SURVIVOR OF SCRUB TYPHUS INFECTION

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BRIEF HISTORY:

- 9Y/M, developmentally normal
- Fever x 1 week
- Facial puffiness
- 1 episode of GTCS followed by altered sensorium
- Shifted to ICU
STORMY HOSPITAL COURSE

• 2 episodes of cardiac arrest – CPR
• Septic Shock - requiring high dose inotropes
• Sepsis
• Pulmonary Hemorrhage and ARDS
• Coagulopathy
• Acute Kidney Injury - PD
• Seizures, Dyselectrolytemia
• Bed sores
ACRAL GANGRENE
CAUSE

• Positive scrub typhus IgM - Vasculitis
• Vascular steal phenomenon
• Treated with aspirin and low molecular heparin
• Shifted to Stanley Medical College for amputation and further rehabilitation
GENUS

- Rickettsia rickettsii (Rocky Mountain spotted fever), R. conorii (Mediterranean spotted fever),
- R. africae (African tick bite fever), R. akari (rickettsialpox), R. sibirica (North Asian tick typhus and lymphangitis-associated rickettsiosis),
- R. australis (Queensland tick typhus)
- R. japonica (Japanese spotted fever)
- R. honei (Flinders Island spotted fever)
- R. prowazekii (epidemic typhus), R. typhi (murine typhus)
- Several emerging unnamed diseases (R. massiliae, R. aeschlimannii, R. monacensis, R. helvetica, and R. amblyommii).
LIFE CYCLE OF A LEPTOTROMBIDIUM MITE.

Humans are accidental hosts.

Egg

Transovarial transmission (from adult to egg) of O. tsutsugamushi

Larva

Engorged larva

Adult

Nymph

Both the nymph & the adult are free-living in the soil.

Normally the larva (chigger) feeds on small mammals or ground-feeding birds.
PATHOLOGY

- Rickettsiae - saliva of infected ticks and mites or feces of infected fleas and lice
- Spread via lymphatic vessels to the regional lymph nodes & hematogenously to endothelium throughout the body
PATHOPHYSIOLOGY

- Increased microvascular permeability resulting from discontinuities in interendothelial adherens junctions, the effects of TNFα, IFNγ, IL-1β, and VEGF, and COX-2 dependent production of PGE2 and PGI2.

- Endothelial injury:
  1. Toxic reactive oxygen species
  2. Damage to the cell membrane upon rickettsial exit
  3. Cytotoxic T lymphocyte-induced apoptosis of infected endothelial cells
PATHOLOGY

- Focal or disseminated vasculitis similar to PAN
- Perivascular infiltration of leukocytes.
INVESTIGATIONS

• Weil felix test- screening test.
• Confirmatory- indirect immunoperoxidase test and immunofluorescent assay.
• 4-fold increase in antibody titers between acute and convalescent serum specimens.
• Probable case- single high titer with classic clinical features.
• IFA: gold standard. It is not available in India.
INFORMATION

- Weil Felix Test – King’s institute, Chennai
- Scub typhus serology at KKCTH, Apollo Hospital, Chennai and CMC Vellore
FUTURE ADVANCES

- Blocking the pathogenic mechanisms
  1. Rickettsia-induced oxidative stress
  2. Modulation of the pathologic effects of the immune response such as T regulatory cell mediated immunosuppression.
PREDICTORS OF POOR PROGNOSIS

- Age = 60 years
- Absence of eschar
- WBC counts > 10,000/mm³
- Hemoglobin = 10 g/dL
- Albumin = 3.0 g/dL
- Serum creatinine > 1.4 mg/dL
- CRP > 10 mg/dL

Clinical and laboratory findings associated with severe scrub typhus
Dong-Min Kim et al. BMC Infect Dis. 2010; 10: 108
PREDICTORS OF MORTALITY

- Metabolic Acidosis
- ARDS
- Altered sensorium ± Shock

"Greater use of Doxycycline appears justified for patients with undiagnosed fever in settings where rickettsial diseases are endemic"

TAKE HOME MESSAGE

• Scrub typhus can involve any system
• Absence of ESCHAR does not rule out infection
• Clinical suspicion – start treatment
Well, good night, sleep tight, and don’t let the bed bugs bite.