Insertion of an Intra-Aortic Balloon Catheter

This guideline is approved for use in Nepean Adult ICU only, where a patient receives continuous monitoring. The authors and Nepean ICU don’t endorse, and aren’t responsible, for the use of this guideline outside the ICU.

Purpose
The Intra-Aortic Balloon catheter is inserted via the femoral artery into the ascending aorta. It is positioned just below the subclavian artery and just above the renal artery. It improves myocardial performance by increasing coronary artery perfusion and myocardial oxygen supply while decreasing the pressure the left ventricle must work against (afterload) and reducing oxygen demand.

Indications:
- Left ventricular failure or cardiogenic shock.
- Mechanical complication of acute myocardial infarction.
- Intractable ventricular arrhythmias.
- Weaning from pulmonary bypass.
- Bridge to cardiac transplant.
- Left ventricular compromise secondary to septic shock and/or severe myocardial contusion.

Contra Indications:
- **Absolute**
  - Severe aortic valve regurgitation
  - Dissecting aortic aneurysm

- **Relative**
  - ‘End stage’ cardiomyopathies if transplant is not an option.
  - Severe artherosclerosis.
  - Non-resected abdominal aortic aneurysms.
  - Previous femoral or iliac artery surgery.

Definitions
Intra-Aortic Balloon (IABP): a balloon inserted into the aorta of the patient which is timed to inflate and deflate with the patient’s cardiac cycle to improve myocardial oxygen supply while decreasing left ventricular workload.

The IABP can be inserted in either the Cardiac Catheter Laboratory or the Intensive Care Unit.
Procedure

Equipment:
- The correct intra-aortic balloon catheter size is determined by the patient’s height, so that the balloon is positioned above the renal vasculature and is 85 to 90% occlusive of the aorta.
  - Patient > 190 cm use 50cc balloon
  - Patient 165 – 190 cm use 40cc balloon
  - Patient < 165 cm use 30cc balloon
- Arrow Counter Pulsation Pump console, with all necessary patient cables
- ECG electrodes
- Arterial pressure transducer line and flush bag (normal saline) for the central lumen of the balloon catheter
- General Tray:
  - Gowns and gloves (2 people to scrub)
  - Sterile drapes x 3
  - Alcoholic chlorhexidine
  - Lignocaine 1% x 2 ampoules
  - 1 x 20 ml syringe
  - 3 x 5 ml syringes
  - Suture material
  - Opsite 3000 x 2
  - Blueys x 4
  - 1 x 20ml syringe
  - 3 x 5ml syringes

Procedure:
1. Perform a pre-insertion assessment which includes a full haemodynamic and physical assessment. Assess and record the circulation observations of both legs.
2. Obtain consent.
3. Prepare the pump console:
   a. Turn the console on
   b. Check the helium supply
   c. Ensure all cables are attached to the machine – the ECG cable is attached to the patient, the arterial pressure cable attached to the transducer.
4. Prepare the patient:
   a. Shave both groins
   b. Lie patient flat
5. Medical Officer and assistant perform a 2 minute scrub, don gown and gloves.
6. Following cleaning and draping, the femoral artery is accessed and the guide wire inserted through the access needle. The assistant helps maintain the sterility of the guide wire. Insert sheath.
7. Prepare the balloon catheter for insertion by attaching the one-way valve to the end. Using the 60ml syringe, ensure that the balloon is completely deflated by pulling the plunger of the syringe all the way out (‘pop’ the syringe).
8. Remove the stylet from the central lumen of the catheter. This can be used to judge the insertion distance needed for the catheter – measure from the puncture site to the patient’s manubriosternal angle.

9. Insert the catheter over the guide wire. Once in place, aspirate blood from the central lumen and flush with 5ml of normal saline.

10. Assistant to prepare the arterial pressure transducer by priming the line, maintaining sterility.

11. Connect the end of the repositioning sleeve to the sheath and stitch in place.

12. Connect the pressure line to the catheter.

13. Connect the helium line to the catheter and the pump console. Ensure that the correct, corresponding helium line for the catheter size is used (ie. white for 30cc balloon, blue for 40cc balloon & yellow for 50cc balloon).

14. Dress the site as for any other venous access device.

15. Attach the pressure line and patient cables.

16. To initiate pumping, select the standby key first. This shuffles helium 4 times quickly into the balloon to uncoil it. Then press start.

17. Select the most appropriate trigger for the patient. With the Arrow ‘Autocat’, the machine will automatically select the most accessible trigger in the Autopilot mode.

18. Ensure the correct timing of inflation and deflation of the catheter while the pump is in 1:2 pumping ratio, when timing is optimal, change to 1:1 ratio. In the ‘autopilot’ mode, the pump will set the timing, but the timing set may not be optimal. Timing should still be checked while in ‘autopilot’ mode.

19. Perform a chest x-ray to ensure correct placement of the catheter – the tip of the balloon is between the second and third intercostal spaces. Once correct position is determined, suture the catheter.

**Risk Rating**

Low – For Review 3 years from validation date unless significant and compelling evidence becomes available to indicate a practice change within that time.

**Implementation Plan**

Endorsed by ICU Management Committee

Discussed at ICU Ward Meetings and other relevant unit meetings

New Procedure placed in ICU Communication Book

Electronic file loaded onto ICU website

Education and in service provided to relevant staff

**Education Notes**

Risks associated with the insertion of an IABP include:

- Aortic wall dissection, rupture or local injury.
- Air, thrombus or plaque emboli.
- IABP catheter balloon rupture causing a helium embolus.
• Infection.
• Obstruction of major vessels due to malpositioning of the catheter.
• Compromised circulation to the leg due to catheter leading to ischaemia or compartment syndrome.
• Thrombocytopenia.
• Bleeding.

References and Related Policies

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