

DEPARTMENT OF NEPHROLOGY

CERTIFICATE COURSE IN DIALYSIS TECHNOLOGY (CCDT)

1. **Name of the Course** : Certificate Course in Dialysis Technology (CCDT)
2. **Duration of study** : 1 year full time course
3. **No. of seats proposed** : 20 candidates per year
4. **Commencement of the session:** August of each year

1. Period of Study:

- (a) The candidate will have to undergo a certified period of full time study for one year.
- (b) During the period of study if the candidates has absented himself/ herself on any account (including vacation but excluding Institute Holidays and casual leave if any) for more than a total of 3 months his period of training will be extended by a period of six months. In case the absence is for more than a total of six months, the period of training will be extended by one year. In case the absence is for more than one year, his/her registration may be cancelled.

2. Training Programme:

- (a) Every candidate shall be required to work as a full time member in the section concerned for 1 year.
- (b) The candidate will be required to attend a two hours dialectic lecture per week, one hour seminar and four hour of demonstration per week. He will also undergo dialysis training exposure of minimum of 36 hours per week.
- (c) The candidate will be required to maintain a log book of his day to day work for haemodialysis, peritoneal dialysis CAPD, laboratory procedures, nutrition and other records. He would get the log book certified by the Head of the Department or his nominee and submit it for the assessment at the time of examination.

3. Methods of Examination:

At the end of each year of the course the candidate will be subjected for evaluation in the following manner:

(a) Theory: It will consist of 2 papers of 3 hours duration each carrying 100 marks.

Paper I : Basic Sciences and Nutritional aspects as applied to dialysis therapy.

Paper II : Technical and Medical aspect of dialysis.

(b) Sessional Examination : Will be of 100 marks consisting of record keeping, weekly work assignment and day to day working etc.

(c) Practical and viva-voice : It will be consist of 200 marks.

4. Syllabus for Certificate Course in Dialysis Technology:

Attached

5. Certificate:

“Certificate Course in Dialysis Technology (CCDT) will be awarded to the successful students who has secured 50% or above and Honor will be awarded to the candidates scoring 75% or more marks.

6. Other ordinance and rules will be same as applicable to other certificate course of the University.

SYLLABUS FOR CERTIFICATE COURSE IN DIALYSIS TECHNOLOGY (CCDT)

1. Introduction to course:

- Physiology of renal function
- Patients criteria for dialysis

2. Patients dealing/and personal management:

Sterilization procedure for instruments and the surroundings (FUMIGATION)

Organization of the dialysis unit

3.

- a) Anatomy of kidney
- b) Physiology of the kidney
- c) Diseases of the kidney

4. **Medical Overview :**

The body makeup – the distribution of water – function of the body fluids – composition of the extra cellular space – function of the normal kidney – Acute renal failure – Chronic renal failure –Function of the artificial kidney – the technique of haemodialysis.

5. **Theory and principles of haemodialysis :**

Diffusion – Osmosis – Dialysis defined – Concentration gradient – Direction of fluid flow – Hydrostatic pressure and resistance – Pressure gradient – Ultrafiltration – Dialysate.

6. **Chemistry of haemodialysis:**

Molecular weight – Equipment weight – Milli equivalents – Milligramme percent – Hardness of water – Preparation of dialysate concentrate and dialysate – Special dialysate preparation – Methods for determining dialysate composition – Total anion and chloride test reagents. Chloride determination – total anion determination – Potassium determination.

7. **The dialysis system:**

Access to the blood stream – Dialysers – Dialysate – Dialysate delivery system – Monitoring devices.

8. **Dialysers:**

Types of dialysers – Coil dialysers – Parallel plate dialysers, Hollow fibre dialysers – Comparative study of all available dialysers.

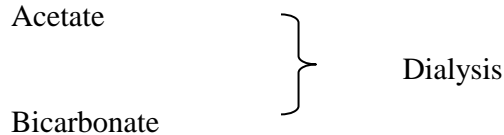
9. **Dialysate and dialusate delivery system:**

Dialysate composition – preparation

Delivery system – batch type and proportioning type

Drake Willock, Centry, Gambrom, Fresenius etc.

Maintenance and trouble shooting



10. Dialysate supply subsystems:

Water pre-treatment – Water pressure regulation – Temperature control – Temperature sensors – Chemical proportioning – Degassing flow and negative pressure control – Monitors. Conductivity cell – chemical concentration monitor – Temperature compensation – Temperature monitors – Pressure monitors – Flow - Rate monitors – Blood leak monitors – Readout devices – Alarms.

11. Preparation of concentrate:

Utility of concentrate

Precautions to be taken

Problem that can rise

Electrolytes, pH, temperature, contamination, care in handling the concentrate

12. Introduction of patient of haemodialysis:

Predialysis education of the patient – Initiation of haemodialysis timing, the start of haemodialysis – Cannulation – Complication during the first dialysis – Convulsions due to dialysis disequilibrium syndrome- Serum osmolality – Serum potassium – Metabolic acidosis – The digitalized patient – Establishment of the dialysis pattern.

13. Monitoring the dialysis procedures:

Monitoring dialysate concentration – Monitoring dialysate flow – monitoring dialysate temperature – Negative pressure and drop chamber pressure monitoring – Blood leak detectors – Air bubble detector – Monitoring heparin infusion and blood flow – Monitoring patient variables.

14. Initiation of haemodialysis:

Description of the dialyser – Cleaning the dialyser – Kill dialyser assembly – Dialyser testing and sterilization – Priming the dialyser. Starting the patient on hemodialysis – Access, machine setting, patient evaluation, precautions, safety checks.

15. Discontinuing dialysis:

Closing hemodialysis in the patient – access, machine settings, patient evaluation, precautions, safety checks, Discontinuing – Saline rinse.

16. Complications during dialysis:

Line cannula separations – Blood leaks – Clotting – Acute bleeding – Hypotension – Hypertension – Fever – Nausea – pyrogenic vomiting – Headache – Cardiac arrhythmias – Chest pain – reactions muscle cramps – Restlessness – Pruritis – Convulsion – Hemolysis.

17. Re-use of dialysers:

Storage and re-use of parallel plate dialysers – Re-use of hollow fibre dialysers – Hydrogen peroxide method – Fibre bundle volume checking.

18. Medical problems in the chronic haemodialysis patients:

Hypertension – Congestive heart failure – secondary hyperparathyroid disease – Metastatic classification – Blood requirements – Peripheral neuropathy – Arthritis – Hepatitis – Uremic pericarditis.

19. Water treatment:

Need for water treatment – Sand Filter – Water Softner – Carbon filter – Deioniser – Reverse osmosis unit – In line ultraviolet rays – Bacterial filters – water sampling – Microbiological Checking.

20. Bacteriology of haemodialysis:

Identification of common infections organisms – Cannula site infections – Virus Infections – Disinfection and sterilization. Sterilization: Steam autoclave – Ethylene oxide – Gamma ray sterilization – Sterilization - Formaldehyde sterilization – Clinitest - Schiff's Reagent.

Disinfectants : Formaldehyde – Sephiran chloride – Phenolic disinfectants – Isoprophyl alcohol – Iodine, newer disinfectants, antiseptic sampling procedures – Contamination problems – Sterile technique – Isolation techniques.

21. Adequacy of dialysis :

Clinical well being, oedema hypertension, food intake, ability to work, rehabilitation. Investigations: PCV, Urea, Creatinine, Creatinine clearance, S. calcium, Phosphorus, alkaline phosphate, radiology, EMG. Methods of assessing dialysis adequacy. Consequence of inadequate dialysis. Pitfalls in providing adequate dialysis.

22. Dialyser performance and laboratory layout:

- Dialyser comparison and evaluation – experimental technique clearance studies – Blood compartment total volume – Blood flow rate – Resistance – Ultrafiltrations: Clinical measurement of ultrafiltration. Determination of transmembrane pressure. Ultrafiltration rate. Hemodialysis laboratory layout – Inventory – maintenance – record keeping.
23. Hepatitis in dialysis setup – Prevalence – Mode of entry – Precautions – Prevention and immunization – Cross infection – Risks associated with dialysis.
24. **Basic Nursing:**
- Vital signs – Temperature, pulse, respiration temperature – taking marking, different pulse and respiration – Different types of pulse blood pressure – Systolic, diastolic. Meeting eliminational needs.
25. Common medications used in the dialysis patient, their administration, precautions, side effects.
- General management of critically ill patients.
 - Hygienic needs during dialysis.
 - Control of infection including aseptic technique.
 - Total patient care during haemodialysis.
 - Dietary management in renal failure and in the dialysis patient
26. **Access to the circulation:**
- General description of the cannula system – Cannula implantation cannulas - Activity and immobilization of the cannulated limb – Position of the cannulaed limb – Cannula cleaning – Cannula complications – Cannula infections – Cannula clotting – Declotting – The subcutaneous arterial venous fistula – Advances in the access to the circulation – subclavian, femoral access – Shunt converted fistula – Grafts – single needle dialysis.
27. **Anticoagulations:**
- Anticoagulation – anticoagulant – heparin – Coumadin – Lee-White clotting time – Activated clotting times – Intermittant infusion and continuous infusion – Systemic heparinisation – regional heparinisation – Rigid heparinisation – Heparin rebound – Heparin modeling – Saline dialysis – Low molecular weight heparin.
28. **Acute renal failure:**

Etiology, Pathology & pathogenesis, clinical features, diagnosis and management.

29. Acute dialysis:

Indication for dialysis

Special precautions during the dialysis of acutely ill patients.

30. CAPD, Principle, Method of insertion, procedure and protocol of CAPD, common complications of CAPD and their management.

31. CAPD- Advantage & disadvantage, nutritional requirement of CAPD, CCPD, social and psychological aspect of dialysis.

32. Dialysis for poisoning:

Endogenous and Exogenous poison, Dialysable drugs and poison, Hemoperfusion.

33. Peritoneal dialysis:

Theory – patient criteria – indications for peritoneal dialysis – Continuous ambulatory peritoneal dialysis – Continuous cycling peritoneal dialysis – Intermittent peritoneal dialysis, complications of peritoneal dialysis – patient management – during peritoneal dialysis.

34. Types of haemodialysis and its variety:

Conventional haemodialysis with acetate – Conventional haemodialysis with bicarbonate – Sequential ultrafiltration haemodialysis – Haemofiltration – Haemodiafiltration – Continuous arteriovenous haemofiltration – Continuous arteriovenous haemodialysis – High flux haemodialysis – Controlled high sodium haemodialysis .

35. Transplantation:

- Principle , type of Kidney transplantation
- Patient criteria and workup
- Pre and post operative management
- Rejection management
- Donor management and care

36. Emergencies in Nephrology:

- Cardiac arrest
- Air embolism
- Hemorrhage
- Hemolysis
- Others

37. Staff Education :

- Hepatitis
- HIV
- Cross infection
- Risk associated with dialysis
- Discipline & internal management
- Protocol for various procedures in dialysis unit

38. Dialysis machine maintenance:

- Maintenance
- Repairing and servicing
- Drake-Willock proportioning unit

39. Haemoperfusion & haemofiltration technique, complication, advantage and disadvantage

40. Transplant nursing and care:

- Psychological aspects of CRF and dialysis

41. Procedure sets for various dialysis modalities IHD, PD, CAPD, CCPD etc. and their preparation

42. Kidney biopsy and its nursing aspects

43. Newer trends in dialysis including GI and abdominal dialysis

44. Patient management – Total patient care:

- Nutritional consideration in CKD and dialysis patient
- Diet/Hygiene/Fluid
- Rehabilitation

45. Common lab. procedure in dialysis patient – urine examination, estimation of blood urea, serum creatinine, serum sodium, serum potassium, Hb, GBP and various sample collection techniques

46. Recent trends in Renal Nursing.