Live. Learn. Hope.

MANAGING HEMODIALYSIS PATIENT PROBLEMS AND EMERGENCIES

Clinical Education

4/2021

NORTHWEST Kidney Centers

Learning Objectives

At the end of this presentation, the nurse will be able to:

1. Understand the nursing implications associated with each of the emergency.
2. Make sound nursing judgment.
3. Triage care – know priorities.
4. Remember personnel to notify.
5. Recognize the importance of documentation.

INTRODUCTION

Procedure # **HDP-G19091** *"Guidelines for Managing Hemodialysis Patient Problems & Emergencies"*

V-Tags:

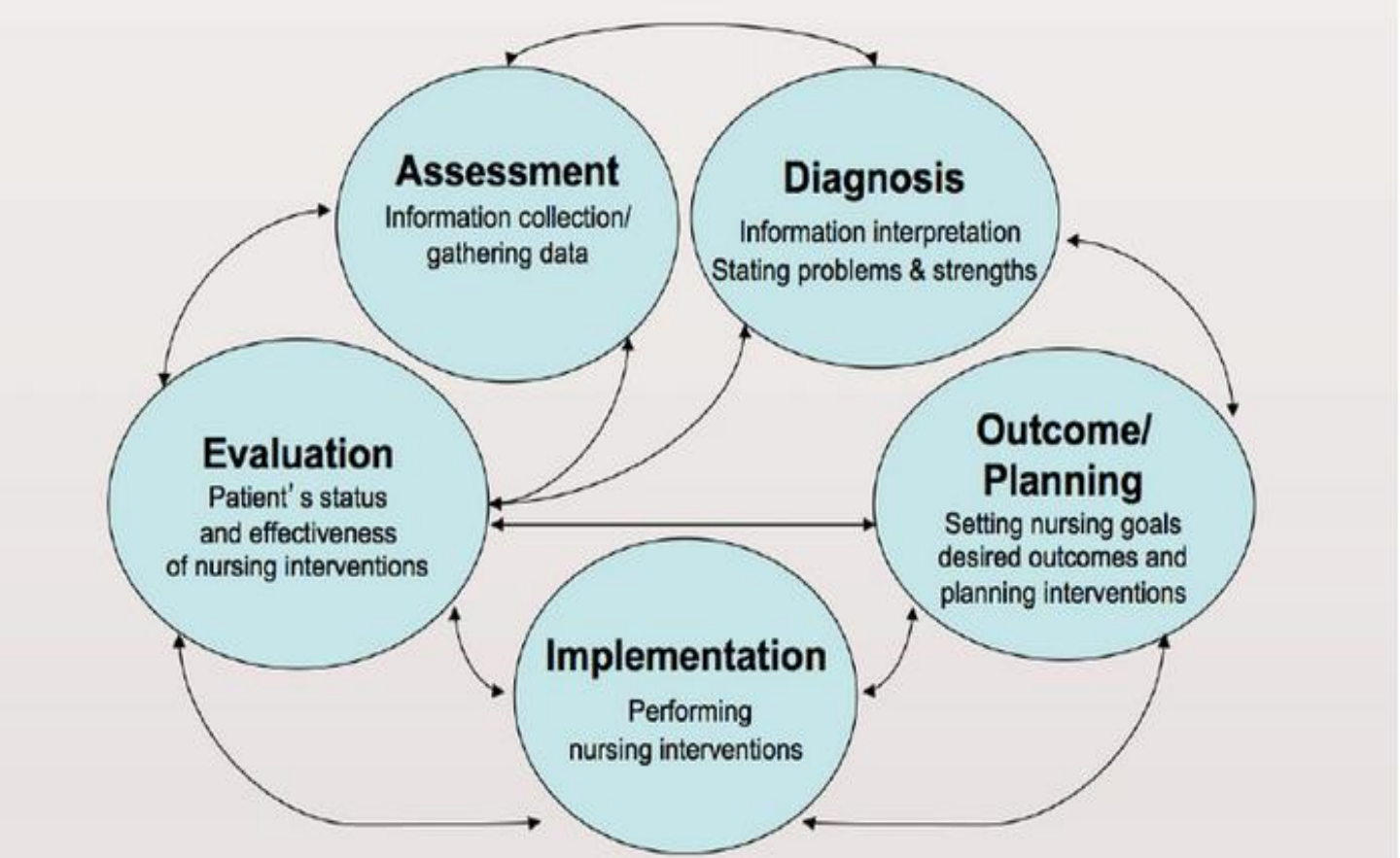
- **V408** Emergency Preparedness
- **V409** Emergency Preparedness of Staff
- **V410** CPR
- **V411** Training of Nursing Staff
- **V413** Emergency Equipment
- **V414** Emergency Medical Assistance

Purpose: To provide guidelines caregivers can use to manage hemodialysis patient problems and emergencies that can occur during treatment.

Nursing Implications

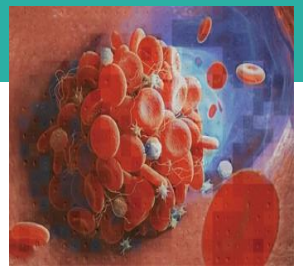
1. Comprehensive assessment of patient & situation – with safety being priority
2. Sound nursing (or IDT) judgment – use nursing process
3. Decision to send patient to ER/hospital
4. Notification of NKC personnel, MD, and family members / caregivers
5. Prompt documentation and completion of appropriate SAS
6. Use of appropriate PPEs

Remember The Nursing Process!



The steps of the nursing process are interrelated, forming a continuous circle of thought and action that is both dynamic and cyclic (Doenges & Moorhouse, 2008 a+b)

ACUTE HEMOLYSIS



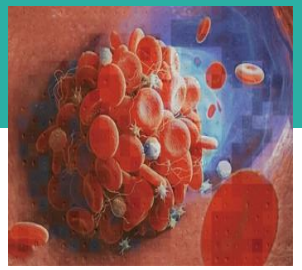
❖Rupture or destruction of RBCs

Possible Causes: Hypotonic solutions / fluids; high pressures in blood circuit, chemicals in dialysate, oxidative agents in water, & other mechanical trauma to blood cells (such as excess arterial or venous pressures)

Immediate Signs & Symptoms:

Nausea & vomiting, shortness of breath (SOB), abdominal pain, back pain, chills, respiratory &/or cardiac arrest

ACUTE HEMOLYSIS

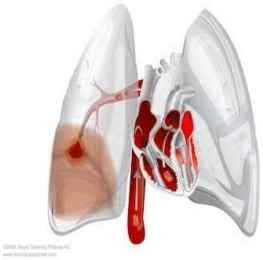


Nursing implications:

DO NOT RETURN BLOOD

- **Stop dialysis**, clamp bloodlines, & disconnect from machine
- Keep needles open with NS syringes
- Provide O2, monitor VS, assess for dysrhythmias, SOB, hypotension, may require CPR
- Notify MD, NKC Admin, family / caregiver
- Collect dialysate sample & verify conductivity & pH were tested prior to incident
- Blood draw per MD order (esp. H&H & lytes)
- Complete documentation: EMR and SAS

AIR EMBOLUS



Significant amount air has entered the bloodstream that can travel to the brain, heart, or lungs

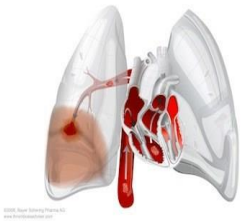
Possible Causes: defect in access &/or bloodlines, loose connections

Signs & symptoms:

Coughing, difficulty breathing that could lead to respiratory failure, chest pain, mental status changes, low blood pressure, cyanosis

AIR EMBOLUS

Nursing implications:



STOP DIALYSIS

- Clamp bloodlines & disconnect from bloodlines
- Use recirculator to remove air from bloodlines
- Turn patient on LEFT side, Trendelenburg position, give O2, & monitor VS
- Observe for visual disturbances, CP, SOB, hemiparesis, seizure, confusion, & coma
- Perform lung assessments
- Transfer to hospital as needed
- Notify MD, NKC Admin, family / caregiver
- Complete documentation: EMR and SAS

ANAPHYLACTIC SHOCK

A severe, potentially life-threatening allergic reaction that can occur within seconds or minutes of exposure to the allergen

Possible Causes: Adverse reaction to medication, blood, or dialyzer membrane incompatibility

Signs & Symptoms:

Integument: itching, hives, flushed or pale skin

Cardiac: hypotension, weak and rapid pulse

Respiratory: constriction of airways and swelling of tongue and throat, wheezing, SOB / dyspnea

GI: nausea, vomiting, or diarrhea

Neuro: dizziness or fainting

ANAPHYLACTIC SHOCK

Nursing implications:

DO NOT RETURN BLOOD

- **Stop dialysis**, clamp lines, disconnect bloodlines
- Keep airway open, administer O2
- Give emergency meds (Epinephrine, Benadryl, Solumedrol)
- Monitor VS
- May require CPR
- Notify MD, NKC Admin, family / caregiver
- Complete documentation: EMR and SAS

BLOOD LEAK (DIALYZER)

Blood leak happens when the semipermeable membranes of the dialyzer breaks (torn) causing the patient's blood to leak into the dialysate compartment. This results in exposure of blood in the hyper or hypotonic dialysate solution which could lead to hemolysis.

Possible Causes: High pressure in dialyzer, defective dialyzer

Signs & symptoms:

Blood loss, pink or red dialysate in the outflow hose, hemolysis

BLOOD LEAK (DIALYZER) (cont.)

Nursing Implications:

make sure machine is in **BYPASS

- If Hemastix is positive (x2) blood is visible in dialysate hose & / or drain line & dialysate hose is pink **STOP DIALYSIS** & **DO NOT RETURN THE BLOOD**

- If the Hemastix test strip is positive x 2; **but** the **dialysate remains clear,** return the blood with the minimum UF rate activated. **Stop immediately** if the dialysate outflow becomes pink or red.

BLOOD LEAK (DIALYZER) (cont.)

- If Hemastix negative (x2) & if alarm clears, continue dialysis, if not, return blood & set patient up on a different machine

- Use a different bottle of Hemastix for each test

- Notify MD if blood not returned; draw H&H if ordered by MD; monitor patient for complications

- Complete documentation: EMR, SAS, & machine work order request (for Tech Services)

CODE BLUE

Cardiac &/or respiratory arrest

Possible causes:

Cardiac or respiratory failure; dialysis treatment related such as hemolysis, blood leak, anaphylactic shock, air embolism, etc.

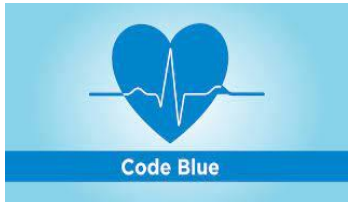
Signs & symptoms:

Unresponsive, absence of pulse, &/or breathing (air exchange)

CODE BLUE – Full Code

Nursing Implications:

- **Verify Code Status!**



For **"Do Resuscitate"** (Full Code) – initiate emergency procedures

- Assess responsiveness, circulation, airway
- "Code Blue", call 911, AED, ambu bag, backboard
- Start CPR, use AED immediately upon arrival
- Return blood (if appropriate)
- Leave needles for fluid & med administration
- Give emergency meds per S.O.
- Provide patient info to Medics & assist prn

CODE BLUE – Full Code (cont.)

Nursing Implications (during & immediately after):

- Notify MD, NKC Admin, patient's family / caregiver
- Medic-One personnel can pronounce the death of patient if resuscitation efforts are unsuccessful
- Refer to the following policy & procedures:
  - ✓ Code Blue Guidelines # HDP-C19088
  - ✓ Code Blue Checklist Form # HDP-C19086
  - ✓ Machine Associated with Code Blue SW # ED-SW2129
  - ✓ Care of the Dead # HDP-C19087

CODE BLUE - DNR

Workflow for DNAR patients:

DNAR patient, lost pulse → Do not resuscitate, do not call Medic One → See "Care of the Dead" procedure

DNAR patient, pulse present → Call Medic One, inform them that patient has POLST → Pull up POLST form → Medic One will triage based on POLST

CODE BLUE - DNR

Nursing Implications:

For **"DNR"** – check for POLST

- Comfort care & provide privacy
- Two RNs (or one RN & one LPN) can legally pronounce death
- Care of the dead body # HDP-C19087
- Notify MD, NKC Admin, & pt.'s family/caregiver
- Call funeral home **

Refer to the following policy & procedures:

- ✓ Code Guidelines # HDP-C19088
- ✓ Code Status & POLST # CD-N1036

CHEST PAIN

Discomfort that is felt in the center/side of the chest caused by reduced blood (oxygen) supply to the heart.

Possible causes:

Myocardial infarction, pericarditis, pleuritis, air embolism, gastro-esophageal reflux, catheter infection, cardiac overload related to treatment

Signs & symptoms:

Feels like a “crushing” or “burning” sensation. The pain might travel to the neck, into the jaw, or radiates to the back or down on the arms.

CHEST PAIN

Nursing implications:

- Give O2, minimum UF, lower BFR
- NS bolus if needed
- Give SL nitroglycerine – as indicated by BP
- Monitor Vital Signs closely
- Notify MD, family/caregiver
- May need to send to hospital if CP persists
- Complete documentation: EMR and SAS

DIALYSIS DISEQUILIBRIUM

Occurs when rapid or drastic changes in patient's extracellular water affect the brain – usually experienced by new patients.

Possible Cause:

Urea gradient that causes water to move into the CNS resulting in increased ICP

Signs & symptoms

Headache, nausea, vomiting, restlessness, hypertension (HTN), increased intracranial pressure, decreased sensorium, muscle twitching, convulsions, coma, & death

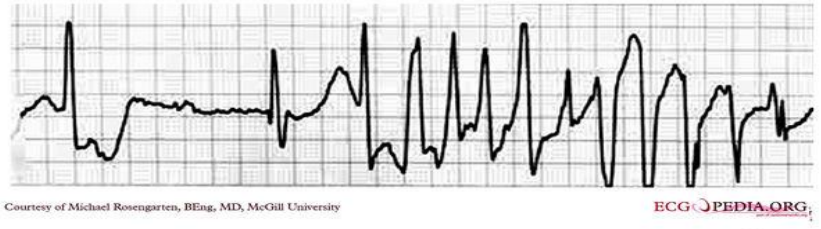
DIALYSIS DISEQUILIBRIUM

Nursing implications:

- Early recognition of signs and symptoms is important
- Rapid termination of HD
- Monitor VS and neuro changes
- Transfer to hospital
- Notify MD – changes in order, osmotic agent, &/or changes in dialysate orders
- Complete documentation: EMR and SAS

DYSRHYTHMIAS

(AKA) arrhythmias or irregular HR



Possible cause:

Rapid shift of electrolytes – K+, hyper / hypokalemia, cardiovascular disease

Signs & symptoms:

Irregular pulse (A-Fib), chest discomfort, tachycardia, bradycardia, changes in EKG, asystole - sudden cardiac death (SCD)

DYSRHYTHMIAS

Nursing implications:

- Monitor VS & check AP, give O2
- If hypotensive, place on "Minimum UFR", give NS prn
- Monitor patient's condition, have crash cart ready
- Notify MD, draw serum K+ if ordered
- Discontinue HD & transfer to hospital if unstable
- Evaluate serum K+ vs K+ bath
- Dietary referral as needed
- Complete documentation: EMR and SAS

ELECTRICAL POWER OUTAGE

No power to run the dialysis machine(s).

Possible causes:

Localized (outlet), unit or citywide electrical power outage.

Staff actions:

- Turn machine to "**OFF**" position to mute alarm
- If need to hand crank the machine, Remove venous blood line from line clamp
- Use hand crank to manually turn the blood pump
  - Clockwise, 1 revolution every 4 seconds

ELECTRICAL POWER OUTAGE

Nursing implications:

- Monitor for blood leak, infiltration, clotting, line separation, & air in blood
- Treat symptoms as they arise
- Call power company to check on duration of outage
- Return patient's blood if power out >10 minutes
- Notify manager, NKC Admin, & MD if unable to resume treatment
- May need to transfer patients to other units
- Refer to NKC's Emergency Notebook
- Complete documentation: EMR and SAS

RETURN OF POWER

Nursing implications & staff actions:

- Turn all machine power switches "ON"
- Mute the alarms
- Thread venous line back to the line clamp (set up new blood circuit if power out >10 mins or circuit is clotted)
- Increase BFR gradually to ordered speed
- Resume HD, double check machine settings
- Check status of DCI
- Check status of alarms – back to green light
- Check all patients' VS and accesses
- Complete documentation: EMR & SAS

WATER OUT

No water supply to dialysis machine

No water = no dialysis

Possible causes:

Break in unit RO system or city water line / supply

- Charge nurse &/or FSS to troubleshoot R/O
  - May need to change to back-up system if available
  - Check with city water

WATER OUT

Nursing implications & staff actions:

- Make sure machine is in "**BYPASS**"
- Monitor patients – be prepared to rinseback if appropriate
- Notify manager, NKC Administrator, & MD
- May need to transfer patients to other units
- Complete documentation: EMR and SAS

EXSANGUINATION

Severe loss of blood

Possible causes:

Accidental or intentional: needle dislodgement, bloodline separation from access line, access rupture, or dialyzer defect

- Immediately: turn off blood pump, clamp needle/bloodline

- Immediately: apply pressure – call 911 if bleeding is excessive / unable to stop

EXSANGUINATION

Nursing implications:

- If blood loss is significant &/or patient is experiencing SOB, CP, arrythmias, or hypotension = administer O2 & NS per SO
- Evaluate need to transfer to hospital
- Obtain MD orders for H&H
- Notify NKC Admin, Med. Dir, MD, family/caregiver
- If dislodgement was intentional:
  - Call 911 or NKC Security Dept. 206-720-3995
  - Remove other patients / personnel in immediate danger
- Complete documentation: EMR & SAS

FEVER

Unexplained elevated temperature before, during, or after a dialysis treatment

Possible causes:

Infection, access related, exposure to organisms during treatment (such as contaminated supplies or water)

Signs & symptoms:

Elevated temperature > 100F or 38.2C, chills, malaise, sweating, confusion, or dehydration

FEVER PREDIALYSIS

Nursing implications:

- Follow NKC S.O.
- If patient has a CVC, draw two sets of BC at least 5 minutes apart.
- If patient has AVF or AVG, call MD for orders
- Assess access site for s/s of infection
- Monitor temp and condition,
- Eval need to transfer to hospital if condition worsens
- Complete documentation: EMR & SAS

FEVER INTRADIALYSIS

Nursing implications:

- Follow NKC S.O.
- Draw two sets of blood cultures, 5 mins apart
- Check dialysate temp, isolate HD machine & station
- Notify FSS to draw water & dialysate samples for cultures, LALs, & colony counts
- Disinfect machine after dialysate and water samples obtained
- Notify MD, Med. Dir., NKC Admin, & family.
- Notify Water Purification Manager or Specialist
- Complete documentation: EMR & SAS

FIRE (R.A.C.E. & P.A.S.S.)

Rapid termination of dialysis in event of fire (clamp and disconnect procedure)

Staff Actions:

- **R**escue – remove anyone from danger
- **A**ctivate – pull the alarm & call 911
- **C**ontain – close all doors, fire extinguisher (PASS)
- **E**vacuate – use available exits – assemble in designate area

Use of **Fire Extinguisher** (**Type = ABC**)

- **P**ull the pin
- **A**im at the base of the fire
- **S**queeze handle
- **S**weep at the base of fire

FIRE

Staff actions:

- Turn off oxygen system/tanks
- If fire is too big, do not attempt to extinguish, evacuate immediately – use "**Clamp & Disconnect**" procedure
- Bring emergency supplies
- Meet at the designated location for head count DO NOT re-enter the building until authorized to do so by the fire dept
- Wait for instructions.
- Comply with building rules for emergency procedures/security management.

FIRE

Nursing implications:

- Work with Medics – Assess patients & provide triage care – attend to injuries
- Notify NKC Admin, MD, & patients' families / caregivers
- Consider transferring patients to other units for treatment
- Complete documentation: EMR & SAS

FIRST USE SYNDROME (FUS)

A reaction to a new dialyzer that happens at the start of dialysis.

Possible causes:

Ethylene oxide gas, manufacturing residues, or dialyzer fiber material.

Signs & symptoms:

Minor: Coughing, sneezing, or rhinorrhea

Mild-Moderate: headache, hypotension, pruritus, urticaria, muscle cramps, & back pain

Severe-life-threatening: SOB, wheezing, vascular collapse, N/V, fever, chills, & airway narrowing

FIRST USE SYNDROME (FUS)

Nursing implications:

Minor symptoms:

Administer Benadryl 25mg IV, MRx1

Continue HD & monitor patient

Mild – Moderate symptoms:

Administer Benadryl, Epi, or Solumedrol

May rinseback blood, monitor patient

Severe – life threatening:

Administer O2, give Epi 0.3mg IM, Solumedrol 125mg IV push over 5-10 mins, Benadryl 25mg IV push

DO NOT RETURN BLOOD

FIRST USE SYNDROME (FUS)

Nursing implications:

- Monitor patient's condition / VS
- Assess need to transfer patient to hospital
- Notify patient's MD & family / caregiver, NKC Admin., Med. Dir.,
- Eval need to make treatment parameter changes (dialyzer, extra NS prime, etc.)
- Complete documentation: EMR & SAS

HYPERKALEMIA

Elevated serum K+ level

Possible causes:

Kidney failure, excess K+ intake, bleeding, hemolysis, surgery, or fever

Signs & symptoms:

Numbness & tingling around the mouth or tongue, muscle weakness, arrythmias, nausea & vomiting, diarrhea, or SCD

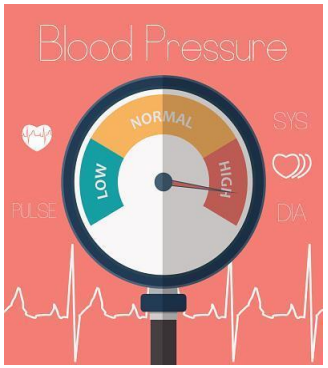
HYPERKALEMIA

Nursing implications:

- Call 911 / transfer to hospital for severe symptoms
- Notify patient's MD for orders – lab draw &/or change in K+ bath (see ICHD S.O. for 1K+ bath)
- Monitor VS & condition, check AP rhythm
- Diet referral
- Complete documentation: EMR & SAS

HYPERTENSION

Elevated BP: SBP > 200 &/or DBP >120



Possible causes:

Kidney failure, FOL, lifestyle, diet, CVD, ethnicity, or gender

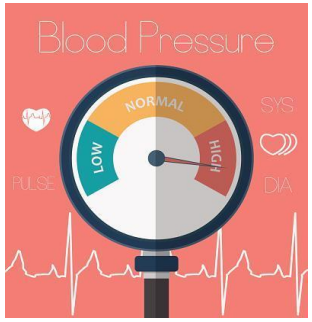
Signs & symptoms:

None to vague symptoms like headache, neck pain, blurred vision, feeling flushed, SOB, possibly nosebleed, or lead to chest pain or stroke

HYPERTENSION

Nursing implications:

- Recheck BP reading
- Assess patient for symptoms & volume status
- Keep patient in sitting position
- Delay treatment, & notify MD
- Check order for prn anti-hypertensive med
- Decrease or hold Heparin dose
- Evaluate need to transfer patient
- Complete documentation: EMR & SAS



HYPOTENSION

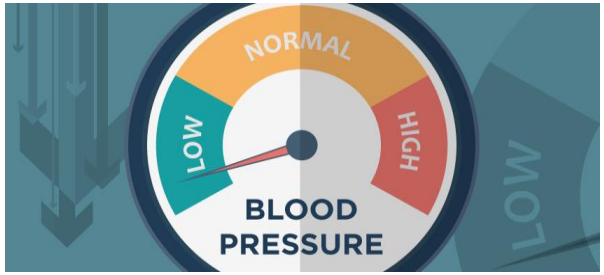
Low BP reading: SBP < 100 &/or DBP < 50

Possible causes:

Volume depletion/dehydration, BP meds, age, eating during HD, & CVD

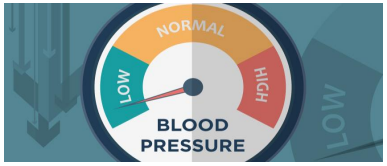
Signs & symptoms:

Feeling warm, yawning, restless, dizziness, fainting, nausea, cramping, and could lead to seizures, coma, or death



HYPOTENSION

Nursing implications:



- Determine accuracy of BP & monitor symptoms
- Review list of anti-hypertensive medications: update frequently
- Evaluate accuracy of Target Weight
- Assess tolerance of fluid removal – UF profile
- Re-assess Target Weight after hospitalization, illness or change in health condition
- Patient education
- Notify MD and unit staff of findings
- Document in EMR

WRONG DIALYZER

Nursing implications:

- Monitor VS – including temp
  - If VS Stable:
    - Notify MD, obtain 1x order, & continue dialysis
    - Monitor patient closely for reactions
    - Complete documentation: EMR & SAS

WRONG DIALYZER

Nursing implications:

- If VS Unstable:
  - Eval signs & symptoms of reaction & follow SO to administer Benadryl, Epi, or Solumedrol
  - DO NOT RETURN BLOOD if having allergic reaction
  - Notify MD, obtain order to draw H&H if not able to return blood
  - Eval need to transfer patient or reschedule treatment

PATIENT INJURY

Including patient falls

The safety & welfare of the patient is ALWAYS the priority.

"It is the responsibility of ALL NKC staff to be involved in seeking out and using the appropriate resources as needed to treat the patient."

PATIENT INJURY

Nursing implications:

- Perform full pt. assessment including vital signs
- Monitor pt.'s status closely
- Assess if pt. can be moved safely – if not, call 911
- Note any injury – refer to S.O. if injured or no injury
- Notify manager, MD, family member / caregiver
- If injury occurred, notify NKC Administrative Personnel
- Assess & determine if pt. can go home safely or needs to be transferred to hospital

PATIENT INJURY

Follow-up - Nursing implications:

- Documentation in EMR & SAS should include:
  - Objective data related to the injury
  - Assessment of the patient and pertinent details leading up to the incident
  - Who was notified?
  - Time & all follow up actions
    - Refer to the *"NKC Patient Fall Disposition Pathway"*
    - Complete & update Fall Risk Assessment & Post Fall Assessment
- Follow-up with patient/family/caregiver after the patient has left the unit

RAPID TERMINATION OF DIALYSIS

When / Why?

Emergency events such as fire, earthquake, etc. that will need immediate removal of patients

Nursing Staff actions:

- "**Clamp & Disconnect**" procedures – Leave all clamps in place
- Instruct &/or assist patients to safe area
- Take unit's emergency evacuation box & daily schedules

RAPID TERMINATION OF DIALYSIS

Nursing implications:

- Provide triage care
  - Attend to injuries, treat symptoms
  - Provide access care
- Notify MD, NKC Admin, Med. Dir.
- Coordinate with SW/IDT for possible transfer to another unit or reschedule treatment
- Complete documentation: EMR & SAS

RECIRCULATION DURING DIALYSIS

The patient's blood may need to be recirculated in several different situations during dialysis including:

1. Bathroom break
2. Air in the bloodline
3. Access problems during HD

Nursing Staff actions:

- Disconnect patient from bloodlines
- Use recirculator
- Flush access lines/ports with NS
- See HDP-R19105 "*Recirculation of Blood on the B.Braun When Dialysis is Interrupted*"

RECIRCULATION DURING DIALYSIS

Nursing implications:

- DO NOT RETURN BLOOD if recirculating > 10 minutes
- Ensure access lines are flushed and remain patent
- Monitor for clots
- Maintain aseptic technique
- Notify MD if unable to return blood & get order for H&H
- Document blood loss and treatment time loss
- Complete documentation: EMR & SAS

SEIZURES

Involuntary muscle spasms and loss of consciousness

Possible causes:

Severe hypotension, electrolyte shift/loss, dialysis disequilibrium, contaminated water dialysate, CVA, subdural hematoma, drug induced neurotoxicity, alcohol withdrawal, or seizure disorder

Signs & symptoms:

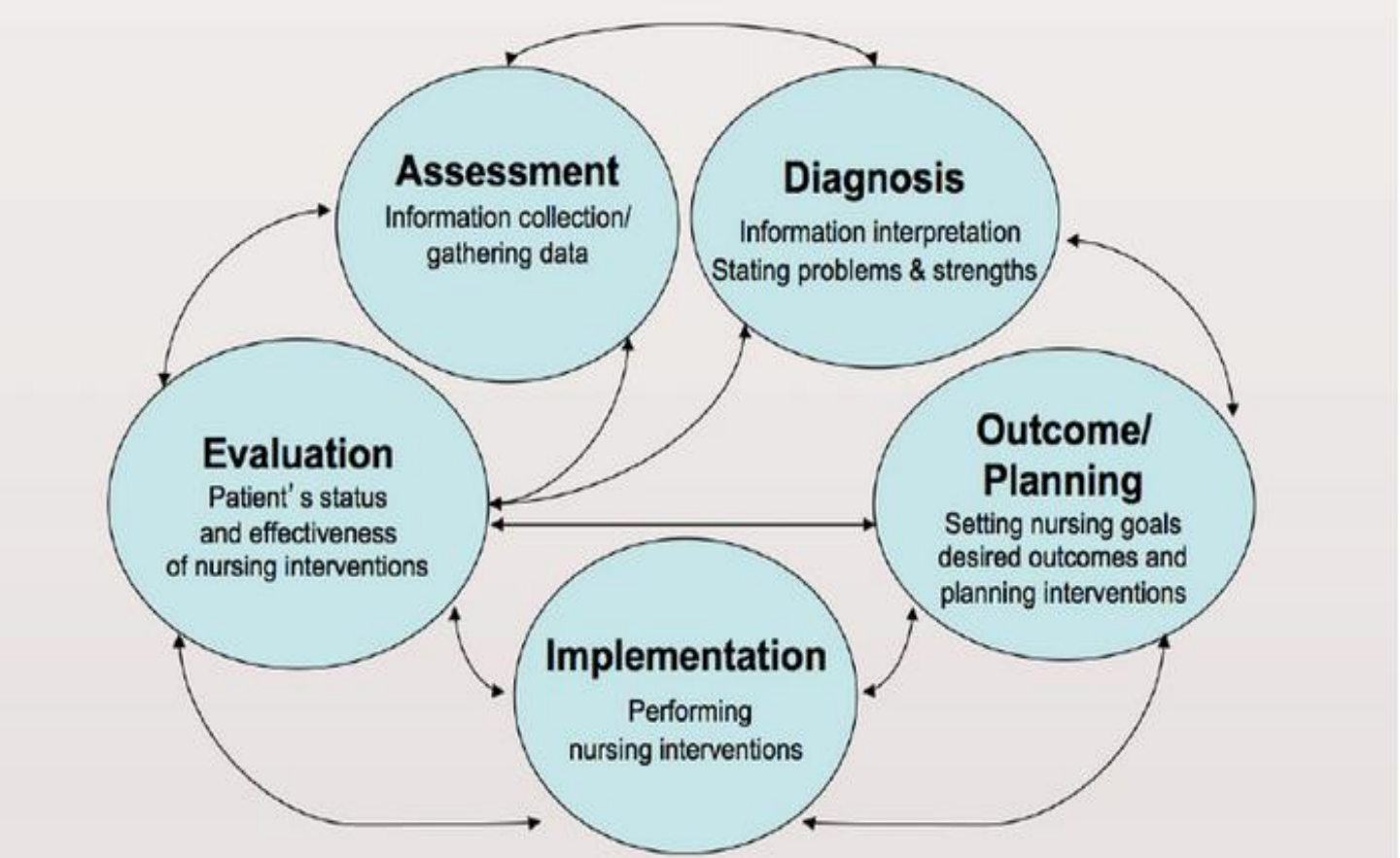
Temporary confusion, staring spell, uncontrollable jerking movements of extremities, loss of consciousness, feeling of fear or anxiety

SEIZURES

Nursing implications:

- Protect the pt. & access – do not hold pt. down
- Position on left side to prevent aspiration
- If indicated, treat hypotension, hypovolemia, or hypoglycemia
- Discontinue dialysis if seizure activity continues
- Call 911 if seizure > 2 minutes
- Do not give anything orally (meds, water, food)
- Assess need to transfer to hospital after seizure
- Notify manager, MD, family / caregiver
- Complete documentation: EMR and SAS

Remember The Nursing Process!



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Questions?