

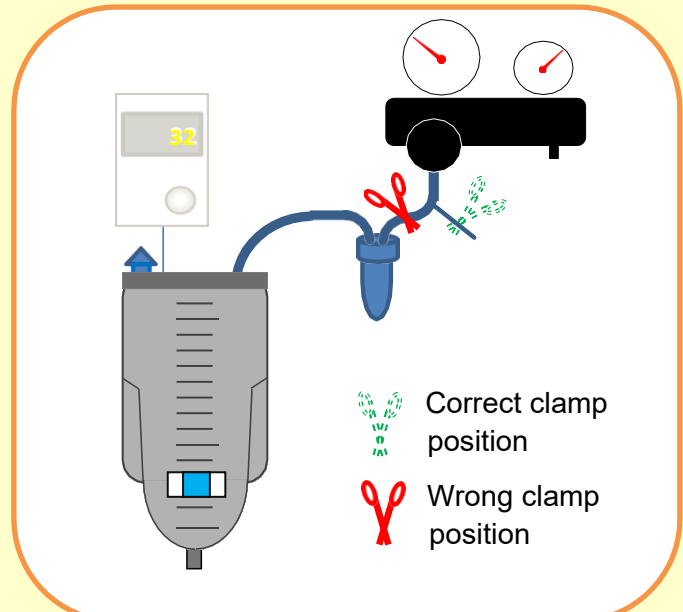
## Notes on Using VAVD Devices

There was a case of an emergency stop of cardiopulmonary bypass due to mishandling during extracorporeal circulation using Vacuum-Assisted Venous Drainage (VAVD). Please reconfirm the safety measures.



### 【Case】

A venous reservoir with a positive pressure relief valve was used, and normal open system extracorporeal circulation was initiated. Then, to increase the venous return flow, a clamp was applied to the vacuum-assist line to start VAVD, but the blood volume in the reservoir continued to decrease. The perfusionist determined that the position of the venous cannula was inadequate and asked the surgeon to check its distal position, but the situation did not change. As the venous flow continued to decrease, it was determined that cardiopulmonary bypass cannot be continued, and the bypass was stopped. The cause of the problem was immediately determined, and the cardiopulmonary bypass was resumed. The surgery was completed without problems.



Clamp position on the vacuum-assist line in the reported case



### 【Cause of the occurrence】

- ① Negative pressure was not applied to the venous reservoir due to incorrect clamping of the vacuum-assist line.
- ② Failure to monitor the pressure in the venous reservoir led to the failure to confirm that pressure in the venous reservoir was positive.

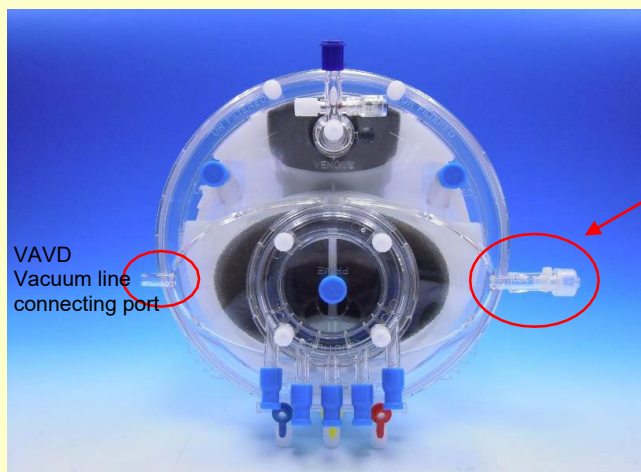


## Countermeasures

- ① The Joint Review Committee of Three Japanese Societies\* for Vacuum-Assisted Venous Drainage Extracorporeal Circulation recommends that the following four points should be observed when implementing extracorporeal circulation with vacuum-assisted venous drainage:

1. **Attach a moisture trap to the vacuum-assist line instead of a gas filter.**
2. **Use a new, sterile vacuum-assist line circuit every time.**
3. **Install a pressure monitor with a positive pressure alarm and a positive pressure relief valve to the venous reservoir.**
4. **Use a dedicated vacuum regulator that can be fine-tuned when implementing VAVD.**

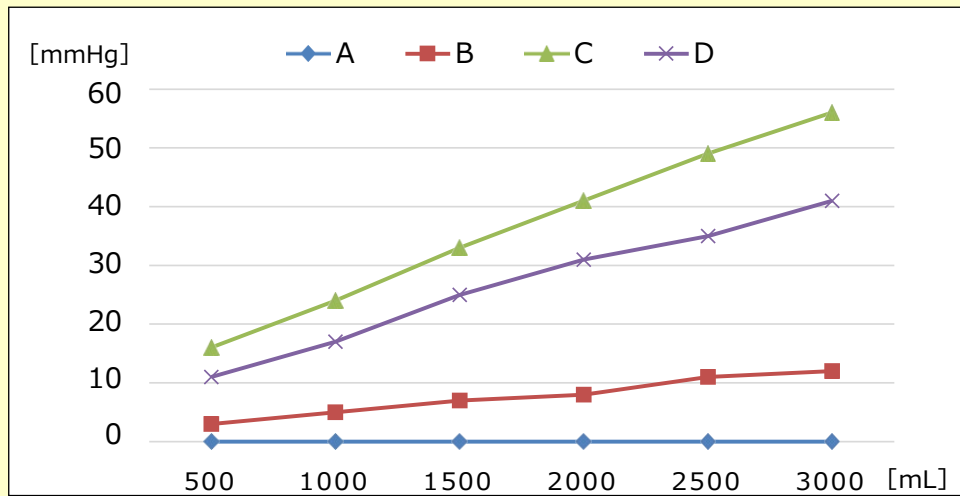
- ② Take measures such as placing a marking tape on the position of the atmosphere vent line of the vacuum-assist line where the clamp should be applied.
- ③ When using a venous reservoir that does not have a built-in positive pressure relief valve, attach a positive pressure relief valve manufactured exclusively for the venous reservoir by the manufacturer to the designed location. In that case, understand the characteristics of the positive pressure relief valve before use.
- ④ Please ensure at each facility to be familiar with the basic operation methods (procedure) for implementing VAVD and conduct trouble simulations.



Positive Pressure Relief  
Valve

**【Reference material】**

- The pressure at which positive pressure relief valve opens differs depending on the venous reservoirs even with built-in positive pressure relief valves.



Change in internal pressure of various device with respect to suction flow rate  
(Release pressure for the positive pressure relief valve)  
(Survey result by JaSECT Safety Committee, 2017)

\* The Three Japanese Societies are formed by; The Japanese Association for Thoracic Surgery, The Japanese Society for Cardiovascular Surgery, and the Japanese Society for Artificial Organs.