

CRITICAL CARE

NURSING STUDY NOTES

Critical care nursing bundle



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ACLS & BLS CHEAT SHEET

WHAT'S THE DIFFERENCE
BETWEEN **BLS** & **ACLS**?

BASIC LIFE SUPPORT

BASIC CPR GUIDELINES → can use this in any first responder situation

STEP-BY-STEP BLS

- 1 **SCAN THE SCENE FOR SAFETY**
- 2 **ASSESS FOR RESPONSE**
"Hey hey are you okay?"
- 3 **CALL FOR HELP**
 - ▶ Activate emergency response system/shout for nearby help
 - ▶ Delegate someone to call 911 & get AED
- 4 **ASSESS BREATHING & PULSE**
 - ▶ Check carotid pulse
 - ▶ Check for chest rise or gasping

NO LONGER THAN 10 SECOND ASSESSMENT!

NO PULSE + ABNORMAL BREATHING

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
- 5 **START CPR**
Start cycle of 30 chest compressions & 2 breaths
- 6 **USE AED AS SOON AS IT ARRIVES**
Pad placement → **HIGH RIGHT LOW LEFT**
 - ▶ One pad on upper right chest & one on lower left chest
 - ▶ Make sure skin is dry & avoid hairy patches
 - ▶ Clear the patient (ensure no one is touching patient)
 - ▶ Deliver shock if advised by AED
- 7 **RESUME CPR IMMEDIATELY**
 - ▶ Continue for 2 minutes then check pulse
 - ▶ Follow cycle until help arrives or patient becomes responsive

ADVANCED CARDIAC LIFE SUPPORT

Set of clinical guidelines grouped into different algorithms based on the clinical situation that involves CPR, medications, & medical procedures

ACLS CARDIAC ARREST ALGORITHM

- 1 **START CPR**
 - ▶ Compressions → Rate 100-120 per minute
 - ▶ Oxygen → 30:2 ventilation ratio
 - ▶ Attach monitor & defibrillator pads
- 2 **CHECK THE RHYTHM**
 - ▶ Check the rhythm for no more than 10 seconds
 - ▶ Compressions are stopped during rhythm check

SHOCKABLE	NON-SHOCKABLE
→ V. Fib	→ PEA
→ Pulseless Vtach	→ Asystole

SHOCKABLE RHYTHMS

 - ① Resume CPR immediately while charging defibrillator
 - ② Clear & shock patient
 - ③ Give epinephrine every 3-5 minutes
 - ④ Consider intubation (capnography to confirm placement)
 - ⑤ After 2 mins rhythm check & shock (if shockable)
 - ⑥ Give amiodarone or lidocaine
 - ⑦ Treat reversible causes

NON-SHOCKABLE RHYTHMS

NO ELECTRICAL CONDUCTION!
→ shock provides no benefit

 - ① Give epinephrine ASAP & every 3-5 minutes
 - ② Consider intubation (capnography to confirm placement)
 - ③ Treat reversible causes

REMEMBER YOUR H's & T's

* Hypoxia * Hypovolemia * Hydrogen ions (acidosis) * Hyper/hypokalemia * Hypothermia	* Tension pneumothorax * Tamponade * Toxins * Thrombosis (coronary) MI * Thrombosis (pulmonary) PE
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HIGH QUALITY CPR

POSITIONING	COMPRESSIONS	BREATHING
▶ Heels of hands on top of each other ▶ Shoulders directly over the hands & elbows locked ▶ Ensure patient is positioned on firm surface	▶ Minimum rate of 100-120 compressions/ min ▶ Compression depth 2-2.4 inches ▶ Allow full chest recoil after each compression	▶ 2 breaths every 30 compressions ▶ Head-tilt/ chin-lift to open airway ▶ Assess for chest rise with each breath ▶ AVOID excessive ventilation

ARTERIAL LINES

WHAT IS IT?

A thin catheter inserted into an artery for hemodynamic monitoring

SITES USED

- ★ Radial **MOST COMMON** ★ Axillary
- ★ Brachial ★ Ulnar
- ★ Femoral **INFECTION RISK** ★ Dorsalis pedis

TRANSDUCER

Connects catheter to monitor so measurement can occur

LOCATION: Aligned to height of right atrium

→ **PHLEBOSTATIC AXIS**

4th intercostal space, mid-axillary line

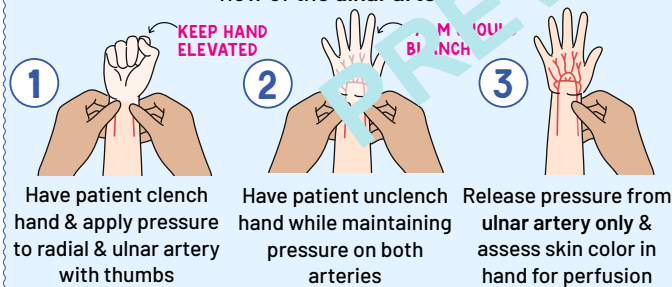
★ **MUST BE LEVELED PROPERLY FOR ACCURATE READING**

COMPLICATIONS

- ▶ Thrombosis ▶ Bleeding
- ▶ Ischemia ▶ Dislodgement
- ▶ Hematoma formation ▶ Air embolus
- ▶ Infection ▶ Pain/ swelling

ALLEN'S TEST

Used prior to insertion to test patency & blood flow of the ulnar artery



If hand flushes within 15 seconds = **POSITIVE RESULT**

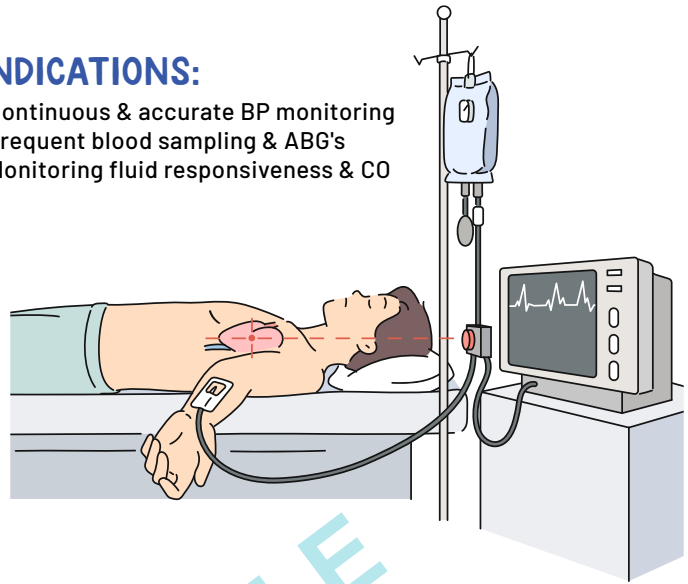
→ adequate blood flow for arterial puncture

NURSING INTERVENTIONS

- Neurovascular checks
- Monitor waveform (zero Q4 or if inaccuracy is suspected)
- Monitor blood pressure & compare to cuff BP
- Monitor site for:
 - ▶ Bleeding ▶ Hematoma
 - ▶ Dislodgement ▶ Infection

INDICATIONS:

- ▶ Continuous & accurate BP monitoring
- ▶ Frequent blood sampling & ABG's
- ▶ Monitoring fluid responsiveness & CO



WAVEFORM ASSESSMENT

Arterial wave forms go up & down with the blood pressure & show accuracy of BP measurement

INACCURATE BP READINGS LEAD TO INACCURATE TREATMENT!

→ TO MEASURE ACCURACY

SQUARE WAVE TEST

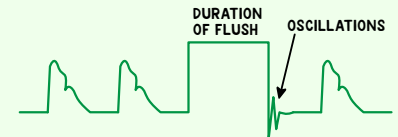
Rapidly flush the line by pulling the release on the flush device → this generates a square wave

→ **ASSESS OSCILLATIONS & WAVE TO DETERMINE ACCURACY**

NORMAL WAVE

1 to 2 oscillations

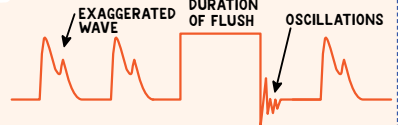
ACCURATE READING



UNDERDAMPED WAVE

>2 oscillations

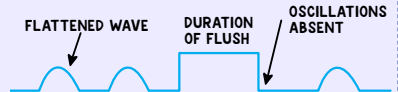
FALSE HIGH BP



OVERDAMPED WAVE

<1 oscillation

FALSE LOW BP



IF WAVE OVERDAMPED OR UNDERDAMPED:

- Ensure there are no kinks in tubing
- Check pressure bag is inflated fully
- Check for air bubbles or clots in tubing
- Relevel and rezero transducer

MECHANICAL VENTILATION

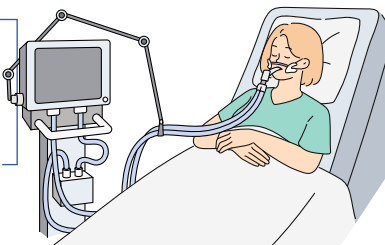
BASICS

WHAT IS IT?

A machine that takes over functions of breathing for patients that cannot breathe on their own

USES **POSITIVE PRESSURE** TO **PUSH** AIR INTO LUNGS

↳ Compared to normal breathing in which **negative pressure** is used to inhale oxygen into lungs



INDICATIONS:

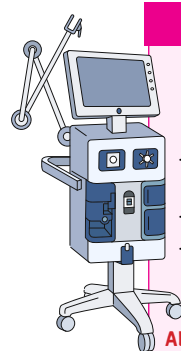
- Unable to protect airway
 - ▶ Under anesthesia for surgery
 - ▶ Brain injury or stroke
- Severely impaired gas exchange
 - ▶ Pneumonia or COPD
 - ▶ ARDS

Anything that causes
IMPAIRED GAS EXCHANGE OR
COMPROMISED AIRWAY

VENTILATOR SETTINGS

TIDAL VOLUME	FI _{O2} (FRACTION OF INSPIRED OXYGEN)	PEEP (POSITIVE END EXPIRATORY PRESSURE)
Volume of air that is delivered with each breath	Oxygen concentration of air being delivered to patient	Pressure applied at the end of each expiration PREVENTS ALVEOLAR COLLAPSE
FREQUENCY (RATE)	I:E RATIO	PRESSURE SUPPORT
Number of breaths per minute delivered to patient	Proportion of time set for Inspiration & Expiration	Push of air to assist patient with spontaneous breath

VENTILATOR MODES (MOST COMMON)



AC	SIMV	CPAP
ASSIST CONTROL Used for patients that require full ventilator support → Delivers preset volume & number of mandatory breaths → Patient can trigger breaths → Breaths patient triggers will deliver a set volume CAN LEAD TO RESPIRATORY ALKALOSIS IF PATIENT IS TACHYPNEIC	SYNCHRONIZED INTERMITTENT MANDATORY VENTILATION Used for patients that require partial ventilator support → Delivers preset volume & number of mandatory breaths → Allows patient to take spontaneous breaths in between preset breaths → Patient controls tidal volume on spontaneous breaths WEANING MODE	CONTINUOUS POSITIVE AIRWAY PRESSURE Used for patients that require minimal ventilator support → NO mandatory breaths are given → Provides constant positive pressure at preset number → Commonly used to assess if patient is ready for extubation MUST BE ABLE TO TAKE OWN BREATHS! WEANING MODE

MOST SUPPORTIVE ←

→ LEAST SUPPORTIVE

PRESSURE ALARMS

HIGH PRESSURE

- ▶ Kink in tubing
- ▶ Secretions blocking airway
- ▶ Coughing, gagging, or "fighting" the ventilator
- ▶ Pulmonary edema or pneumothorax

LOW PRESSURE

- ▶ Disconnection from circuit
- ▶ Air leak around cuff
- ▶ Break/ open valve in tubing
- ▶ Self-extubation

NURSING INTERVENTIONS

- Keep bag-valve mask at bedside at all times
- 100% oxygen before and after suctioning
- Always suction out, not in
- Suction only when needed to avoid lung injury
- Bowel regimen to prevent constipation
(lack of movement + sedation = decreased motility)

VAP BUNDLE Evidence-based interventions to prevent Ventilator Associated Pneumonia

- * Keep HOB >30 degrees
- * Oral care with chlorhexidine
- * Stress ulcer prophylaxis
- * Daily "sedation vacation"
- * DVT prophylaxis
- * Q2 Turning