The Royal Melbourne Hospital

Perfusion Protocol - Pump failure

○ *Aetiology*

1. Electrical or Mechanical failure
2. Runaway pump

○ *Prevention*

1. Availability of backup equipment
2. Frequent servicing of equipment
3. Battery backup

The Stockert S5 Heart-lung machine's UPS can bridge a power failure up to 130 minutes (20 minutes at full load)

○ *Cause:*

1. Internal mechanical or electrical malfunction
2. Internal overload tripped due to over occlusion
3. Total OR power failure

○ *Management*

Open, closed-loop communication with the surgeon and the perfusionist is essential for identifying correctable factors that can have an impact on failure to wean.
Secondary personnel should always be nearby to obtain backup equipment and assist in emergency.

Power loss can be to the entire heart-lung unit or be localized to individual components of the heart-lung unit.

The patient should be maintained in one of the following states

a) Normothermic with cardiac output and ventilation
b) Enough volume in patient to enable internal cardiac massage and ventilation
c) Deep hypothermic arrest

1) If main pump stops — isolate source of stoppage

Immediately clamp venous line to prevent patient exsanguination in an arterial pump failure.

a) Begin Hand cranking in the correct direction at appropriate RPMs before removing venous line clamp and maintain SvO_2 > 60%;
b) Monitor flow with a spectrum flow meter.
c) Turn off pump on console switch, wait 60 seconds and reboot the pump
d) Stop hand cranking and start the pump.

e) If the pump does not reboot go through steps a) and b) again. If it still will not reboot replace the pump with a Stockert roller pump.

There is a backup roller pump available in the perfusion room to replace ancillary roller pump.

2) Total mains AC failure

a) The heart lung machine will run on power supplied by the UPS battery backup unit. In order to minimise power usage, switch off any ancillary devices using this power supply. These may include :Vent and Soft suction (when not in use)
b) If still loss of power supply and no battery backup, Begin Hand cranking in the correct direction at appropriate RPMs before removing venous line clamp and maintain SvO_2 > 60%;
c) Use torch to monitor venous reservoir level
If total mains AC failure, air compressor will be off

I. Disconnect gas line from blender and reconnect to O_2 out
II. Automatic takeover of emergency generator should occur within 5 sec

Urgently contact maintenance engineers (dial: 9342 7680)

1. If speed controller failure occurs, the pump may not respond to speed control knob and even ‘runaway’ at maximum RPMs.
    a. Turn off power to pump immediately.
    b. Begin hand cranking. Replace with backup unit.