Air Embolism from Cardioplegia Delivery Circuit

【Air embolism from cardioplegia delivery circuit】

Trouble of sending air from the cardioplegia delivery circuit during its delivery can be fatal, just like sending air from systemic blood flow or selective cerebral perfusion. Below would be the points to keep in mind and measures to prevent these problems from occurring.

【Points to note】

Air entry to the cardioplegia delivery circuit

① Running out of cardioplegia solution can easily cause air to enter the circuit by a simple mistake. Cardioplegia solution level should always be monitored. Note that even when using a spike in a plastic bottle of cardioplegia solution, air in the bottle may be mistakenly sent.

② When negative pressure is applied to the oxygenator, drawing of air occurs with Blood Cardioplegia, just like in selective cerebral perfusion. Attention should be paid to the pressure in the circuit before and after the oxygenator.

③ When the cardioplegia delivery is stopped, check each connection of the circuit and the three-way stopcock of the purge line for possible air entry due to loosening of the stopcock.

If in case air is sent by mistake

① Stop the cardioplegia pump immediately and eliminate the air from the circuit.
② Deliver cardioplegia again to remove the air in the coronary artery and actively eliminate the air delivered.
If the delivery was antegrade, switch to retrograde.
If the delivery was retrograde, switch to antegrade.

Countermeasures

Installation of bubble detectors in cardioplegia delivery circuits is also strongly recommended in JaSECT's Installation Standards of Safety Device. The preferred location is at the last line to the patient after the heat exchanger. (It is possible that not only the running out of the cardioplegia solution, but air can also be introduced from loosened or damaged connection, or from drawing air due to negative pressure.) If there is a function that stops the pump in conjunction with the audible alarm when bubbles are detected, it will be safer to turn the function ON. In addition, the use of bubble trap or arterial line filter is also effective, as in the case of cardiopulmonary bypass circuits. Storing cardioplegia solution in a soft reservoir bag can also prevent air delivery.

To be able to respond quickly to cardioplegia related problems, it is important to conduct troubleshooting training on a regular basis.