



# Critical Thinking

Beat the Clock!



# Critical Thinking

- Making good choices by using information from several sources
  - Training
  - Policies and procedures
  - Communicating/collaborating with other dialysis professionals
- Always aware of the patient's condition and try to recognize potential problems before they occur
  - Avoid operating on "auto pilot"
- Valuable skill that can improve the care you provide



# Scenario # 1

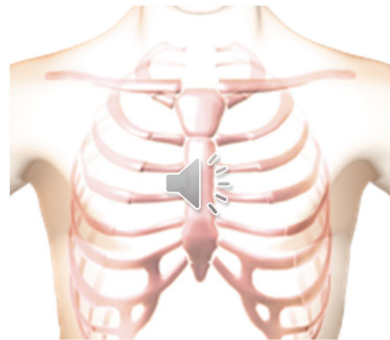
Mr. Brown is 24 years old and has been on hemodialysis for three years. Since starting a new job two months ago, he has been cutting his dialysis treatment time and skipping Saturday.

Today he arrives at the clinic, looking extremely tired, and tells you he doesn't feel well. For the past few days he has had a low-grade fever that seems to get worse at night and has been sleeping, propped up on three pillows, to alleviate the chest pain he experiences when lying down flat in bed.

His pre-treatment temperature is 99.8 and there are no signs or symptoms of infection when you evaluate his fistula. His pre-treatment blood pressure is 107/68, which is much lower than normal. You review his last three treatment records and his pre-treatment blood pressure readings were 179/90, 166/92 and 172/89.



Upon listening to his apical pulse, you hear something unusual.



You notify the charge nurse of all of your findings, she too listens to his apical pulse, and confirms what you heard.

What are these symptoms telling you?



# Answer

**Pericarditis** – Inflammation of the pericardium (the sac around the heart). Patients with kidney failure may develop pericarditis. In those with CKD, this problem is most often due to uremic toxins and may occur before or after the start of dialysis.

Symptoms may include:

- Constant pain in the center of the chest that may spread out to other places. The pain may be sharp and stabbing, is often worse when lying down and may be better when sitting up.
- Fever
- Dry cough
- Fatigue
- Low blood pressure
- Irregular heartbeat



# Treatment and Your Role

Treatment includes pain medication and anti-inflammatory drugs, antibiotics, and/or intensive dialysis (longer and/or more frequent treatments). In some cases, the sac can squeeze the heart so it cannot beat as well and surgery may be needed to reduce pressure so the heart can function properly.

## Your role:

- Always notify the nurse of abnormal findings and patient complaints before starting treatment
- Report all complaints of chest pain to the nurse right away
- If a patient has chest pain before dialysis, do not start the treatment until the nurse has assessed the patient
- If a patient starts to have chest pain during treatment, notify the nurse immediately
- Give each patient their full treatment as ordered by nephrologist



## Scenario #2

Mr. Anderson returns to his hemodialysis unit after his week-long vacation. It is Monday and he states “I have not had dialysis since last Tuesday, the other staff could not cannulate my graft”. Mr. Anderson tells you his legs are weak and that he has tingling and numbness in his arms and legs.

His pre-treatment vitals are as follows; BP is 197/102, pulse is 54 and irregular, temperature is 98.2 and he is 6kg above his target weight.

What are these symptoms telling you and what should you do?



# Answer

**Hyperkalemia (too much potassium in the blood)** – Can result if the patient consumes too many high-potassium foods and/or drinks. Other causes include severe blood loss, crush injuries, trauma, hemolysis, and missed treatments. Hyperkalemia can change heart rhythm, which can be fatal.

Symptoms may include:

- Weakness
- Changes in heart rhythm/bradycardia
- Skipped heart beats
- Cardiac arrest

Always notify the nurse of abnormal findings and patient complaints before starting treatment and remember the potassium level may be dangerously high if they have missed treatments.





## The Rest of the Story

The nurse calls Mr. Anderson's nephrologist and orders are given to draw a stat potassium and BUN, and start the treatment using a lower potassium bath. Knowing Mr. Anderson hasn't dialyzed in nearly one week, the nephrologist makes additional changes to the treatment prescription to avoid another very serious complication.

Which serious complication is the nephrologist concerned about?



**Dialysis disequilibrium syndrome (DDS)** – Urea transfers more slowly from the brain tissue to the blood. When we remove urea from the blood, water moves into the brain (where the concentration of urea is higher) through osmosis and causes swelling. DDS is uncommon these days but may still occur in patients who are new to dialysis or who have missed a number of treatments.

Symptoms occur during or towards the end of treatment and include:

- Nausea/vomiting
- Blurred vision
- Headache
- Tremors/restlessness
- Behavior changes
- Seizures
- Coma
- Death



# Treatment and Your Role

Slow removal of urea is important to avoid DDS, and the nephrologist may prescribe the following:

- A smaller dialyzer with lower clearances
- Slower blood and dialysate flow rates
- Concurrent dialysate flow
- Shorter, daily treatments for a few day

## Your role:

- Monitor patients for symptoms
- Notify the nurse if you suspect a problem
- Stop the treatment, if directed by the nurse, and return the patient's blood



## Scenario #3

Mrs. Smith arrives for her dialysis treatment today feeling well and indicates she hasn't experienced any problems or complications since her last treatment two days ago.

Her pre-treatment vitals are as follows; BP is 156/77, pulse is 72, temperature is 97.8 and she is 3.7kg above her target weight. Her CVC exit site is dry, slightly red and no swelling or drainage is noted.

Approximately 60 minutes into her treatment, you notice Mrs. Smith is shivering. Her blood pressure is 89/60 and she complains of nausea, muscle aches and feeling cold. You immediately check her temperature and it is now 100.1°F.



You also notice the dialysate temperature is set at 36°C on her machine and turn it up to 37°C as ordered by the nephrologist.

Upon notifying the charge nurse, you learn that two other patients are experiencing similar symptoms; one patient has been on the machine for 45 minutes, the other patient has been on for an hour and 10 minutes, and these two patients were also afebrile before their treatment started.

What are these symptoms telling you?



# Answer

**Pyrogenic reaction** – A fever caused by pyrogens. A patient may be having a pyrogenic reaction if they have a normal temperature pre-treatment and develop fever and chills 45 – 75 minutes after the start of dialysis. This is especially true if more than one patient develops symptoms during a shift. A problem with water treatment or a reprocessed dialyzer that has endotoxins in it can cause a pyrogenic reaction.

Symptoms typically occur approximately 45 – 75 minutes after the start of dialysis and patients may have:

- Fever
- Shaking/chills
- Low blood pressure
- Nausea/vomiting
- Muscle pain



## Your role:

- Notify the nurse
- Stop the treatment and follow the nurses' instructions
- Check the patient's vital signs, including temperature
- Obtain water and dialysate samples for LAL and bacterial testing as directed by the nurse
- Isolate involved equipment and supplies as directed by the nurse



## Scenario #4

A newer technician is dialyzing a pod of four patients and is having problems with constant alarms on one dialysis machine. You notice that in response to the alarms, she is continuously pressing the “Reset” button on the machine which re-starts the blood pump.

Suddenly she calls for help and when you arrive, you notice the arterial drip chamber is almost empty and the patient is having chest pain, is short of breath and their lips appear blue.

What are these symptoms telling you and what should you do?





# Answer

**Air embolism** – Air bubbles enter the bloodstream and flow into a vessel small enough to be blocked by the air.

If patient is *lying down*, air may go to the heart and lungs causing:

- Shortness of breath or coughing
- Cyanosis (blue lips/fingers/toes)
- Irregular heart rhythms
- Chest pain
- Cardiac arrest
- Death

If patient is *sitting up*, air may travel to the brain and cause:

- Changes in vision
- Confusion
- Slight paralysis on one side of body
- Seizure
- Stroke
- Coma
- Death



## Your role:

- Clamp the blood lines and turn off the blood pump to stop the infusion of air
- Call for help
- Raise the patient's feet above their head (Trendelenburg position)
- Turn the patient on their *left* side so air will rise to the *right* side of the heart



# Open Discussion

