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Supplemental material

Shunting outcomes in posthemorrhagic hydrocephalus: results of a Hydrocephalus Clinical Research Network prospective cohort study
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### VGS Placement

1. Position patient supine.
2. Prep top of head with Chlorhexidine.
3. C-shaped incision at the lateral corner of the anterior fontanel, with the flap based posterolaterally in anticipation of conversion to a permanent shunt.
4. Careful dissection of the subgaleal pocket from ear to ear to inion but excluding forehead.
5. Construct VGS from 4 cm of proximal catheter, a right angle metal connector, and 4 cm of distal abdominal catheter that includes a distal slit valve. Use silk ties to secure components.
6. Ensure that distal slit valve is open.
7. Coagulate dura and open sharply. Coagulate edges then insert proximal catheter.
8. Collect 3cc of CSF for gram stain, culture, cell count, glucose, and protein. Collect another 5cc for study freezing (when IRB confirmed).
9. Carefully anchoring proximal catheter insert distal end of VGS under flap.
10. Vicryl tack down stich over the right angle connector.
11. Close skin with interrupted vicryls then a monofilament or vertical mattress stitch depending on integrity of skin.
12. Apply polysporin and dressing.

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### VR Placement

1. Position patient supine.
2. Prep top of head with Chlorhexidine.
3. C-shaped incision at the lateral corner of the anterior fontanel, with the flap based posterolaterally in anticipation of conversion to a permanent shunt.
4. Construct ventricular reservoir form 3-5 cm of ventricular catheter attached to a reservoir.
5. Coagulate dura and open. Insert proximal catheter into ventricle.
6. Puncture reservoir dome using 27G needle to confirm spontaneous flow of CSF. Collect 3cc of CSF for culture, gram stain, glucose, and protein. Collect another 5cc for freezing (when IRB approved). Recommended initial aspiration of 10cc/kg over 15-20 minutes (2cc/kg/min).
7. Inject vancomycin and gentamicin at study doses into reservoir using 27G needle.
8. Place a tack down stitch over the silicone cap.
9. Close the skin with interrupted vicryl suture for the galea (if possible) then a monofilament suture on the skin.
10. Apply dressing.
HCRN VENTRICULAR RESERVOIR TAPPING PROTOCOL

VERSION 5.0

INSERTION OPERATION:
- Tap 10cc/kg at a rate of 2cc/kg/min in the OR for insertion
- 2cc of intrathecal Vancomycin and Gentamycin inserted

MONITORING (AT MINIMUM):

WEEKLY intracranial ultrasound (recommend Monday)
TWICE WEEKLY clinical assessments (recommend Monday and Thursday):
- Anterior fontanelle- full, bulging, or tense
- Cranial sutures- split or not

WHEN TO TAP VENTRICULAR RESERVOIR:
Tap in the presence of ANY ONE of the following:
  a) Increased FOR on ultrasound (or other image)
  b) Ant fontanelle bulging above the bone when baby is calm and head is elevated
  c) Mid-sagittal suture split of more than 2mm

If none are present, HOLD tapping until next assessment

HOW MUCH TO TAP EACH TIME:
Tap 10cc/kg at a rate of 2cc/kg/min.

STOPPING RULE:
If the ventricles are larger but the fontanelle is sunken then hold tapping until next assessment

TERMINATION OF TAPPING
If the patient is still requiring tapping twice a day, once a day, or once every two days then consider converting to a permanent CSF shunt as per SOPHH protocol.