



IF Protocol for testing shunt valves

- The shunt is opened on the sterile back table prior to incision. A blunt needle is inserted into the proximal tubing entering the valve. The valve is flushed with sterile antibiotic irrigation (saline/gentamicin solution). After flushing and replacing the air in the valve with fluid, a length of IV administration tubing (20 cm or so and open-ended) is plugged into the blunt needle after filling the tubing with the same solution. The IV tubing is held vertically and the valve is placed horizontal on the table. The column of fluid in the IV tubing is allowed to run down through the valve and the attached distal shunt tubing until it stops. The height of the fluid column in the IV tubing when the flow stops is the closing pressure of the valve. For a medium pressure valve, the height of the column (closing pressure) should be somewhere between 4 and 10 cm. If the flow is very sluggish at higher pressures or the closing pressure is above 10 cm, then the valve is not good. However, if the closing pressure is high or the flow sluggish, I do not immediately discard the valve. Flush it again a couple of more times. This usually "loosens it up" so as to achieve proper function. The rate of valves that need to be discarded is normally low - perhaps 5%.
- Another important point is to cut off the distal slit valves from the end of the distal shunt tubing prior to testing the valve or placing the shunt. It has been demonstrated very well that the presence of these distal slits increases the likelihood of a distal shunt malfunction. A simple open-ended tube performs better.
- Finally, any valve will block if the CSF has very high protein or is bloody. If a shunt is placed in a child with post-infectious or post-hemorrhagic hydrocephalus, the character of the fluid may predispose the valve to failure. Also, a common cause of shunt malfunction is post-operative infection.

Dr Benjamin Warf
Medical Consultant IF
Paediatric Neurosurgeon, ABNS, ABPNS