A SEEMINGLY SEPTIC SOLDIER

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Initial illness

- Diarrhoea (watery) & vomiting
- Hyperpyrexia (T 41.5˚)
- Systemic Inflammatory Reponse Syndrome (SIRS)
  - Tachycardia, tachypnoea, fever (normal WCC)
- Jaundiced
- Raised transaminases (X 10)
- Disordered clotting, thrombocytopenia
- Acute phase response (CRP 142)
- Settled over 8 days (no antibiotics)
- No definite diagnosis

Second episode

- 2 months later (Apparently well between)
- Diarrhoea, vomiting and fever
- High fever (41° C) but seemed “less septic”
  - Pulse and resp rate slower
- Splenomegaly
- Again delayed elevation in ALT/AST
- Jaundiced
- All settled again without specific treatment
- Non typhoidal salmonella species isolated from stool later

Summary

- Very similar (?second one milder)
- Diarrhoea, vomiting, fever, SIRS
- Delayed rise in CRP, transaminases and bilirubin
- Delayed fall in albumen, platelets
- Normal white cells and platelets
- 2 episodes 6-8 weeks apart
- Spontaneous resolution with supportive therapy only

Possibilities

- One infective illness with a biphasic pattern
  - arbovirus (CCHF, sandfly fever)
  - rickettsia
  - leptospirosis
  - Q fever
  - But interval probably too long. D&V a major feature
- One initial infection with relapse
  - Salmonella
  - But strange to settle spontaneously without antibiotics
- Initial infection and then reinfection with same organism
  - Norovirus (fever and other sequelae unusual)
  - Shigella
- Initial infection and then reinfection with different organism
- Non infective illness

Priorities

- Infections that represent a risk to public health
  - Viral haemorrhagic fever (Congo Crimean HF)
  - Norovirus
  - Shigella
  - Other gastrointestinal infections
  - Influenza
- Infections that represent a risk to patient without treatment (and that CAN BE treated)
  - Malaria
  - Meningococcal disease
  - Rickettsial infection
  - Bacteraemia (typhoid/non typhoidal samonella)

Diagnosis

- Travel history
  - Where, what, who, how, why
- Clinical history
  - Fever and accompanying symptoms

Travel history

- Where – exact region, game parks etc
- When – incubation periods, wet/dry season/previous trips
- Why – holiday, business, VFR
- Who - health care, sexual contact
- How – five star, backpacking etc
- What precautions – vaccinations, chemoprophylaxis etc
- What did they do – water exposure, insect exposure etc

Clinical History

- Duration/pattern of fever
- Associated symptoms
  - Rigors
  - Diarrhoea
  - Abdominal pain
  - Sore throat
  - Rash
  - Cough
  - Jaundice
  - Arthralgia
  - Myalgia
  - Bruising or bleeding including nose or gum bleeding

Investigations

- Full blood count and film
  - Malaria (+ antigen test)
  - Eosinophilia
  - Others
- Biochemistry and liver function
- Chest x ray and abdominal ultrasound
- Appropriate cultures (blood, urine, stool)
- HIV test
- Other serology (and PCR) as appropriate (hepatitis, brucella, rickettsia etc)

Differential diagnosis

- Norovirus
- Q fever
- Sandfly fever
- Shigella
- Salmonella (typhoid/NTS)
- Leptospirosis
- Rickettsia
- Non infective

? Heat related illness

- High ambient temperature
- Exertion
- Responded to cooling
- Potential precipitant (infection)

Thermo regulation

- Normally - heat generation (muscle/liver)= heat loss (skin/lungs)
- Pre optic nucleus of anterior hypothalamus
  - Sensory input from periphery (abdomen, skin, spinal cord)
  - Detects blood temperature
  - Increases output in response to temperature above thermal set point (37˚)
  - Output stimulates thermal release
    - Vasodilatation
    - ↑ cardiac output
    - Sweating
    - Panting
    - ↓ metabolic activity

Calvello BJHM 2011

Fever

- Thermal set point ↑ by PGE_2
- Hypothalamus detects normal body temp as hypothermia
  - ↑ heat production
    - ↑ metabolism
    - Shivering
    - Vasoconstricion
  - Prostaglandin E_2 release stimulated by endogenous (En) pyrogens and exogenous (Ex) pyrogens
    - Microbes and toxins (ExP)
      - LPS, superantigens
    - Cytokines released by leucocytes (EnP)
      - IL2 IL6 TNF

Hyperthermia

- Thermal set point is normal (unless fever as well)
- Temperature rises, hypothalamus recognizes this at normal set point but measures to ↓ body temperature fail

Differential diagnosis of hyperthermia

- Drugs
  - Anticholinergics, stimulants, salicylate
  - Neuroleptic malignant syndrome
  - Drug/alcohol withdrawal
  - Drug induced fever
- Infection
- Endocrine
  - Thyroid storm, phaeo
- Neurological
  - Status epilepticus, cerebral haemorrhage
- Environmental exposure
  - Heat exhaustion/heat stroke
- Blood clots
  - PE/DVT

Heat stroke

- Core body temperature > 40 with hot dry skin and acute phase response leading to multi organ failure often with encephalopathy.
  - Environmental heat exposure (“Classic “heat stroke)
  - Exertion (“Exertional” heat stroke)
  - Inappropriate clothing
  - Dehydration
  - Drugs interfering with sweating/cardiac output
  - Inappropriate behaviour (dementia etc)

Bouchama NEJM 2002

Management

- Priority is to cool by increasing heat transfer from skin without causing vasoconstriction
  - Evaporative cooling
  - Coldwater immersion
  - Core cooling (bladder/rectal/gastric/PD)
  - Diazepam for convulsions/shivering
  - No role for salicylate/paracetamol/dantrolene

Summary

- Previously fit soldier
- 2 acute episodes of hyperthermia with acute phase response
- No infective cause confirmed except for NTS on second episode
- Probable heat stroke - ? Preciptated by infection

Learning points

- Take good travel history in all fevers
- In travel related fever priorities are
  - Risk to public health
  - Risk to patient
- Usual clinical method
- Exclude malaria
- Eosinophilia means helminths