CS100 Color Display and Keypad Controls
Datascope is now MAQUET Cardiovascular

In early 2009, the purchase agreement between Datascope and Getinge AB was completed. As a result, Datascope's innovative cardiovascular product portfolio will be integrated into MAQUET Cardiovascular, a global leader representing the Medical Systems Business area of Getinge AB.

Cardiac professionals have always relied on gold-standard Cardiac Assist products from Datascope, helping them to feel confident that they are delivering the highest quality of care to their patients. Now, as a part of MAQUET Cardiovascular, Datascope is even better positioned to focus on the future advancement of Cardiac Assist products and seeks to explore the full potential of this technology through our continued dedication to innovation, service and clinical excellence.

Quality Products:
Expect the same great quality products you have relied on over the years with names you are familiar with like: Fidelity, Linear and Sensation IAB's, CS300 balloon pumps, SafeGuard and StatLock.

Quality Service:
Rest assured that you will receive the same amazing service and clinical support you have become accustomed to from Datascope. We are still here for you 24/7 with technical support, loaner equipment and clinical help.

Worldwide:
MAQUET ranks among the leading providers of medical products, therapies and services for Surgical Workplaces, Critical Care and Cardiovascular applications. Since its foundation more than 170 years ago, MAQUET has stood for innovation and the advancement of patient care technologies in the field of medicine. The portfolio of MAQUET products is extensive, providing a comprehensive solution that is designed for efficient workflows, safety and the improvement of patient lives and outcomes.

Welcome to MAQUET Cardiovascular:
With a fresh vision of the future, this new, combined organization is committed to providing the highest quality patient care solutions for cardiologists, interventional radiologists, cardiothoracic and vascular surgeons, critical care clinicians and their teams.

For further information please visit www.datascope.com
Managing Intra-Aortic Balloon Therapy

Course Description
This six hour program is designed for the experienced healthcare professional directly involved with the care of the patient requiring intra-aortic balloon pump therapy. Participants should have experience with hemodynamic monitoring and 6 months critical care experience. Previous experience with intra-aortic balloon pump therapy is preferred.

This program is comprised of 3 modules consisting of theoretical, technical, and clinical considerations for a patient requiring IABP therapy. The theoretical module will briefly review cardiac physiology and the theory of intra-aortic balloon pumping. The technical module will discuss percutaneous insertion and removal of the intra aortic-balloon catheter followed by a detailed explanation of the Datascope IABP, highlighting troubleshooting in the clinical setting. Case studies will be utilized to further reinforce troubleshooting techniques. The clinical module provides a discussion of clinical considerations for patients requiring IABP therapy. A skills workshop utilizing the system trainer and Abbreviated Operator’s Guide will be provided.

Behavioral Objectives
At the conclusion of this program, the participants will be able to:
1) Define the two physiologic effects achieved by the mechanics of inflation and deflation of the IAB as it relates to the cardiac cycle illustrated by an augmented arterial pressure waveform.
2) Identify four indications and three contraindications for IABP therapy.
3) Identify the potential complications associated with IABP therapy.
4) Demonstrate the set up, operation, and troubleshooting of the Datascope IABP utilizing the system trainer for practice and the abbreviated operators guide for reference.

Caution: U.S. Federal Law restricts this device to sale by or on the order of a physician
Refer to package insert for current indications, warnings, contraindications, precautions and instructions for use.
Course Schedule

8:00 – 8:10  Introduction
Review Program

8:10 – 9:30  MODULE I - Theoretical Aspects
Review Cardiac Mechanics
Measurement of Cardiac Performance
Left Ventricular Failure
Theory of IABP
Factors Affecting Diastolic Augmentation/Timing Errors
Indications/Contraindications

9:30 – 9:45  Break

9:45 – 10:45  MODULE II IAB - Catheter and Technical Introduction to IABP
IAB Catheter Insertion
Technical Features of the IABP

10:45 – 11:00  Break

11:00 – 12:00  Troubleshooting Alarm and Advisory Messages
Hands On

12:00 – 12:30  Lunch

12:30 – 1:15  Additional Hands on

1:15 – 1:45  MODULE III - Clinical Considerations
Side Effects/Potential Complications
Care Management/Case Studies

1:45 – 2:00  Open Discussion
Program Evaluation
Module I

Theoretical Aspects of IABP
I. Review Physiology of Cardiac Mechanics

A. Cardiac Cycle
   1. Atrial Systole
   2. Isovolumetric Contraction
   3. Ventricular Ejection
      a. Slow Ejection
      b. Rapid Ejection
      c. Slow Ejection
   4. Isovolumetric Relaxation
   5. Ventricular Filling
      a. Rapid Filling
      b. Slow Filling
B. Pressure Waves
   1. Ventricular Waveform
      a. Pressure
      b. Volume
   2. Arterial
      a. Radial/Brachial
      b. Aortic
Normal Arterial Waveform

- Systolic Pressure
- Rapid Ventricular Ejection Phase (75% SV Ejected)
- Run-Off Phase (25% SV Ejected)
- Dicrotic Notch
- Aortic Valve Closes
- Diastole Begins
- Aortic End Diastolic Pressure

Aortic Valve Opens
C. Myocardial Oxygen Supply and Demand

<table>
<thead>
<tr>
<th>SUPPLY</th>
<th>DEMAND</th>
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<tbody>
<tr>
<td>1. Coronary artery anatomy</td>
<td>1. Heart Rate</td>
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<tr>
<td>2. Diastolic pressure</td>
<td>2. Afterload</td>
</tr>
<tr>
<td>3. Diastolic time</td>
<td>3. Preload</td>
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<tr>
<td>4. O₂ extraction</td>
<td>4. Contractility</td>
</tr>
<tr>
<td>a. HBG</td>
<td></td>
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<tr>
<td>b. PaO₂</td>
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</tbody>
</table>

MVO₂

D. Frank-Starling Law of Heart

Ventricular function curve. As the end-diastolic volume increases, so does the force of ventricular contraction. Thus the stroke volume becomes greater up to a critical point after which stroke volume decreases. [Cardiac failure]
LV Failure
II. Theory of IABP Therapy

A. Counterpulsation
   1. Balloon Structure and Position
   2. Increased Coronary Perfusion
      a. Inflation
      b. Augmentation of Diastolic Pressure
   3. Decreased Left Ventricular Workload
      a. Deflation
      b. Afterload Reduction
   4. Physiological Pressure Wave Changes
      a. Dicrotic Notch
      b. Diastole: Augmentation
      c. Decreased End-Diastolic Pressure
      d. Systole: Decreased Assisted Systolic Pressure
Increased Coronary Artery Perfusion

Reduced Myocardial O₂ Demand

A. One Complete Cardiac Cycle
B. Unassisted Aortic End Diastolic Pressure
C. Unassisted Systolic Pressure
D. Diastolic Augmentation
E. Assisted Aortic End Diastolic Pressure
F. Reduced Systolic Pressure
Arterial Waveform Variations During IABP Therapy

1:1 IABP Frequency

1:2 IABP Frequency
B. Effects of IABP
   1. Primary
      a. Supply
      b. Demand
   2. Secondary
      a. CO/CI
      b. HR
      c. PAD-PCWP
      d. SVR
      e. B/P-SYSTOLIC
         DIASTOLIC
         MAP
         DIASTOLIC AUGMENTATION
   3. Systemic
      a. Neuro
      b. Renal
      c. Vascular
      d. Respiratory
C. Factors Affecting Diastolic Augmentation

1. Patient Hemodynamics
   a. Heart Rate
   b. Stroke Volume
   c. Mean Arterial Pressure
   d. System Vascular Resistance

2. Intra-Aortic Balloon
   a. IAB in Sheath
   b. IAB Not Unfolded
   c. IAB Position
   d. Kink in IAB Catheter
   e. IAB Leak
   f. Low Helium Concentration

3. IABP
   a. Timing
   b. Position of IAB Augmentation Control
D. Timing Errors

1. Early Inflation
   Inflation of the IAB prior to aortic valve closure

   **Waveform Characteristics**
   - Inflation of IAB prior to dicrotic notch
   - Diastolic augmentation encroaches onto systole (may be unable to distinguish)

   **Physiologic Effects:**
   - Potential premature closure of aortic valve
   - Potential increase in LVEDV and LVEDP or PCWP
   - Increased left ventricular wall stress or afterload
   - Aortic Regurgitation
   - Increased MVO₂ demand

2. Late Inflation
   Inflation of the IAB markedly after closure of the aortic valve

   **Waveform Characteristics:**
   - Inflation of the IAB after the dicrotic notch
   - Absence of sharp V
   - Sub-optimal diastolic augmentation

   **Physiologic Effects:**
   - Sub-optimal coronary artery perfusion
3. Early Deflation
Premature deflation of the IAB during the diastolic phase

**Waveform Characteristics**
- Deflation of IAB is seen as a sharp drop following diastolic augmentation
- Sub-optimal diastolic augmentation
- Assisted aortic end diastolic pressure may be equal to or less than the unassisted aortic end diastolic pressure
- Assisted systolic pressure may rise

**Physiologic Effects:**
- Sub-optimal coronary perfusion
- Potential for retrograde coronary and carotid blood flow
- Angina may occur as a result of retrograde coronary blood flow
- Sub-optimal afterload reduction
- Increased MVO₂ demand

4. Late Deflation

**Waveform Characteristics:**
- Assisted aortic end-diastolic pressure may be equal to the unassisted aortic end diastolic pressure
- Rate of rise of assisted systole is prolonged
- Diastolic augmentation may appear widened

**Physiologic Effects:**
- Afterload reduction is essentially absent
- Increased MVO₂ consumption due to the left ventricle ejecting against a greater resistance and a prolonged isovolumetric contraction phase
- IAB may impede left ventricular ejection and increase the afterload
E. Indications
1. Refractory Unstable Angina
2. Impending Infarction
3. Acute MI
4. Refractory Ventricular Failure
5. Complications of Acute MI [i.e. acute MR or VSD, or papillary muscle rupture]
6. Cardiogenic Shock
7. Support for diagnostic, percutaneous revascularization, and interventional procedures
8. Ischemia related intractable ventricular arrhythmias
9. Septic Shock
10. Intraoperative pulsatile flow generation
11. Weaning from bypass
12. Cardiac support for non-cardiac surgery
13. Prophylactic support in preparation for cardiac surgery
14. Post surgical myocardial dysfunction/low cardiac output syndrome
15. Myocardial contusion
16. Mechanical bridge to other assist devices
17. Cardiac support following correction of anatomical defects

F. Contraindications
1. Severe aortic insufficiency
2. Abdominal or aortic aneurysm
3. Severe calcific aorta-iliac disease or peripheral vascular disease
4. Sheathless insertion with severe obesity, scarring of the groin, or other contraindications to percutaneous insertion

Please Refer to the Instructions for Use Prior to Insertion of the IAB
Module II

Technical Aspects
I. Intra-Aortic Balloon Catheter

A. Designed for sheathless or sheathed insertion
B. Clinical Considerations for Central Aortic Pressure Monitoring

PRECAUTION: For optimal signal quality, use no more than 8 feet (2.5 meters) maximum of pressure tubing between the transducer and female luer hub of the Y-fitting.

When monitoring pressure through the inner lumen, use a standard arterial pressure monitoring apparatus connected to a three-way stopcock. Connect the three-way stopcock to the female luer hub of the inner lumen. A 3cc/hour continuous flow through the inner lumen is recommended. The anticoagulation dosage should be in accordance with standard hospital practice for arterial pressure lines and may be modified, on physician discretion, for patients receiving anticoagulation therapy. Per hospital policy, a fast forward flush may be performed hourly to help maintain patency of the inner lumen.

PRECAUTIONS DURING PRESSURE MONITORING THROUGH IAB CATHETER

1. Use a standard flushing apparatus for arterial pressure monitoring with the inner lumen. Careful technique should be used in the set up and flushing of the arterial pressure monitoring apparatus to minimize the risk of an embolus entering the aorta where it could potentially enter the carotid or coronary arteries.
2. Aspirate and discard a 3cc volume of blood from the inner lumen prior to attaching a flushing apparatus to the female luer hub.
3. Ensure that all air bubbles are removed from the inner lumen and flushing apparatus. In addition, tap the Y-fitting to remove all air bubbles.
4. Prior to fast flushing, stop IAB pumping to reduce the risk of an embolus entering the aortic arch should an embolus be ejected from the inner lumen.
5. For optimal signal quality the inner lumen should not be used for blood sampling.
6. Always aspirate 3cc initially if the inner lumen aortic pressure line or the inner lumen becomes damped. If you meet resistance during aspiration, consider the inner lumen to be occluded. Discontinue the use of the inner lumen by placing a luer cap on the female luer hub.
7. The use of in-line filters or other devices can potentially alter the appearance of the arterial pressure waveform.
8. Do not over-tighten connections.

RECOMMENDATIONS FOR ACHIEVING OPTIMAL PRESSURE SIGNAL QUALITY

1. Use no more than 8 ft. (2.5 m) of a low compliance pressure tubing such as that supplied by Datascope in the IAB Insertion Kit between the transducer and Y-fitting of the catheter.
2. Once the catheter is in place, aspirate and discard 3cc of blood from the inner lumen and then immediately perform a manual flush using a syringe filled with 3cc to 5cc of flush solution. This will minimize the chances of stagnant blood clotting in the inner lumen.
3. Apply only gentle force to the syringe when aspirating the inner lumen.
4. Do not use a R.O.S. E. (Resonance Over Shoot Eliminator) or other damping device.
5. Remove air from flush bag prior to pressurizing.
6. Prime the pressure set-up using gravity flush.
7. Maintain 300 mmHg of pressure on the flush solution and elevate it above the transducer.
8. Whenever the inner lumen of the IAB becomes filled with blood (such as after aspiration), the flush valve should be activated for a minimum of 15 seconds in addition to the time it takes to clear the pressure tubing of blood.
9. Ensure that all air bubbles are removed from the inner lumen and flushing apparatus.
10. Use room temperature flush solution.
II. Technical Components of the CS100 Intra-Aortic Balloon Pump
A. Rear Panel

1. Safety Disk/Condensate Removal System
   a. DC Input
   b. IAB Fill Port
   c. Drain Port

2. Helium Supply
   a. Pressure Gauge
   b. Manual Fill Port

3. Patient Connections
   a. ECG
   b. Pressure
   c. Monitor Input
   d. ECG/Pressure Output

4. Data Communications Outputs
   a. RS-232
   b. Phone Line
   c. Diagnostic Output

5. Power Cord/Mains

6. System Timer
B. Monitor CS100

1. Alarm Messages
2. Advisories
3. ECG
   a. Lead
   b. Gain
4. Pressure Source
5. IAB Fill Mode
6. Slow Gas Alarm Status
7. Operation Mode
8. IAB Status Indicator
9. Trigger
10. Heart Rate Display
11. Pressure Display
12. Augmentation Alarm
13. Battery Indicator
14. Helium Indicator
C. CS100 IABP Key Pad Controls

1. Operation Mode Keys
   a. AUTO
   b. Semi-Auto
   c. Manual

2. Zero Pressure Key

3. START key and Indicator

4. STANDBY Key and Indicator

5. Trigger Source Key
   a. ECG
   b. Pressure
   c. Pacer V/AV
   d. Pacer A
   e. Internal

6. IAB Frequency

7. IAB Augmentation

8. IAB Inflation Controls

9. IAB Deflation Controls
D. CS100 Key Pad Control Panel
   1. Alarm Mute Key
   2. IAB Fill Key
   3. Help Key Indicator
   4. Menu Guide
      a. Ref Line
      b. Aug. Alarm
      c. ECG/AP Sources
      d. Pump Options
      e. User Preferences
   5. Inflation Interval Key
   6. Freeze Display Key
   7. Print Strip Key
E. Recorder
1. ECG
2. Pressure
3. Balloon Pressure Waveform
F. System Battery
   1. Charge Status
   2. Portable Operation

G. Doppler Storage
The inflation marker shows the period of inflation. Vertical timing marks located below the arterial waveform are also available to aid with initial timing.

A unique automatic timing algorithm allows effective balloon pumping even during atrial fibrillation. Press the Inflation Interval key to observe the period of inflation while pumping. Vertical markers located below the arterial waveform and the highlighted portion indicate the period of balloon inflation.
III. Troubleshooting

A. Alarm Messages

1. Trigger Alarms
   
   AUTO Operation Mode
   a. No Trigger
   b. Poor Signal Persists
   
   Semi-Auto or Manual Operation Modes
   a. No Trigger
   b. No Pressure Trigger
   c. Check Pacer Timing
   d. Trigger Interference

2. Catheter Alarms
   a. Leak in IAB Circuit
   b. Rapid Gas Loss
   c. IAB Disconnected
   d. Check IAB Catheter
   e. Blood Detected
   f. AutoFill Failure - No Helium
   g. AutoFill Failure
   h. AutoFill Required

3. Pneumatic Alarms
   a. High Drive Pressure
   b. Low Vacuum

4. System Surveillance Alarms
   a. Electrical Test Fails Code # ________________
   b. System Failure
   c. Safety Disk Test Fails
B. Advisory Messages

1. Alert Messages

**AUTO Operation Mode**
a. Poor Signal Quality
b. No Pressure Source Available
c. Unable to Update Timing

**Semi-Auto or Manual Operation Modes**
a. Irregular Pressure Trigger
b. Verify Proper Timing
c. ECG Detected
d. IAB Not Filled
e. Manual Fill IAB

**All Operation Modes**
a. Prolonged Time in Standby
b. Maintenance Required Code # _________________
c. No Patient Status Available
d. Low Helium
e. Low Battery
f. Low Battery [EXT]

2. Status Messages

**AUTO Operation Mode**
a. Function Unavailable in the AUTO Operation Mode

**Semi-Auto and Manual Operation Modes**
a. Automatic Operation Mode is Disabled
b. Gas Loss and Catheter Alarms Disabled
c. Auto R-Wave Deflate
d. R-Wave Deflate

**All Operation Modes**
a. System Trainer
b. System Test OK
c. Autofilling
d. Leak Testing Safety Disk
e. Slow Gas Alarm Is Off
f. Battery in Use
g. Battery in Use [EXT]

3. Prompt Messages

a. Unplug Disk Outlet
b. Plug Disk Outlet
c. Manual Fill IAB
C. Patient Conditions
   1. Atrial Fibrillation
   2. Ectopics
   3. Cardiac Arrest
   4. Cardioversion/Defibrillation

D. Changing Helium Tank

E. Safety Disk Leak Test

F. Manual Fill

G. Manual Timing
IV. Normal Balloon Pressure Waveform

- Peak Inflation (Positive Overshoot)
- Plateau (Full Inflation of IAB)
- IAB Inflation
- IAB Deflation
- Zero Baseline
- Return to Zero Baseline
- Peak Deflation (Negative Overshoot)
A. Variations in Balloon Pressure Waveforms

Variations in balloon pressure waveforms may be due to the following conditions:

1. Heart Rate

**Bradycardia**
Increased duration of plateau due to longer diastolic phase.

**Tachycardia**
Decreased duration of plateau due to shortened diastolic phase.

2. Rhythm

Varying R-R intervals result in irregular plateau durations.

3. Blood Pressure

**Hypertension**
Increased height or amplitude of the waveform.

**Hypotension**
Decreased height or amplitude of the waveform.
4.  **Gas Loss**

Leak in the closed system causing the balloon pressure waveform to fall below zero baseline. This may be due to a loose connection, a leak in the IAB catheter, H₂O condensation in the external tubing, or a patient who is tachycardiac and febrile which causes increased gas diffusion through the IAB membrane.

5.  **Catheter Kink**

Rounded balloon pressure waveform, loss of plateau resulting from a kink or obstruction of shuttle gas. This may be caused by a kink in the catheter tubing, improper IAB catheter position, sheath not being pulled back to allow inflation of the IAB, the IAB is too large for the aorta, the IAB is not fully unwrapped, or H₂O condensation in the external tubing.

6.  **Sustained Inflation**

Theoretical possibility if the IAB remains inflated longer than 2 seconds. System 90 Series intra-aortic balloon pump will activate the System Failure alarm and deflate the IAB.
Datascope CS100 IABP Performance Checklist

Name: ____________________________ Date: ____________________

Date and initial the following as completed:

Review of hospital policy and procedures: ____________________________

Attends IABP Seminar: ____________________________

Written exam taken: ____________________________ Score: ____________________________

For the following: indicate 1 for Satisfactory, 2 for Repeat Performance Necessary.

<table>
<thead>
<tr>
<th>Initial Set Up</th>
<th>System Trainer</th>
<th>Clinical</th>
<th>Instructor Initials</th>
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</thead>
<tbody>
<tr>
<td>Establish Power, verify Mains power switch On &amp; IABP On/Off switch ON</td>
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<tr>
<td>Establish Gas Pressure</td>
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<tr>
<td>Establish ECG and Pressure</td>
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<tr>
<td>Zero Transducer</td>
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<td></td>
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<tr>
<td>Confirm Initial Control Settings</td>
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</tr>
<tr>
<td>a. IABP controls</td>
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<td>b. Auxiliary controls</td>
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<td>c. Override controls</td>
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<tr>
<td>Initial Timing</td>
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<tr>
<td>Identify Inflated Point</td>
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<tr>
<td>Identify Deflated Point</td>
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<tr>
<td>Fill the IAB Catheter and Initiate Pumping</td>
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<tr>
<td>a. Attach IAB to appropriate connector</td>
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<tr>
<td>b. Attach connector to safety disk/condensate removal module</td>
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<tr>
<td>c. Press START – observe for the “Autofilling” message</td>
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<tr>
<td>d. Verify optimal augmentation</td>
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<tr>
<td>e. Fine tune deflation timing</td>
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<td></td>
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<tr>
<td>f. Assess hemodynamic benefits</td>
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<tr>
<td>1. augmentation</td>
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<tr>
<td>2. afterload reduction</td>
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<tr>
<td>g. Record pressures</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1. assisted</td>
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<tr>
<td>2. unassisted</td>
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Troubleshooting

For the following sections indicate 1 for SATISFACTORY OR 2 FOR REPEAT PERFORMANCE NECESSARY:

SCORE:

A. TRIGGER - DEMONSTRATES ABILITY TO IDENTIFY VARIABLE TRIGGER SELECTION CRITERIA AND APPROPRIATE USE OF EACH TRIGGER

WHICH TRIGGER IS THE MOST APPROPRIATE FOR:

- 1. Atrial Fibrillation
- 2. Demand Ventricular Pacemaker, Rate 60
- 3. AV sequential pacemaker, demand mode
- 4. Unobtainable ECG signal, regular rhythm, BP 100/50
- 5. Cardiac arrest with good chest compressions
- 6. Sinus Tachycardia
- 7. Sinus Rhythm with frequent PVCs
- 8. Fixed rate AV sequential pacemaker
- 9. Atrial pacemaker - 100% paced

B. IAB CATHETER - DEMONSTRATES UNDERSTANDING OF SITUATIONS THAT MAY CAUSE AN IAB CATHETER ALARM AND DESCRIBES APPROPRIATE INTERVENTION

DESCRIBE WHY THE FOLLOWING SITUATIONS MAY CAUSE AN IAB CATHETER ALARM

- 1. Pt. sitting straight up in bed
- 2. IAB has not exited the sheath

C. GAS LOSS - IDENTIFIES AND RECOMMENDS APPROPRIATE ACTION FOR POTENTIAL LOSS OF HELIUM

- 1. What does blood in the IAB catheter shuttle gas tubing indicate
- 2. Describe the nursing considerations that would be involved
- 3. What status message would appear if the IAB catheter became disconnected from the console

D. DEMONSTRATES UNDERSTANDING OF THE HEMODYNAMIC RELATIONSHIP BETWEEN THE PATIENT AND IABP THERAPY

DESCRIBE WHY THE FOLLOWING FACTORS WOULD CAUSE THE DIASTOLIC AUGMENTATION ALARM TO SOUND:

- 1. Increased heart rate
- 2. Decrease in patient stroke volume
- 3. Ectopy
- 4. Decrease in patient BP
- 5. Decreased SVR
E. TIMING - RECOGNIZES, INDICATES POTENTIAL CLINICAL IMPLICATIONS, AND DEMONSTRATES APPROPRIATE INTERVENTION FOR THE FOLLOWING:

__ 1. Early inflation
__ 2. Late inflation
__ 3. Early deflation
__ 4. Late deflation

F. MISCELLANEOUS

1. PORTABLE OPERATION:
   a. Initiates and terminates portable operation
   b. Identifies location of battery charge light

2. SLAVE CABLES: (IF APPLICABLE)
   a. Identifies location and use of ECG and/or pressure cables
   b. Describes proper use of ECG slave cable in the presence of pacemakers

INSTRUCTOR SIGNATURE: ________________________________________________

COMMENTS: ___________________________________________________________

__________________________________________________________

__________________________________________________________
Module III

Clinical Considerations
I. Side Effects/Complications

II. Weaning and Removal
   A. Frequency
   B. Balloon Augmentation

III. Nursing Care Kardex/System Review Care Plan

IV. Critical Pathway/Clinical Progression

V. Considerations for Transport
# I. Side Effects and Complications of IABP Therapy

<table>
<thead>
<tr>
<th></th>
<th>Assessment</th>
<th>Prevention</th>
<th>Treatment Options</th>
</tr>
</thead>
</table>
| 1. Limb Ischemia | • Check distal pulses, color, temp. and capillary filling Q30 min x 2 hrs, then Q2 hrs.  
• Monitor differential toe temperatures. | • Use smallest sheath/catheter sizes indicated.  
• Risk factors: female, diabetics, peripheral vascular diseases.  
• Select limb with best pulse. | • Remove sheath and observe for bleeding.  
• Subcutaneous Xylocaine injection for arterial spasm.  
• Change insertion site to opposite limb.  
• Bypass graft femoral artery. |
| 2. Excessive bleeding from insertion site | • Observation - anteriorly and posteriorly for blood or hematoma. | • Careful insertion technique.  
• Monitor anticoagulation therapy.  
• Prevent catheter movement at insertion site. | • Apply pressure. Assure distal flow.  
• Surgical repair. |
| 3. Thrombocytopenia | • Daily platelet count. | • Avoid excessive heparin. | • Replace platelets as needed. |
| 4. Immobility of balloon catheter. | • **DATASCOPE RECOMMENDS THAT THE IAB NOT BE LEFT IMMOBILE IN THE PATIENT FOR MORE THAN 30".**  
• Observation of IAB status indicator movement.  
• Observation of augmentation. | • Maintain adequate trigger.  
• Observe movement of IAB Status indicator.  
• If unable to inflate the IAB with the IABP, inflate and deflate the IAB by hand, using a syringe and stopcock once every 3-5 min. | • Notify the physician if the IAB is immobile for > 30". |
<table>
<thead>
<tr>
<th></th>
<th>Assessment</th>
<th>Prevention</th>
<th>Treatment Options</th>
</tr>
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<tbody>
<tr>
<td>5.</td>
<td>Balloon leak</td>
<td>Do not remove the IAB from its tray until it is ready to be inserted.</td>
<td>If blood is observed in the pneumatic tubing, disconnect the balloon from the IABP and notify the physician immediately.</td>
</tr>
<tr>
<td></td>
<td>• Observe tubing for blood with or without the presence of a blood detect, low augmentation, and/or gas loss or IAB catheter alarm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Infection</td>
<td>Sterile technique during insertion and dressing changes as per infection control policy.</td>
<td>Antibiotics.</td>
</tr>
<tr>
<td></td>
<td>• Observation of insertion site.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Blood cultures for symptoms of infection.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Assess for pain between shoulder blades.</td>
<td></td>
<td>Surgical repair.</td>
</tr>
<tr>
<td></td>
<td>• Daily hematocrit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If suspected, aortogram may be indicated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Compartment syndrome may develop after IAB removed.</td>
<td>Use the smallest catheter/sheath appropriate.</td>
<td>Fasciotomy if necessary.</td>
</tr>
<tr>
<td></td>
<td>• Observation of limb for swelling and/or hardness.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>• Measure calf girth.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Monitor interstitial pressure.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Plan of Care for IABP Patient

**Vital Signs:**
- Monitor Q15'-Q30' until stable
- Including hemodynamic parameters
- Heart Rate
- Mean Arterial Pressure
- CVP
- Pulmonary Artery Pressure
- Pulmonary Capillary Wedge Pressure
- Note and record: Cardiac Output/Cardiac Index
  
  **System Vascular Resistance**

**Notify physician if:**
- Accepted hemodynamic parameters deviate
- Significant change ABG studies or chest film afterload
- Low urine output < 30cc/hr
- Signs of limb ischemia
- IABP non-functioning > 15"  

**Special Treatment Needs:**
- Note and record quality of pedal pulses Q30" after insertion x 2H, then Q2H
- Change IABP dressing - PRN with sterile technique
- Utilize air mattress/heel protectors PRN
- Maintain anti-coagulant protocol
- Observe for side effects/complications of IABP
- Routine care associated with:
  - Respiratory and O₂ therapy
  - N-G tube
  - Hemodynamic monitoring lines
  - Chest tube
  - IV’s
  - Foley catheter

**IABP:**
- Refill IAB Q2H/PRN
- Maintain optimal augmentation
- Reduction by adjusting timing PRN
- Zero transducer PRN
- Note placement IAB on chest X-ray
- Change Helium tank PRN

**IABP:**
- Refill IAB Q2H/PRN
- Maintain optimal augmentation
- Reduction by adjusting timing PRN
- Zero transducer PRN
- Note placement IAB on chest X-ray
- Change Helium tank PRN

**Intake/Output:**
- Q1H (Strict)
- Urine Specific Gravity - Q8H
- Sugar/Acetone PRN

**Activity:**
- Bedrest with log rolling
- Do not elevate HOB > 30°-45°
- Do not flex balloon leg at groin or knee
- Utilize fracture bedpan
- ROM Q8H to uninvolved extremity
- Dorsiflexion of involved foot

**Diet:**
- NPO - clear liquid - soft as tolerated
- Supplemental nutritional support
- Tube feedings - hyperalimentation

**Respiratory Therapy:**
- Evaluate breath sounds Q4H & PRN
- Routine respiratory care of patient with endo tube/trach
- Sterile suction technique
- Modified respiratory therapy
- Coughing and deep breathing, incentive spirometry and nasotrachial suctioning may be utilized

**Daily Lab Work/PRN Blood Work:**
- SMA - 18 QD
- Monitor K⁺, BUN, creatinine closely PRN
- Cardiac enzymes CPK, isoenzymes QD
- CBC with Diff. QD/PRN
- Platelets, PT, PTT, clotting times QD/PRN
- ABG - monitor closely QD/PRN
- Chest X-ray QD
- Urine and serum osmolarity - QD
- EKG QD - rhythm strips PRN
- Blood, urine and sputum cultures for temperature 102°

---

<table>
<thead>
<tr>
<th>Unit Number:</th>
<th>Bedspace:</th>
<th>Name:</th>
<th>DX:</th>
<th>Physician:</th>
</tr>
</thead>
</table>

---

41
Nursing Care of the Patient on an Intra-Aortic Balloon Pump

<table>
<thead>
<tr>
<th>System</th>
<th>Potential Problems</th>
<th>Nursing Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac</td>
<td>Left Ventricular Failure</td>
<td>Monitor Vital Signs q15-30&quot; until stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blood Pressure MAP, Syst, DA, AOEDP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heart Rate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PCWP/LAP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardiac Output/Cardiac Index</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CVP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SVR (Systemic Vascular Resistance)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintain Optimal Diastolic Augmentation and Afterload Reduction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintain Clarity of ECG Pattern Serving as Trigger</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rhythm Strips prn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 Lead ECGs QD and prn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cardiac Enzymes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check Pacer Function</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Caution: In the event of Asystole, assure balloon movement by placing Trigger on ECG, Arterial Pressure or Internal (bear in mind a Mean Arterial Pressure of about 50 mmHg is required to visualize augmentation).</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Pulmonary Edema</td>
<td>Monitor ABGs closely prn</td>
</tr>
<tr>
<td></td>
<td>Pulmonary Emboli</td>
<td>Observe Chest X-ray QD</td>
</tr>
<tr>
<td></td>
<td>Atelectasis</td>
<td>Lung fields</td>
</tr>
<tr>
<td></td>
<td>Pneumonia</td>
<td>Balloon position</td>
</tr>
<tr>
<td></td>
<td>Pleural Effusions</td>
<td>Provide appropriate ventilatory support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard respiratory care on intubated patient with sterile suctioning technique</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-extubation, modified respiratory therapy is utilized</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deep breathing, coughing, chest physiotherapy and naso-tracheal suctioning may be used</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elevate HOB 30°</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Turning (if hemodynamically stable) cautiously</td>
</tr>
<tr>
<td>Neurological</td>
<td>Altered Level of Consciousness</td>
<td>Neurological assessment q2h/prn</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>Psychosis</td>
<td>(Pupils, LOC, motor function)</td>
</tr>
<tr>
<td></td>
<td>Over Sedation</td>
<td>Appropriate sedation</td>
</tr>
<tr>
<td></td>
<td>Cerebral Embolization</td>
<td>Normalization of environment (TV and radio, if appropriate)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uninterrupted rest periods are essential to these patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emotional support regarding fears and anxieties should be provided to patient and family</td>
</tr>
</tbody>
</table>
### Nursing Care of the Patient on an Intra-Aortic Balloon Pump

<table>
<thead>
<tr>
<th>System</th>
<th>Potential Problems</th>
<th>Nursing Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal</td>
<td>Prerenal Failure</td>
<td>Observe urine output q1h&lt;br&gt;Notify physician if &lt; 30cc or &gt; 200 cc/hr. In absence of diuretics or fluid challenge</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td></td>
<td>Observe patient’s fluid volume status - Intake and output&lt;br&gt;Daily Serum K⁺, BUN, Creatinine or Blood chemistries qd/prn&lt;br&gt;Daily weight&lt;br&gt;Urine Specific Gravity q8h&lt;br&gt;Urine Electrolytes and Osmolarity qd&lt;br&gt;Note appearance of urine&lt;br&gt;Watch for signs of urinary tract infection&lt;br&gt;Check position of IAB catheter on chest film</td>
</tr>
<tr>
<td>Vascular</td>
<td>Peripheral Ischemia</td>
<td>Check peripheral pulse (q15” x 1 hr, then q2h post-insertion)&lt;br&gt;Pedal, Posterior Tibial, Popliteal</td>
</tr>
<tr>
<td>Thrombocytopenia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peripheral Embolism</td>
<td></td>
<td>Observe color and temperature of involved leg q2h&lt;br&gt;Maintain anticoagulation protocol:&lt;br&gt;Heparin&lt;br&gt;Aspirin&lt;br&gt;Rheomacrodex&lt;br&gt;Observe coagulation studies: PT, PTT, Platelets, Hbg and Hct&lt;br&gt;Observe for side effects of anticoagulation therapy: petechiae, ecchymosis, excessive bleeding from catheter insertion sites&lt;br&gt;Avoid flexing the patient’s hip and knee of involved leg due to IAB catheter&lt;br&gt;Apply anti-embolism stockings to non-involved leg</td>
</tr>
<tr>
<td>Immunologic</td>
<td>Wound Infection</td>
<td>Monitor temperature&lt;br&gt;Observe WBC&lt;br&gt;Maintain antibiotics&lt;br&gt;Change IAB dressing qd - strict sterile technique&lt;br&gt;Maintain “Best Practice” for all hemodynamic lines and observe for drainage&lt;br&gt;Culture appropriate sites including blood, urine and sputum if specific signs and symptoms of infection process are present.</td>
</tr>
</tbody>
</table>
# Nursing Care of the Patient on an Intra-Aortic Balloon Pump

<table>
<thead>
<tr>
<th>System</th>
<th>Potential Problems</th>
<th>Nursing Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastro-intestinal</td>
<td>Nutritional</td>
<td>May have diet as tolerated (clear liquid/soft)</td>
</tr>
<tr>
<td></td>
<td>Stress Ulceration</td>
<td>Hyperalimentation or tube feedings may be necessary with prolonged intubation</td>
</tr>
<tr>
<td></td>
<td>Paralytic Ileus</td>
<td>Measure abdominal girth q8h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assess bowel sounds q8h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observe for abdominal distention. Use stool softeners and fracture bedpan as appropriate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Portable KUB X-ray may be required without interrupting IABP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naso-Gastric tube if appropriate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naso-Gastric drainage q8h for occult blood</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide appropriate antacid regimen</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>Thrombosis</td>
<td>ROM - Active and Passive to uninvolved leg</td>
</tr>
<tr>
<td></td>
<td>Decubitus Ulcer</td>
<td>Dorsiflexion of foot on involved leg</td>
</tr>
<tr>
<td></td>
<td>Foot Drop</td>
<td>Turn (log roll) q1-2h – cautiously if hemodynamically stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Apply air mattress and utilize heel and elbow protectors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use footboard or high top tennis shoes to prevent foot drop</td>
</tr>
<tr>
<td>Patient and Family</td>
<td>Family anxiety</td>
<td>Reinforce simple explanation to patient and family</td>
</tr>
<tr>
<td>Teaching</td>
<td>Late Distal Emboli</td>
<td>Discharge planning – communication of progress to nursing floor</td>
</tr>
<tr>
<td></td>
<td>Late Aortic Dissection</td>
<td>Observe for and instruct in manifestations of late peripheral ischemia or emboli</td>
</tr>
<tr>
<td>Cardiac Assist</td>
<td>Mechanical Function of IABP</td>
<td>Note and record settings according to hospital policy</td>
</tr>
<tr>
<td>Device</td>
<td></td>
<td>Obtain optimal diastolic augmentation and optimal afterload</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduction prn</td>
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<tr>
<td></td>
<td></td>
<td>Notify physician of difficulty</td>
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<tr>
<td></td>
<td></td>
<td>Prevent inflation of IABP during Ventricular Ejection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintain adequate ECG and arterial trace</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change Helium tank prn</td>
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<tr>
<td></td>
<td></td>
<td>Note IAB autofill q2h/refill prn</td>
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<tr>
<td></td>
<td></td>
<td>Watch for signs of balloon leak: frequent loss of augmentation, blood in extender tubing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If IAB catheter is immobile for greater than 30 minutes, notify physician for appropriate intervention</td>
</tr>
</tbody>
</table>
## Critical Pathway of the Intra-aortic Balloon Pump Patient

<table>
<thead>
<tr>
<th></th>
<th>Insertion</th>
<th>Pumping</th>
<th>Weaning</th>
<th>Removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Work</td>
<td>H&amp;H, pt, ptt</td>
<td>Platelet count, WBC</td>
<td>Prior to removal, obtain: H&amp;H, pt, ptt, platelet count</td>
<td></td>
</tr>
<tr>
<td>Diagnostic Procedures</td>
<td>Fluoroscopy Portable CXR</td>
<td>Routine CXR qd, radiopaque tip at 2nd to 3rd ICS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatments</td>
<td>Shave and prep both potential insertion sites</td>
<td>Monitor insertion site frequently. Arterial line care per policy. Dressing change per policy.</td>
<td>Pressure applied and site dressed per policy.</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Maintain bed rest: Do not raise HOB &gt; 30 degrees. Do not flex or bend the leg in which the IAB was inserted. Assist the patient with log rolling and positioning.</td>
<td></td>
<td>Bed rest per policy. OOB as tolerated.</td>
<td></td>
</tr>
<tr>
<td>Nutrition</td>
<td>Will depend on the patient’s condition and the indication for IAB insertion.</td>
<td></td>
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</tr>
</tbody>
</table>

### Nursing Interventions
- Assess patient and monitor hemodynamic alterations per ICU routine.
- Administer IV fluids, vasodilator and/or inotropic agents per orders.
- Assess patient for pain or discomfort and medicate per physician order.
- Assess vascular status (color, sensation and movement) as well as pulse quality (pedal, posterior tibial, popliteal, femoral, and radial bilaterally).
  - *Note:* diminished left radial pulse may indicate IAB migration.
- Maintain anticoagulation protocol per physician order and observe for side effects.
- Encourage deep breathing.
- Assist the patient with turning and positioning at least q2h.
- Observe for urine output > 30cc/hr
  - *Note:* urine output < 30cc/hr may be an indication that the IAB is occluding the renal arteries.
- Assure IAB movement, verify IABP controls in accordance with hospital policies.
  - *Note:* IAB should not remain immobile for > 30 minutes in situ.
  - *Note:* change of pedal pulses in affected leg could be a sign of limb ischemia.

### Patient Teaching
- Educate the patient and family members on IABP therapy utilizing the patient education brochure.
- Explain each phase of the IABP process. Instruct patient to:
  - apply pressure to insertion site if they should cough or sneeze
  - report any chest pain or heaviness
  - report any pain, numbness or tingling in their arms or legs
## Critical Pathway of the Intra-aortic Balloon Pump Patient

<table>
<thead>
<tr>
<th>Expected Outcomes</th>
<th>Insertion</th>
<th>Pumping</th>
<th>Weaning</th>
<th>Removal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patient and family will have adequate knowledge base of IABP therapy.</td>
<td>Relief of patient and family anxiety.</td>
<td>The patient will experience clinical improvement from the IAB by:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- increasing the supply of myocardial oxygen</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- decreasing the demand for myocardial oxygen</td>
<td></td>
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<td></td>
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<td></td>
<td>This will be evidenced by:</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- increased cardiac output</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>- increased MAP</td>
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<td></td>
<td>- decreased PAP/PCWP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- decreased chest pain</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Smooth progression through IABP therapy.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Patient hemodynamically stable.</td>
<td></td>
</tr>
</tbody>
</table>

The foregoing is intended to serve as a guideline for the development of a critical pathway. It is not a recommendation from Datascope Corp.
## Clinical Progression - Intra-aortic Balloon Pump Therapy

<table>
<thead>
<tr>
<th>Description of Phases</th>
<th>Insertion</th>
<th>Pumping</th>
<th>Weaning</th>
<th>Removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A balloon is positioned in your aorta after being introduced through an artery.</td>
<td>The IABP shuttles gas from the console to the balloon and is timed with your heart beat.</td>
<td>Decreasing the amount of assistance your heart needs from the IABP</td>
<td>Removing the balloon from your artery.</td>
<td></td>
</tr>
</tbody>
</table>

### Teaching

Most insertions of the IAB can be completed in approx. 15 minutes. The insertion site will be numbed prior to insertion. During the insertion, you may feel some pressure at the insertion site.

The IABP is helping your heart but not beating for it. Pumping will stop every 2 hours for a short period of time. This is normal.

The amount of time it takes to wean varies for each patient.

Removal is typically done at the bedside and only takes a few minutes to complete.

### Activity

**Bed Rest**
- To ensure that the IAB remains in the proper position, you should not sit up or attempt to get out of bed.
- The leg in which the IAB is inserted should not be bent or flexed.

Your nurse will assist you with turning and changing your position. Take deep breaths frequently.

Once the IAB is removed, you will remain in bed for a specific length of time depending on what your physician has ordered. This is usually 6-8 hours.

### Nursing Interventions

Your condition will be monitored according to ICU routine. The nurse will assess your vital signs, which include:
- Heart rate and rhythm, blood pressure, respirations, pulse checks and other measurements as your condition warrants.

The insertion site will be checked frequently by your nurse. The dressing will be changed on a regular basis. Your nurse will give you pain medication. Please report any of the following:
- chest pain or heaviness, pain, numbness or tingling in your arms or legs.

Report any wetness at the insertion site.

### Diagnostic Procedures

Fluoroscopy (X-ray guidance) may be utilized during insertion. Chest X-ray will be done to verify placement of the IAB.

Routine chest X-rays will be obtained during IABP therapy.
Clinical Progression - Intra-aortic Balloon Pump Therapy

<table>
<thead>
<tr>
<th></th>
<th>Insertion</th>
<th>Pumping</th>
<th>Weaning</th>
<th>Removal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nutrition</strong></td>
<td>Your diet will depend on your condition and the reason the IAB was inserted.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lab Tests</strong></td>
<td>Blood tests will be obtained prior to the insertion.</td>
<td>Blood tests will be obtained as your condition warrants it.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The foregoing is intended to serve as a guideline for developing a clinical progression for IABP Therapy. It is not a recommendation from Datascope Corp.

Patient Questions
Comments

Patient Name
Date of IAB insertion
This clinical progression is an outline of what to expect for patients and families who require Intra-aortic Balloon Pump Therapy. The process will vary for each patient.
V. Considerations for Transport

A. Purpose of Transport Program

B. Planning the Transport Program
   1. Retrieval vs. Referral
   2. Coordinator of Transport Team

C. Transport Team
   1. Physician
   2. Nurse, IABP Technician

D. Transport Program Considerations
   1. Team Leader
   2. Liabilities
   3. Communication and Response Procedure
   4. Consent Form and Patient Chart
   5. Family Education
   6. Patient Management During Transport

E. Vehicle Used for Transport
   1. Ambulance
      a. power supply
      b. equipment on board
      c. ramp
      d. response time
   2. Aircraft
      a. power supply
      b. equipment on board

F. Equipment Considerations
   1. IABP Supplies
   2. Drugs
   3. Infusion Pumps
   4. Respiratory Care

G. Post Transport Considerations
   1. Equipment Check
   2. Follow-up
Reference List


Bibliography

Theory


Indications


Lazar, Harold L,.MD; et al, Role of Percutaneous Bypass in Reducing Infarct Size After Revascularization for Acute Coronary Insufficiency. Circulation 1991; 84 [suppl III]: III-416-III-421


McNamara NS, Wharton Jr TP, LaRochelle T, Deboard D. Use of intraaortic balloon counterpulsation in patients with acute myocardial infarction who present to community hospitals. Critical Pathways in Cardiology 2002 Sep;1(3):159-179


Complications


size intra-aortic balloon counterpulsation catheters based on 9,332 patients in the prospective Benchmark® Registry. Catheterization and Cardiovascular Interventions 2002;56(2):200-206


Insertion


Pediatrics


Transport


Nursing Care


Patacky MG, Garvin BJ, Schvirian PM. Intra-aortic Balloon Pumping and Stress in the Coronary Care Unit. Heart and Lung 1985 Mar;14(2):142-8


Shoulders O. Managing the Challenge of IABP Therapy. Critical Care Nurse 1991 Feb;11(2):60-76

Weinberg LA. Buying Time with an Intra-Aortic Balloon Pump. Nursing 1988 Sep;44-49
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PROGRAM AND SPEAKER EVALUATION

Managing IABP Therapy   Date: ____________________
Program Code 05

Please rate the program and speaker items by placing a mark in the appropriate column.

<table>
<thead>
<tr>
<th>Program Evaluation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program met the stated objectives</td>
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<tr>
<td>2. Content covered topic adequately</td>
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<td>3. Overall quality of this program</td>
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<td>4. Overall quality of speaker(s)</td>
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<td>5. Quality of the program facilities</td>
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<td>6. Program met my personal objectives</td>
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<td>7. I can incorporate program content into my practice</td>
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</tbody>
</table>

| Speaker Name: ____________________ |

<table>
<thead>
<tr>
<th>Speaker Evaluation</th>
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</thead>
<tbody>
<tr>
<td>1. Objectives – Stated learning objectives met</td>
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<td>2. Audiovisual – Contributed to presentation</td>
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<tr>
<td>3. Content – Relevance of content to objectives</td>
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<td>4. Presentation – Speaker qualified and held interest</td>
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<td>5. Effectiveness – Speaker was organized and effective</td>
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<td>6. Practice – Validated and/or changed practice</td>
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</tbody>
</table>

Comments:

| Participant Name: ____________________ |