Placement of EVD:

1. Obtain Consent
2. Confirm Coagulation Status of Patient
3. Gather Supplies
    a. Cranial Access Kit
    b. EVD Catheter
    c. Drainage Bag Kit
    d. Electric Razor
    e. Silk Tape, 2 inch
    f. Betadine Prep Solution & Tubs of Gauze
    g. 2-0 or 3-0 Silk Suture for Securing Drain
    h. ¾ Drape for Patient
    i. Hand Towel & 2 inch Tape (to make head roll for positioning)
    j. Gown/Gloves/Eye protection
    k. Nurse to have any sedation/pain medications immediately available
    l. Antibiotics
4. Position Patient
    a. Supine, top of head at edge of bed
    b. Place head on donut made from rolled up towel for stabilization
    c. 2 inch tape across forehead, securing patient's head to bed
    d. Adjust bed position so head is at an angle/level allowing ease of drilling/catheter placement (elevated ~20-30 degrees)
    e. Adjust foot of bed so that legs elevated slightly so patient does not slide down in bed
5. View Imaging/Confirm Side of Placement
6. Shave either R or L Frontal Region
    a. Make sure to shave large enough region to allow for catheter tunneling
7. Mark Location for EVD Placement
    a. Make sure head is facing straight ahead, mark midline
    b. Feel for the coronal suture & mark this
    c. Measure 11 cm back from the nasion & 3 cm laterally, mark this (Kocher's Point)
    d. Confirm that you are in line with the mid-pupillary line & are anterior to the coronal suture
8. Prep Patient: Betadine Soaked Gauze x 3
9. Open Cranial Access Kit at all supplies onto tray/table in sterile fashion
10. Put on sterile gown/gloves
11. Perform Timeout
12. Drape Patient: drapes in cranial access kit & ¾ drape
13. Confirm EVD entry point that was marked, lay out all supplies/assemble drill
14. If using local anesthetic, inject now (include tunneling trajectory with this)
    a. Included in cranial access kit
15. Incision: linear, centered over marked entry point, approximately 2.5cm in length

    a. Place small self-retaining retractor
16. Drill: position drill orthogonal to skull and make burr hole without changing angle
17. Durotomy: Make small hole through dura using one of the needles in the kit
18. EVD catheter insertion
    a. Identify where 6cm is on the catheter, this is the maximum depth to be inserted at the outer table of the skull
    b. Position catheter orthogonal to skull (aimed at the junction of a line extending backwards from ipsilateral medial canthus & a line extending coronally from the ipsilateral tragus)
    c. Advance catheter until you either see CSF return or feel a "pop" indicating entry into the ventricle. At this point advance the catheter a few more millimeters to ensure the catheter tip is fully in the ventricle (maximum depth = 6cm at the outer table of the skull)
    d. Remove the stylet, confirm CSF drainage
19. Tunnel Catheter
    a. Attach tunneler to catheter
    b. Hold the catheter tubing at the skull with a NON-toothed forceps to ensure that it does not move
    c. Tunnel catheter under skin approximately 3-4 cm posteriorly from insertion site
    d. After exiting skin, cut off tunneler from catheter & confirm that it is still draining
    e. Attach cap to catheter temporarily to prevent excessive drainage
20. Secure Catheter
    a. Secure catheter at skin exit site 1st to minimize possible movement
    b. Remove small sell-retaining retractor, being careful not to disturb the catheter
    c. Close incision site, interrupted silk sutures
    d. Place silk tie around end of catheter where cap attachment is located to secure these two pieces together
    e. Secure catheter in semicircle shape laterally with 3-4 interrupted sutures along its length
21. Attach to Drainage Bag
    a. Nurse has already prepped tubing of drainage system in sterile fashion with preservative free saline
    b. Attach catheter tubing to drainage bag tubing in sterile fashion, being careful not to touch the ends of the tubing
    c. Make note of the initial ICP
    d. Level drainage bag with zero at the tragus & set to appropriate drainage height
22. Remove Drapes & Place Sterile Dressing
23. Document Procedure