Checklist for Insertion and Setup of an ICP Monitoring Device

Before proceeding, contact neurosurgery to identify the type of catheter to be inserted. The catheter type will define the equipment requirements and preparation needed.

1. Obtain the Catheter (choose one of 3 types below):

   A. Codman Microsensors™ (two types):

   Codman Microsensors™ are catheters that measure intracranial pressure via a strain guage microchip located at the tip of the catheter. Both Microsensor™ catheters below are connected to the Codman Express™ for pressure monitoring. Unlike fluid filled pressure monitoring, pressure transmission is unaffected by obstructed fluid paths (e.g., from clot or tissue).

   I. Codman Microsensor™ Intraparenchymal Catheter (pressure only, no drainage):
   This catheter is inserted into superficial brain tissue. It measures pressure only, it does not drain CSF. It may be used for monitoring when ventricles are too small to access, or in patients with normal intracranial pressure who are at risk to develop elevated pressures. If ICP rises, it may be changed to an

   II. Codman Microsensor™ Intraventricular Drainage Catheter (pressure measured independent of fluid filled channel):
   This is an intraventricular catheter. It is used to measure ICP and to drain CSF.
B. Standard Intraventricular Drainage Catheter (fluid filled pressure monitoring):

The standard ventricular catheter is used to measure ICP and to drain CSF. Pressure is measured using a standard transducer, picking up pressure that is transmitted through the fluid filled channel of the catheter.

2. Obtain supplies to insert ICP Catheter:

- Ventricular Drainage Tray (ensure drill is packaged with tray)
- Hair clipper with clipper head
- Line cart
- Sterile gowns
- Large sterile drape and sterile towels
- Local anaesthetic
- Tegaderm™ dressing

3. Do you need a CSF drainage unit (Codman EDS 3)?

Both the Codman Microsensor™ ventricular drainage catheter and the standard ventricular drainage catheter require a CSF drainage unit. There is no drainage of CSF with an intraparenchymal catheter.

Supplies Needed:

- Codman EDS 3™
- Standard pressure transducer kit (used to flush drainage unit)
- 500 ml bag of normal saline
- Codman laser level
- Portable IV pole

4. Obtain supplies for pressure monitoring:

Microsensor™ catheters (intraparenchymal or intraventricular):

- Codman Express™ monitor
- Codman Express™ cable (should be attached to Codman Express™)
- Codman™-Datex™ pressure cable for transferring pressure from the Codman Express™ to the Datex™ monitor (Datex™ end of cable is red)
- Datex™ pressure module (e.g., P3, P4 or an unused P2)

Standard Intraventricular Drainage Catheter:

- Datex™ pressure module (e.g., P3, P4 or an unused P2)
- Datex regular pressure cable
- Pressure transducer (also used to prime Codman EDS3™ drainage unit)
PROCEDURE FOR PRIMING CODMAN EDS3 (CSF collection unit):

For Codman Microsensor™ ventricular drainage catheter and standard ventricular drainage catheter.

- Perform hand hygiene
- Hang the Codman EDS3 on IV pole
- Prime pressure tubing with normal saline (do not pressurize saline bag)

- Connect pressure tubing to the Codman EDS3 stopcock that is closest to the patient catheter

- Flush drainage tubing toward patient catheter connection, then into CSF collection chamber
- Turn patient stopcock to 45 degrees (off in all directions) until ready to hook up
- Using laser level, adjust position of drainage unit until “0” on drainage panel is level with external auditory canal

- Position the drip chamber to the ordered level (be sure the orders clearly identify whether the order is for cmH₂O or mmHg
PROCEDURE FOR SETUP UP OF CODMAN EXPRESS™

For both Codman Microsensor™ Catheters

- Perform hand hygiene
- Place Codman Express™ on IV pole and plug into red electrical outlet
- Turn Codman Express™ on and listen for audio beep

- Assist physician to prepare sterile field and open Codman Microsensor™ catheter
- Connect Microsensor™ to Codman Express™ cable

- As soon as cable is connected, “Transducer Detected” will appear on the screen
- Provide physician with a syringe of sterile saline. This will be used to fill the catheter tray and submerge the tip of the catheter during zeroing.
- With catheter in the horizontal position and submerged in 3 inches of sterile saline, press the blue “Zero” button when prompted
When zeroing is completed, a 3 digit reference number will display

- Document the 3 digit reference number in the Kardex and AI record. Record the number on the Microsensor™ with a Sharpie
- Press “MENU/ENTER”
Catheter can now be inserted; the pressure will automatically display on the Codman Express™

**PROCEDURE FOR CONNECTING CODMAN EXPRESS™ TO DATEX™ MONITOR**

For both Codman Microsensor™ Catheters

ICP is measured by the Codman Express™. This pressure can be duplicated on the Datex™ monitor for the purpose of generating an ICP waveform.
• Select a pressure module for ICP monitoring. This can be a P1, P2, P3 or P4. **If you choose a P3 pressure module:**
  o Go to the admit patient menu of the Datex monitor
  o Choose “Modes”
  o Choose “CCTC Neuro”
  o This mode will default the P3 to ICP monitoring.
  o It will also print waveforms displayed from P3 from a snapshot.
  o If you add a P3 module to a “CCTC General Mode, you will not be able to print the waveform.

• Any wave measured on a P1, P2 or P4 will print from a snapshot in the CCTC General mode.
• **You MUST label the ICP waveform as “ICP”** and the arterial waveform must be measured from a P1 and labeled “Art” for the Cerebral Perfusion Pressure to automatically calculate.

**Connect the Codman Express™ to the Datex™ monitor**

• Obtain the Codman to Datex cable

![Codman to Datex cable](image)

• Remove any cables from the pressure box you plan to use for ICP monitoring (P1, P2, P3 or P4).
• Remove any existing pressure cable from the Datex module.
• Connect the red rimmed Codman to Datex cable into the Datex pressure module.
• The black end connects to the back of the Codman™.

**Troubleshooting Tip**

If pressing the “zero patient monitor” on the Codman Express™ does not result in a message to “confirm zero” or “zero bedside monitor”, check to ensure that both ends of the cable are correctly connected.
- When prompted (on the Codman Express™ screen), press the “Zero” button on the Datex™ module. (Note that you do not need to open any stopcocks or adjust the position of any tubing or devices).

- Confirm that the reference line for the ICP waveform is displaying zero and the reference line is along the zero baseline
- When prompted (on the Codman Express™ screen), confirm that the monitor is reading zero by selecting the “MENU/ENTER” button
- When prompted to choose the calibration signal, select the “20” button.

- Confirm that the bedside monitor has a reference line at 20 mmHg and then press the “MENU/ENTER” key to verify
- If the pressure is not correct, use the arrow keys to adjust the reference line before pressing “MENU/ENTER”.
PROCEDURE FOR MONITORING ICP WITH STANDARD VENTRICULAR CATHETER:

ICP is measured with standard transducer and fluid filled circuit.

- Perform hand hygiene
- After priming the Codman EDS3, connect the pressure transducer cable to a bedside Datex™ module (e.g., P3, P4 or a spare P2)
- Change the Module label to “ICP”
- Tape the transducer to the back of the Codman EDS3 aligning the stopcock from the transducer with the zero reference stopcock on the Codman EDS3.
- Confirm that the stopcocks are level with the patient’s external auditory canal using a laser level
- Zero the transducer

Please note the following:
- An LCD switch is located on the back of the ICP Express to see screen in the dark
- Alarms are automatically off when ICP express is turned on. To activate alarms go to menu/enter button, choose on/off alarm limits option and activate alarm option by arrowing up or down for required limits.

Troubleshooting
- When zeroing the ICP Express monitor, if the value -99 appears this means the grey cable that connects to the front of the ICP Express monitor needs to be replaced
- If you attempt to zero the bedside monitor by selecting the “zero patient monitor” button on the Codman express and nothing changes, check to ensure the cable from the Codman express is connected into a Datex pressure module
- If a zero reference number appears before zeroing, turn ICP Express off and restart steps

Traveling
- Disconnect catheter from grey cable attached to ICP Express
- When reconnecting catheter to ICP Express, the reference number on the monitor must match the number written on the catheter. Either accept the displayed reference number (if they match) or adjust. Go to menu/enter and use arrow key to choose the correct reference number
- The Codman Microsensor™ is MRI compatible

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