Hemodialysis an Overview

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ABSTRACT: Dialysis is a process for removing waste and excess water from the blood, and is used primarily as an artificial replacement for lost kidney function in people with renal failure. Dialysis may be used for those with an acute disturbance in kidney function or progressive but chronically worsening kidney function–a state known as chronic kidney disease stage 5 (previously chronic renal failure or end-stage renal disease. **Key words: Dialysis**

INTRODUCTION: Now-a-days, kidney diseases are more common which may be both acute and chronic. Chronic renal failure is a progressive, irreversible deterioration of renal function in which the body's ability to maintain fluid and electrolyte balance fails, resulting in uremia or azotemia. There is an estimation of 100 new cases per million populations in a year globally 1 lakh of patients from India. In 2010, the **World Health Organization** reported that the diseases of kidney and urinary tract contribute to over 8,50,000(85%) deaths and over 15 million disability to adjusted life. Most CKD patients reporting to tertiary care centers in India are in the end stage where Renal Replacement Therapy (RRT) is the only option at this stage. Haemodialysis is a medical procedure that uses a dialyzer to filter waste products from the blood and to restore normal constituents.

The Indian Society of Nephrology (2017) indicates that 1 in 10 persons in the general population are estimated to have some form of chronic kidney diseases. (CKD). About 1,75,000 new people have kidney failure (stage V CKD) every year in India and require dialysis and/or kidney transplantation. It has also been estimated that about 60% to 70% of CKD cases are offshoots of diabetes and hypertension.

As per report available (2017) Among all districts in Andhra Pradesh, cases of Chronic Kidney Disease (CKD) are high in Srikakulam, where more than 13,000 persons, suffering from diseases related to kidney, were screened in the Uddanam area, alone.

TYPES: Haemodialysis and peritoneal dialysis. Peritoneal dialysis uses the lining of the abdomen [peritoneum] to filter blood. A soft catheter introduced under the skin in a tunnel and then into the abdomen. So that its tip is in the pelvic area. But this is not possible in all children as it depends on the fluid being able to flow freely through abdomen.

Haemodialysis is usually under taken in hospital but, as with peritoneal dialysis, can be done at home. In the haemodialysis, there needs to be access

to the blood vessels so that blood can be taken out of the body, passed through a filter to clean it and then returned to the body. Access can be either via a catheter (or) by a fistula.

CASE REPORT: Mr. Siva Krishnan with the age 61 years male admitted in Narayana hospital with chronic kidney disease undergoing hemodialysis.

DIAGNOSIS:

BLOOD pressure: 190/100 mm/hg

Heamoglobin: 7.8mg/dl

Urea – 90. 1 mg/dl

Creatinime -9.8 mg/dl

Urine albumin - +++

Medical management:

Treatment Dose	Fre	Morning	Evening	Night
Tab.nephivit	TID	1 tab	1tab	
Tab.cilacar	Bd	1 tab 10mg		1 tab 10 mg
Tab.sobosis	Tid	1 500mg	1 500mg	1 tab 500mg
Tab.amolng	Od		10 mg	
Tab.aspirin	OD		150mg	

DEFINITION: Hemodialysis (HD), blood is shunted through an artificial kidney (dialyzer) for removal of toxins/excess fluid and then returned to the venous circulation. **Hemodialysis** is a fast and efficient method for removing urea and other toxic products and correcting fluid and electrolyte imbalances but requires permanent arteriovenous access. Procedure is usually performed three times per week for 4 hrs. **Hemodialysis** may be done in the hospital, outpatient dialysis centre.

INDICATONS:

1. Acidemia from metabolic acidosis in situations in which correction with sodium bicarbonate is impractical or may result in fluid overload.

2. Electrolyte abnormality, such as severe hyperkalemia, especially when combined with AKI.

3. Intoxication, that is acute poisoning with a dialyzable substance. These substances can be represented by the mnemonic.

SLIME: Salicylic acid, lithium, isopropanol, Magnesium-containing laxatives and ethylene glycol.

4. Overload of fluid may not be expected to respond to treatment with diuretics.

5. Uremia complications, such as pericarditis, encephalopathy or gastrointestinal bleeding.

Principles of Dialysis:

Osmosis,Diffusion,Ultra filtration,

Osmosis: It is a chemical process by which dissolve chemical will migrate from an area of low concentration to high concentration.

Diffusion: Diffusion is a physical process that refers to the net movement of molecules from a region of high concentration to one of lower concentration.

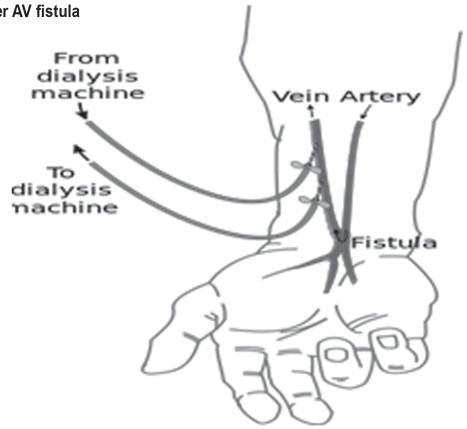
Ultra filtration: The high hydrostatic pressure forces small molecules such as water, glucose, aminoacids sodium chloride and urea through the filter, from the blood in the glomerular capsule across the basement membrane of the bowmans capsule and into the nephron. This process is called ultra filtration.

Haemodialysis	Peritoneal Dialysis
1. Hemodialysis is the removes wastes and water by circulating blood outside the body through an external filter, called a dialyzer, that contain a semi permeable membrane.	1. Peritoneal dialysis is the introduced through a permanent tube in the abdomen and flushed out either the automatic peritoneal dialysis or continuous peritoneal dialysis.
2. Hemodialysis is a fast and efficient method for removing urea and other toxic products and correcting fluid and electrolyte imbalances but requires permanent arterio-venous access.	2. Peritoneal dialysis is a technique to remove the waste products from the blood.
3. The decision to initiate dialysis in patients with renal failure depends on several factors.	3. Peritoneal dialysis continues to be the preferred dialysis modality for infants and young children.
4. Principles of haemodialysis mainly three types as same as peritoneal dialysis. ❖ Osmosis ❖ Diffusion ❖ Ultra filtration	4. Principles of peritoneal dialysis mainly three types are there. ❖ Osmosis ❖ Diffusion ❖ Ultra filtration
5. Slower	5. Faster
6. Require less equipment	6. Require more equipment

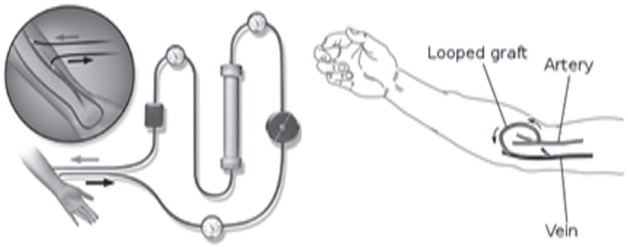
7. fewer physiologic adverse reactions.	7. more physiologic adverse reactions
8. Requires professional	8. Can be performed by patient
9. Takes blood from the body to be filtered	9. Does not takes blood from the body to be filtered
10. Uses a synthetic filter in a dialysis machine to filter blood	10. Uses a lining of the abdomen (peritoneum) to filter blood.
11. Is less flexible as has to be done in hospital.	11. Is more flexible as can be done almost anywhere.

ACCESS USED IN HAEMODIALYSIS:

Catheter AV fistula



A radiocephalic fistula.



AV graft

An arteriovenous graft.

SIDE EFFECTS OF THE HAEMODIALYSIS

- Low blood pressure
- Fatigue
- Chest pains
- Leg-cramps
- Nausea and headaches

NURSING DIAGNOSES:

1. Pain related to Av fistula as evidenced by facial expression.
2. Fluid Volume excess related to excess fluid intake through the I.V. blood as evidenced by the edema.
3. Risk for infection related to venipunture
4. Risk for injury related to the clotting factors or accidental disconnection.
5. Fluid volume, deficient related to Ultra filtration or blood loss as evidenced by dry lips.

Risk for injury related to the clotting factors or accidental disconnection.

Nursing Interventions	Rationale
Monitor internal AV shunt patency at frequent intervals: Palpate for distal thrill; Auscultation for a bruit; Note color of blood or obvious separation of cells and serum;	Thrill is caused by turbulence of high-pressure arterial blood flow entering low-pressure venous system and should be palpable above venous exit site. Bruit is the sound caused by the turbulence of arterial blood entering venous system and should be audible by stethoscope, although may be very faint.
Palpate skin around shunt for warmth.	Change of colour from uniform medium red to dark purplish red suggests sluggish blood flow/early clotting.
Avoid trauma to shunt; e.g., handle tubing gently, maintain cannula alignment. Limit activity of extremity. Avoid taking BP or drawing blood samples in shunt extremity. Instruct patient not to sleep on side with shunt or carry packages, books, purse on affected extremity.	Separation in tubing is indicative of clotting. Very dark reddish-black blood next to clear yellow fluid indicates full clot formation. Diminished blood flow results in “coolness” of shunt. Decreases risk of clotting/ disconnection.
Attach two cannula clamps to shunt dressing. Have tourniquet available. If cannulas separate, clamp the arterial cannula first, then the venous. If tubing comes out of vessel, clamp cannula that is still in place and apply direct pressure to bleeding site. Place tourniquet above site or inflate BP cuff to pressure just above patient’s systolic BP.	Prevents massive blood loss while awaiting medical assistance if cannula separates or shunt is dislodged.

Assess skin around vascular access, noting redness, swelling, local warmth, exudate, tenderness.	Signs of local infection, which can progress to sepsis if untreated.
Avoid contamination of access site. Use aseptic technique and masks when giving shunt care, applying/changing dressings, and when starting/completing dialysis process.	Prevents introduction of organisms that can cause infection.
Monitor temperature. Note presence of fever, chills, hypotension.	Signs of infection/sepsis requiring prompt medical intervention.

❖ Fluid volume, deficient related to Ultra filtration or blood loss as evidenced by dry lips.

Nursing Interventions	Rationale
Measure all sources of I & O. Have patient keep diary.	Aids in evaluating fluid status, especially when compared with weight. Note: Urine output is an inaccurate evaluation of renal function in dialysis patients. Some individuals have water output with little renal clearance of toxins, whereas others have oliguria or anuria.
Weight daily before/after dialysis run.	Weight loss over precisely measured time is a measure of ultrafiltration and fluid removal.
Monitor BP, pulse and hemodynamic pressures if available during dialysis.	Hypotension, tachycardia, falling hemodynamic pressures suggest volume depletion.
Apply external shunt dressing. Permit no puncture of shunt. Place patient in a supine/ Trendelenburg's position as necessary.	Minimizes stress on cannula insertion site to reduce inadvertent dislodgement and bleeding from site. Maximizes venous return if hypotension occurs.
Administer IV solutions (e.g., normal saline [NS])/volume expanders (e.g., albumin) during dialysis as indicated; Blood/PRCs if needed.	Saline/dextrose solutions, electrolytes, and NaHCO3 may be infused in the venous side of continuous arteriovenous (CAV) hemofilter when high ultrafiltration rates are used for removal of extracellular fluid and toxic solutes. Volume expanders may be required during/following hemodialysis if sudden/marked hypotension occurs.Destruction of RBCs (hemolysis) by mechanical dialysis, hemorrhagic losses, decreased RBC production may result in profound/ progressive anemia requiring corrective action.
Reduce rate of ultrafiltration during dialysis as indicated	Reduces the amount of water being removed and may correct hypotension/hypovolemia.
Administer protamine sulfate as appropriate.	May be needed to return clotting times to normal or if heparin rebound occurs (up to 16 hr after hemodialysis).

CONCLUSION: Lifestyle habits and renal problems alter the human life and that such can be saved by the dialysis procedure under proper top institutions.

REFERENCES

❖ Brunner and suddarath's Text book of medical and surgical nursing,11th edition, published by Lippincott, Williams and Wilkins P.p: 1608-1615.

❖ Joyce M Black Text book of medical and surgical nursing, 8th edition,published Elisever, page no 2015-2021.

❖ Luckmens text book of core principles and practice of Medical Surgical Nursing 2nd edition jaypee publications pp no 1449-1.

❖ LEWIS, Text book of medical and surgical nursing, 7th edition published by Chinthamani. P-p :1508-1514.

NET REFERENCES:

❖ https://www.ncbi.nlm.nih.gov

❖ https://www.omicsonline.org

❖ https://www.journlas.elsevier.com

❖ https://www.mayoclinic.org

❖ https://www.academia.edu

❖ https://www.emedicine.medscape.com