

INTRA-AORTIC BALLOON PUMP – ICU, Cath Lab

PURPOSE: To outline the management of the patient with an intra-aortic balloon pump (IABP). The IABP is a circulatory assist device. IABP therapy is designed to increase coronary artery perfusion, which increases myocardial oxygen supply, and decreases afterload and myocardial workload, which decreases myocardial oxygen demand.

SUPPORTIVE DATA: The IABP is a balloon-tipped catheter threaded into the descending thoracic aorta. The balloon inflates during diastole resulting in improved coronary artery blood flow and increased blood flow distally to the rest of the body. Rapid deflation of the balloon immediately prior to systole reduces afterload. The primary complication is decreased perfusion. If placed too high, perfusion to the brain and upper extremities can be occluded. If placed too low, perfusion to the GI tract or kidneys may be occluded. Flow to the lower extremities may also be occluded. Therefore, perfusion to both lower extremities must be evaluated. Correct placement is evaluated by fluoroscopy/ X-ray at the time of balloon catheter insertion and by daily X-ray, post-insertion.

When the IABP is no longer required, the balloon and sheath (if applicable), are removed by the Attending Physician or Fellows. If the Fellow removes the sheath, they need to be supervised by the Attending. Manual pressure the Femostop™, or ANGIO-SEAL® device is applied to the area. The Femostop™ device is managed according to the Femoral Compression System (Femostop™) /Internal Vascular Closure Device Nursing Clinical Standard.

IABP management is restricted to IABP certified RNs.

The balloon pump catheter is attached to a console that pushes helium into the balloon catheter during diastole and pulls helium out just prior to systole.

ASSESSMENT:

1. Verify provider's order is complete and matches pump settings upon initiation, with order changes, when transferred from one unit to another, and every shift.
2. Verify that the balloon pump machine is connected to the monitor.
3. Assess the following immediately post-insertion and every 15 minutes for the first hour, every 30 minutes for the second hour, then every 1 hour.
 - Level of consciousness (LOC), vital signs, electrocardiogram (ECG)
 - Lower extremity perfusion including:
 - Pulses
 - Skin color, temperature and appearance
 - Catheter site for presence/absence of bleeding/hematoma
4. Assess the following immediately post-insertion then a minimum of every hour:
 - Pulmonary artery pressure (PAP), right atrial and (RA) pressure
 - IABP waveform readings
 - Diastolic augmented pressure (DAP)
 - Assisted systole (AS)
 - Assisted diastole (AD)
 - Systolic unloading (SU)
 - Mean arterial pressure (MAP)
 - Counter pulsation frequency (i.e., 1:1, 1:2, 1:3)
 - Trigger mode
5. Assess pulmonary artery wedge pressure (PAWP) immediately post-insertion then as ordered. (Exception: Cardiothoracic ICU does not obtain PAWP readings)
6. Assess full line of data (including cardiac output post-insertion, a minimum of every 4 hours and with each frequency change.
7. Assess the unassisted systole (US) and unassisted diastole (UD) post insertion and a minimum of every 4 hours.

8. Assess IABP pressures and obtain IABP strip in the following situations:
 - At the beginning of each shift
 - Change in ECG rhythm
 - Change in frequency (i.e., going from 1:1 to 1:2 timing)
9. Measure urine output (UO) hourly.
10. Assess balloon refill every 2 hours.
11. Assess the following immediately post-insertion then a minimum of every 4 hours:
 - Heart and lung sounds
 - Pain: Chest, incision/insertion site, leg
 - Signs of infection
 - Signs of retroperitoneal bleeding:
 - Severe back pain
 - Lumbar-sacral ecchymosis
12. Evaluate hematocrit (HCT), anticoagulation and LD levels as drawn.
13. Assess balloon tubing for evidence of discoloration or blood in the tubing (signs of possible balloon perforation).

ANTICOAGULATION:

14. Administer anticoagulants as ordered (some patients on an intra -aortic balloon pump receive intravenous heparin).

SAFETY:

15. Review provider's order and settings during handoff communication.
16. Flush IABP central lumen with quick flush every 1 hour.
17. NO blood draw from the catheter.
18. Immobilize catheterized extremity if applicable or if necessary.
19. Maintain head of bed no higher than 30 degrees.
20. Keep affected extremity straight and hip in alignment.
 - Logroll to reposition, consider use of pressure-relief devices.
 - Set DAP alarm settings.
21. IABP (CARDIOSAVE®) batteries should be maintained at full charge when being used to operate the IABP. It is critical to keep the batteries charged at all times to avoid interruption in power (ex: during transport). The primary RN needs to ensure that the system is plugged into a live AC receptacle and that the "Battery in Use" informational message is NOT displayed.
22. Cath Lab will hand-off IABP (CARDIOSAVE®) serial number to receiving ICU RN.
 - ICU RN will check/confirm IABP (CARDIOSAVE®) serial number at beginning of each shift.
 - In the event of a IABP switch, a nursing summary documentation is required to state the new IABP (CARDIOSAVE®) serial number in use.
23. Use separate IV poles for pressure bags connected to IABP catheters, do not place fluids on top of pump.

POST CATHETER REMOVAL:

24. Manage femoral compression system per the Femoral Compression System (Femostop™) Nursing Clinical Standard or utilizing the ANGIO-SEAL ® device.

COLLABORATION:

25. Notify provider immediately for:
 - Decreasing DAP or MAP
 - Signs of:
 - Incorrect placement (e.g., decreased UO, LOC, acute neurologic changes, or perfusion to extremities, especially to left arm)
 - Decreased perfusion
 - Bleeding
 - Infection
 - Abnormal HCT/coagulation values
 - Unrelieved chest pain

- UO less than 30 mL/hr for 2 consecutive hours
- Abnormal LD levels

PATIENT/CAREGIVER
EDUCATION:

26. Instruct on the following:
- Purpose of IABP
 - Importance of bedrest, need to keep extremity with IABP straight and hip in alignment, and extremity immobilization
 - Need to report discomfort/pain
 - After catheter removal, report any warm or wet feeling on the leg, or any dizziness/light-headedness

ADDITIONAL
STANDARDS:

27. Implement the following as indicated:
- Anticoagulant Therapy
 - Arterial Line – ICU
 - Chest Pain
 - Femoral Compression System (Femostop™) /Internal Vascular Closure Device
 - Immobility
 - Inotrope Infusion – ICU
 - Pulmonary Artery Catheter – ICU
 - Restraints

DOCUMENTATION

28. Document in accordance with documentation standards.
29. On the Adult ICU Line-Devices Navigator band, IABP Settings/Measures section. (Do not record arterial line or non-invasive BP from the bedside monitor)
Record:
- IABP pressures
 - Counter pulsation ratio 1:1
 - HR
 - Trigger
 - Central flush/balloon refill
 - Lower extremity pulse
 - Left arm pulses
 - LOC
 - DAP, PAP alarm setting
30. Cath Lab will document IABP (CARDIOSAVE®) serial number upon initial IABP insertion.

Initial date approved: 11/94	Reviewed and approved by: Critical Care Committee Nurse Executive Council Attending Staff Association Executive Committee	Revision Date: 11/95, 3/97, 11/00, 03/05, 5/08, 6/12, 08/14, 10/18, 09/22
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REFERENCE

AACN Procedure Manual for High Acuity, Progressive, and Critical Care. 7th Edition. Debra L. Wiegand. Elsevier. (2017)