CHRONIC RENAL FAILURE

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

- Respiratory Changes

-Kussmaul Respiration

-Dyspnea

-Pulmonary oedema

-Uremic Pleuritis

-Pleural Effusion

-Uremic Lung

-Cough Reflex is depressed

- Cardio Vascular Changes

-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, bamnana, melons, tomatoes, 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