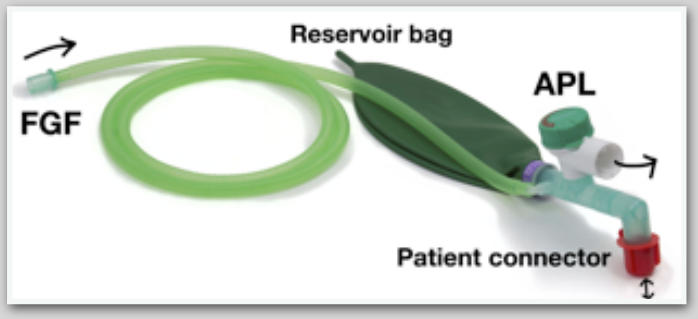
ACCU KIT OF THE WEEK

THE ROYAL LONDON HOSPITAL

Mapleson C Circuit

Ciaran Megoran/ JM April 2021



What?

Often called a Waters' circuit (Technically needs a soda lime canister to be this though…)

Breathing systems that need a fresh gas flow to wash out CO2 have various arrangements. These were classified by Mapleson, and we frequently use the simple and lightweight Mapleson C on adult ICU.

What are its uses on ACCU?

-Resuscitation (oxygenation and manual ventilation- 'bagging')
-Bagging to determine "feel" of the lungs
-Recruitment of the lungs (although this is potentially dangerous as uncontrolled pressures can be delivered- aim to use the ventilator instead if indicated)
-During airway emergencies to allow visual assessment of tidal volume and manual ventilation

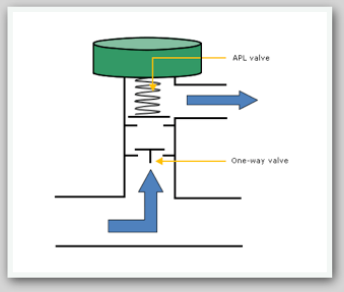
What are its components?

-Fresh Gas Flow inlet
-Reservoir bag
-Tubing
-Adjustable Pressure Limiting (APL) Valve
-Patient connector

How does it work?

- It can be connected to an ETT or to a facemask
- A compact, semi-open system
- Requires fresh gas flow (FGF) to ventilate
- Flow rate must be >2x minute volume ventilation to avoid re-breathing
- **Inspiration:** Fresh gas flow and expired gas in system is delivered to patient
- **Expiration:** Expired gas fills circuit and reservoir bag. Then vents through APL valve once APL pressure reached

What does an APL valve do?
-One-way exhaust valve
-A mechanism to enable adjustable positive pressure ventilation using a reservoir bag
-As a safety blow-off valve in the breathing system



What does the reservoir bag do?
-Provides a source of gas during peak inspiration (where flow rates may be 30-40 L/min)
-An visual indicator of spontaneous ventilation
-Allows for positive pressure ventilation by squeezing the bag

Limitations?

-Rebreathing is inevitable in spontaneously ventilating patients, unless fresh gas flow >2x minute volume
-It is inefficient- fresh gas flow not delivered to patient vents via APL valve

-Even with high fresh gas flows CO2 accumulates
-Hypoventilation from an inadequate seal
-Pneumothorax from bagging
-Gastric distension (which may lead to)
-Pulmonary aspiration

When to use the BVM?

Bag Valve Masks are in the emergency bag at the end of every bed. They are used to provide positive pressure ventilation when resuscitating an apnoeic patient. It is very difficult to breathe against the valve so a BVM should not be used in a spontaneously ventilating patient.
-They can't provide PEEP unless a separate PEEP valve is applied
- A major benefit is that a BVM doesn't need a fresh gas supply in order for the bag to fill. This means you can ventilate your patient with room air if needed.