Dialysis/ Renal Failure

History
- Peritoneal or Hemodialysis
- Anemia
- Catheter access noted
- Shunt access noted
- Hyperkalemia

Signs and Symptoms
- Hypotension
- Bleeding
- Fever
- Electrolyte imbalance
- Nausea and / or vomiting
- Altered Mental Status
- Seizure
- Arrhythmia

Differential
- Congestive heart failure
- Pericarditis
- Diabetic emergency
- Sepsis
- Cardiac tamponade

Cardiac Arrest — YES → P: **Calcium Gluconate 2 gm IV / IO (Or Calcium Chloride 1 gm IV / IO)**; **Sodium Bicarbonate 50 mEq IV / IO** → Exit to Appropriate Cardiac Protocol(s) ***as indicated***

NO

Shunt / Fistula Bleeding — YES →
- **Apply firm finger tip pressure to bleeding site**
- Apply dressing but avoid bulky dressing
- Dressing must not compress fistula / shunt as this will cause clotting of the shunt

NO

- Blood Glucose Analysis Procedure
- Diabetic Protocol AM 2 ***as indicated***
- B: 12 Lead ECG Procedure
- IV or IO Access Protocol UP 6
- P: Cardiac Monitor
- CHF / Pulmonary Edema Protocol AC 5 ***as indicated***

NO

Systolic Blood Pressure < 90 — YES → A: **Normal Saline Bolus 250 mL** Repeat as needed **Maximum 1 L** *If lungs remain clear*; Hypotensive/ Shock Protocol AM 5 ***as indicated***

NO

Peaked T Wave QRS ≥ 0.12 sec — YES → P: **Calcium Gluconate 2 gm IV / IO (Or Calcium Chloride 1 gm IV / IO)**; **Sodium Bicarbonate 50 mEq IV / IO**

NO

Notify Destination or Contact Medical Control

Adult Medical Protocol Section

Dialysis/ Renal Failure

Peritoneal dialysis:

Patient has a catheter placed inside the abdomen called a Tenckhoff Catheter. Patient infuses abdomen full of dialysate at night and removes in the morning, which is called a dwell. The metabolic waste will be absorbed by osmosis into the solution across the peritoneal membrane. In addition to the typical problems encountered by the dialysis patient, infection, bleeding, and occlusion and/ or disruption of the Tenckhoff catheter may occur.

Hemodialysis:

Patient has a long term catheter or shunt placed for this procedure. Catheters are placed in the upper chest region or groin. Shunts are typically placed in the arms or forearms. The shunt is created by connecting a vein and an artery together and you will feel a thrill over the shunt when palpated and hear a bruit when functioning properly. This typically occurs 3 times per week in 4 hour sessions. Some patients are now performing hemodialysis at home daily for 1 to 2 hours.

Shunt bleeding:

Bleeding after hemodialysis is not uncommon but typically is controlled at the center before leaving. Many dialysis patients receive heparin during their treatment. When faced with a bleeding shunt you should identify the site of bleeding. Typically this will occur in 1 to 4 tiny holes made by needles. A common response is to wrap in a bulky dressing. This will absorb the blood but will NOT control the bleeding.

Direct finger tip pressure should be performed. You may fold a small gauze into a half inch square and place over the bleeding area(s) but direct pressure is key. When the bleeding stops place tape over the gauze but do not remove the gauze to check your progress as this will usually cause more bleeding. Circumferential dressing should NOT be used as this can occlude the shunt and cause clotting of the shunt. The tape should envelope about 180 degrees of the extremity.

Indwelling catheter and shunt access:

In an emergency when vascular access by IV or IO procedure cannot be obtained the paramedic may access the long term vascular catheter for use. Access by this means should only be used in an emergency when no other means of vascular access are available. Use sterile technique as infection is a great risk in this procedure. IO is preferred.

Pearls

- **Recommended exam: Mental status. Neurological. Lungs. Heart. Skin.**
- **Preferably transport to a medical facility capable of providing dialysis treatment.**
- **Do not take Blood Pressure or start IV / IO in extremity which has a shunt/ fistula in place.**
- **Access of shunt indicated in the dead or near-dead patient only with no IV or IO access.**
- **If hemorrhage cannot be controlled with firm, uninterrupted direct pressure, application of tourniquet with uncontrolled dialysis fistula bleeding is indicated.**
- **Hemodialysis:**
  Process which removes waste from the blood stream and occurs about three times each week.
  Some patients do perform hemodialysis at home.
- **Peritoneal dialysis:**
  If patient complains of fever, abdominal pain, and/ or back pain, bring the Peritoneal Dialysis fluid bag, which has drained from the abdomen, to the hospital.

Complications of Dialysis Treatment:

Hypotension:
Typically responds to small fluid bolus of 250 mL Normal Saline.
May result in angina, AMS, seizure or arrhythmia.

Filtration and decreased blood levels of some medications like some seizure medications:

Disequilibrium syndrome:
Shift of metabolic waste and electrolytes causing weakness, dizziness, nausea and/ or vomiting and seizures.

Equipment malfunction:
Air embolism.
Bleeding.
Electrolyte imbalance.
Fever.

- **Fever:**
  Consider sepsis in a dialysis patient with any catheter extending outside the body.
- Always consider Hyperkalemia in all dialysis or renal failure patients.
- Sodium Bicarbonate and Calcium Chloride/ Gluconate should not be mixed. Ideally give in separate lines.
- Renal dialysis patients have numerous medical problems typically. Hypertension and cardiac disease are prevalent.