

Measurement to Prevent Recurrence of Air Embolism Accidents from Selective Cerebral Perfusion

【Risk of drawing air from the oxygenator】

There are several methods of selective cerebral perfusion, but when roller pump is used as the arterial pump, especially in the case of antegrade cerebral perfusion, if the cerebral pump flow rate is higher than the arterial pump flow rate (arterial pump flow < cerebral pump flow), negative pressure on the membrane of the oxygenator can cause problem of drawing air.



Countermeasures

There are number of measures that can be taken, and each facility should take all possible measures. Three methods and other means are given here for reference. Please refer to the circuit drawings.

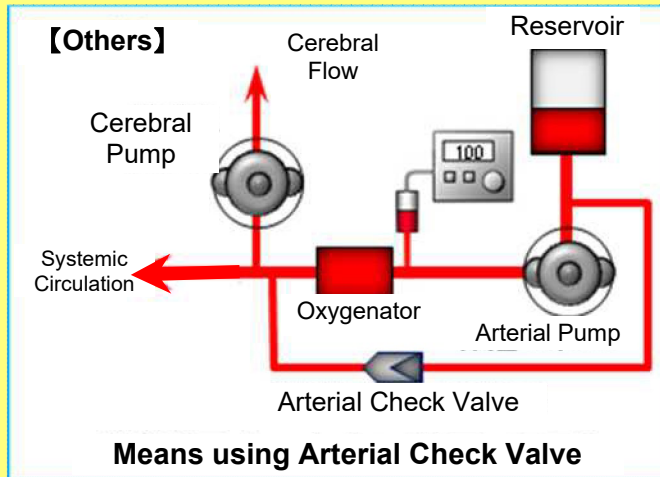
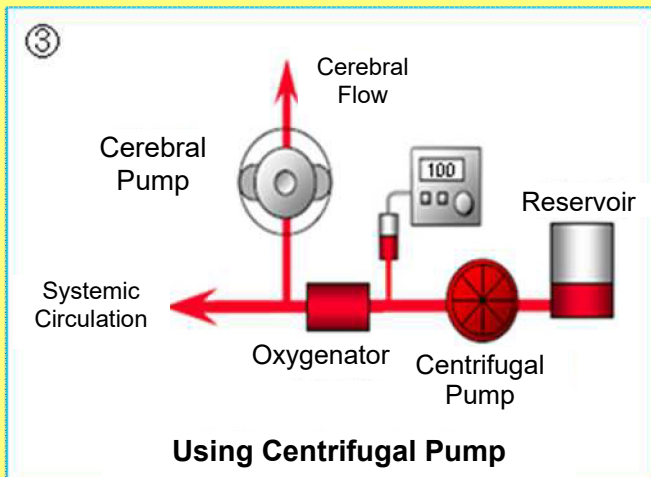
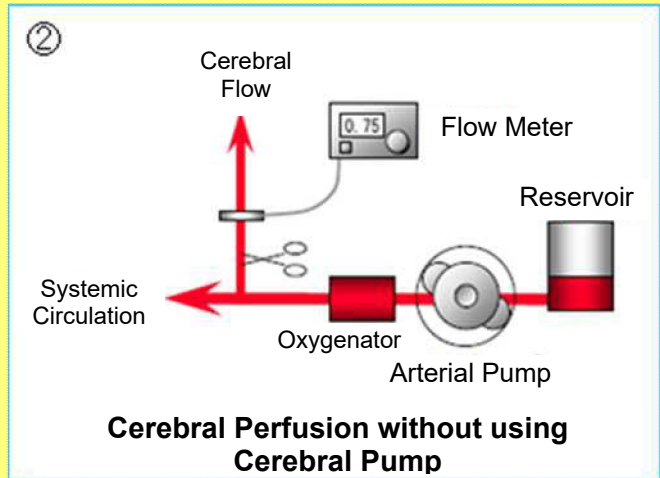
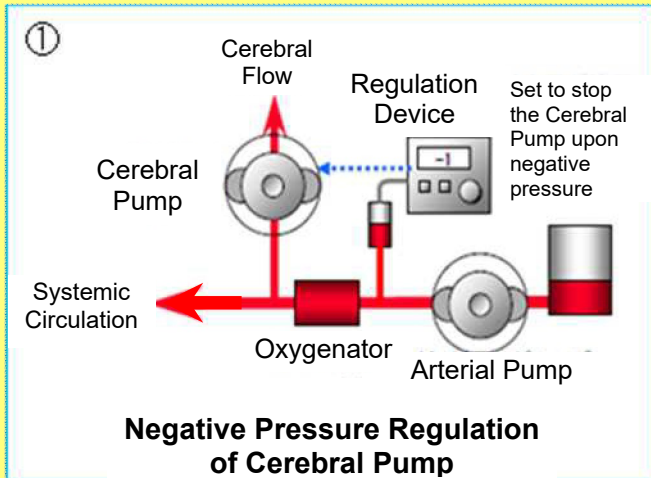
- ① Set a negative pressure regulation to the cerebral pump:
Set a pressure monitor between the arterial pump and the oxygenator. When setting, set the cerebral pump to stop when the arterial pressure becomes negative. In addition, if the system is equipped with a safety mechanism that stops the cerebral pump in conjunction with the stopping of the arterial pump, it should be used.
- ② Selective perfusion – If cerebral pump is not used, a flow meter should be installed in the cerebral perfusion line to constantly monitor the blood flow.
- ③ If a centrifugal pump is used the arterial pump, display the pressure as in ① and maintain the pump speed at which positive pressure is achieved.

* Other means:

- Installing a bypass circuit including an arterial check valve from just below the reservoir outlet to the blood outlet of the oxygenator
- Gravity-driven method:

Cerebral perfusion is performed by gravity force between the patient and the reservoir placed above. Perfusion pressure depends on the hydrostatic pressure of the gravity and is a method of maintaining constant pressure. A flow meter is required for flow management.

Measures to prevent negative pressure in oxygenator [Circuit Drawings]



The points noted in this issue are also important when performing blood cardioplegia. Before using a new system, be sure to inform the surgeon and take safety measures such as simulator training and revision of the manual.