Hemodialysis: Zoll Plus Automatic External Defibrillator (AED) in Community Dialysis Units

Site Applicability

Providence Health Care Renal Community Dialysis Units in Metro Vancouver (Vancouver, East Vancouver, Richmond, and North Shore sites)

Practice Level

Specialized:
Nurses (RNs and LPNs) who have completed the required education and provide nursing care in a Providence Health Care Renal Program Community Dialysis Unit

Requirements

1. Basic Life Support (BLS) certification (ie. cardiopulmonary resuscitation or CPR) is required for all staff upon hiring.
2. As per the Occupational Health and Safety recommendations, all clinical staff should have an up-to-date fit test for an N95 mask.
3. Staff members caring for a patient must be aware of their assigned patient's code status, and the patient's own directives such as an advanced care plan, advanced directive or provincial "No CPR" form. Staff members should discuss with the most responsible provider if there is any lack of clarity concerning the patient's code status (e.g. Options for Care or Medical Order for Scope of Treatment also known as MOST)

Need to Know

1. Staff are expected to maintain competency in performing BLS skills by attending education sessions of their choice at least once per year.
2. In a life-threatening event, emergency medical services (EMS) must be notified by dialing 911 for metro Community Dialysis Units.
3. Early defibrillation is critical to survival from sudden cardiac arrest for the following reasons:
    - The most frequent initial rhythm in witnessed sudden cardiac arrest is ventricular fibrillation
    - The treatment for ventricular fibrillation is electrical defibrillation
    - The probability of successful defibrillation diminishes rapidly over time and
    - Ventricular fibrillation tends to deteriorate to asystole within a few minutes
4. Survival of ventricular fibrillation is highest with implementation of immediate CPR, and defibrillation within 3 to 5 minutes.

5. Use the Zoll AED Plus when a suspected cardiac arrest victim has an apparent lack of circulation indicated by:

- Unconsciousness, and
- No breathing or absence of normal breathing (e.g. only gasping), and
- Absence of a pulse or signs of circulation (take no longer than 10 seconds to assess for a pulse)

Do NOT use the Zoll AED Plus when the patient is:

- Conscious, or
- Breathing, or
- Has a detectable pulse or other signs of circulation

6. Do NOT use the Zoll AED Plus near or within puddles of water.
7. Do not use the AED near flammable agents (e.g. oxygen-rich environments).
8. The AED must NOT be used for a second event until the internal batteries have been replaced.
9. The AED machine must be visually inspected daily to ensure that a green check mark (√) appears in the lower left-hand corner of the display screen. The √ indicates the machine is in good functioning order. The Zoll AED Plus does periodic self-tests. To perform a manual self-test hold the on/off button down for 5 seconds.
10. If a red X is displayed in the lower left-hand corner of the display screen, do NOT use the AED machine. Send it to the biomedical engineering department for repair.
11. Check the expiry date of the CPR-D-padz; if less than 60 days from expiring, notify the biomedical engineering department. This should be performed with the daily inspection described in step 7.

Equipment and Supplies

1. Zoll Plus AED
2. CPR D padz
3. towels
4. Razor

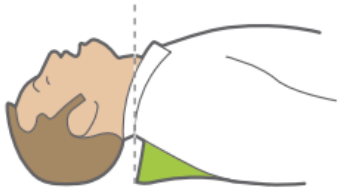
Protocol

Steps

1. Place the patient in a supine position and assess the patient's level of consciousness, circulation, airway, and breathing status as per Hemodialysis: Cardiac Arrest (Code Blue) – Staff Responsibilities in Community Dialysis Units. Start returning the blood.
2. Initiate chest compressions, call for help, request someone call 911, and administer oxygen as applicable. Second responder will bring the emergency crash cart with the AED. Hemodialysis: Cardiac Arrest (Code Blue) – Staff Responsibilities in Community Dialysis Units.

3. Continue CPR until the AED is available. As soon as the AED is available, turn it on and follow the voice prompts.
4. If there is no evidence of head or neck trauma, the head tilt chin lift method is the recommended maneuver for opening the airway. The lid of the AED can be used as a passive airway support system (PASS) to help maintain head tilt.
   Roll the patient on his/her side and roll him/her back over so that the PASS is under the patient's shoulder causing the head to tilt backwards.

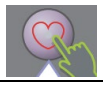
The unit cover also functions as the Passive Airway Support System (PASS).



Place the PASS under the victim to lift his/her shoulders. Do not use the PASS if there is a suspected head or neck injury.

Figure 4: Using the PASS Cover

STEPS FOR APPLYING THE AED	RATIONALE
1. Remove all clothing covering the patient's chest. May need to cut away clothes.	To enable electrode placement.
2. Ensure the patient's chest is dry.	This will minimize burning.
3. If the patient has excessive chest hair and time allows, quickly shave the area before applying the electrodes.	To ensure proper adhesion of the electrodes.
4. Turn on the AED and connect the electrodes (CPR-D-padz) to the AED, if not already connected.	
5. Follow the AED prompts.	
6. Tear open the electrode package and unfold the electrodes. Place the electrodes on the patient according to the graphics on the package. 7. Hold the CPR sensor and place the sensor between the nipples and on the middle of the patient's breastbone, using the sensor's cross hairs as a guide. Ensure the CPR sensor maintains a position over the lower half of the breastbone.	

STEPS FOR APPLYING THE AED	RATIONALE
8. Press the CPR sensor with your right hand and pull the number 2 tab to peel protective backing from electrode. Press the electrode from the center out to make sure it adheres properly to the patient's skin. The pad is placed on the upper right side of the chest.	
9. Press the CPR sensor with your left hand and pull the number 3 tab to peel the protective backing from the electrode. Press the electrode from the center out to make sure it adheres properly to the patient's skin. The pad is placed on the lower left side of the chest, a few inches below the left armpit. **NOTE:** If the patient is large or there is a need to place the electrode under a breast, you may need to tear away the lower pad at the perforated line and extend the pad. Place the pad slightly to the patient's left and below the patient's left breast. **NOTE:** If the patient has an implanted pacemaker or defibrillator in the upper right chest, angle the electrodes slightly to avoid placing the electrodes over either device.	Pacemaker stimuli may degrade the accuracy of the ECG rhythm analyses or the pacemaker may be damaged by defibrillator discharges.
10. Prepare to let the AED analyze the heart's rhythm. Do not touch the patient during ECG analysis. Stop CPR during the analysis.	Touching the patient may interfere with the ECG analysis. Interrupt chest compressions as infrequently as possible and for no longer than 10 seconds, except for specific interventions (e.g. use of a defibrillator).
12. If shock is advised, don't touch the patient. Give "Stand Clear" warning and ensure no one is touching the patient. Press the shock button on the AED. 	Defibrillation energy delivered to the patient may be conducted through the patient's body and cause a lethal shock to those touching the patient.
11. After the AED delivers the shock or if no shock is advised, immediately start/resume CPR.	
12. The Zoll AED Plus has voice and visual prompts to encourage a compression depth of at 5 to 6 cm at a rate of 100 to 120 compressions per minute.	
13. After 2 minutes of CPR, the AED will perform another ECG analysis. Follow prompts.	

STEPS FOR APPLYING THE AED	RATIONALE
14. Continue to follow the AED prompts and CPR until EMS arrives and assumes control.	
15. At the conclusion of the event, send the AED to the onsite biomedical technician or to the St. Paul's Hospital (SPH) Biomedical Engineering department for replacement of the internal batteries. The internal batteries of the AED must be replaced by a qualified biomedical engineering technologist after each use or when the AED (when off) emits an audible beep every minute indicating low battery level.	The AED must NOT be used for a second event until the internal batteries have been replaced.
16. After each use, clean and disinfect the AED using 90% isopropyl alcohol, or soap and water, or chlorine bleach and water mixture (30 mL/1 litre)	

Documentation

1. Document the event in Cerner including: the time the patient was found unresponsive, the events leading up to the arrest, the time CPR was initiated, the time EMS/911 call was placed, the number of shocks, the time of EMS team arrival, the names of the staff involved, and the actions/procedures performed by the staff.
2. Document the outcome of the incident and the name of the nephrologist who was notified of the event.

Patient and Family Education

Provide emotional support and debriefing of the incident as soon as possible

Related Documents

1. B-00-12-10115 - Hemodialysis: Cardiac Arrest (Code Blue): Procedure in Community Dialysis Units
2. B-00-13-10147 - Hemodialysis: Cardiac Arrest (Code Blue)- Staff Responsibilities in Community Dialysis Units

References

Heart & Stroke Foundation. (2023) *AEDs: How to use an automated external defibrillator*. Retrieved from AEDs | Heart and Stroke Foundation

Rea,T., Eisenberg, M. (2023). Automated External Defibrillators. In UpToDate. Page, R. Parikh, N. (Ed). Retrieved on May 17, 2023 from UpToDate, Waltham, MA, 2023.

Zoll Medical Corporation. (2023) *AED Plus Administrator's Guidel*. Retrieved from https://www.zoll.com/medical-products/product-manuals?product=AED+Plus

Zoll Medical Corporation. (2023) *Rev V, AER Plus Operators Manual*. Retrieved from https://www.zoll.com/medical-products/product-manuals?product=AED+Plus

Groups/Persons Consulted:

Renal Clinical Practice Group

Developed/Revised By:

Nurse Educator Community Dialysis Units

First Released Date:	01-JUN-2007
Posted Date:	20-SEPT-2023
Last Revised:	20-SEPT-2023
Last Reviewed:	20-SEPT-2023
Approved By: *(committee or position)*	PHC
	Professional Practice Standards Committee Hemodialysis Clinical Practice Guidelines Group
Owners: *(optional)*	PHC
	Renal Program