


Nursing Care of the ECMO Patient

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Staffing

ICU Leveling

Level 1 ICU: Vents, Swans, A-lines, Vasopressors/Sedatives, CRRT, Stabilized VADs/Transplant

Level 2 ICU: The entirety of level 1 plus; IABP; Stable Centrimag, Immediate Recovery of CABG/Valve

Level 3 ICU: The entirety of level 1&2 plus; Immediate Recovery of VADs/Transplants, ECMO, Unstable Admissions from Outlying Departments/Hospitals, Massive Transfusion Protocols

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Training

Didactic Class/Hands on Training- Initial

Discuss Pathophysiology that leads a patient to need the technology surrounding ECLS

- Pathophysiology and Indications for ECLS

- Patient selection

Describe techniques involved with ventilator management for patients undergoing ECLS therapy

- Advanced ventilator management

- Patho/phys of ARDS

Describe the interplay of the ECLS circuit in relation to drug therapies

- Drug properties, drug dosing, and routine monitoring during ECLS

- Anticoagulation

Apply knowledge gained from lecture to patient at the bedside

- ECLS equipment

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Training

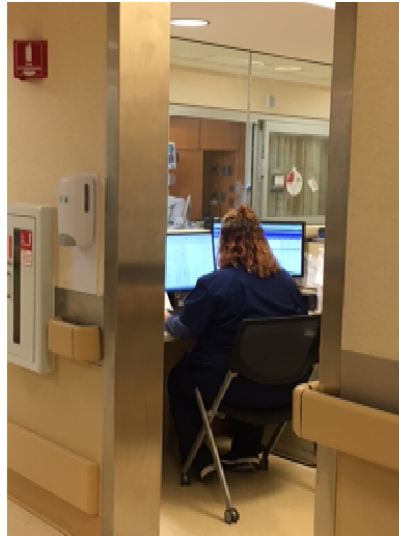
Ongoing



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We're Getting an ECMO.....

The process begins



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Preparing for Admission



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Handoff

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Patient Handoff: Cath Lab to ICU Checklist

Cath Lab Staff (Fellow or Attending)

Procedural:

- PMH/pre-admission events
- Allergies
- Physical Exam abnormalities
- Sheath Information (difficult stick, still in place, etc)
- Airway: (difficult or potentially difficult/method/mask ventilation)
- Invasive lines (locations/difficulty/concerns/abnormal placement)
- Key events (arhythmias/injuncts/significant hypotension)
- Fluid totals (crystalloid, colloid, blood products, urine output)
- Sedation/Analgesic medication concerns
- Paralytic Status (Neuromuscular blockade reversal given?)
- Intervention (ie, Stent/thrombectomy)
- Pacer: Yes or No
- Lab abnormalities (i.e. blood glucose, H/H, K+, etc)
- Coagulation status
- Post Procedure Orders placed
- Antiplatelet/Anticoagulation

Perfusion

- Flows, Setting, Fluid
- Reperfusion Catheter (DPC) in place

CT Surgery (Fellow, Attending, or PA)

- Flows, Setting, Fluid
- Reason/Details of Procedure - Cannulation (difficult placement)
- Hemodynamic Goals (BP, HR)
- Orders reconciled and accurate (IV gtt's)

ICU Team (Fellow or Attending & NP)

- Drip Reconciliation
- Respiratory Plan of Care (Vent wean, Inhaled agents)

Admitting RN

- Questions for the multidisciplinary team

In Conclusion: "We are most concerned about..."

V3 4 RHH GRM 10/01/18
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Bliss Maloney, RN

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OR TO ICU HANDOFF 4 RHH

PATIENT IN ROOM

↓

ESSENTIAL TASKS

↓

PATIENT IS STABLE

↓

STOP

**HANDS OFF
FOR
HANDOFF**

- Patient on Central Monitor
- Patient on Ventilator
- Bed Plugged In
- Call to UCA

PROCEED

- Release Orders (Pathway?)
- Verify IV Drips
- Connect CO Cable
- Chest Tubes to Suction
- Change ECG Leads
- Etc

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Immediate Needs

A, B, C

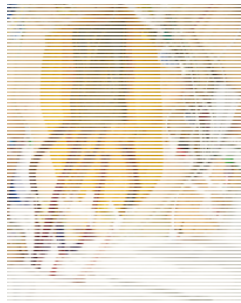


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Circulation

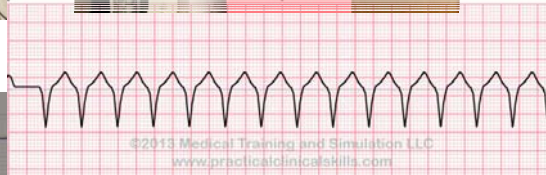
Sorting out the Lines, Tubes, and Drains



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Monitoring

Hemodynamics



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Monitoring

Massive Transfusion Protocol - MTP

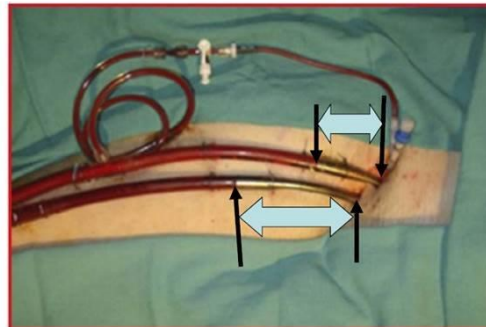
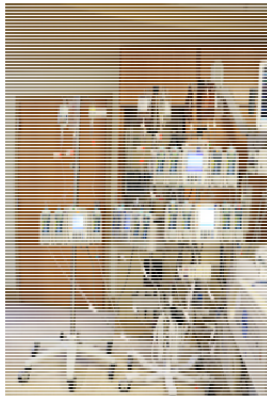


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Monitoring

Equipment

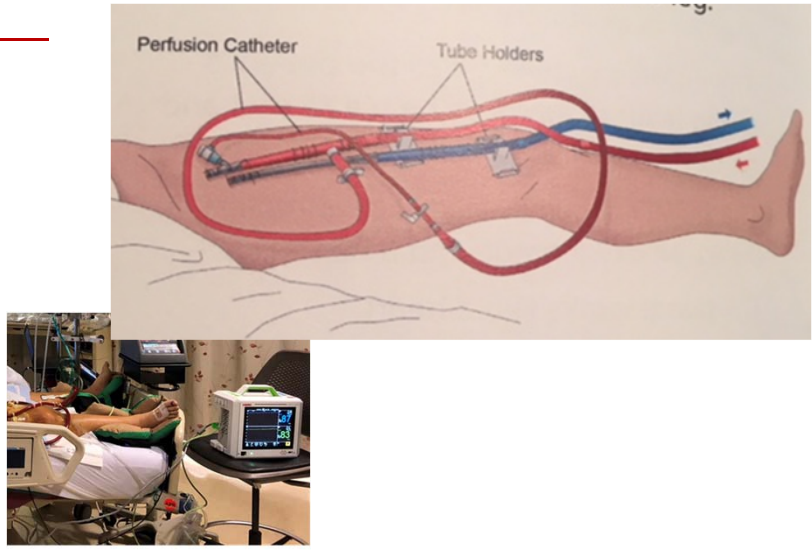
Nursing



Measure from insertion site to the end of the metal coil.

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Circulation/Neuro Checks



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We have to go where???

Transporting the ECMO patient



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Transportation Policy

System and Nursing

Appendix A: Patient Transport Guidelines	Patients who meet the following criteria may be transported without an RN accompanying	Equipment required for transport based on patient needs
<p>Patients with the following special care needs will be accompanied by an appropriately trained RN and/or Physician:</p> <ul style="list-style-type: none"> VAD (ICU status) [Physician Required] ECMO [Physician Required] Mechanical ventilation Intra-Aortic Balloon Pump Pulmonary artery catheter Arterial line catheter Vasovactive medications requiring titration or high dosages Dependence on continuous vasovactive medications for hemodynamic stability Infusion of blood products (in process) Monitored OR patients being transferred to monitored beds Ventricular Assist Devices Unstable cardiac rhythm Unstable vital signs Unstable respiratory status Uncontrolled chest pain within the past 12 hours Temporary pacing Active ETOH withdrawal symptoms such as: <ul style="list-style-type: none"> Acute agitation, unstable vitals, delirium/hallucinations, sedation, or any positive answer to current patient assessment questions regarding alcohol withdrawal. Unstable neurological status i.e. seizure activity Some high risk medications will require registered nursing transport for monitoring purposes. For specific medications such as chemotherapy etc., see monitoring parameters at Pharmacy website link. The following medications will require nursing transport: <ul style="list-style-type: none"> Continuous insulin drips Continuous cardiac drips Continuous Neuroleptic Blockade drips Pulmonary hypertension medications Any other patient condition that requires a monitored or accompanied transport for patient safety. Patient's monitoring needs during a test/procedure should be considered when traveling to an area where there are not adequate monitoring, defibrillation capabilities, or monitoring-qualified personnel to care for the patient. 	<ul style="list-style-type: none"> Patient on continuous ECG/ Telemetry Monitoring will be transported by either an RN or Patient Care Associate who is OSU staff, have completed arrhythmia recognition training, and have current BLS certification. Selection of appropriate patients for PCA transport will be on ECG/Telemetry Monitoring will be done using critical nursing judgment in conjunction with the guidelines outlined in the Transportation Policy. Patient is not on telemetry. Exception: Emergency Department (ED) EMT's who are OSU staff and have current ACLS certification, may transport telemetry monitored patients out of the ED to procedures or other units as delegated by the RN. Certain ED patient types should be transported by the RN and critical nursing judgment must be utilized prior to delegation of this duty. If for any reason the RN feels that an "unmonitored" transport or transport with a staff member other than an RN accompanying is not appropriate, arrangements will be made for patient monitoring. Inpatients in physical restraints, or on suicide precautions, or with a physician's order for a sitter, will always be accompanied off the patient care unit by a member of the nursing staff from the inpatient unit (MCA/PCA / LPN / RN) or a member of the medical staff (Nurse/Resident/Attending). Rehabilitation patients at Dodd Hall in physical restraints or on suicide precautions will always be accompanied off the patient care unit by a member of the nursing staff (PCA/ LPN/ RN). Transportation/PCA/ LPN/ RN Patients being transported on continuous oxygen will have portable oxygen applied with sufficient amount, by the inpatient nurse prior to transport and upon return from transport. Patients with a chest tube to suction must have an order to disconnect the chest tube from suction prior to transport. 	<ul style="list-style-type: none"> Cardiac monitor - ECG monitored / telemetry ordered Defibrillator - Unstable ventricular dysrhythmia Airway management equipment and resuscitation bag of proper size and fit for patient including face mask - for all intubated or respiratory compromised patients Oxygen source - continuous oxygen or ventilator with sufficient amount Portable BP cuff or BP monitoring module - potential instability, arterial line or lack of equipment in destination area SPO2 monitoring (pulse oximetry) Adequate replacement of IV fluids and continuous infusion medications (infusion pumps as needed) Additional medications to provide the patient's scheduled intermittent doses and to meet anticipated needs (i.e., sedation) with a physician order. Additional portable equipment as needed by patient (i.e., cap and portable suction) <p>Except in cases of emergency, the following cases Relative Contraindications for Transport</p> <ul style="list-style-type: none"> Hemodynamic instability: defined as the inability to maintain mean arterial pressure greater than 65 without vasovactive medication support (Level VII) Oxygen requirement greater than 2L/minute Airway monitoring greater than once every 2 hours; Decreased level of consciousness from baseline; The infusion of isotropic or vasovactive drugs or blood products; Intravenous insulin infusion; VAD (ICU status); ECMO; Heart rate about 120 beats per minute (Level VII); High flow nasal cannula (intrap or C-pop); For patients in isolation, refer to Epidemiology's isolation website for transport (Click Here)

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Nursing Documentation

URO	<input checked="" type="checkbox"/>				
EPIDURAL	<input checked="" type="checkbox"/>				
ARJAC	<input checked="" type="checkbox"/>				
Cardiac	<input checked="" type="checkbox"/>				
ECG	<input checked="" type="checkbox"/>				
Circ Support/Ventri...	<input checked="" type="checkbox"/>				
Circ Support/Ventri...	<input checked="" type="checkbox"/>				
PERIPHERAL NEUROVASCULAR	<input checked="" type="checkbox"/>				
ASTROINTRACRANIAL	<input checked="" type="checkbox"/>				
ENTOURINARY	<input checked="" type="checkbox"/>				
PRODUCTION	<input checked="" type="checkbox"/>				
ON	<input checked="" type="checkbox"/>				
NASOGASTROINTESTINAL	<input checked="" type="checkbox"/>				
UTERINE	<input checked="" type="checkbox"/>				
COSS/MONITORING DEVICES	<input checked="" type="checkbox"/>				
BANDS/TUBES	<input checked="" type="checkbox"/>				
LOC/Significant Event	<input checked="" type="checkbox"/>				
Vitals ICU/PCU	<input checked="" type="checkbox"/>				
Art Line (I) Monitoring	<input checked="" type="checkbox"/>				
Oxygen Therapy	<input checked="" type="checkbox"/>				
Ventilator Settings and Monitoring (Adult/Peds)	<input checked="" type="checkbox"/>				
ECG	<input checked="" type="checkbox"/>				
Hemodynamics/Circulatory Support Device Sel...	<input checked="" type="checkbox"/>				
Pulmonary/Cardiac Hemodynamics	<input checked="" type="checkbox"/>				
Oxygen Delivery/Consumption Hemodynamics	<input checked="" type="checkbox"/>				
ECMO (VA) Device Data	<input checked="" type="checkbox"/>				
ECMO (VV) Device Data	<input checked="" type="checkbox"/>				
Cerebral Blood Flow Monitoring	<input checked="" type="checkbox"/>				
Lab Collection/ Point of Care Tests/ Devices (P...	<input checked="" type="checkbox"/>				
Critical Results Received	<input checked="" type="checkbox"/>				

Device (Ext) Site Location	Placement Date/Time	Inserted by	placed at	Intact	Intact
Circ Support/Ventricular Assist Device	09/22/18 0000	Inserted by: placed at	IM Carmel VAD/Circulatory		
Device (Ext) Site Location	femoral/groin (right)				femoral/groin...
Device (Ext) Site Assessment	Intact				Intact
Date Dressing Changed	9/26/2018				9/26/2018
Dressing Status	Intact				Intact
Dressing Interventions	Teqadem				Teqadem
Dressing Change Frequency	Every other day				Every other...
Inflow Markings (insertion site to coil)					18 cm
Outflow Markings (insertion site to coil)					6 cm
Dressing Change Due	9/28/2018				9/28/2018
Circ Support/VAD Safety Checklist	Alarms on, Parameter...				Alarms on...
VAD Securement Device	Tube Securement Dev...				Tube Secu...
Circ Support/Ventricular Assist Devices					
Circ Support/Ventricular Assist Device	Placement Date/Time: 09/22/18 2100	Inserted by: Dr Whitson	VAD/Circulatory Assist		
Device (Ext) Site Location	internal jugular (right)				internal ju...
Device (Ext) Site Assessment	Dry/Intact				Dry/Intact
Date Dressing Changed	9/26/2018				9/26/2018
Dressing Status	Clean Dry/Intact				Clean Dry I...

ECMO (VA) Device Data		
Circ Support /VAD Laterality (device)		right
ECMO (VA) Access		venoarterial info...
ECMO Pump Flow		4.78
ECMO Pump Speed (Rotations/min)		3500
ECMO Sweep Gas (Blender Flow-L/m)		6
ECMO Sweep Gas (Blender FIO2%)		100
ECMO (VV) Device Data		
Circ Support /VAD Laterality (device)		right
ECMO (VV) Access		
ECMO Pump Flow		1.38

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Orders

OSU Medical Center
The Richard M. Ross Heart Hospital
Improving people's lives through personalized health care

Room # **4014**

Day: **Wednesday** Date: **Sept 26th** Questions for Patient Care Team

Surgeon: **Whitson** CHS
 CHM

Today's Plan/Activities:
Do Not Wean ECMO
Flow per Dr. Whitson

9/21 V fib arrest Mt. Carmel
 VA ECMO, ex-lap. c/crt tx 4 Ross
 9/22 WASHOUT, MTP, VA-V ECMO
 9/23 cont. EEG, CT head
 9/25 WASHOUT

Intensivist: _____
 Hospitalist: _____
 CNP: _____
 Nurse: **Avent** Phone: **599161**
 PCA: **Kaithin**
 CM/SW: _____
 RT: **Andrea** Phone: **656832**
 PT/OR: _____
 Pharmacist: _____

Full dose heparin
 ↳ PTT due @ 1000
 Q4 Sodium - due @ 0630
 * **HEPARIN**
Meeting tomorrow
 11:30 ~ 12:00 ish
 Class Schedule
 - 64617

Discharge Class: _____
 Family Support Group: _____
 VAD Support Group: _____

Discharge Needs:
 PR&C: **THU THU THU II**
 PFF: **THU THU THU II**
 PTF: **THU II**
 CMO: _____
 Case Manager: **Corinne 783-6248**
 Perfusion - **63334**

Targets: MAP > 60 30-60
 PO₂ > 60 Sun - Surgery

Pain control is our Goal!
 Acceptable pain score is _____ out of 10
 Last Pain Intervention was at _____ any/pm
 R opm out = 6 6
 R Id: 7.5
 R opm in = 185 18

Re-Position: _____
 Re-Insertion: _____
 After Med Admin: _____
 Discontinue when extubated unless patient still receiving enteral nutrition via NG
 Intubation: _____
 Routine: CONTINUOUS, Management of hemodynamic instability requiring hourly titration
 Indications for Foley: Management of hemodynamic instability requiring hourly titration
 Remove Indwelling Foley Catheter: Per Nursing Urinary Catheter Removal Protocol
 Tube Care: Per Protocol
 Passive Drainage: To Gravity Drain
 Intermittent Irrigation: _____
 Continuous Irrigation: _____
 Post-op/Post-Proc: _____
 Routine: CONTINUOUS, Sodium Chloride 0.9% 500ml per pressure bag to all transfused lines. Obtain hemodynamic profile 1 hour after all IV drip off. ICU
 Routine: CONTINUOUS, Sodium Chloride 0.9% 500ml per pressure bag to all transfused lines. Obtain hemodynamic profile 1 hour after all IV drip off. ICU
 Routine: CONTINUOUS, Please administer heparin and nitroglycerin releases via distal perfusion ports while on ECLS, when ordered. ICU
 Routine: CONTINUOUS, Please administer platelets and protamine via peripheral IV when ordered, if available. ICU
 Routine: DAILY
 Aseptic Skin Cleanse: Shower/Swab
 Daily bath with disinfectant cloth. Post-op/Post-Proc

FOR QUESTIONS OR CONCERNS PLEASE NOTIFY PATIENT CARE TEAM OR CALL CUSTOMER SERVICE AT (614) 293-8944

[X] ECMO CANNULATION SITE CARE INSTRUCTION (NUR186) Routine, AS DIRECTED, Record ECMO parameters at same frequency as vital. ICU
 Routine, CONTINUOUS, Initial post op dressing. Keep original surgical ECMO driveline dressing in place until POD #2. May reinforce original post op dressings using sterile technique. ICU

[X] DOCUMENT CANNULATION POSITION (NUR186) Routine, CONTINUOUS, Document cannulation position daily - measure from insertion site to end of metal within cannula. Notify Physician/Physician Extender if any change > 5 cm from original cannula placement measurement. ICU

[X] ECMO CANNULATION SITE CARE INSTRUCTION (NUR186) Routine, CONTINUOUS, Starting S+1, Post ECMO implant, Dressing POD #2 through POD#6 Change original surgical dressing on POD#2. Using sterile technique (mask and sterile gloves). Cleanse with CHG and replace with sterile dressing every (24) hours. Gauze dressings should be changed at least every 48 hours. ICU

[X] ECMO CANNULATION SITE CARE INSTRUCTION (NUR186) Routine, CONTINUOUS, Starting S+5, Post ECMO implant, On POD #5-7 begin dressing change schedule every Monday/Thursday with transparent dressing (CVC K) and securement device (Hollister). ICU

[X] AUTO DC VENT ORDERS - RN TO COMPLETE TASK (NUR1215) Routine, CONTINUOUS, Post-op/Post-Proc

[X] AUTO DC VENT ORDERS - RN TO COMPLETE TASK (NUR1215) Routine, CONTINUOUS, Post-op/Post-Proc

Beyond Initial Placement

The Next Steps In Patient Care.....



Family

ECMO

Extracorporeal Membrane Oxygenation

ECMO is a life support treatment for people with severe respiratory (lung) failure or heart failure that does not respond to usual treatments. The person's blood is brought out of their body through a very large tube. The blood is oxygenated through the ECMO machine to remove waste and to add oxygen, and then the oxygenated blood goes back into the body through another large tube. This treatment is also called extracorporeal life support (ECLS). Extracorporeal means outside the body.

Because patients are very sick before receiving ECMO and often have problems from the treatment, death may still occur.

How ECMO works

ECMO is like a heart and lung bypass machine used in open heart surgery. It is used in intensive care areas for days to months of treatment.

The ECMO machine gives the patient's failing heart or lungs a chance to rest and recover.

The ECMO circuit is made up of tubing, a pump, an oxygenator, and a heater.

The pump works like a heart and pumps blood with little oxygen out of the body through a very large tube, called a cannula.

The oxygenator works like the lungs, taking carbon dioxide out of the blood and adding oxygen to the blood.

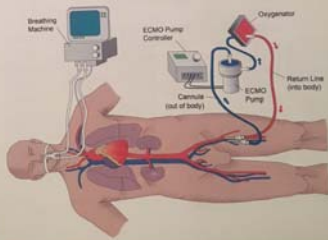
The oxygen-rich blood is pushed through the heater to warm the blood to body temperature.

The warmed blood is pumped back into the body through another tube, called a cannula or return line.

The cannulas are tubes that are about the size of a garden hose.

- Cannulas may be placed in the neck, chest, or the top of the leg, called the groin.
- The cannulas may need to be moved to other positions in some cases.

There are risks or problems that can occur from the treatment and because the person is so very sick.



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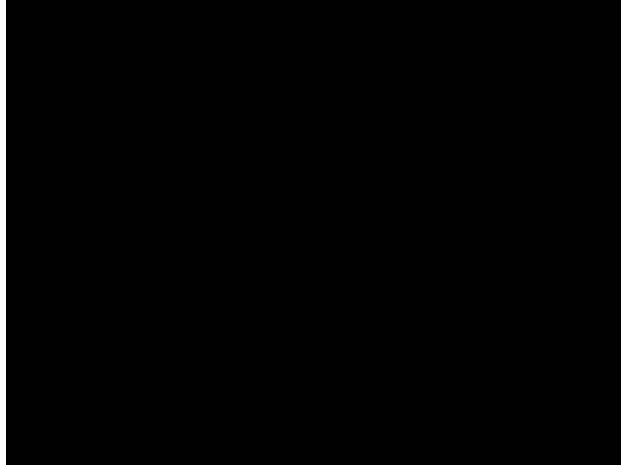
Immobility

"Mobility Crew" Avoiding Deconditioning

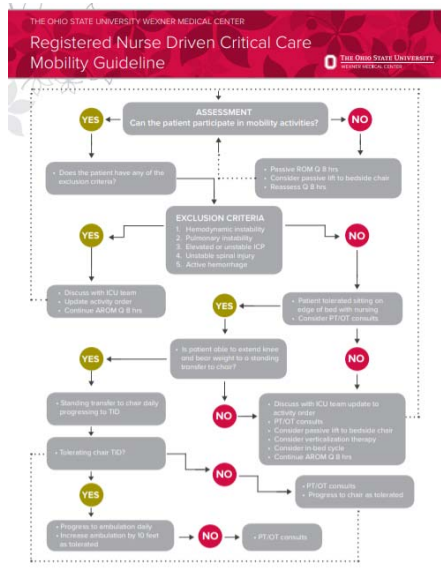


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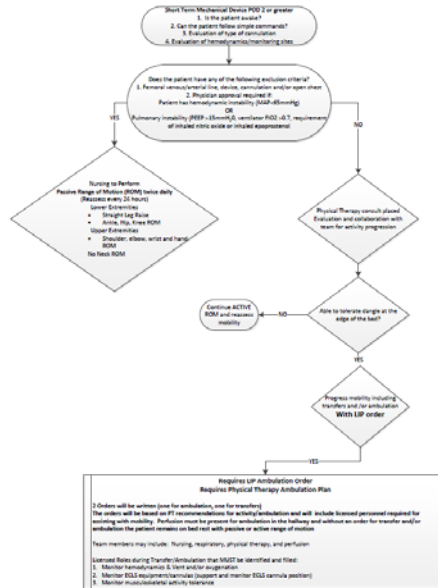
CVICU Turning Protocol



Critical Care Mobility Guideline



Mechanical Assist Policy



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Progressing Mobility

Mobility Rounds – Individualizing Care



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Skin/Wound Care

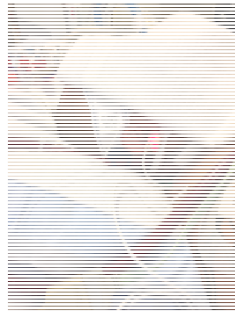
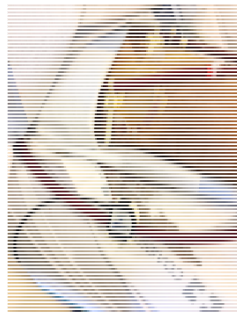
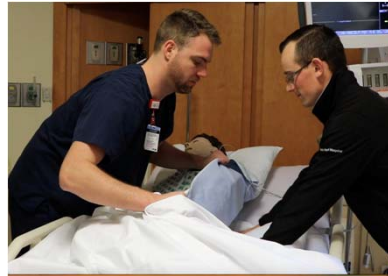
“Skin Squad”

Weekly rounds

Review of findings

Review plan of care for skin integrity

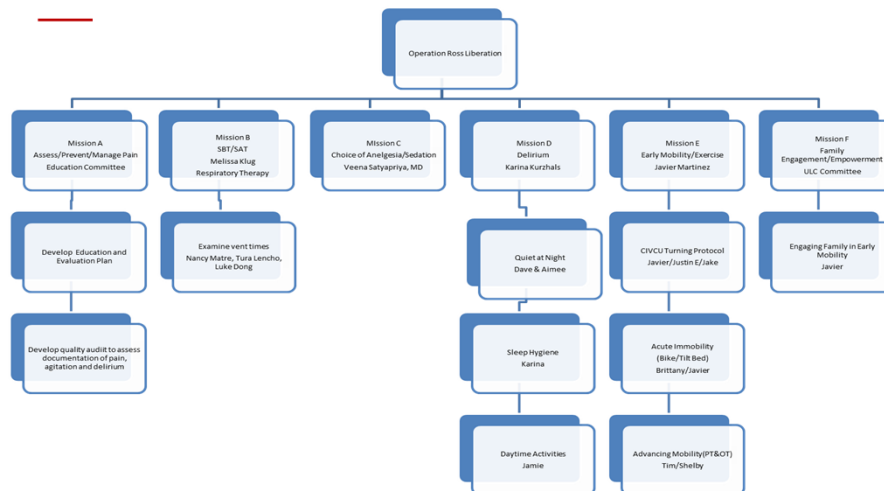
Looking at trends over time – information entered into an electronic data base



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Delirium

Operation Ross Liberation



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Infection Surveillance

“Bug Squad”

Knock Out CLABSI A Quality Improvement Project

Authors: Jonathan Spieberger, BSN, RN, CCRN, Cory Shimolovits, BSN, RN, Alisa Knapp-Starky, BSN, RN, CCRN, James Lower, BSN, RN, CCRN, Dan Wade, BSN, RN, Sheila Chuda, DNP, RN, CCRN



Identifying the Opponent

- Told to improve CLABSI rates but what does this mean?
- Reviewed information during morning huddle on CLABSI a from epidemiology for CVICU 2016-2017
- 11 total infections noted from 2016-2017
- Most infections occur later in the hospital course
- Most infections on patients with dialysis lines and/or mechanical devices in place (ASP, ECMO etc.)
- CVICU had manual collection of data at this time, with “Skin Squad” collecting information in a variety of areas



Round 1 – System and CVICU Initiatives

2016 Evidence Based Initiatives
1. Standardize access line insertion and maintenance
2. Implement TEGO™ connector
3. Standardize access line placement
4. Implement real-time outcome data
5. Implement real-time outcome data
6. Implement real-time outcome data
7. Implement real-time outcome data
8. Implement real-time outcome data
9. Implement real-time outcome data
10. Implement real-time outcome data
11. Implement real-time outcome data

Round 2 – The Fight is On – It’s a Draw

- CVICU already had a quality process in place for weekly audits
- Develop CVICU focus group for infection “Bug Squad”
- Created electronic database with focus on CLABSI metrics
- Program calculates compliance and makes the data available to nursing leadership as well as the bedside staff entering information
- Allows for real-time outcome data to be shared with staff caring for patient
- Continue to find that dialysis lines are present on patients with CLABSI in CVICU – discover product TEGO™ that may assist in decreasing CLABSI
- Announces time that access lines are “open”
- Trial in CVICU – positive feedback
- Work on development of TEGO™ kit
- Standardize access to dialysis lines
- Addition of documentation for TEGO™ connector to assess date of placement
- October 2017 kit available across the health care system



2017 Evidence Based Initiatives

- 1. Standardize access line insertion and maintenance
- 2. Implement TEGO™ connector
- 3. Standardize access line placement
- 4. Implement real-time outcome data
- 5. Implement real-time outcome data
- 6. Implement real-time outcome data
- 7. Implement real-time outcome data
- 8. Implement real-time outcome data
- 9. Implement real-time outcome data
- 10. Implement real-time outcome data
- 11. Implement real-time outcome data

Round 3 – CVICU Emerging Victorious CLABSI Rates Decreasing



The Hard Work is Paying Off

- CLABSI rates still slightly higher than desired
- Staff involvement and awareness is making a difference
- Future Plans
- Staff develop CLABSI debrief
- Staff lead CLABSI debrief with peers



Post Discharge

Phone calls to patients – unit nurse coordinator

- Assist getting into programs

Victory Lap



Lessons Learned

Always Learning and Improving Care Delivery

Continue to improve documentation of process

- Addition of distal perfusion line to EMR

Increasing family involvement with care

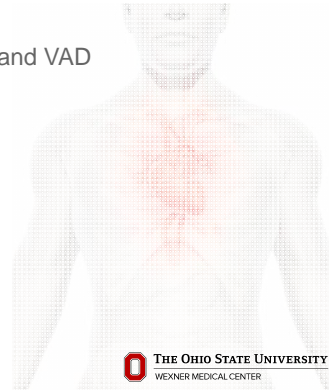
- Engaging family in early mobility

Revisions in Mechanical Assist Policy

- Team revisions – Nursing, Perfusion, Physicians, and VAD coordinators

Incorporation of ABCDEF bundle into care

- Delirium Reduction



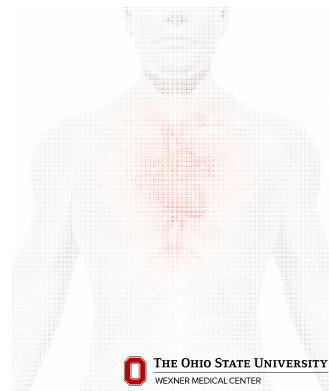
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What Questions Do Have?

Thank You

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