



The First 24 Hours After Open Heart Surgery: A Nurse's Perspective

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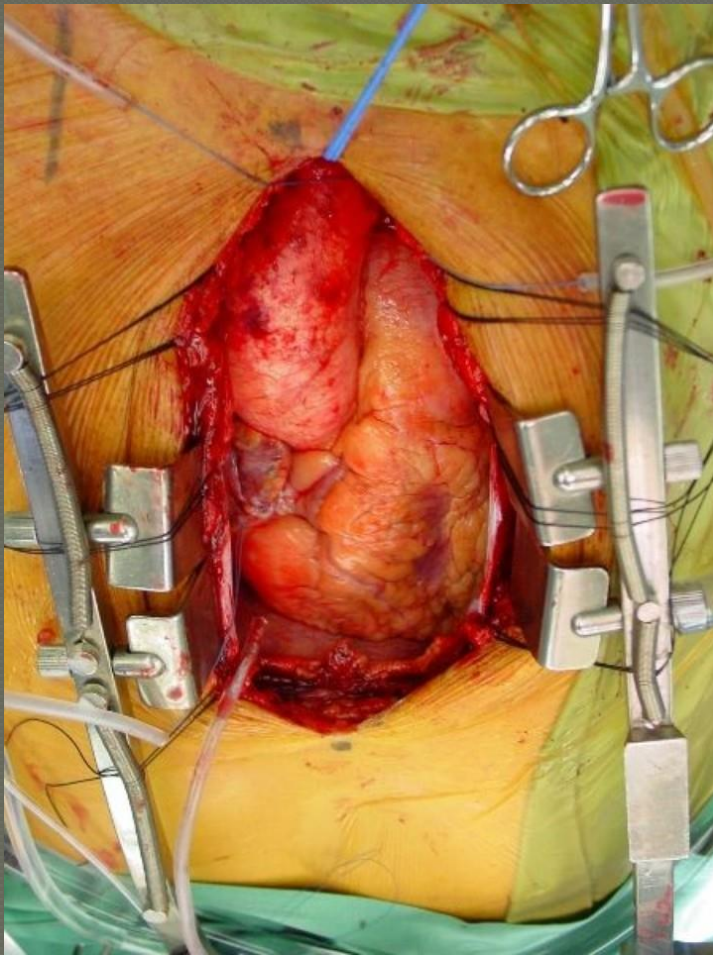
History of Open Heart Surgery

- **1893** - First successful heart surgery performed, Provident Hospital, Chicago. The surgery repaired the pericardium, the sac around the heart. Many do not consider this to be the first successful "heart surgery" because the heart itself was not operated on.
- **1896** - First successful heart surgery performed, in Germany. Surgeons repaired a stab wound in the muscle of the right ventricle.
- **1952** - First successful heart surgery where the heart was stopped and restarted.
- **1953** - First successful surgery using a heart-lung bypass machine.

History of Open Heart Surgery

- **1963**-First successful lung transplant by Dr. James Hardy in Jackson, Mississippi
- **1966** –First ventricular assist device implanted by Dr. Michael DeBakey to a 37-year-old woman. A paracorporeal (external) circuit was able to provide mechanical support for 10 days after the surgery.
- **1967** - First heart transplant surgery performed, by South African Christian Barnard. The heart recipient survived 18 days until succumbing to pneumonia.
- **1988** –First longterm ventricular assist device by Dr. William Bernhard of Boston Children's Medical Center and Thermedics, Inc of Woburn, MA under a National Institutes of Health (NIH) research contract which developed Heart-mate.

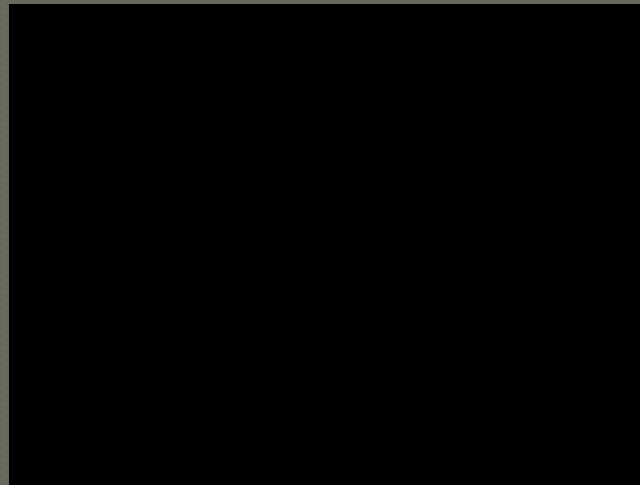
Operative view and Heartmate II



Handoff

- Immediately upon arrival to room
- **SAFETY FIRST!!**
- Persons involved
 - Cardiac Fellow/surgeon, Anesthesia, First Assists/Physician Assistant, Nurse Practitioner, Nurse, Respiratory Therapist
- Fellow
 - Gives brief patient history, discusses case and gives individualized orders on how to progress patient
- Anesthesia
 - Gives brief history of anesthesia points during surgery and patient's respiratory status and hemodynamic status
 - Gives medications to patient to help reverse the anesthesia before leaving the room

Waking Up.....a Patient's view



Monitoring

○ Continuous monitoring

- 1 or more RNs at bedside
- Monitoring hemodynamics every 15 min the first hour, every 30 minutes the second hour, every 1 hour until progressed to Progressive Care
- Labs sent within 15-30 minutes
- Chest and Abdomen xray for line and tube placement within 15-30 minutes
- 12 lead EKG upon arrival

Ventilator

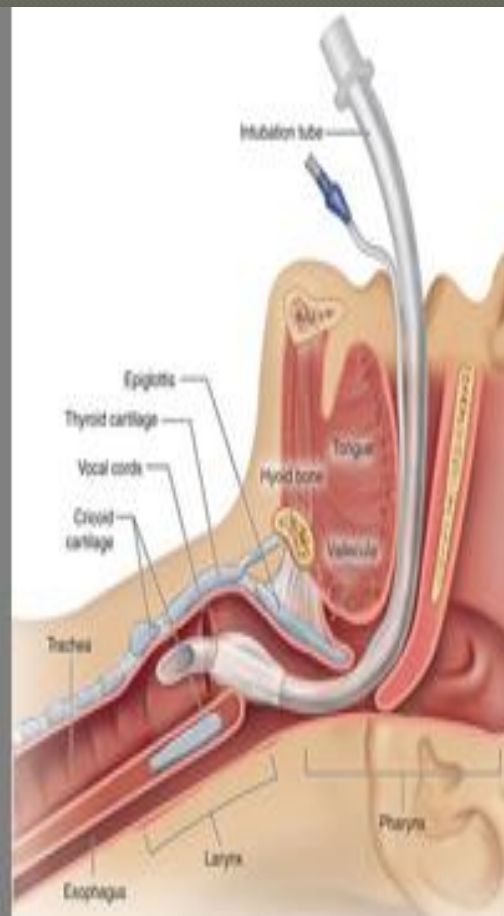


Ventilator

- “Breathes” for you during surgery and after until you wake up from anesthesia
 - Blows a mixture of oxygen and air into the lungs
 - Exhalation is performed on own
 - Can be programmed for a set amount of breaths or breaths can be assisted
 - Assists in regulating body chemistry along with kidneys
 - ABGs

Endotracheal Tube

- AKA Breathing tube
- Inserted through vocal cords and into the windpipe
 - You are unable to speak
 - You may be uncomfortable when awake
 - Coughing/gaging
- Attached to ventilator and secured to face
- Allows suctioning of secretions and maintains your breathing



Ventilator and Endotracheal Tube

- Goal to take the ETT out is 4-6 hours
 - Switch to CPAP when awake and breathing over minimal breaths set by ventilator
 - Follows commands
 - Lifts head off pillow
 - Arterial blood gases
 - Upon arrival, extubation, prn
 - Passes negative inspiratory force and vital capacity
 - Evaluates if strong enough to maintain airway and exchange

Oral Gastric Tube

- A flexible tube that passes through mouth and into stomach
 - Attached to suction
 - Removes gastric juices
 - Eases nausea
 - Prevents emesis (vomit)
 - Administration of medication
- Removed with ETT

Ventilator Assisted Pneumonia (VAP) Prevention

- Remove ETT ASAP!
- Clean mouth every 2 hours and as needed
 - SAGE products
 - Chlorhexidine solution
- Suciton mouth every 2 hours and as needed
- Move ETT every 4 hours
- Head of bed greater than 30 degrees

Pulmonary Artery Catheter



- Swan-Ganz catheter
- Floating the catheter
 - Internal jugular vein
 - Right atrium
 - Tricuspid valve
 - Right ventricle
 - Pulmonic valve
 - Pulmonary Artery

Pulmonary Artery Catheter

- **Diagnostic Tool:**
- Management of complicated myocardial infarction
 - Hypovolemia vs cardiogenic shock
 - Ventricular septal rupture (VSR) vs acute mitral regurgitation
 - Severe left ventricular failure
 - Right ventricular infarction
 - Unstable angina
 - Refractory ventricular tachycardia
- Assessment of respiratory distress
 - Cardiogenic vs non-cardiogenic pulmonary edema
 - Primary vs secondary pulmonary hypertension

Pulmonary Artery Catheter

- Assessment of type of shock
- Assessment of therapy
 - Afterload reduction
 - Vasopressors
 - Betablockers
 - Intra-aortic balloon counter-pulsation
- Assessment of fluid requirement in critically ill patients
 - Hemorrhage
 - Sepsis
 - Acute renal failure aka Acute Kidney Injury
 - Burns
- Management of postoperative open heart surgical patients
- Assessment of valvular heart disease
- Assessment of cardiac tamponade/constriction

Pulmonary Artery Catheter

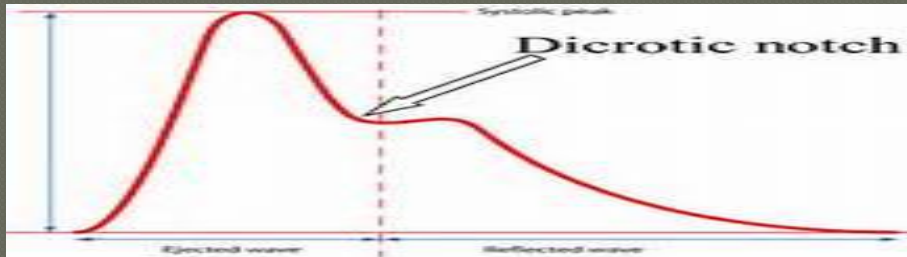
○ Mobility

- You are unable to walk with this catheter
- You can get up to chair

○ Removal

- Vasoactive and inotropic medications
 - Must be off for 4 hours
 - Cardiac output/index normal
 - Hemodynamically stable
 - Blood pressure normal, heart rate normal, no bleeding
- In bed for removal of catheter

Arterial Line



WAVEFORM



- Location
 - Radial, brachial, femoral
- Indications/use
 - Continuous, uninterrupted measure of blood pressure
 - Arterial blood gas
 - Labs
- Removal
 - 4hours after PA catheter removed
 - Vasoactive drips off 4 hours
 - In chair or bed

Vasoactive and Inotropic Medications



INOTROPIC MEDICATION

- Epinephrine
 - increases heart rate, cardiac output, stroke volume
- Dobutamine
 - Increases heart rate, stroke volume and decreases blood pressure
- Phosphodiesterase Inhibitor
 - Milrinone
 - Forces calcium into cardiac cells
 - Increases contractility
 - Decreases blood pressure
 - Increases right ventricular ejection

Vasoactive and Inotropic Medications

VASOACTIVE DRUGS

About a Nurse

allnurses.com



“Yours is medication, and mine is coffee. They’re both vital to our well-being.”

- Norepinephrine
 - Increases heart rate, blood pressure, glucose
 - Slows gastrointestinal motility
 - Causes body to use more oxygen
- Phenylephrine
 - Mimics epinephrine
 - vasoconstriction
- Vasopressin
 - Neurohormonal
 - Increases water reabsorption in the kidneys
 - vasoconstricts

Fluid Resuscitation

- Blood and Blood Products
 - Given based on lab values (hemoglobin, platelets, fibrinogen)
 - Given based on output of chest tubes and response to fluids
- Plasmalyte
 - Intravenous fluid commonly used to 'hydrate' patients
 - Is a good source of water, electrolytes and calories
- Albumin
 - Given intravenously
 - Contains the albumin component of plasma in your blood
 - It is a soluble protein that helps expand your volume equal to the amount given

Edema

○ Edema (swelling)

• Causes

- Prolonged bypass induces cytokine activation and an inflammatory response
- Increased capillary permeability which causes intravascular fluid to shift to interstitial space- third spacing called edema or swelling
- Postoperative blood products and fluid resuscitation

Edema

- Signs and Symptoms
 - Swelling of face, hands, fingers, ankles, feet
 - May feel like skin is tight and have difficulty with fine motor skills
 - Feet and legs feel heavy when walking
- Removal of Fluids
 - Diuresis
 - Diuresis is removal of extra fluids by increasing urine production
 - Lasix or Mannitol given when on heart-lung bypass to help kidneys naturally excrete free radicals and cytokines
Lasix is continued postoperatively in intravenous form then switched to oral form before discharge
 - Ambulating
 - Helps move fluids into the vessels for diuresis

Chest Tubes and Foley



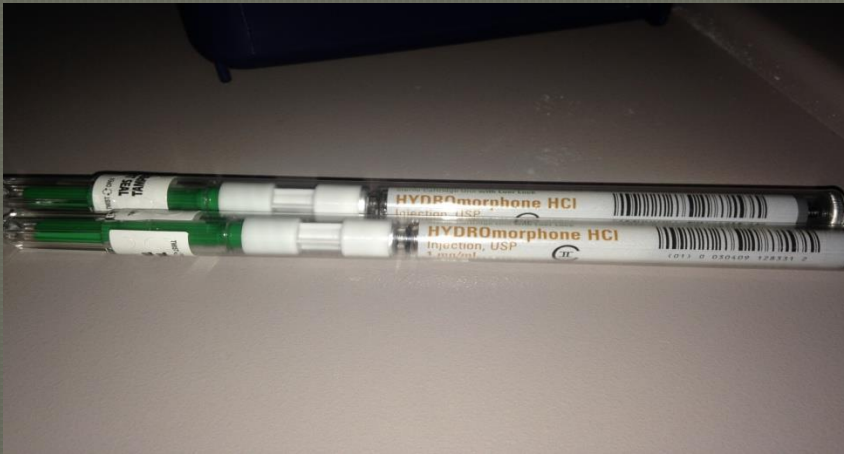
● Chest Tube

- Hollow, flexible tube
- Drains blood, fluid and air from lungs and chest
- Placed between rib or below sternum
- Care
 - Hooked to low wall suction
 - Monitor color and amount of drainage
 - Monitor for airleaks

Chest tubes and Foley

- Chest Tubes
 - Up to chair after extubation
 - Helps with lung expansion with deep breathing
 - Assists in drainage
 - Chest xray within 24 hours to view drainage left in chest
 - Removed when less than 100-150mL/24 hours
- Foley
 - Monitors urine output in the critically ill
 - Require 30 mL/hours of urine
 - Removed when urine output is greater than 30mL/hours and mobility increases

Pain



- Subjective
 - “it is what it is”
 - May be very different person to person
 - Extenuating factors
- More intense on day 2
 - Up to chair
 - Ambulating
 - Removal of chest tubes, etc
- Use
 - Hydromorphone (Dilaudid) IV
 - Oxycodone/Acetomenophen (Percocets) or Hydrocodone (Norco) by mouth

Pain

- Side effects

- Nausea

- Sweating

- Lethargic

- Constipation

- Bowel regimen

- Docusate, Miralax, Bisacodyl suppository, Senna

Pain

- Alternative therapies
- Successful regimens
 - Important!!!
 - Mobility prevents complications
 - Pneumonia, constipation, pressure ulcers
 - Builds strength
 - Helps with confidence and fear
 - Discharge from hospital quicker

Insulin and Glucose



- Checked within 30 min upon arrival
 - Every hour with insulin infusion
 - @ 18 and 24 hours for CMS
 - Goal less than 200
- 4Rross Guidelines
 - Drip initiated glucose 150+
 - Individualized scale
- Elevations:
 - Stress response
 - IV medications
 - Steroids
- Diabetes consult
 - Lantus
- Sliding scale
 - Carbohydrate coverage and sliding scale when eating
- Prevents Infection!!!!

Infection

○ Sternal Wound

- 1% ; significant mortality: 20%
- Staph aureus, coagulase-negative staph
- Risk factors: comorbidities, emergent OR, reoperations, prolonged surgery/bypass, excessive bleeding, low cardiac output, poorly controlled blood glucose
- Prevention!!!!

Infection Prevention

- Nosocomial
- 10-20% patients
- Bacteremia affecting surgical sites as well as respiratory/urinary tracts
 - Remove foley catheter and endotracheal tube ASAP
- Risk factors: comorbidities, nasal carriage staph, prolonged OR, prolonged mechanical ventilation, foley catheter, low cardiac output, stroke, hyperglycemia

Infection

STOP THE SPREAD OF GERMS!

FOLLOW THESE SIMPLE RULES!

IN THE WORKPLACE:



1. Avoid bare skin-to-skin contact! Shake hands using a stick.



2. Don't sneeze into your hands: whenever possible, sneeze into the back pocket of a co-worker.



3. Do not touch vending machines. Insert coins with your mouth.

A MAD HEALTHY LIVING POSTER

WRITER: DICK DEBARTOLO ARTIST: GARY HALLGREN

IN THE RESTROOM



1. Avoid contact with the faucet. Wash hands wearing gloves.



2. Toilet seats breed germs. Carry your own toilet seat with you wherever you go.



3. Never flush using your hands. Push the handle with your foot. Then wash your foot thoroughly.

Prevention

- Remove foley catheter, all invasive lines, endotracheal tube ASAP
- Bathe with Chlorhexidine wipes daily
- Wash hands
- Use sternal precautions

Infection Prevention

CUROS CAPS

DISINFECTS IN 1 MINUTE AND
KEEPS PORTS CLEAN FOR 7
DAYS
DISTINGUISHES IV LINES FROM
OTHER LINES



CHLORAPREP

FDA APPROVED SINCE 2000
MEETS CDC GUIDELINES FOR
CENTRAL AND INVASIVE LINES
RAPID KILL OF
MICROORGANISMS AND
BACTERIA



Infection prevention

CHLORHEXIDINE
TEGADERM



DRESSING FOR CENTRAL ,
PICC LINES AND VAD
DRESSINGS

- An antimicrobial I.V. dressing designed to offer site visibility, catheter securement, and breathability
- Antimicrobial Protection: Integrated chlorhexidine gluconate (CHG) gel pad provides immediate and continuous protection
- Securement: Reinforced border and notch provide catheter securement
- Site Visibility: Transparent film and gel pad allows continuous site observation
- Breathability: Promotes moisture evaporation and enhances securement
- 3M Tegaderm (2016)

Infection prevention

USE YOUR INCENTIVE
SPIROMETER!
GET UP TO THE CHAIR!!!!!



AMBULATE IN HALLS!!!!



Fall Prevention

- The Joint Commission states:
- “Every year in the United States, hundreds of thousands of patients fall in hospitals, with 30-50 % resulting in injury.
- Injured patients require additional treatment and sometimes prolonged hospital stays. In one study, a fall with injury added 6.3 days to the hospital stay.
- The average cost for a fall with injury is about \$14,000”
- Sentinel Event. A complimentary publication of The Joint Commission Issue 55, September 28, 2015



Fall Prevention

○ Fall Screen

- Upon admission, transfer, condition change and every 8 hours

○ Fall Wheel

- Visible in all rooms
- Quick indicator of fall risk of patient
- Correlates with our 'Safety section' in charting

○ Safety measures

- Call light, up with assist, nonskid socks, clear floor of cords, close to nurses station, sitter, etc

Pathway



- How 4Ross is preventing infections and getting you home quicker
- Initiated in 2015
- Nurse driven

Pathway

Verizon 06:04 100%

Done Pathway updates 2015.p...



Outcomes Changes

OHS: CABG / VALVE Clinical Pathway

- Day of Surgery (0 to 24 hours)**
- Extubated in 6-8 hours (Or Patient Extubated in OR)
 - Vasoactive drips weaned (NTG excluded)
 - Incentive Spirometry every hour while awake (10 x per hr)
 - LDA Protocol: PA Cath Removal
 - LDA Protocol: Arterial Line Removal
 - Up to Chair/Chair Position (1st Time) for the Day
 - Up to Chair/Chair Position (2nd Time) for the Day
 - Release CABG/VALVE (POD#1) S&H Orders at End of This Step

POD #1

- LIP: Order/Pathway Reconciliation & ICU to PCU Transitioning
- Incentive Spirometry every hour while awake (10 x per hour)
- LDA Protocol: Foley Cath Removal
- Up to Chair/Chair Position (1st Time) for the Day
- Ambulate (1st Time) for the Day
- Ambulate (2nd Time) for the Day
- Release CABG/VALVE (POD#2) Sign & Held Orders at End of This Step

Done

Pathway updates 2015.pptx



Assessments

0-24 hour and POD1

Assessments

- Daily Weights - Last documented on 11/22/15 0606 by Sidney Anjou, RN.
- Blood Glucose (per order frequency) and at 18hrs and 24hrs postop - No documentation.
- MEWs Score Q12Hrs in ICU/PCU Acuity (and w/any change in clinical condition) - No documentation.
- Swallowing Assessment per Admission Guidelines - No documentation.
- Cardiac Assessment per policy - No documentation.
- Respiratory Assessment per policy - No documentation.
- Safety Assessment x 3 - No documentation.
- Activity Type - No documentation.
- SCD's documentation with assessment while patient in bed - No c

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- [SCD's documentation with assessment while patient in bed - No documentation.](#)

POD 2

Conclusion

- Getting you home
 - Safety
 - Education
 - Infection prevention
 - Pain control
 - Compassion



Happy Nurses Week!!!

THEY MAY FORGET YOUR NAME,
BUT THEY WILL NEVER FORGET
HOW YOU MADE THEM FEEL.

-MAYA ANGELOU

