EXTERNAL VENTRICULAR DRAINAGE

SURGICAL TECHNIQUE

DE-104, DE-105 et DE-106
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CATHETER INSERTION
Patient is placed in supine position.
For a frontal ventriculostomy, the Kocher’s point is identified, located about 2 cm lateral to the midline and 2 cm anterior to the coronal suture. Anatomical landmarks are taken with the ruler and the sterile marker.
Shave the head of the patient. Sterilize the skull and drape the patient.
An incision of about one centimeter is made down to the bone.
INCISION

Make sure the bony plate is well exposed and perform hemostasis on the wound edges.
Perforation is performed through the internal and external skull plates. After crossing the internal plate, the drill bit is withdrawn, and the hole is irrigated with sterile normal saline.
PERFORATION
The dura can be punctured with a lumbar needle tip.
Ventricular catheter with pre-inserted stylet is taken.
Held by its pre-inserted stylet the catheter is implanted in the direction of the ventricle.
To get to the ventricle, catheter is guided in the direction of inner canthus of the opposite eye.
After the catheter has been advanced about 5-6 cm, adequate flow of CSF is typically obtained. Caution is exercised not to place the catheter too deeply.
Once the catheter is properly positioned in the ventricle, stylet is removed while holding the catheter in place. Its positioning can be checked by the flow of CSF and a first sample can be taken.
OVERVIEW
Trocar is inserted in catheter.
The tunneling trocar is inserted between the scalp and the skull from the burr hole towards the emergence site.
Catheter is pulled out of the tunnel, taking care of maintaining it in place in the ventricle.
The ventricular catheter length is adjusted.
CATHETER CONNECTION
Luer connector is inserted into the catheter and sutured to the catheter. Care should be taken to allow only a minimal amount of CSF to leak.
Tubing cap is removed from the drainage bag.
Drainage bag tubing is connected to the Luer connector.
Position of the catheter is secured with a suture wing right next to the emergence site. Additional sutures on the tubing will secure further the positioning of the catheter.
Check the permeability of the system
Head of the patient is carefully bandaged. The dressing is to be redone every 4 days unless soiled or detached.

*N.B : 3-way stopcock need to be accessible.*
3. ADJUSTEMENTS AND MONITORING
The height of the top of the drip chamber on the drainage bag compared to auditory meatus of the patient (level 0) will determine the drainage flow: the higher the chamber, the lower the flow. Drip chamber position is adjusted thanks to the cord, according to the neurosurgeon prescription.
Once everything is settled, clamp is opened to initiate drainage.
For patient transportation, the clamp on the tubing must be closed.

N.B. In a general manner, use of clamp to initiate / stop drainage helps preventing infections compared to the manipulation of 3-way stopcocks!
Close and regular Monitoring. Especially the amount of drained CSF.

- Check the permeability of the system.
- Zeroing at the tragus of the ear.
- Medical prescription of the height.

Monitoring the appearance of the CSF: watery, haemorrhagic, cloudy, purulent

- Monitoring of ICP: clamp the EVD
ICP MONITORING

An electronic pressure monitoring system may be attached to the transducer adapter on the patient’s line (at the 3-way stopcock).

The system should be mounted in such a way that the main stopcock is at the level of the foramen of Monroe.
Take a look at real life implantation!

Automated drill
External Ventricular Drain insertion

Handrill and catheter fixation
How to place an external ventricular drain (aka: ventriculostomy)
ED removal

First, wean the patient off the ED by clamping the system. It is necessary to check before ablation if:

- Conscious patient, no intracranial hypertension
- Level up by 5cm/24h
- Clamping after 24h well tolerated at +20cmH2O
- Control CT scan after 48h of clamping.

No hypertension symptoms and normal ventricular size after 24h ablation is possible.

DECISION

- Open the dressing and disinfect the patient.
- In a sterile manner, removal of the threads, systematic sending of the catheter to bacteriology.
- Cutaneous closure
- Monitor the neurological state and the absence of CSF leakage at the puncture site