

Season 3 Episode 9 - Intensive Care Devices: Part 2

Show Notes

PART II

INTENSIVE CARE DEVICES

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Intensive Care Devices: Part 2

This is the final episode for Season 3. Arterial lines, ventilators, central lines galore! Together with Acute Care Nurse Practitioner Sean Dent, Melissa and Kati discuss some tips and tricks for dealing with typical ICU devices.

Introduction to CRRT

- CRRT stands for Continuous Renal Replacement Therapy
- It is another form of dialysis treatment for a patient who is either in acute on chronic or acute renal failure.
- It is gentler to the body than HD (hemodialysis)
 - HD is anywhere from 2-6 hours
 - But CRRT is over 24 hour period at a trickle rate
- Best piece of advice Sean Dent can give with CRRT is to master the machinery that your facility utilizes.

- Over the years, he experienced 3 different machines. Each machine comes with its own set of troubleshooting and issues.
- The machine is dependent on the flow of the catheter.
 - It's a central venous catheter
- Treat it the same way you treat a central line.
 - Look for patency
 - Look for infection
 - Is it sutured into place?
 - Is it moving?
 - Is there pus coming out of the insertion site?
 - Is the dressing intact?

HD - Hemodialysis Catheters

Is the catheter the same for HD as it is for CRRT?

- **No, they are different.**
 - You cannot do CRRT through an AV Fistula
- There are different accesses for patients on chronic dialysis, which can be:
 - Fistula
 - Permacath - usually placed in the chest wall, but can also be in the femoral. You can't do CRRT with permacath either because it has to do with the flow.
 - Blood flow goes in one direction, through one catheter, when a dialysis nurse accesses an AV fistula they use 2 catheters - one for venous, one for arterial. But when you use a CRRT catheter, it has 2 separate ports. One is inflow and the other is outflow. There is no arterial and venous, the catheter sits in the vein.
- **If a patient was on CRRT can you use the same catheter for short term dialysis?**
 - No. They will need either a temporary dialysis catheter or they will need a more permanent dialysis catheter.
 - The catheters used for chronic dialysis are not the catheters used for CRRT.
- **New Nurses - What You Need to Know Before Taking CRRT / HD Certification Classes**
 - You have to work for a certain amount of time before you qualify to take the class.
 - You need to be comfortable with:
 - Stabilizing hemodynamics
 - Drips
 - Basal Pressures
 - Working with patients that are most of the time on the ventilator
- **Why CRRT Machines are Finicky**
 - They are very flow dependant
 - Any changes in the following things will sound an alarm:
 - Flow rate from outside to inside the patient
 - Is there a change in flow rate from the machine?

- Is there something going on with the filter?
 - Is there something going on with the catheter itself?
- The catheters are very positional.
 - You have a single catheter that has 2 lumens of equal size on both sides that have 2 separate ports.
 - One port is inflow, one is outflow, they are going at a high-pressure rate
 - Sometimes these flows - pushing fluids in and pulling fluids out - can cause the catheter to bump against the vessel.
 - Once that happens, you have to troubleshoot the machine until you've exhausted your efforts and then the staff nurses have to approach the provider to see if they can manipulate the catheter itself.

Impellas and Intra Aortic Balloon Pumps

What are they and are they the same thing?

- **Similarities**
 - They are both catheters
 - They are both inserted into the groin
 - They are inserted on different sides of the groin
 - Usually the balloon pump is on the left
 - The Impella is on the right
- **IABP - The Intra Aortic Balloon Pump**
 - It is an augmentation device to offset afterload
 - Afterload has to do with the systemic vascular resistance of the body which equates to your systolic blood pressure.
 - Afterload is "what is the heart pumping against?"
 - The IABP is going to pump or inflate at the end of diastole - allowing the heart to work a little less.
 - It is a temporary device
- **The Impella Device**
 - A ventricular assistive device.
 - A device to help with the strength of the EF - ejection fraction.
 - When someone has a cardiac event, and they have a cardiac stunning (like the heart got knocked out) it needs a little bit of time to wak up.
 - The Impella device helps the heart wake up without having to work overtime.
 - It does the same thing as an IABP, it just does it in a different part of the cardia cycle with a different part of the hemodynamic support.
- Both are treated the same way from an external perspective
 - Look at infection
 - Look at the ports
 - Look at bleeding
 - Looking for irritation

- Dressing changes
- The devices themselves have troubleshooting things you will have to learn to address
- Both work on timing mechanisms and how often they inflate and deflate in the cardiac cycle.
- As a bedside nurse, pay attention to how your patient responds to the treatment. If they become less stable, discuss it with the health care provider.
- Both of them are in the venous system
- Don't ever assume just because they have a pump in, that they will be anticoagulated in 24 or 48 hours as each surgeon or cardiologist treats it a little bit differently because of the patient's comorbidities and their disease process.
 - Someone who has a coagulopathy who has an unstable bleeding pattern, you won't anticoagulate them.
- Are patients that have these awake?
 - They can be.
- If the patient is awake, not vented, not sedated, what kind of considerations do you have to have?
 - They are going to have to lay flat
 - Most of the time, they can't sit up, because of the location of the catheter in the groin.
 - Best practice is to allow them to sit up maybe 20 or 30 degrees.
- Is there a complication related to the catheters, just by having them in place?
 - Catheters just being there can cause bleeding, hematomas, pseudoaneurysms
- Are these removed at the bedside?
 - They can be.
 - It all depends on the patient profile
 - Surgeons and interventionalists remove them.
 - The biggest concern is that you can have post-removal hypotension and bradycardia.

Internal Pacing

These are the different types of devices that help with internal pacing.

- Temporary Pacemakers
 - Internal pacing for someone who has an electrophysiology compromise
 - These are good for someone who is refractory bradycardia
 - Or someone who has sustained v-tac
 - You will need a temporary pacemaker to stabilize them until they can get a permanent pacemaker
 - These are also inserted into the groin
 - These are also very positional - the patient has to lay flat or maybe 10 degrees
 - These are monitored by the bedside nurses
 - This is a very specialized piece of equipment that requires additional training.

- Even if you haven't had the specific training, you can care for people who have pacemaker wires postoperatively if you have the correct support from other staff members. Always ask if you have any questions.

Proning Devices

What is proning? What are some devices? When will we run into this?

- Proning is - instead of someone laying on their back (which is called supine), you are going to lay them on their stomach.
- This is in extreme respiratory failure scenarios.
- ARDS - Acute Respiratory Distress Syndrome
 - Significant and severe respiratory distress
 - Leaky lung syndrome
 - Capillary membrane leaking
 - When lungs can't hold onto the water they need to and it leaks
- Prone therapy came out 12-15 years ago
- It has been proven that when you take a patient from laying on their back to laying on their stomach, it helps.
 - When you are laying on your back, the lung tissue that is closest to your nipples is receiving the most oxygen.
 - Fluid always travels down.
 - So if you are turned upside down, with your back toward the sky. Whatever is anterior will have oxygen now.
- Someone that needs to be prone is very sick, they are usually on a ventilator - this can be very difficult dealing with the tubes.
- They have created a specialty bed - [a rotoprone bed](#) - you clamshell them from top to bottom, then it spins on its axis so you can go from their back to their stomach without compromising the equipment.
- Evidence doesn't support the manner in which you leave them there.
 - How long? Do you lean them on right side? Left side?
 - No evidence supports what's better or worse.
- If you don't have a bed, you can "jerry rig" a set of pillows to put on their chest and above their head and around their head and manually flip them - with a LOT of support of course.
 - It usually takes about 10 people
 - Some to watch and handle the machines
 - 1-2 at each part of the patient - the head, the feet, the arms, etc
- Watch out for pressure ulcers when laying on the stomach
- The oscillator
 - Mostly used for babies
 - Can be used for adults with the flu who weren't ventilating well with other ventilation
 - Not used very often on adults

- Last ditch effort

Advanced Practice Provider - Favorite Device

What is your favorite device that you get to use?

- Ventilators
 - As a bedside nurse, they were scary and it became his goal to master them.
 - He always asked questions of people more advanced than him and learned how to master devices that once scared him.

Advice to New Nurses

- Stay uncomfortable - don't avoid those things that challenge you, that is how you grow

Non-Invasive Cardiac Monitors

The final device of the show will be non-invasive cardiac monitors

- You can monitor cardiac output from the outside in using an external device.
- You have some that you can put monitor leads on their chest wall.
- Some monitor calculations using an A-Line.
- They monitor:
 - Fluid volume status
 - Cardiac output
 - Cardiac index
 - Cardiac performance
- It's great for the bedside nurse because you manage that entire machine.