

Cases of Acute Renal Failure & Haemodialysis at Shree Birendra Hospital

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INTRODUCTION

Kidneys are highly vascular organs. Therefore they are very vulnerable to Haemodynamic alteration. In the tropical countries, they may be damaged by (1) Infective agents such as Malaria, Cholera and Viral Hepatitis (2) Toxins like snake bite, Copper Sulphate and (3) Heat Stroke.

Sometimes the damage occurs over hours to weeks leading to Acute Renal Failure. Acute Renal Failure is a common clinical problem. It is defined as a sudden decline in renal function resulting in azotemia with an accumulation of nitrogenous waste products (creatinine and urea) over hours to weeks. Acute Renal Failure causes derangements in electrolyte, volume, and metabolic status. Patients in Acute Renal Failure may be either Oliguric (i.e., producing less than 500 ml urine/day) or Nonoliguric (i.e. producing more than 500 ml urine/day). Anuria is defined as the production of less than 100 ml urine/day).

1. Causes:

There are three general mechanisms of Acute Renal Failure.

a) Perennial causes: Acute Renal Failure results from hypoperfusion of the Renal Parenchyma.

(1) True Intravascular volume depletion (eg., from hemorrhage, severe dehydration, or overzealous diuresis) can lead to Acute Renal Failure.

(2) Peripheral vascular changes leading to vasodilatation or a decreased Cardiac output may result from Cardiac Pump Failure, Sepsis or Anaphylaxis, leading to Acute Renal Failure.

b) Renal (intrinsic) causes involve direct injury to the Renal Parenchyma.

(1) Tubule injury (e.g., from acute tubular necrosis (ATN)) is the most common cause of Acute Renal Failure in adults. ATN can occur secondary to Ischemia, Toxins (e.g. intravenous contrast dye or Aminoglycoside Antibiotics), or rhabdomyolysis, fortunately, in many cases the damage is reversible.

(2) Interstitial injury (e.g., from Acute Interstitial Nephritis) is most often caused by an adverse drug reaction and is often associated with systemic manifestation, such as fever, rash and joint pain.

(3) Glomerular Injury (e.g., from Glomerulonephritis) is also an intrinsic cause of Acute Renal Failure.

c) Postrenal causes (i.e., Obstructive Nephropathy) must be bilateral in order to induce Renal Failure (unless the patient has only one Kidney). The obstruction may be intrinsic or extrinsic in origin, and located anywhere along the urinary meatus to the renal collection system.

As mentioned above, Acute Renal Failure may occur in different settings and sometime it is classified according to branches of science as Medical, Surgical and Obstetric causes. The causes of Acute Renal Failure in tropics is different from Western Countries. See table-I Acute Renal Failure may present as a Benign form with mild reduction in renal function or Malignant form with urine requiring Dialysis.

TABLE-1**COMPARATIVE INCIDENCE OF ACUTE RENAL FAILURE IN TROPICS**

Country	Obstetrical (%)	Surgical (%)	Medical (%)	Year	No of Patients
Singapore	16	24	60	1975	
Indonesia	29	8	63	1975	
Argentina	28	14	58	1975	
Thailand	15	24	61	1975	
China	24	4	52	1976	
India	22	11	67	1978	
South Africa	25	10	65	1978	
India	23	21	56	1985	
India	15	25	60	1987	

SHREE BIRENDRA HOSPITAL

-	-	-	6	1997	6
-	-	1	8	1998	
-	-		4	1999	4

CASES OF ACUTE RENAL FAILURE AT SHREE BIRENDRA HOSPITAL IN LAST THREE YEARS**Prerenal:**

1. Acute Gastroenteritis (Cholera) 15
2. Septicaemia 3
3. Cirrhosis with Ascites (Hepato Renal Syndrome) 4

Renal:

1. Acute Glomerulo Nephritis 4
2. Acute Pyelo Nephritis 1
3. Acute Tubular Necrosis 10
 - (a) One following fracture Femur Surgery
 - (b) Two following Septicaemia
 - (c) Four following Gastroenteritis

Postrenal:

- CA Prostrate 2

Acute Renal Failure Cases Requiring Dialysis:

1. Post Surgical 1
2. Medical 6

TYPES OF HAEMODIALYSIS:

1. Peritoneal 1
2. Haemodialysis 5

The indications for Haemodialysis were as following:

1. Uremia 1
2. Volume Overload 1
3. Hyper kalemia 1
4. Acidosis Refractory to Conservative management 3

Clinical Features:

Mostly it may present as fatigue weakness or shortness of breath but it affects different systems and symptoms which will be related to those organs.

1. **Central Nervous System (CNS)**

-Confusion diminished level of consciousness, altered mental status.

2. **Cardio Vascular System (CVS):**

-Congestive Cardiac failure or Pulmonary Edema, Hypertension, Arrhythmia

3. **Metabolic:**

Acidosis Uremia N.B.:Pulmonary edema and Arrhythmia can quickly kill the patient if urgent Haemodialysis is not given . Among our cases patient of ARF died one due to Arrhythmia and other due to Pulmonary oedema.

LABORATORY STUDIES

1. **BLOOD:**

- a. C.B.C. Anaemia may be present
- b. Electrolytes to detect Hyperkalemia
- c. Urea Creatinine to assess renal Function
- d. Glucose Calcium Phosphorous level

2. **URINE:**

See table No-2

3. **ECG:**

To detect Arrhythmia

4. **BIOPSY**

- * Acute Glomerulonephritis 1
- * Acute Tubular Necrosis 1

All cases of ARF do not require Biopsy, however it is useful when the diagnosis is other than Ischaemic or Nephrotoxic injury.

TABLE NO-2

Urinalysis Findings in Patients with Acute Renal Failure

Microscopic Analysis	Prerenal Cause	Renal(Intrinsic Cause)	Postrenal cause
	Unremarkable	Granular, Hyaline and Cellular Casts, RBC Casts, Proteinuria	Unremarkable
Urine Sodium	<40mEq/L	>40 mEq/L	Nondiagnostic
Urine Specific Gravity	>1.020	<1.010	<1.010
Urine Osmolality	>500mOsm/KgH ₂ O	<300mOsm/KgH ₂ O	Nondiagnostic
Urine Creatinine: Serum Creatinine: Ratio	>40:1	<20:1	<20:1
Serum Urea Nitrogen:Serum Creatinine Ratio	>20:1	=10:1	<10:1
Fractional Excretion of Sodium(FENa)*	<1%	>2%	>2%

$$*FENa = \frac{\text{Urine Na/Serum Na}}{\text{Urine Cr/Serum Cr}} \times 100$$

Therapy:

- 1 Treat Hyperkalemia, Hypertensive Crisis
- 2 Dialyse in case of Acidosis, Hyperkalemia, Pulmonary Oedema, Pericarditis, Uremia.
- 3 Treat cause of Acute Renal failure

(a) Prerenal Causes:

- Treat volume depletion
- Low dose Dopamine (1-3 mg/mg/min)

(b) Renal Causes:

- Lasix
- Low dose Dopamine

(c) Post Renal Causes:

- Elimination of the obstruction with a Folly's Catheter
- Urethral stent, Consultation with Urologists

Most of the cases of Acute Renal failure improve on conservative and supportive treatment. But some Patient with Acidosis, Hyperkalemia, Volume overload, pericarditis and Urenia require Haemodialysis. They should be promptly referred to Nephrology unit for Haemodialysis.

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74th Anniversary of Shree Birendra Army Hospital.



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