

Bacteremia and Infective Endocarditis

Sepsis, septicaemia = its all the same thing.

BACTERAEemia IS COMMON! = every time you brush your teeth

SEPTICAEMIA means SYMPTOMATIC BACTRAEMIA

Symptoms related to endo and exo toxins

septic shock = cardiovascular collapse due to septicaemia

happens when the Systemic Immune Response Syndrome (SIRS) makes your venules dilate and makes your capillaries leaky. Thus blood pressure plummets

PRESENTATION:

Symptoms are non-specific and vaguely remind you of inflammation...

- Tachycardia
- Tachypnoea
- Vasodilation (flushed, plethoric)
- Fever
- Malaise
- Lethargy
- Headache
- Confusion
- Coma

WATCH OUT FOR
STAPH
ENDOCARDITIS!!
= will eat through valves in 6-12 hours

OR!! There may be a FOCUS

i.e where the microbe came from; Eg.

- Abdo pain (typhoid)
- Gall bladder pain (cholangitis)
- kidney (pyelonephritis)
- joints (infectious arthritis)
- pelvic infection
- spine (epidural abscess)
- meningitis

The patient may be presenting VERY LATE: with END-ORGAN DYSFUNCTION

This stems from microhaemorrhage secondary to disseminated intravascular coagulation
Borderline functioning organ will fail first; eg. chronically diseased kidneys will go into acute failure
Plus-

The patient may have specific signs that point to a particular pathogen's toxic shock syndrome Eg. Haemolytic-uremic syndrome, where enterohaemorrhagic E.Coli endotoxin attacks the red blood cells

In ENDOCARDITIS, there may be nephrotic syndrome due to circulating Ag/Ab complexes

SEPTIC SHOCK:

- **Hypotension** due to vasodilation and increased capillary permeability
- **Circulatory failure** due to hypotension
- **Renal failure** (pre-renal, due to hypotension- with tubular and cortical toxicity)
- Thus, **Oliguria**
- **Disseminated Intravascular Coagulation** which consumes all your platelets,
- Thus **Consumption Coagulopathy and MICROHAEMORRHAGES**
- Leaky capillaries allow too much water into the lungs:
 - Thus→ **Characteristic fluffy opacities on chest X-ray=**
 - = **ACUTE RESPIRATORY DISTRESS SYNDROME**
 - = normally occurs 1-2 days after septic insult
 - = massive reduction in gas exchange and compliance with an option to upgrade into fibrosis. **MAY NEED VENTILATION**
- Underperfusion causes **GUT WALL ISCHAEMIA**
 - Thus→ **translocation of gut organisms into the abdominal cavity**
- **HEPATIC DAMAGE** from endotoxin directly
- **Gall Bladder "Sludging"** (the formation of thickened fluid that has not yet formed stones. The sludge is thick enough to prevent a normal flow of bile so it has the same effect as gallstones)
- **Failure of GIT means failure of nutrition, and the acute phase response results in reduction in blood albumin which exacerbates the extravasation of fluid.**

Emergency Diagnosis and Management of SEPSIS

Anybody on IV antibiotics or with unexplained hypotension needs this assessment:

INCLUSION CRITERIA

SIRS: 2 of these ←

- Temperature **over 38** or **under 36**
- Heart rate **over 90**
- Respiratory rate **over 20**
- Arterial PaCO₂ **under 32mmHg**
- White Cell Count **over 11** or **under 4**
(or more than 10% of immature forms)
- Sepsis of unknown origin and on IV antibiotics

SEPSIS is SIRS arising from a documented infection

JVP = immediate clue regarding hypovolemia. If there's a JVP, there's probably enough blood to go around.

Septic shock

- Systolic Blood Pressure **under 90** AFTER crystalloid fluid challenge - of more than 20-30ml/kg over 30 minutes
- Blood Lactate **over 4mmol/L**
- Oliguria +/- acute deterioration of mental state
- Acute end-organ dysfunction

SO, your patient is septic.

Now, fluids are their best friend. FLUIDS !!

1) AIRWAY, BREATHING, CIRCULATION.

May need to **intubate**.

2) venous access: big cannula in each arm

3) take **bloods**:

- FBC
- 2 x Culture (aerobes + anaerobes)
- ABGs
- Lactate
- EUC
- LFTs
- BSL
- Coagulation

4) IV FLUIDS: because the vessels are globally dilated, one must refill the new available space so that the heart may fill and beat again.

THUS: give 20 to 30 ml/kg over 30 minutes until their systolic BP gets over 90

5) Antibiotics as per department guidelines (give together with first fluids)

6) insert Urinary Catheter (to measure output)

7) keep giving crystalloid bolus 500mls over 30min until blood pressure normal

FIND THE ABSCESS!!

...and drain it. antibiotics are very useful, but they will only touch the outside of the massive pocket of pus.

! pus may be hidden !

Head-to-toe survey, then-

- gallbladder
- kidney (pyelonephritis)
- joints (infectious arthritis)
- pelvis
- spine (epidural abscess)
- meningitis

and ORDER A CHEST X-RAY

Patients blood pressure **NORMALISED?**

= Give noradrenaline (ONLY if central venous pressure is 8 to 12 mmHg)

ONLY UNTIL MAP is over 70

GOALS OF THERAPY:

- Central venous pressure 8-12 mmHg
- Mean arterial pressure over 70 mmHg
- SaO₂ over 93%
- Hematocrit over 30
- Central venous O₂ saturation of over 70

Endocarditis:

Usually a trivial bacteraemia which latches onto a slightly abnormal vascular surface.

- **Heavy prolonged bacteraemia may affect an only slightly abnormal area**
- **Trivial bacteraemia may infect a very badly abnormal area**

PRESENTATION:

- **Fever 90%**
- **Nausea, anorexia, malaise, lethargy, weight loss = 90%**
- **Murmur 85%**
- **Embolus 50%**
- **Splenomegaly 20-60%**
- **Stroke 20%**

SEQUELAE:

Vave destruction
Nephritis
Splenomagely
Major emboli

INVESTIGATIONS:

FBC: Neutrophilia

+ anaemia of chronic disease

ESR: elevated

FERRITIN: elevated

ECG: ST changes in all leads

ECHO: new valve dysfunction

Diagnostic Criteria:

- **Demonstrate bacteraemia:**
3 bloods in 48 hrs has nearly 100% sensitivity
- **Clinical supportive evidence (Hx + exam)**
- **Demonstration of vegetations by echo**

REPEATED BLOOD CULTURES ARE THE BEST INVESTIGATION

