RAMA UNIVERSITY

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FACULTY OF NURSING

Renal Failure

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DEFINITION

- **CRF OR ESRD IS A PROGRESSIVE, IRREVERSIBLE DETERIORATION IN RENAL FUNCTION IN WHICH THE BODY'S ABILITY TO MAINTAIN METABOLIC AND FLUID AND ELECTROLYTE BALANCE FAILS RESULTING IN UREMIA OR AZOTEMIA**

ETIOLOGY AND RISK FACTORS

- **DECREASED RENAL BLOOD FLOW**
- **SYSTEMIC DISEASES**
  - **-DIABETES MELLITUS**
  - **-HYPERTENSION**
  - **-SLE**
  - **-POLYARTERITIS**
  - **-SICKLE CELL DISEASE**
  - **-AMYLOIDOSIS**
  - **-C\C GIOMERULONEPHRITIS**
  - **-PYELONEPHRITIS**
  - **-ARF**

- OBSTRUCTION OF THE URINARY TRACT
- HEREDITARY LESIONS
  - -POLYCYSTIC KIDNEY DISEASE
- INFECTIONS
- VASCULAR DISEASES
- MEDICATION OR TOXIC AGENTS
- ENVIRONMENTAL OR OCCUPATIONAL AGENTS
  - -LEAD
  - -CADMIUM
  - -MERCURY
  - -CHROMIUM

PATHPHYSIOLOGY

DUE TO ETIOLOGICAL FACTORS

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DECREASED GFR

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HYPERTROPHY OF REMAINING NEPHRONS

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INABILITY TO CONCENTRATE URINE

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FURTHER LOSS OF NEPHRON FUNCTION

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LOSS OF NON-EXCRETORY AND EXCRETORY FUNCTION

STAGES OF CRF

1) **Reduced Renal reserve**
   - **BUN is high or normal**
   - **Client has no C/M**
   - **40 to 75 % loss of nephron function**
2) **Renal Insufficiency**
   - **75 to 90 % loss of nephron function**
   - **Impaired urine concentration**
   - **Nocturia, mild anemia, increased creatinine and BUN**

3) Renal failure

- Severe azotemia
- Impaired urine dilution
- Severe anemia
- Electrolyte Imbalances
  - Hypernatremia
  - Hyperkalemia
  - Hyperphosphatemia

4) End Stage Renal Disease

- 10 percentage nephrons functioning
- Multisystem dysfunction

Clinical Manifestations of CRF

- Electrolyte and acid-base balance
- Hematologic System
  - -Anemia
  - -Bleeding Tendencies
  - -Infection
- Metabolic changes
  - -Waste products accumulation
  - -Altered CHO metabolism
  - -Elevated triglycerides

- **Gastrointestinal changes**

  -Mucosal Ulcerations

  -Stomatitis

  -Parotitis

  -Gingivitis

  -Oesophagitis

  -Gastritis

  -Colitis

  -GI Bleeding

  -Diarrhoea

  -Constipation

-Metallic Taste in mouth

-Anorexia

-Nausea

-vomiting

-Kussmaul Respiration

-Dyspnea

-Pulmonary oedema

-Uremic Pleuritis

-Pleural Effusion

-Uremic Lung

-Cough Reflex is depressed

-HTN- Leads to

-CHF

-Retinopathy

-Encephalopathy

-Nephropathy

-Dysrhythmia

-Peripheral Oedema

-Uremic Pericarditis

- **Neurologic Changes**
- **Manifestations of peripheral neuropathy**

-Burning feet

-Gait changes

-Foot drop

-Paraplegia

- **Features of CNS involvement**
  -Forgetfulness
  -Inability to concentrate
  -Short attention span
  -Impaired reasoning
- **Musculoskeletal changes**
  -Osteomalacia
  -Osteitis fibrosa
  -Osteoporosis
  -Oateosclerosis

Integumentary Changes

-Yellow grey discoloration of skin

-Pale

-Dry and scaly

-Pruritis

-Bruising ,Petechial and Purpura

-Hair is brittle

-Nails are thin and brittle

- **Reproductive Changes**

Women

-Menstrual irregularities

-Infertility

-Decreased libido

Men

-Impotence

-Testicular atrophy

-Oligospermia

-Decreased libido

-Decreased sperm motility

- Endocrine Changes

-Hypothyroidism

-Increased GH and prolactin

- **Immunologic changes**

-Depression of human antibody formation

-Decreased function of leukocytes

- Depression of delayed hypersensitivity

- Psychosocial Changes

-Personality and behavioral changes

-Withdrawal

-Depression

-Anxiety

-Decreased ability to concentrate

-Solved mental activity

DIAGNOSTIC STUDIES

- History and physical examination
- Routine lab measurements
  - BUN
  - Serum Creatinine
  - Serum Electrolytes
  - Hematocrit and Hb levels
  - Urine Analysis
  - Urine Culture

- **Identification of Reversible Renal Disease**
  - **Renal Ultrasound**
  - **Renal Scan**
  - **C T Scan**
  - **Renal Biopsy**

MANAGEMENT

1) **Preserve the renal function and dialysis**
   - **Controlling the disease process.**
   - **Controlling BP by diet control, weight control and medication.**
   - **Reducing dietary protein intake.**
2) **Alleviate extra renal manifestations.**

   a) Pruritis
   - **Topical emollient and lotion.**
   - **Antihistamine.**
   - **IV Lidocaine**

b) Neurological manifestations.

- Safety measures to protect from injury.
- Anticonvulsants.
- Sedatives

c) Hematologic changes.

- Therapy with epoetin alfa three times a week
- supplemental iron, vitamin B_{12} and folic acid.

3) **Improve body chemistry.**

   a) Dialysis

   b) Medications

   c) Diet

a) Dialysis

- Peritoneal dialysis
- Hemodialysis

b) Medications

* Hyperkalemia
  - Insulin administration – I/V
  - Sodium bicarbonate
  - Calcium Gluconate – I/V
  - Sodium polystrene sulfonate(Kayexalate)

* Hypertension

- Sodium and fluid restriction
- Anti hypertensive drugs Diuretics
  Beta adrenergic blockers
  Ca channel blockers
  ACE inhibitors

* Renal osteodystrophy

- Regulation of calcium, phosphorus and acidosis

- Treatment of hyperparathyroidism

- Calciferol

- **Paricalcitol (Vitamin D analog)**

- **Calcium based phosphate binders**

Calcium acetate

Calcium carbonate

* Anaemia

- Erythropoietin – I/V subcutaneously
- Epogen (Epoetin alfa)
- Parental iron
- Folic Acid 1 mg daily

* Diuretics

- Given early to stimulate excretion of water

* Vitamins

- Supplemental water soluble vitamins

c) Diet

* Protein restriction

- 0.6 to 0.75 gm/kg of ideal body weight/day
- 1.2 to 1.3 gm/kg of ideal body weight/day once the patient starts dialysis

* Water restriction

Patient not receiving dialysis – 600ml + an amount equal to the previous days urine out put

Patients on dialysis – fluid intake is adjusted so that weight gains are not more than 1 to 3 kg between dialysis

* Phosphate restriction

- 1000 mg/day
  - Phosphate rich foods are Diary products (milk, Ice cream, cheese etc.)

* Potassium restriction

2 to 4 gm/day

(Sources are – orange, melons, tomatoes, bamnana, beans, legumes etc.)

* Sodium restriction

- 2 to 4 gm/day

(Sources are – pickled foods, canned soups, soya sauce etc.)

* Calcium

If serum ca levels are low, adequate calcium intake is important.

* Magnesium

Mild Mg restriction may be imposed

Surgical Management

Renal Transplantation

Thank you