Urinary Findings

A) Hematuria

1. Nephronal 2. Non-Nephronal

B) Pyuria

C) Casts

1. Hyalin & Fatty Casts, Oval Fat Body: Proteinuria
2. WBC, Granular & Epithelial Casts: Interstitial Disease
3. Waxy Casts: Chronic Progressive Renal Disease
4. Broad Casts: Chronic Renal Failure
5. Dirty Brown Casts: ATN
6. RBC Casts: Glomerulonephritis

D) Proteinuria

1. Functional 2. Orthostatic 3. Transient
4. Intermittent 5. Persistent

Acute Renal Failure

a) Prerenal b) Intrarenal c) Postrenal

	Urine Sediment	Oliguria (< 400 ml/24h)	Urine Osmolality	Urine Na	BUN/Cr	FENa	RF Index
Prerenal	Normal	++	> 500 (U/P>1.5)	< 10 meq/L	> 20	< 1	< 1
Renal	Brown Granular Casts	+	< 350 (U/P<1)	> 20 meq/L	< 10	> 2	> 1

$$\text{Fractional Excretion of Na} = \frac{U_{Na} / S_{Na}}{U_{Cr} / S_{Cr}} \times 100$$

$$\text{RF Index} = \frac{U_{Na}}{U_{Cr} / S_{CR}}$$

$$FE_{Na} = \frac{U_{Na} \times \text{Serum creat}}{\text{serum}_{Na} \times U_{creat}} \times 100 \ (\%)$$

Causes of Prerenal Failure

1. Volume depletion (blood loss, dehydration)
2. Volume overload with reduced renal perfusion
   CHF, Cirrhosis, Hypoproteinemia
3. Hemodynamically mediated:

a) Efferent arteriolar vasodilatation: Ace inhibitors, ARBs

b) Afferent arteriolar vasoconstriction: Hepatorenal, NSAIDs, Cox-2 inhibitors, Iodinated contrast, Cyclosporine A, Tacrolimus, Hypercalcemia

Renal Toxicity of NSAIDS

1. Prerenal azotemia
2. Tubulo-interstial nephritis
3. Minimal change glomerulonephritis
4. Papillary necrosis
5. Hyperkalemia

Intrarenal Acute Renal Failure

A) Glomerular Diseases

B) Tubulo-Interstitial Nephritis
   1. Allergic 2. NSAIDs 3. Systemic Infections

C) Acute Tubular Necrosis (ATN)
   1. Ischemia 2. Rhabdomyolysis
   3. Drug Toxicity : Aminoglycosides, Contrast Agents, Cisplatin, Amphotericin

D) Vascular (atheroembolic dis.)

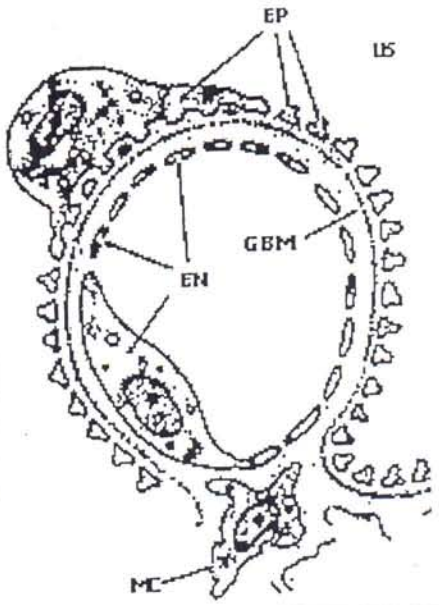
Causes of Rhabdomyolysis

(Aka Pigment Nephropathy)

1. Crush injury
2. Heat stroke
3. Strenuous exercise
4. Alcoholism
5. Cocaine
6. ↓K ↓PO4

Structure of Normal Glomerular Capillary

EP - Epithelium
EN - Endothelium
MC - Mesangial Cells
GBM - Glomular Basement Membrane
US - Urniary Space



Glomerulonephritis

Diffuse	Involves all glomeruli
Focal	Involves some glomeruli
Segmental	Involves part of glomeruli
Proliferative	Increased number of cells
Necrotizing	Area of necrosis

IC's
SLE → subendothelial deposits
Post-strep → subepithelial deposits
Good pasture's
Anti-GBM Ab's

post-strep GN
- 1-3wks post infection
- Ix: early Ab does not prevent Cx like Rheumatic fever)
- long-lasting Immunity
- ⊕ ASO or ⊕ anti-deoxyribonuclease
- Bx → large subepithelial deposits
↓ C3 → alternate pathway, normal C4

Alport's Syndrome
Ex.) - high-freq hearing loss
BP 146/96
urine - 2+ blood w/ dysmorphic RBCs
prot:creat ratio 1-2
- inherited d/o (X-linked dominant)
- mutation of basement membrane collagen
- persistent microscopic hematuria
- proteinuria
- progressive decline in renal function → ESRD
- ? ocular abnorms too

Presentation of Glomerular Diseases

1. Asymptomatic Urinary Findings
2. Acute Nephritis
3. Nephrotic Syndrome
4. Rapidly Progressive Glomerulonephritis
5. Chronic Glomerulonephritis

- >3.5g proteinuria
- hypoalbuminemia

- HTN
- sudden-onset hematuria
- <3g proteinuria
- edema
- ↑ BUN/creat
- urine → RBC's w/ RBC casts
- Ex.) post-strep GN
  - lag of 1-3wks.

(→ Crescentic GN)

A) Good pasture's (Type I)
- anti-GBM

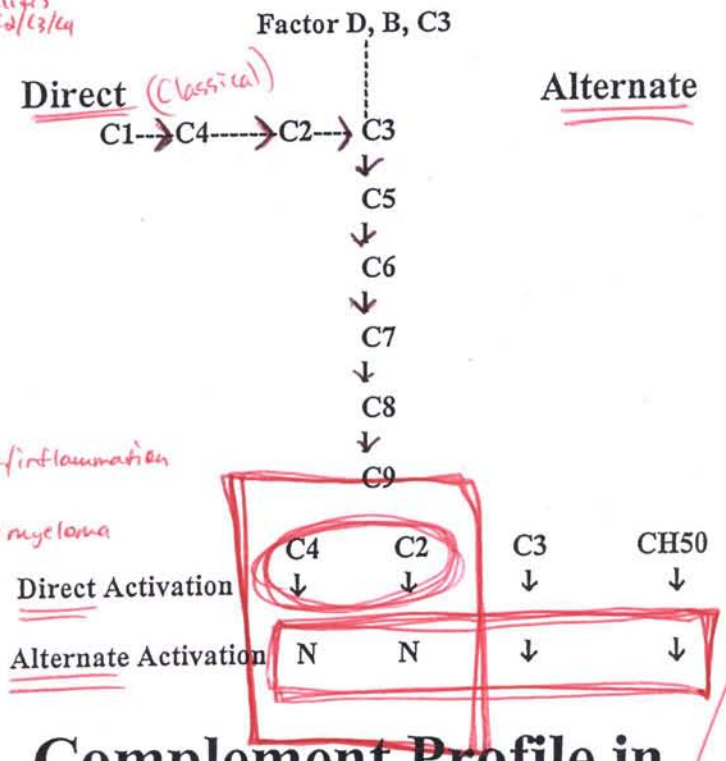
B) IC (Type II)
- SLE or post-infx

C) ⊖ Ab's or IC → pauci immune (Type III)
- ✓ ANCA
  - (proteinase 3) c-ANCA - wegener's
  - p-ANCA - microscopic polyangiitis

Acute Interstitial Nephritis (AIN)
Triad:
- fever
- skin rash
- arthralgias
- eosinophiluria
- bland urine sediment
- ? granular casts or WBC casts occasionally

Thin Basement membrane Disease
- aka benign familial hematuria
- dysmorphic RBC's on microscopy
- ⊖ proteinuria

The Complement System



Complement Profile in Glomerulonephritis

Alternate Activation
Poststreptococcal, Membranoproliferative type II

Direct Activation
SLE, Cryoglobulinemia, SBE
Membranoproliferative type I

No Activation :
Goodpasture, Wegener, IgA nephropathy, Polyarteritis, Pauci-immune RPGN, Minimal change disease

Causes of Nephrotic Syndrome

Glomerulopathy – proteinuria but ↓ quite nephrotic range
obesity

Adults
Membranous glomerulonephritis (most common)
Secondary causes: Solid tumors, Lymphomas, SLE, Hepatitis B, Syphilis
Drugs: Gold, Penicillamine, Captopril

Minimal-change disease
Secondary causes: Hodgkin's disease, NSAIDs, Lithium

Focal segmental glomerulosclerosis

Membranoproliferative type I & II

Other secondary causes:
Amyloid, Diabetes, HIV & Heroin nephropathy, Endocarditis

Children + young adults
Minimal-change disease (most common)
(↓albumin w/ proteinuria normal complement)

Henoch-schonlein Purpura (HSP)
-younger pt's
- abd. pain
-palpable purpura w/ leukocytoclastic vasculitis
-direct complement activation ↓C3/C4

Amyloidosis
Ex.) 50 y.o. man w/ ↑LE edema +dyspnea, ⊕ peripheral neuropathy + cardiomegaly ⊕⊕ proteinuria raised, waxy papules of skin diarrhea + macroglossia
Dx: Amyloid
skin Bx → AL (light chains) AA → chronic infx/inflammation
↓ SPEP to look for M-spikes can be ordered to multiple myeloma
Tx: Melphalan / Prednisone

Wegener's
-renal dis. preceded by extrarenal (Ex.) infx.) manifestations
- Tx: same as Goodpasture's

Tx for Adults: corticosteroids + ↓ cyclophosphamide then maintenance mycophenolate

IgA Nephropathy
-Ex.) 1 day post strep throat pt. develops gross hematuria urine → RBC's w/ RBC casts dysmorphic RBC's too
Dx: IgA
-hematuria shows up post-infectious / post-exercise (vigorous)
-Bx → IgA IC's mesangial expansion
Tx: minor Dis → ϕ HTN / proteinuria → ACEI's
fish oil
-transplanted kidney to another pt. ↓ Dx disappear so IgA nephropathy pt's can donate accepting normal kidney ↓ 22% rate of IgA recurrence

Microscopic Polyangiitis
-assoc. w/ pulm. infiltrates (alveolar bleeding from capillaritis)
-pulm-renal syndrome
Churg-Strauss
-assoc. w/ asthma + eosinophilia

Ex.) 50 y.o. man w/ edema 4⊕ proteinuria ⊕ RBC's / RBC casts
Renal Bx → thickened GBM + mesangial proliferation
EM → ⊕ C3 ϕ Ig's ↓C3, normal C2/C4
Dx: Membranoproliferative Type II

Type I → infx
-Bx → direct complement activation ↓C2/C4

Goodpastures
-hematuria / hemoptysis
CXR - patchy bilar infiltrates
Bx → linear immunofluorescence
-RPGN
-circulating anti-GBM Ab's ⊕
-normal complement
-p-ANCA ⊕ in 30%
Tx: -Steroids plus cyclophosphamide
-plasmapheresis + transfusions (1st) then
-If pulm. hemorrhage ↓ plasmapheresis

squamous cell lung ca.

-assoc. w/ reflux nephropathy

-most common cause membranous ↓ Renal vein Thrombosis

most common cause in Adults

→ ↓ C2 (C3/C4)
-hematuria

Ex.) Edema + facial puffiness x months sudden-onset ⊕ flank pain + gross hematuria or acutely worsened proteinuria
BUN - 40
creat - 2.0
urine - RBC's, ϕ casts, 3⊕ protein
c/s → ⊕ kidney enlargement
Dx: RV Thrombosis
Tx: Anti-coags
✓ Doppler u/s or CT to Dx or MRV (best test)

Ex.) 40 y.o. female w/ idiopathic membranous nephropathy sudden-onset SOB ⊕ VQ scan ⊕ LE Doppler

Treatment of Nephrotic Syndrome

Minimal-change disease	Corticosteroids
Focal segmental	Corticosteroids
Membranous	Corticosteroids + cyclophosphamide or chlorambucil

Ace inhibitors to reduce proteinuria

Complications of Nephrotic Syndrome

1. Infections
2. Iron Resistant Microcytic Anemia
3. Hyperlipidemia
4. Increased Risk of Thrombosis
5. Osteomalacia

Diabetic Nephropathy

Microalbuminuria (Incipient nephropathy)

30-300 mg/g of creatinine in a morning urine sample
20-200 ug/minute in an overnight urine collection
30-300 ug/minute or in a 24-hour urine collection
30-300 mg/d in a 24-hour urine collection

Macroalbuminuria (Overt nephropathy)

Albumin excretion in excess of above values

Treatment

1. BP < 130/80
2. ACES or ARBS (target urinary protein < .3 gm/24 hr)
3. HbA1C < 7%
4. LDL < 100 mg/dL
5. Protein restriction .8gm/Kg
6. Smoking cessation

Nephrolithiasis

Ex) 60 y.o. man w/ sudden-onset (R) flank pain
urine – (+) RBCs

Best Initial Test
Non-contrast CT → ? stones

Types of stones : Calcium oxalate, calcium phosphate, uric acid, cystine, calcium oxalate + uric acid, Mg NH4 PO4

(most common)

don't show up on XR
urate stones → radiolucent
-all other stones radiopaque

(B) stones → struvite (staghorn)
-always due to UTI's
urease - splitting organisms (Ex) Klebsiella, Proteus)
Tx: Abx + alkalinization

Metabolic Causes :

1. Hypercalciuria
2. Hyperuricosuria
3. Hyperoxaluria
4. Hypocitrauria
5. Hypomagnesiuria
6. Cystinuria
7. Distal RTA (Type I)
8. Urinary Infections
9. Low urine pH of elderly

1. Hypercalciuria — Tx: Thiazides
2. Hyperuricosuria — 80% calcium oxalate, 20% urate; Tx: Allopurinol + alkalinize urine
3. Hyperoxaluria — Primary or dietary
   - malabsorptive
   - ileal resection
   - Crohn's
   - Tx: ↓ oxalate diet, ↑ Ca(++) intake (≥ 1 g/day Ca(++)), ↑ dietary fluoride intake
   - ↑ Ca(++) oral → binds up oxalate in GI tract → prevents absorption
   - Ethylene Glycol
     - antifreeze → oxalic acid crystals in urine → envelope-shaped
     - plus fomepizole if ↑ osmolar gap → prevents further conversion to toxic product
     - CNS/myocardial/nephrotoxic
     - Tx: Ethanol for levels > 20; HD for levels > 50
   - Methanol
     - blurred vision → optic disc hyperemia
     - metabolized to formic acid
6. Cystinuria — Tx: Alkalinize urine; Hexagonal crystals
7. Distal RTA (Type I) — Genetic or 2nd to RTA (distal); Tx: K-citrate
   - ↓ urine Ca(++) → ↓ incidence of Ca(++)-oxalate stones
8. Urinary Infections — Tx: acidify urine (methenamine)
   - ↓ NH_4^+ production → acid
   - uric acid stones
   - Tx: Hydration + Alkalinize urine
9. Low urine pH of elderly

Polycystic kidney Dis.
(1) PKD-1 (most common) mutation
(2) PKD-2 mutation (milder form)
both AD inheritance
(3) AR form (rare) → neonatal death
- cysts in medulla + cortex
- Age > 30 w/ (B) 3-5 cysts → Dx
- Age < 30 2 cysts confirm Dx
- symptoms begin in 3rd-4th decade
  - flank pain
  - palpable kidney
  - renal stones
  - hematuria
  - proteinuria
  - RF after age 50
- Assoc. Dis.:
  - liver cysts
  - pancreatic cysts
  - MVP
  - IC aneurysms
  - PCV
  - HTN

Metabolic Acidosis

Anion Gap

Increased
1. Uremia
2. Ketoacidosis
3. Lactic acidosis
4. Salicylate intoxication
5. Ethylene glycol intoxication
6. Alcoholic acidosis
7. Methanol intoxication

Normal
1. Diarrhea
2. Ureterosigmoidostomy, ileostomy
3. Carbonic anhydrase inhibitors
4. Renal tubular acidosis

→ Increased osmolal gap

Salicylates
- tinnitus
- tachycardia
- resp. alkalosis → then metabolic acidosis → then mixed both
- ↑ PT/PTT
- ↑ LFT's
- Tx: activated charcoal, IV HCO_3^-

Osmolal gap = Measured osmolality - Calculated osmolality
(2x Na + Glu/18 + Bun/2.8)

urinary AGap
(urine Na^+) + (urine K^+) – (urine Cl^-)
- if (–) → then unmeasured cation present in urine (NH_4^+) → normal renal response to acidosis
- if (+) → then ↓ unmeasured cations present → abnormal renal response to acidosis

Renal Tubular Acidosis

	Type 1 (Distal)	Type 2 (Proximal)	Type 4 (Hyporenin-Hypoaldo)
Defect	Inability to excrete H ions in the distal tubule	HCO3 lost in the proximal tubule	Defective NH4 production
Acidosis	+	+	+
Urine pH	> 5.5	<5.5	< 5.5
Serum K	Low	Low	High
Fanconi synd.	-	+	-
Renal stones	+	-	-

Metabolic Alkalosis

Measure Cl in urine

< 20 meq/L

Cl depletion alkalosis
(NaCl responsive)

1. Gastric fluid losses
2. Diuretic therapy
3. Posthypercapnea
4. Villous adenoma

> 20 meq/L

K depletion alkalosis
(NaCl resistant)

24 hour urine for K

< 30 meq/day (extra renal losses)

> 30 meq/day (renal losses)

High BP

(↑mineralocorticoid activity)

1. Hyperaldosteronism
2. Cushing's syndrome
3. Ectopic ACTH
4. Malignant hypertension
5. Renin producing tumor
6. Licorice abuse

Normal BP

Bartter's

Evaluation of Hyponatremia

Measure serum osmolality

- **Normal** → **Pseudohyponatremia**
  - 1. Hyperlipidemia
  - 2. Hyperprotinemia
  - E.g.) Multiple Myeloma Na^+ ~ 130, normal serum osmol.
- **Low** → **State of hydration**
  - **Hypovolemic** → **Urine Na**
    - **< 20 meq/L** → **Extra renal losses**
    - **> 20 meq/L** → **Renal losses**
      - 1. Diuretics
      - 2. Adrenal insufficiency
      - 3. Salt losing nephritis
  - **Hypervolemic**
    - 1. CHF
    - 2. Nephrosis
    - 3. Cirrhosis
  - **Isovolemic**
    - 1. SIADH → when w/ ↓ K^+ → dev. to HHCT?
    - 2. Psychogenic polydypsia
      - drink lots of H_2O
      - dilute urine → polyuria (↓ urine osmol)
      - Tx: Restrict fluids
- **Elevated** → **Hyperglycemia** (watershift from intra → ECF compartment)
  - 2. Hypertonic infusions (glucose, mannitol)

How to treat Hyponatremia?
- water restrict
- continue lasix

Interpretation of Urinary / Serum Na & Osmolality

Serum Na	Serum Osmolality	Urine Osmolality	Urine Na	BUN	Uric Acid	Diagnosis
↓	↓	↑	↓	↑	↑	Hyponatremic Dehydration
↓	↓	↑	↑	↓/N	↓/N	SIADH
↓	↓	↓↓	↓	↓/N	↓/N	Psychogenic Polydypsia
↑/normal	↑	↓↓	↓	↑	↑	Diabetes Insipidus
↑	↑	↑	↓	↑	↑	Hypernatremic Dehydration

- Tx: Demeclocycline → ↓ urine osmol
- if urine is > serum → fluid restriction will not correct
- Fluid Restriction: urine Na^+ + urine K^+ vs serum Na^+ + serum K^+
- Diabetes Insipidus: polyuria; central → ↓ ADH; nephrogenic → kidneys don't respond to ADH; impaired renal water conservation; pure water urine losses
- Hypernatremic Dehydration: drop Na^+ 1y 0.5 mEq/hr
- Eg.) 80 y/o woman w/ LL Pneumonia → Na^+ ~160

Causes of Hyperkalemia

1. Factitious
2. Hyporenin Hypoaldosteronism (type 1V RTA)
3. Addison's
4. Rhabdomyolysis
5. Hemolysis
6. Renal Failure
7. Crush Injury
8. Tumor lysis
9. Bowel infarction or tissue trauma in surgery
10. Drugs: ACEIs, ARBs, NSAIDs, COX-2 inhibitors, B blockers, Heparin, K-sparing diuretics (amiloride, triamterene, spiranolactone), Trimethoprim, Cyclosporin, Tacrolimus, Pentamidine

Causes of Hypophosphatemia

A. Renal Wasting	Alcoholism, hyperparathyroidism, Fanconi syndrome
B. Poor Absorption	Malabsorption, alcoholism, phosphate binding antacids
C.↑ Cellular Uptake	Refeeding after starvation, burns, carbohydrate repletion in chronic alcoholics
D.↑ Bony Uptake	Post- parathyroidectomy

Causes of Hypomagnesemia

A. Defective Intake	: Starvation, alcoholism, NG suctioning
B. Malabsorption	
C. Renal Losses	: Diuretics, aminoglycosides, alcohol, amphotericin B, cisplatin
D. Pancreatitis	

Features Suggestive of Chronic Renal Failure

1. Prior Elevated Creatinine
2. Small Kidneys (< 9-10 Cm)
3. Anemia
4. ↓Ca or ↑PO4
5. Subperiosteal Bony Erosions
6. Band Keratopathy
7. Chronic Symptoms : Fatigue, Leg Cramps, Nocturia, Hypertension

Hepatorenal Syndrome
- uremia-lacks urine sediment
- mild proteinuria
- low urine $Na^{\oplus}$

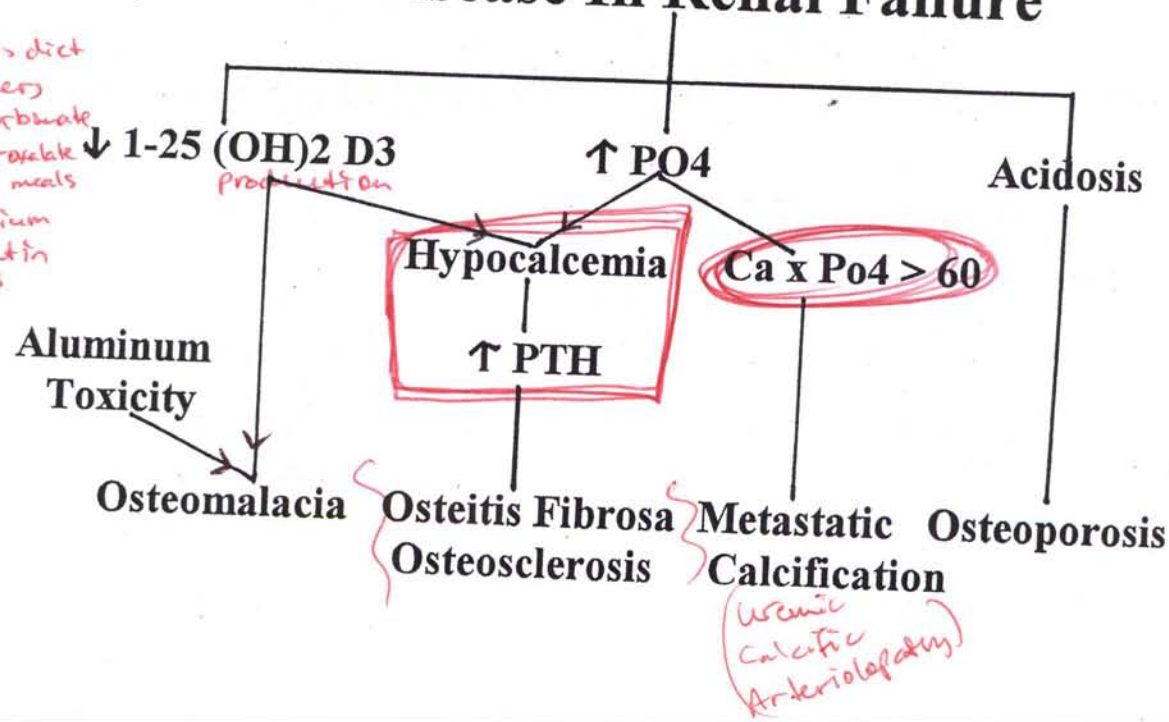
Reversible Causes of Accelerated Renal Failure

1. Volume Depletion
2. CHF
3. Urinary Tract Infection
4. Urinary Obstruction → suspect w/ bladder/prostate enlargement
   - UA → ⊕ diagnostic
   - ✓ u/s → distention
5. Radiocontrast Agents
6. Drug Nephrotoxicity

post-obstructive Diuresis
↑ uop w/ Foley
→ need to replace ⅔ of volume lost

Bone Disease In Renal Failure

Tx:
- Limit Phos diet
- Phos-binders
  - Cal-carbonate or Cal-acetate given w/ meals
- Give calcium replacement in b/w meals



Conservative Treatment of Renal Failure

1. Diet : Salt 4-8 g/d, ↓K, ↓PO4, ↓Protein
2. Aggressive treatment of hypertension
   (<130/80, < 125/75 with proteinuria >.5 gm/gm creatinine)
3. ACE-I/ARB's (to reduce proteinuria <.5 gm/gm creatinine)
4. Correction of acidosis by HCO3 or CaCO3
5. Correction of secondary hyperparathyroidism
   a) PO4 binding agents b) 1-25 dihydroxyvitamin D c) Calcium
6. Erythropoietin for treatment of anemia
7. Statins
6. No need to treat asymptomatic hyperuricemia

Indications for Chronic Dialysis

1. Pericarditis
2. Fluid over-load
3. Uremic encephalopathy
4. Severe hyperkalemia and/or acidosis
5. Neuropathy
6. GFR < 10 ml/min
7. Bleeding diathesis
8. Evidence of malnutrition
9. Symptomatic uremia: Intractable fatigue, anorexia, nausea, vomiting, pruritus

Complications of Dialysis

1. Shunt & fistula infections
2. Disequilibrium syndrome
3. Arrhythmias
4. Aluminum toxicity
5. Cystic kidney disease
6. Renal cell carcinoma
7. Amyloidosis (Beta 2 microglobulin)
8. ↑Risk of MI & CVA
9. Bleeding complications
10. Hepatitis B infection

Renal Transplantation

Renal Masses/Cysts
1) Single cyst - ϕ further w/u
2) Complex cyst - f/u w/ CT or MRI - ↑'d malignant potential
3) Mass - treat as a complex cyst vs CT or MRI - Bx contraindicated ↓ ↑'d bleeding risk

Annual mortality
cadaveric transplants <6%
living related transplants <4%

Absolute Contraindications

(NOT DM!)

1. Malignancy
2. Active infection
3. Active glomerulonephritis
4. HIV infection
5. HbsAg +
6. Severe extra renal disease

Complications

Rejection: Hyperacute & acute (presensitization ↑) (sudden D's increased fx with wks. to months) (Tx: ↑-dose methylprednisolone)

Infections: First month...bacterial

After first month...CMV, fungal, pneumocystis (Meningitis → Listeria)

EBV- associated lymphoproliferative disease

Non Hodgkin's lymphoma, squamous cell carcinoma of skin

- fever/nightsweats
- LAD
- recipient - EBVAb ⊖
- donor - EBVAb ⊕
- ↑ LDH
- common duodenal involvement ↓ ulcers

Tx: ↓immunosuppressant CHOP Rituximab

Maintenance immunosuppressive therapy

Cyclosporine + prednisone + azathioprine or mycophenolate mofetil

Types of Immune Reactions

IgE-mediated
IgE → mast cells + basophils ↓ release of mediators ↓ ↑'d vascular permeability - smooth muscle contraction - attraction of neutrophils

Type I : Immediate Hypersensitivity

a) Asthma b) Allergic rhinitis c) Anaphylaxis

Type II : Cytotoxic

a) Goodpasture's b) Autoimmune hemolytic anemia
c) Autoimmune thrombocytopenia

Type III : Immune-Complex Disease

a) SLE b) Vasculitis c) Serum sickness

Type IV : Delayed Hypersensitivity

a) PPD skin test b) Contact dermatitis

Causes of Rhinitis

Atopic Dermatitis
-chronic dis. of skin
-asthma
-head/face/neck rash -children
- AC area/popliteal fossa/wrist, neck -adults
Tx: Local steroids

1. Allergic
2. Vasomotor → symptoms worse w/ exposure to perfumes/dust/temp shifts or humidity Δ's
   Tx: oral Decongestants + nasal Ipratropium
3. Rhinitis medicamentosa → stop nasal sprays
4. Hypothyroidism, oral contraceptives, pregnancy
6. Infectious

Treatment of Allergic Rhinitis

-sneezing
rhinorrhea
-ocular/nasal itching
-postnasal gtt
-assoc. w/ conjunctivitis
+ eos in nasal secretions
-seasonal (pollen) or perennial (dust)
Tx: Remove carpets @ home (environmental control)

1. Verify cause of allergic symptoms (Histoty & tests)
2. Reduce exposure to allergen
3. Second-generation antihistamine (non-sedating)
   Fexofenadine, Cetirizine, Loratidine, Desloratidine
   may combine these
4. Topical nasal steroids
5. Alpha adrenergic agonist (Pseudoephedrine)
6. Leukotrien-receptor antagonist (Montelukast)
7. Anticholinergic agent (Ipratropium spray) → for rhinorrhea
8. Mast cell stabilizer (Cromolyn spray)
9. Oral steroids or injected depot steroids
10. Allergen-Immunotherapy → -for med/severe sx's despite tx
    -benefits may persist up to 3 yrs. after stopping tx
    -oral/SL or SC admin.
    -contraindicated:
    - ocular or systemic β-blockers
    ↓
    ↑ risk of anaphylaxis
11. Topical agents for ocular use
    Mast-cell stabilizer: cromolyn, nedocromil, iodoxamide
    Antihistamine, Nonsteroidal anti-inflammatory (Ketorolac)

Anaphylaxis/ Anaphylactoid Reactions

ex.) 14y.o. boy w/ 1 hr. of SOB, stomach cramps, flushing + pruritis
HR - 160
BP - 82/50
- raised irregular lesions at trunk
- hoarse voice w/ ⊗ wheezes
Dx: Anaphylaxis
Tx: SQ Epi

Symptoms
-pruritis -flushing
-urticaria
-angioedema
-wheezing
-rhinitis
-stridor
-tachycardia
-hypotension
-abd. cramps
-N/V

1. IGE mediated reactons
   a) Penicillin b) Foreign protein c) Foods d) Immunotherapy
   e) Hymenoptera stings f) Latex → best test IgE RAST
2. Complement-mediated reactions
3. Nonimmunologic mast cell activators
   a) Radiocontrast media b) Opiates
4. Modulators of arachidonic acid metabolism
   NASIDS, aspirin

Treatment of Anaphylaxis

Initial managemeent

1. Epinephrine (SQ)
2. Antihistamine like diphenhydramine
3. Intravenous fluids
3. Aerosolized beta-agonists for bronchospasm
4. O2
5. Cimetidine or other H2 blockers
6. Glucocorticoids

Persistent hypotension and/or broncospasm

Vasopressors (epinephrine, dopamine, norepinephrine, phenylephrine)
Glucagon (for those patients on beta-blockers)
Aminophylline

Urticaria Pigmentosa
- multiple brown spots on chest/trunk
- rubbing spots → flare
- if systemic → systemic mastocytosis

Dx: BM Bx → ↑'d mast cells
↑ uptake on bone scan

Tx: H_1 + H_2 blockers
PPI
Steroids
- chemo (if trunk post cell leukemia)

Latex Allergy
- anaphylaxis after systemic/oral introduction of Latex
↓
use Latex-free gloves

skin testing
↓
↑'d risk of anaphylaxis

↓RAST

Urticaria and Angioedema

- Refer to allergist for immunotherapy

1. IGE- mediated
2. Compement-mediated
   a) Reaction to blood products b) Vasculitis c) Serum sickness
3. Nonimmunologic mast cell activators
   a) Opiates b) Antibiotics c) Curare d) Radiocontrast media
4. Modulators of arachidonic-acid metabolism
   a) NSAID b) Aspirin
5. Physical
   a) Heat b) Cold c) Pressure d) Vibration e) Sunlight
   f) Dermographism
6. Cholinergic
7. Bradykinin Mediated
   a) Hereditary angioedema b) ACE inhibitor → try ARB's w/ caution (some overlap)
8. Idiopathic

- caused by C1-INH defic. or dysfx
- AD inheritance
- recurrent angioedema or GI colic
- ↓ pruritis or urticaria
- confirm Dx w/ both Ag-ic and functional C1-INH
- ↓ C4 b/w attacks

Tx: Anabolic steroids + C1-INH

Contrast Reactions
- ↓ IgE-mediated
- 15-30% chance of reaction w/ re-exposure
- pre-tx w/ Prednisone + Benadryl

PCN Allergy
- avoid PCN's & ceph's
- If PCN needed then desensitize if skin test (+)

Aspirin Allergy
- asthma
- chronic urticaria
- nasal polyps

Tx's avoid NSAID's (except non acetylated NSAID's)

Treatment of Chronic Urticaria and Angioedema

H_1-receptor antagonists
Nonsedating: Fexofenadine, Loratidine, Desloratidine Cetirizine → for chronic sx's
Sedating: Hydroxyzine, Diphenhydramine, Cyproheptadine → can use acutely

H_2-receptor antagonists
Cimetidine, Ranitidine, Famotidine

H_1 and H_2 receptor antagonist: Doxepin
Leukotriene antagonists: Montelukast
Corticosteroids

Immunedeficiency Diseases

1. B cell disorders

a) Common Variable Immunedeficiency
b) X-Linked Agammaglobulinemia
c) Isolated IGA Deficiency
d) IgG subclass defeciency
e) Secondary to protein loss

2. Polymorphs defects

a) Chronic Granulomatous Disease
b) Hyper IGE Syndrome

3. T cell defects

a) Chronic Mucocutaneous Candidiasis
b) DiGeorge's Syndrome
c) Idiopathic CD4 Lymphocytopenia
d) HIV disease

4. Complement deficiency

5. Splenectomy or splenic dysfunction

Heriditary Angioedema

	C1q	C4	C2	C1 inhibitor Level	C1 inhibitor functional
Type 1	N	↓	↓	↓	↓
Type 11	N	↓	↓	N or↑	↓
Acquired	↓	↓	↓	N or↓	↓

Assessment of Functional Status

1. Katz Activity of Daily Living (ADL)
   a) Toileting b) Bathing c) Dressing
   d) Feeding e) Walking d) Getting in & out of chair or bed
2. Instrumental Activity of Daily Living (I ADL)
   a) Shopping b) Cooking c) Money management
   d) House work e) Using telephone f) Travelling outside the home
3. Mini Mental Status Examination of Folstein (Scale up to 30)
   < 25 indicates dementia
4. YeSavage depression scale (Scale up to 30)
   >10 indicates depression
5. Time and change test for dementia
6. Three item recall
7. Evaluation of balance and gait
   Get up and go test
   Gait speed → ~50 ft / 20 s

Draw a clock w/ arms for a specific hand time

→ -make BI from change

slow gait + ↓ Achilles tendon reflex → normal aging

Ex) Elderly pt. w/ progressive dementia + poor oral intake
- PEG tube will not improve survival

Urinary Incontinence

Transient

-do not need UDS in women (urodynamic studies)

Delirium, infection, atrophic urethritis, drugs, depression, restricted mobility, stool impaction, increased urine output

Established Incontinence

incontinence preceded by intense urge to urinate

	Residual urine
1. Detrusor overactivity (most common cause in menstruating women)	N
2. Stress incontinence (rare in men)	N → Tx: α-agonists + kegel exercise (pseudoephedrine) surgery when assoc. w/ cystoceles or urethroceles
3. Uretheral obstruction (#2 cause in women)	↑
4. Detrusor underactivity	↑ If rPVR in women ↓ ↓ UDS
5. Functional	N

Tx: void Q1-2 Hrs, avoid caffeine, anti-cholinergics (oxybutynine or propanthyline or tolteridine (detrol))

Idiopathic or sacral CMN D is.
Tx: Augmented voiding techniques → suprapubic pressure
- Bethanechol

Drugs Causing Urinary Incontinence

cystoceles ↓ surgery

Anticholinergics, Antiparkinsonians, Alpha-agonists, Diuretics, Alpha-antagonists (↳ cause urethral relaxation)

Antipsychotics, Narcotics, Ca Blockers, Alcohol

Antidepressants, Sedatives, ACES, Vincristine

Melanosis Coli
- brown, black pigmentation of colonic mucosa
- seen in pt's on stimulant laxatives

Ex.) NH pt. w/ diarrhea 3 loose stools
PRE → hard stool in rectum
↓
Fecal Impaction
Tx - Enemas + Manual Disimpaction

Causes of Fecal Incontinence

1. Constipation and laxative use
2. Fecal impaction
3. Diarrheal illness
4. Rectal sphincter damage
5. Hyperosmolar enteric feeding
6. Neurological disorder

Cardiogenic syncope
- get an event monitor + echo + EP study

most common drug causes:
- Fe sulfate
- HCTZ
- Anti-cholinergics
- Anti-histamines
- CCB's
- Anti Psychotics

Tx: ↑ fiber diet + propose ... laxatives (ex.) sorbitol)

Syncope
- vasovagal (most common)
- carotid sinus syndrome
- situational syncope
  - assoc. w/ - coughing
  - swallowing
  - urination
  - defecation
- precipitations
  - long standing
  - emotional distress
  - pain
- occasionally seizure like activity (convulsive syncope)
- ∅ post-ictal state
- Best Test: Tilt table
  Dx - if BP drops or symptoms
- Tx: - ↑ fluids + salt
  - isometric arm contraction
  - sit down
  - Tilt training
  - standing x 30 mins QDay
  - midodrine (DOC)
  - fludrocortisone (choice 2)
  - β-blockers (3rd choice)
  - SSRI's (4th choice)

Ex.) Pt goes to his allergist those skin tests placed; 1 min later he is pale, diaphoretic, nauseous + then syncopizes.
BP - 90/60
HR - 40
Dx: vasovagal syncope
- Differentiate from anaphylaxis
  (1) ↓ HR's
  (2) Pallor
  (3) ∅ pruritis/urticaria/angioedema
  (4) ∅ wheezing

Syncope and Seizure

↳ transient LOC

	Syncope	Seizure
1. Pallor	++	Cyanosis or Plethora
2. Aura	-	+
3. Injury from falling	Rare	++
4. Duration of unconsciousness	Brief	Lasts Longer
5. Return to alertness	Prompt	Slow (postictal)
6. EEG	Normal	Abnormal

Carotid sinus overactivity
- syncope when turning head
Tx: Loose collar shirts
PPM (if needed)

Delirium Dementia

	Delirium	Dementia
Onset	Acute	Insidious
S/S	Alteration of attention	Memory impairment
	Disorganized thinking	No motor signs
	Tremors, myoclonus, asterixis, hallucinations	No hallucinations

Causes: metabolic

Tx: Haldol (prn)

Causes of Visual Impairment

- A) Cataract
- B) Macular degeneration (Dry, wet)
- C) Glaucoma
- D) Diabetic retinopathy

Φ exudates

exudates + neovascularization → Tx: Laser Tx

Sensory-Neural Hearing Loss

- A) Presbycusis
- B) Chronic noise exposure
- C) Aminoglycoside toxicity
- D) Barotrauma
- E) Acoustic neuroma
- F) Viral cochleitis → rapidly developing

Gradual onset of (B) high-freq hearing loss ↓ loss of sound discrimination

Conductive Hearing Loss

- A) Cerumen
- B) Otitis
- C) Cholesteatoma
- D) Otosclerosis

urgent audiometry
- cause → HSV
Tx: Acyclovir + steroids
MRI to exclude vascular cause

Causes of Falls in The Elderly

1. Any disease causing gait or balance disorder
2. Visual impairment
3. Hearing impairment
4. Vestibular dysfunction
5. Arthritis
6. Postural hypotension
   - ?- Postprandial orthostatics
   - 20 mm ↓ SBP
   - 10 mm ↓ DBP
   - 1-3 minutes after standing from supine position
   - check pressures after meals

Ex.) 76 yr. man w/ Afib
H/o fall 1 yr. ago
Planning to start Coumadin
↓
OK?
Yes
↳ ↓ recurrent falls

Prevention of Injury From Falls

1. Prevention & treatment of osteoporosis
2. Weight bearing exercises
3. Stop sedative & hypnotic medications
4. Gait training
5. Eliminate hazards at home
6. Use of protective hip pads

Treatment of Insomnia

Non-pharmacological interventions:

1. Go to bed only when sleepy
2. Use the bedroom only for sleeping and sex
3. Go to another room whenever unable to sleep 15-20 minutes
4. Have a regular wake time
5. Avoid day time napping

Pharmacological therapy:

Problem initiating sleep

Zolpidem or Zaleplon (Benzodiazepine-receptor agonists)

Problem maintaining sleep

Eszopiclone (Benzodiazepine-receptor agonists) → Lunesta

Intermediate acting benzodiazepines (Temazepam, or Estazolam)

Avoid long acting benzodiazepines:

Flurazepam, Diazepam, Chlordiazepoxide, Clonazepam

Avoid sedating antihistamine (Diphenhydramine and others)

melatonin : unsure of effects

Restless Leg Syndrome

- difficulty falling asleep
- irresistable urge to move legs
- creepy/crawly sensation in thighs/calves relieved w/ movement
- r/o Fe-Defic. anemia
- assess w/ periodic limb movement d/t's

Dx: r/o

Tx: Pramipexole

Use of Antipsychotic Medications in Nursing Homes

1. Can be used only in patients with documented psychiatric illness
2. May be used short term < 7 days for hiccups and nausea or specific behavior of confused individuals (Biting, kicking, pacing, hallucinations or delusions)
3. In confused patients they may be used after documented attempts to treat with nonpharmacological behavior strategies have failed
4. Patient or proxy should give consent
5. After treatment is started, a trial of gradual dose reduction should be attempted

Use of Physical Restrains

1. You must document failure of less restrictive alternatives
2. Physician order
3. Informed consent
4. Must be used for the shortest time possible

Stages of Decubitus Ulcers

Tx's

Relieve Pressure — Stage 1 Nonblanchable erythema of intact skin

Occlusive Dressing (Hydrocolloid) — Stage 2 Partial thickness epidermal or dermal loss (shallow crater)

Stage 3 Full-thickness damage or necrosis down to underlying fascia (deep crater) → topical anti-microbials if infected

Debridement (Moist wound environment) — Stage 4 Full-thickness destruction, necrosis, or damage to muscle or bone

- systemic Abx only for systemic infection/cellulitis

Prevention

1. Reposition patient every 2 hours
2. Pressure reducing devices that are made of or contain gel, foam, air or water
3. Pillows or foam wedges between ankles and knees
4. Pillow under lower legs to elevate heels, heel protectors

Drugs to be Avoided in Elderly

1. Sedating antihistamines:
   Delirium, confusion, constipation, urinary retention
2. Tricyclics:
   Anticholinergics, sedation, orthostatic hypotension
3. Long acting benzodiazepines:
   Sedation, confusion, falls
4. Muscle relaxants (meprobomate, carisoprodol, cyclobenzaprine)
   Highly anticholinergic, sedation
5. Specified analgesics (Propoxyhene, meperidine, pentazocin)
6. GI antispasmodics (dicyclomine, hyoscyamine, propantheline)
   Highly anticholinergic

Dermatology Slides

1. Pyoderma gangrenosa
2. Warfarin necrosis
3. Erythema nodosum
4. Erythema multiforme minor
5. Erythema multiforme major
6. Pemphigus vulgaris
7. Bullous pemphigoid
8. Dermatitis herpatiformis
9. Porphyria cutanea tarda
10. Melanoma
11. Lentigo melanoma
12. Superficial spreading melanoma
13. Nodular melanoma
14. Subungual melanoma
15. Dysplastic naevus
16. Acanthosis nigrans
17. Carcinoid syndrome
18. Glucagonoma
19. Peutz Jeghers syndrome
20. Eczema

21. Atopic dermatitis -acute eczema -rashin antecubital area Tx: local steroids

22. Contact dermatitis -delayed hypersensitivity reaction
Tx: oral steroids or local steroids

23. Stasis dermatitis

24. Seborrheic dermatitis -scaly face/chest/scalp patches → sebaceous glands areas
Tx: steroids, (oral or topical) Ketoconazole Cause: malassezia
-assoc w/ ovarian Ca. rHIV Test too

25. Pityriasis rosea -herald patch -christmas-tree distribution
-scaly lesions Tx: anti-histamines / steroids / UV light

26. Acne rosacea -involves face
-erythema w/ papules / pustules Tx: topical Flagyl gel
-↓ comedones

27. Lichen planus -flat topped -shiny -network of lines
Tx: steroids -violaceous -pruritic papules -milky white oral mucosal lesions

28. Basal cell carcinoma

29. Mycosis fungoides -resembles eczema
-lymphocytic infiltration → cutaneous lymphoma

30. Von Reckinghaussen's Disease (neurofibromatosis)
-assoc. w/ pheochromocytoma

31. Exfoliate dermatitis -often drug-induced
Tx: steroids

32. Ulticaria (Hives)

33. Psoriasis

34. Psoriasis

35. Pellagra DDD -diarrhea, dementia, dermatitis
-hyperkeratotic rash
-niacin defic.

36. Vitamin A deficiency -Bitot spots on sclera

37. Riboflavin deficiency -angular ketosis

38. Vitamin B12 deficiency -angular cheilitis plus atrophic glossitis

39. Vitiligo -assoc. w/ autoimmune dz.

40. Pretibial myxedema (Grave's dis.)

41. Xanthelasma

42. Cutaneous xanthomas
-homozygous hyperlipidemia

43. Scurvey - ecchymoses w/ perifollicular hemorrhages

44. Atheroembolism

45 Pagets Disease of the breast - eczematoid nipple eruption

46. Milia - superficial
- keratin-containing epidermal cyst - eyelids, forehead Tx: excision of contents

47. Melasma or Cholasma - mask-like face - OCP's, Pregnancy Tx: 3% hydroquinone cream

48. Cushing's Disease

49. Toxic epidermonecrolysis

50. Hereditary angioedema - C1 esterase INH

51. Heriditary hemorrhagic telangiectasia

52. Primary systemic amyloidosis - macroglossia

53. Seborrheic keratosis - slightly elevated, warty, keratotic. Benign lesions

54. Geographic tongue - normal variant

55. Thyrotoxicosis - exophthalmos

56. Leuconychia - hyperproteinemia, Nephrosis

57. Koilonychia - Fe-Defic

58. Clubbing

59. Squamous cell carcinoma - fungating lesions

60. Acromegaly - thickened soft tissues
- prominent jaw/supraorbital ridges

61. Addison's disease - pigmentation of palmar creases

62. Addison's disease Dx: ACTH stim test

63. Pseudo hypoparathyroidism - shortened 4th & 5th knuckles

64. Zinc deficiency
- erythematous
- hyperkeratotic skin lesions

65. Apthous ulcers – superficial ulcers

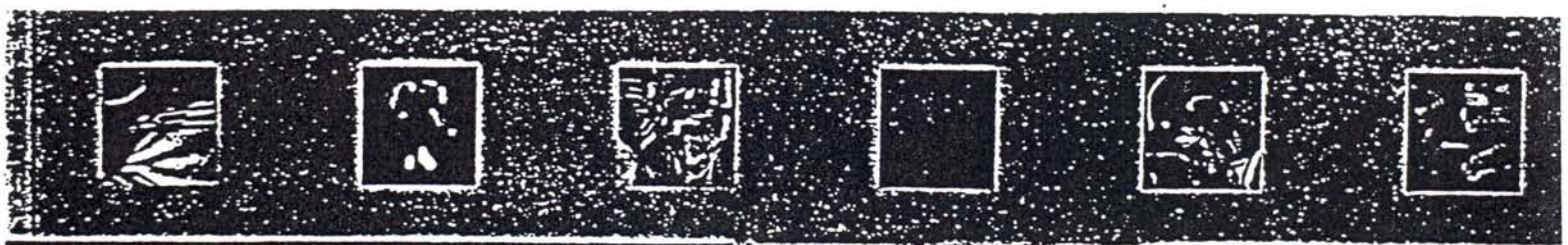
66. Dupuytrens contracture – trigger finger

67. Secondary syphilis – palmar rash

68. Secondary syphilis – solar rash (soles of feet)

Color Atlas and Text of

Clinical Medicine



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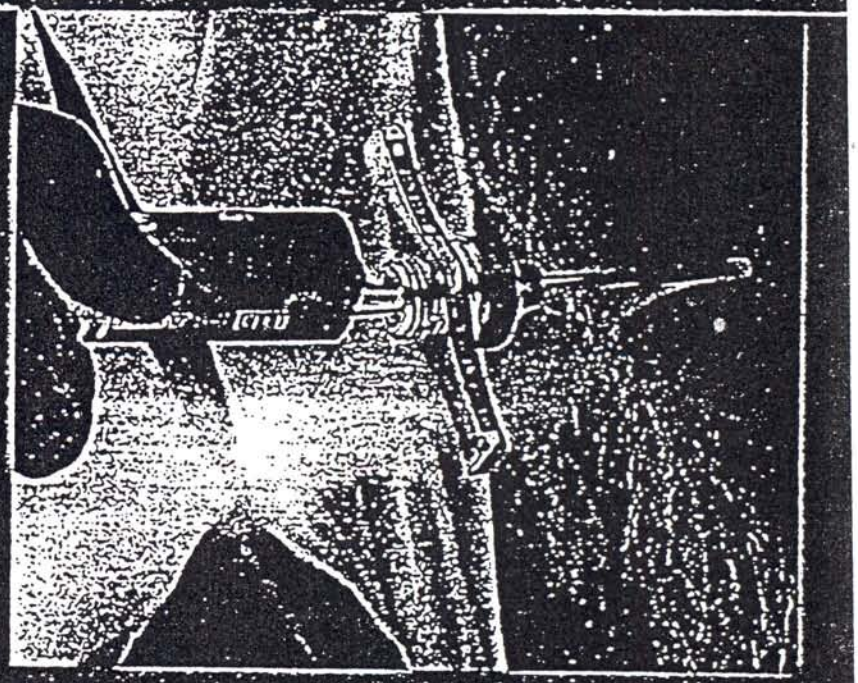

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