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## Tropical Renal Failure

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Acute Renal Failure (ARF) is defined as a sudden sustained decline in glomerular filtration rate (GFR) usually associated with Azotaemia and fall in urine output.'

Tropical nephropathies are associated with both chronic renal disease and acute renal failure (ARF).

Tropical nephropathies causing ARF are broadly classified as infective or toxic. The infective nephropathies are associated with endemic microbial infections: bacterial, viral, fungal and parasitic. Toxic nephropathies include exposure to poisons of animal or plant origin. Aetiologically there may be direct tissue invasion by the causative organism, remote cellular and humeral effects of bacterial antigens and endotoxins, and renal injury as a consequence of the acute systemic effects of the infection. The pathology of ARF caused by tropical nephropathies includes glomerular, microvascular and tubulointerstitial lesions. The tubulointerstitial lesions include interstitial nephritis and toxic/ischaemic acute tubular necrosis (ATN). The pathogenesis of ATN is summarized as follows:

Decreased blood supply to the glomerulus. A number of cytokines contribute to this including Tumour Necrosis Factor (TNF), Interleukin- 1 (IL-1), Platelet Activating Factor (PAF) and Angiotensin II. The imbalance between Endothelin (ET), a vasoconstrictor, and nitric oxide (NO), a vasodilator are also contributory<sup>(2)</sup>.

Decreased GFR. This is produced by decrease in blood supply, decrease in glomerular permeability due to endothelial cell swelling, aggregation of neutrophils in glomerular capillaries and high tubular luminal pressure.

Tubular damage. This occurs due to injury of the tubules by a complex cascade of interactive injury pathways which ultimately lead to cell death<sup>3</sup>. Among the factors leading to that is injury by free radicals due to excessive production of NO due to over production of the enzyme Inducible Nitric Oxide Synthase (i-NOS) triggered by sepsis. Some injured b,,'! viable tubular cells get detached from their basement membrane and are shed in the tubular lumen together with the necrotic cells

### Luminal Obstruction.

This is caused by the shed tubules, the debris released by the injured cells and intraluminal protein casts <sup>(4)</sup>.

### ***Backleak***

Toxic tubular lumen contents leak back into the interstitium due to high luminal pressure and dysfunction of the damaged tubular cells. This further augments the tubular damage.

The principal acute infections reported to cause ARF are malaria salmonellosis, shigellosis, Leptospirosis, cholera and tetanus. Schistosomiasis may cause ARF in both haematobium and mansoni infections.

Of those, the main infections causing ARE are malaria, leptospirosis and tetanus. ARE associated with Salmonellosis, shigellosis and cholera is less common.

Hepatitis B and C viruses are associated with chronic renal disease. Dengue haemorrhagic fever can be associated with ARF.

### ***Malaria***

ARE complicates malaria in 1 - 5% of native patients in endemic areas but in non-immune visitors the figure goes up to It is mostly due to *P. falciparum* with *P. vivax* being the causative species in a minority of cases. The main features are oliguria and hypercatabolism in addition to the systemic effects of malaria. Mild proteinuria, <1 gm/day, may occur but almost resolves completely after treatment. The urine sediment is usually negative. Hyperkalaemia is usually striking due to haemolysis, rhabdomyolysis and acidosis.

Histologically there is a mixture of ATN, interstitial nephritis and glomerulonephritis <sup>(6)</sup>. ATN is the most consistent finding. The glomerular lesions show prominent mesangial proliferation with modest mesangial matrix expansion. Segmental necrosis may occur due to occlusion of the capillaries by erythrocyte rosettes. Immunofluorescence shows finely granular IgM and C<sub>3</sub> deposits along the capillary walls and in the mesangium <sup>(7)</sup>

Mortality depends on the urgency and facilities of treatment ranging from nil in well- equipped centres to as high as 45% when facilities are meager <sup>(8)</sup>.

A study of prognosis from Yemen reported that out of 64 cluiltheu (4.2 - 11.2 Jeats' who required dialysis for APE secondary to falciparum malaria, 28 (43.8%) died. The group that died had significantly high plasma creatinine and BP and low urine output<sup>9</sup>.

### ***Leptospirosis***

Leptospirosis causes necrotizing vasculitis causing severe glomerulonephritis.

### ***Tetanus***

A number of mechanisms may lead to development of the ARE associated with tetanus, rhabdomyolysis' and autonomic nervous system overactivity' 1) being the most prominent.

### ***Salmonellosis***

Abnormal renal function is reported in about 16% of patients'2 with salmonellosis. The main renal lesions are pyelonephritis and lomerulonephritis'3 which is exudative. ARE is usually mild and. resolves with treatment.

### ***Shigellosis***

ATN may occur due to dehydration in severe infections. Proliferative glomerulonephritis can occur. Shigellosis may also induce haemolytic uraemic syndrome (HUS) especially in children<sup>4</sup>.

### ***Schistosomiasis***

ARF in haematobium infection occurs due to acute obstructive uropathy, usually on top of chronic disease. With mansoni infection, ARF may occur with late disease as ATN due to severe variceal bleeding or as hepatorenal syndrome associated with hepatic dysfunction.

### ***Dengue Haemorrhagic Fever***

ARF occurs in 5% of patients with Dengue Haemorrhagic Fever. It is mainly due to ATN which is associated with interstitial oedema and mononuclear cell infiltration.

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