When hard becomes harder: Medical and Trauma considerations in the Immunecompromised Host

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Immune system

- Helps keep us healthy by constantly monitoring and destroying microbes that would otherwise kill us
- Imagine you body as a well built house, impermeable to external environment
- When paint chips, shingles fall, wood rots and there is no repair mechanism the external environment destroys the home

- Innate immunity – immune response is the same magnitude however many times the body is exposed to the antigen
  - common cold
- Acquired immunity – body adapts to the antigen from memory and response is of a greater magnitude than the first exposure to the microbe
  - vaccine

- Immune system recognizes its host as “self” and does not attack it because of the way proteins are organized on the cell membranes
    - Female alligators do not eat their young or others of the same herd
- Some disease result from its immune system attacking its host – Diabetes mellitus, Rheumatoid arthritis

Antigen exposure

- When a microbe enters the body, immune cells sound an alarm that an intruder has entered
  - Think of your house alarm
  - a military base perimeter that is breached
    - » regulate their own growth and behavior
    - » enlist other immune cells
    - » direct the new recruits to trouble spots

- After the fight is over, some immune cells stay behind and act as sentry
  - The next time around there is a greater response to the same antigen than there was initially

B cell

- A type of lymphocyte that is able to produce different antibodies, each capable of its own way of defeating a particular foreign protein/microbe

T cell

- Attack cells, killer cells
- Aid in recognizing the Antibody-Antigen complex then inject chemicals that destroys the organism

WBC

- White blood cells are circulating cells in the blood stream that multiply when exposed to foreign proteins that are microbes and act to contain/fight the infection
  - Main function is to fight an infection, usually bacteria
  - Usually not a factor for viruses

- When all immune cells act together there is inflammation, swelling, fever, body aches
    - War is a terrible thing, everything is destroyed
    - Once the infection is over the body starts to heal as the immune cells stand down

Specific examples

- HIV (human immune deficiency virus)
- enters the body and the cell where it multiplies
- Shuts down the immune response to infection
- Virus takes over, other microbes enter the body and consume it.

- HIV is common, more people have it therefore more chances medical personnel will encounter a HIV in their career
- With HAART medications patient live longer
- When HIV live longer more chances to be traumatized or become infected

- Prevalence of trauma is higher in young HIV
- Prevalence of medical disease is about the same in young and old HIV, but older HIV have a poorer prognosis

Transplant

- Transplant patients take medications that depress immune response so the transplanted organ is not attacked by the recipient host
- Infection and rejection therefore are leading to morbidity and mortality in the first year post transplant

Take home Points

- Immune system keeps us alive and healthy
- Recognize foreign proteins “not self” and attack & destroy
- Sometimes the immune system will attack its own host to produce an autoimmune disease

- The immune system has many ways of doing its job considering the multitude of dangerous bacteria/viruses/fungus organisms outside of the body
- Some viruses are able to destroy our immune system (HIV, hepatitis) which later causes death from overwhelming infection

- twicking a host immune system is common for transplant patients to prevent rejection
  - Downside is increased risk of infection

- There is one system for trauma resuscitation whether for normal or abnormal host immune system
- Complications are more common and harder to treat in immunosuppressed patients