PULMONARY ARTERY CATHETER - ICU

PURPOSE: To outline the management of the patient with a pulmonary artery (PA) catheter.

SUPPORTIVE DATA: Bedside hemodynamic monitoring using a PA catheter allows rapid evaluation of cardiac performance which is determined by heart rate, ventricular preload, cardiac contractility, and ventricular afterload.

Care and removal of the introducer (Cordis) catheter are provided according to:
- Central Venous Catheter Nursing Clinical Standard
- Central Venous Catheters: Care, Maintenance, Troubleshooting and Removal Nursing Procedure

A chest X ray is done to confirm placement of both the introducer and the pulmonary artery catheter. PA catheters placed in the Catheter Lab are under fluoroscopy a chest X ray is not needed on admission.

ASSESSMENT:

1. Monitor pulmonary artery pressures (PAP) and waveforms continuously.
2. Assess catheter cm marking at insertion site:
   - Upon admission
   - When assuming care of the patient
   - Upon admission/transfer/transport from another area/unit
   - To troubleshoot change in waveform
3. Assess breath sounds immediately post catheter insertion.
4. Assess PAP and right atrial (RA) waveforms and record values a minimum of every 2 hours in stable patients and more frequently if unstable.
5. Measure and record pulmonary artery wedge pressure (PAWP) at end-expiration a minimum of every 12 hours or as ordered, and prn (e.g. with deterioration of vital signs, after intervention such as fluid bolus) (Exception: PAWP is not measured routinely on cardiothoracic surgery patients).
6. Level transducer to **phlebostatic axis** (**4th intercostal space, mid chest**) and zero transducer:
   - Within one hour of assuming care (prior to documenting pressures)
   - Every 12 hours
   - Every change in position (relevel only)
   - To verify accuracy of any questionable values
7. Perform square wave test:
   - Upon assuming care
   - A minimum of every 12 hours
   - To verify accuracy of any questionable values
8. Perform a full hemodynamic profile/full line of data (FLOD) as ordered or defined by Unit Structure Standards. Partial/FLOD may be obtained in the following situations:
   - STAT upon insertion
   - With sudden decompensation
   - During vasoactive medication titration
   - Changes in PEEP
   - Initiation or discontinuation of alternative modes of ventilation
   - Following fluid challenge

PRESSURE BAG, FLUSH SOLUTION, TUBING, DRESSING CARE:

9. Maintain pressure bag at 300 mmHg.
10. Change:
    - Flush solution every 96 hours, with catheter change, and as necessary
      - Normal saline is used for flush solution
      - Dextrose 5% is used for Cardiac Output injectate
    - Pressure tubing and transducer every 96 hours and with catheter change

INFUSIONS:

11. Maintain the lines/ ports as follows:
    - Use introducer (Cordis) for continuous infusions.
    - Reserve blue proximal line for cardiac output, RA measurement, and intermittent medications
    - White proximal infusion port may also be used for intermittent or continuous infusions

SAFETY:

12. Secure sterile catheter sheath. Do not apply tape to clear plastic section of sheath.
13. Inflate balloon with the minimal amount of air needed to obtain a PAWP tracing. (Range usually 1.25-1.5 mL; should obtain tracing with no less than 1.25 mL)
    - Limit balloon inflation to 10-15 seconds
    - Use only **volume limited** syringe from PA catheter kit for balloon inflation
14. Label and tape over non-functioning ports (e.g. ruptured balloon port)
15. Ensure balloon is deflated when not in use. Allow balloon to deflate without using the syringe to remove the air, remove air from syringe, and leave gate open.
16. Keep catheter ports connected to transducer/flush system during transport.

PA CATHETER REMOVAL:

17. Discontinue PA catheter and/or introducer (Cordis) as ordered.
18. Ensure the following prior to PA catheter/Cordis removal:
    - Peripheral IV access is established
    - Removal of introducer (Cordis) is specified on provider's order
19. Apply Cordis cap if introducer is to remain in place.

REPORTABLE CONDITIONS:

20. Notify the provider for:
    - Unequal breath sounds
    - Ectopy noted on wedging
    - Less than 1.25 mL of air needed to obtain PAWP
    - Significant change in cardiac output /other hemodynamic parameters
    - Right ventricular waveform, presence of ventricular tachycardia, permanent PAWP waveform
    - Ruptured balloon
    - Nonfunctional port
    - Fluid in sheath
    - Bleeding, signs of infection

PATIENT/CAREGIVER EDUCATION

21. Explain purpose of PA catheter and need for frequent monitoring.

ADDITIONAL STANDARDS:

22. Implement the following as indicated:
    - Central Venous Catheter
    - Arterial Line - ICU
    - Intravenous Therapy
    - Restraints

DOCUMENTATION:

23. Document in accordance with documentation standards.
    - In iView- Lines and Devices- add Dynamic Group for PA catheter
    - In iView- Quick View- customize – add Hemodynamic Measures
    - Complete height/weight measurements
    - Print and record waveforms upon placement/admission, start of shift, any changes and per unit structure standards

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REFERENCES:

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