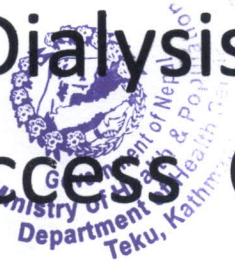


Protocol for Dialysis Procedure and Access Care




Government of Nepal
Ministry of Health and Population
Division of Health Services
Nursing and Social Security Division
2076/077

About the Protocol

This protocol is aimed at providing knowledge and skill for the dialysis procedure and access care in order to provide uniform and standardized quality dialysis in Nepal. This protocol also gives knowledge regarding CAPD procedure and catheter care as well as water treatment plant operation procedure. The medical officers and nursing staff working in dialysis ward will be benefited with the protocol.

[Signature]
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Ministry of Health & Population
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Teku, Kathmandu

Abbreviations

AKI	Acute Kidney Injury
AVF	Arterio-Venous Fistula
AVG	Arterio-Venous Graft
AAMI	Association for the advancement of Medical instrumentation standard
APD	Automated Peritoneal Dialysis
CVCs	Central Venous Catheters
CKD	Chronic Kidney Disease
CAPD	Continuous Ambulatory Peritoneal Dialysis
CRRT	Continuous Renal Replacement Therapy
HD	Hemodialysis
IPD	Intermittent Peritoneal Dialysis
PPM	Parts Per Million
PD	Peritoneal Dialysis
Perm- Cath	Permanent Catheter
QOL	Quality of Life
RRT	Renal Replacement Therapy
R/O	Reverse Osmosis
SLED	Sustained Low Efficiency Dialysis
TDS	Total dissolved solids
TMP	Trans Membrane Pressure
UF	Ultra-Filtration
UV	Ultraviolet
VA	Vascular Access

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1. Introduction

Globally, Chronic Kidney Disease (CKD) is one of the leading causes of death and disability. In 1990, CKD was the 27th leading cause of death which rose up and became 18th leading cause of death in 2010. In 2013, around 1 million people died because of CKD.

Based on limited available data, CKD affects around 10% of the population. CKD affected 753 million people globally in 2016: 417 million females and 336 million males. In 2013 & 2015 it caused 1.0 & 1.2 million deaths respectively. (Hasan, Sutradhar, Gupta, & Sarker, 2018). The causes that contribute to the greatest number of deaths were high blood pressure (550,000) followed by diabetes (418,000), and glomerulonephritis (238,000). (Wang et al., 2016).

According to the Department of Health Services branch of Nepal's Ministry of Health, in 2014 the ministry began providing financial support to those diagnosed with one of 8 noninfectious diseases: Alzheimer's disease, cancer, head injury, heart disease, Parkinson's disease, sickle cell anemia, spinal injury, and kidney disease. A total of US\$966 annually was provided to patients with these diseases, with the exception of kidney disease. Financial support for chronic kidney disease (CKD) began in 2011, and in 2014. Nepalese patients of CKD are younger; males are more affected than females. Chronic Glomerulonephritis (CGN), diabetes and hypertension are three most common causes of CKD; IgA nephropathy is the most common cause of biopsy proven GN leading to CKD. Anemia is common from CKD stage 3 onwards. The most common associated co-morbidity is Coronary Artery Disease (CAD). (Sigdel & Pradhan, 2018).

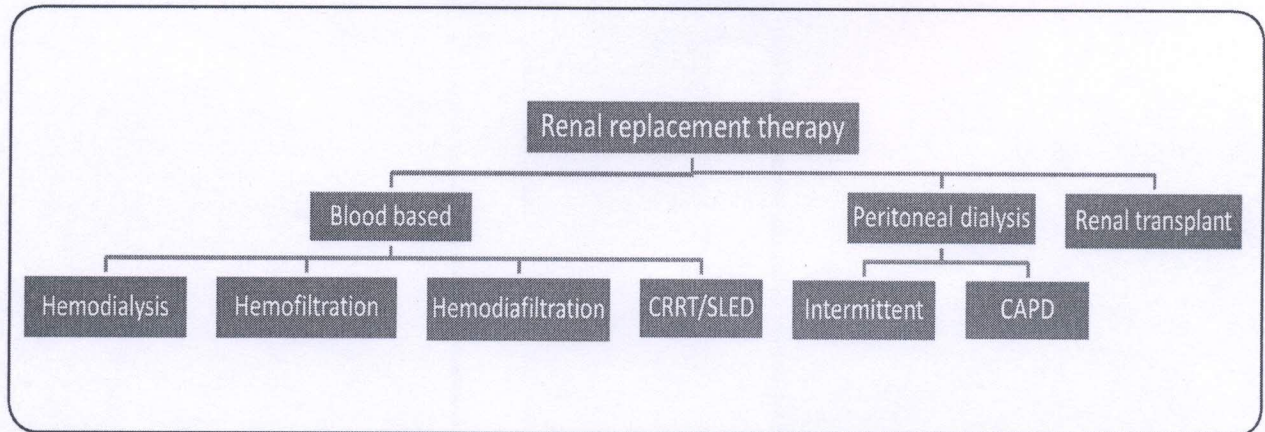
Kidney disease causes enormous economic burden to the patients and the government. Government of Nepal is reimbursing the cost for dialysis, transplant (HLA cross matching, RRT and selected post-transplant medications) and kidney diseases for impoverished nepali citizens. After introducing this reimbursement policy (Bipanna nagarik scheme) of the government, no. of patients and centers catering hemodialysis service is increasing all over the country. Trend of patient receiving HD under bipanna scheme has increased from 730 in 2069-70 to 4500 in 2075-76. Similarly, the number of the HD centers has also increased to more than 50 centers spreading all over the country.

HD is the most common mode of RRT in Nepal. Quality of HD depends mostly on expertise of dialysis nurses and technicians, quality of RO water and adequacy of dialysis. Thus, HD sisters and technicians should have a good knowledge and practice. On this background, this protocol is being prepared so as to cater quality and uniform care to kidney patients especially on dialysis.

Pradhan

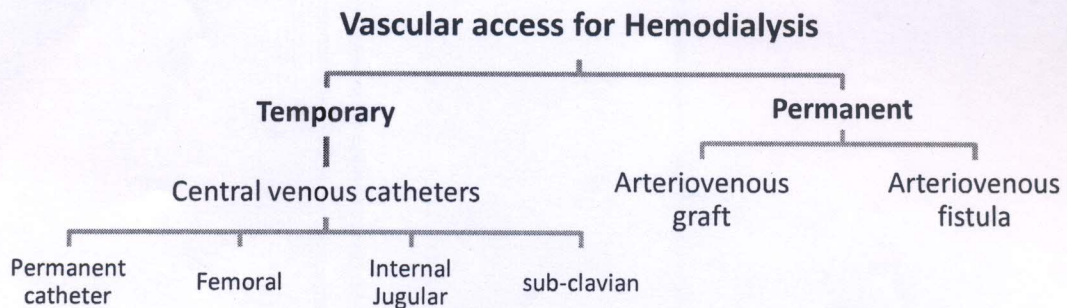


2. Renal Replacement Therapy

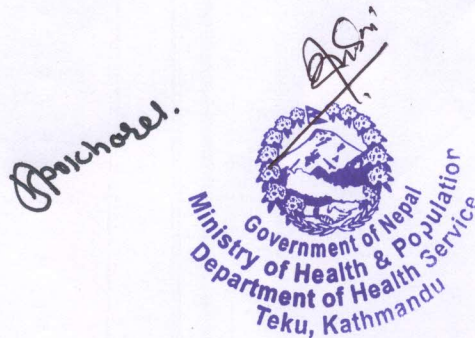


Flow Chart No. 1 : Classification of Renal Replacement Therapy

2.1 Vascular Access



Flow Chart No. 2 : Vascular Access



2.2 Hemodialysis (HD) Machine and HD Fluid Preparation

2.2.1 Introduction

A medical equipment to remove excess fluid and waste products from the blood and to maintain pH and electrolyte balances using a dialyzer also referred to as an “artificial kidney” is called haemodialysis machine. However it can't perform endocrine function.

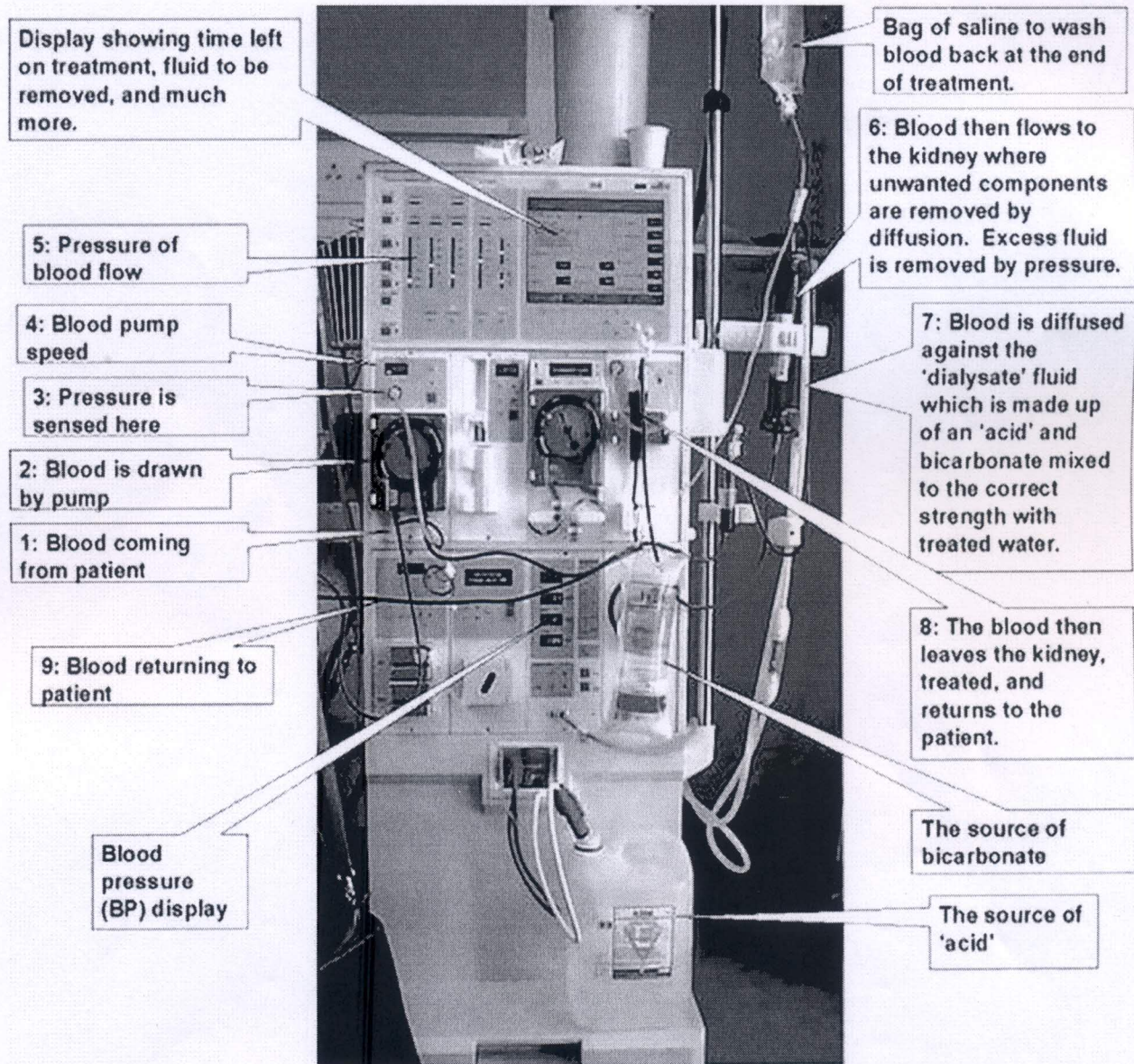


Figure No. 1 : Hemodialysis Machine

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2.2.2 Working Principle of Hemodialysis Machine

- Mixes and monitors the dialysate.
- Pumps the blood and controls administration of heparin.
- Monitors the blood for presence of air and also monitors ultra-filtration rate.
- Pumps and controls the flow of blood from the patient through dialyzer at a predetermined rate and pressure to ensure effective clearances and fluid removal in a specified time period.

2.2.3 Major Section of Hemodialysis Machine

Monitoring section

- Air detector, Artery pressure, Venous pressure, TMP , Blood leak Detector, Conductivity, Temperature, Dialysate flow.

Module section

- Blood pump, Heparin pump and Air detector.

Hydraulic section

- Bicarbonate, fluid sample valve and disinfection.

Shunt Interlock

- Two red & blue dialyzer connectors

2.2.4 Major Components of Hemodialysis Machine

Dilaysate Circuit

- Prepare dialysate from concentrate and water.
- Deliver dialysate, maintain temperature (35-37°C) and flow rate and controls fluid removal

Extracorporeal Blood Circuit

- Delivers blood to the dialyzer at the prescribed flow rate and then returns the blood to the patient.
- (Dialyzer & A/ V tubing)



