INFLAMMATION and TISSUE REPAIR

Dennis W Ross MD PhD
forensicbotanist@gmail.com. 336 748 9993

CASE 1: HIV patient with superinfection

A 35-year-old HIV-positive man was admitted to our hospital with intermittent fever for several months and chronic diarrhea. He was diagnosed HIV-positive 4 years earlier and had subsequently developed several AIDS-defining diseases such as Pneumocystis carinii pneumonia and CMV retinitis. Three months before admission the patient began complaining of watery diarrhea and recurrent fever. His stool showed no blood or mucus. He lost 17 kg of his body weight. On admission, his temperature was 39.3 °C, pulse was 104/min, and blood pressure was 120/80. The patient was cachectic and appeared chronically ill. Further physical examination was unremarkable

. Abnormal laboratory results included a CRP of 31 mg/L, haemoglobin of 9.7 g/dL, serum iron of 5 µmol/L and Ferritin of 323 µg/L.
The CD4 lymphocyte count was 13/µL, HIV viral load was 30 000 copies/mL plasma

. Endoscopic examination of the gastrointestinal tract revealed minimal gastric inflammation and a normal ileum and colon. Blood cultures were negative for pathogens as were stool cultures. The patient was discharged after 9 days. Two months later, re-admission was necessarry because of persistent diarrhea and severe wasting. Again, diagnostic tests were normal.
However, three blood cultures taken on the third hospital day became positive in the automated BacT/Alert-System (Organon Technika, Turnout, Belgium) after incubation for 72 h. Special stain (acridine orange) revealed gram neg rods; PCR revealed a species of Helicobacter
Treatment with Ciproflaxin was successful.

DISCUSSION of Case 1. The Tools of Clinical Pathology

1. Have you heard of any of the infections listed

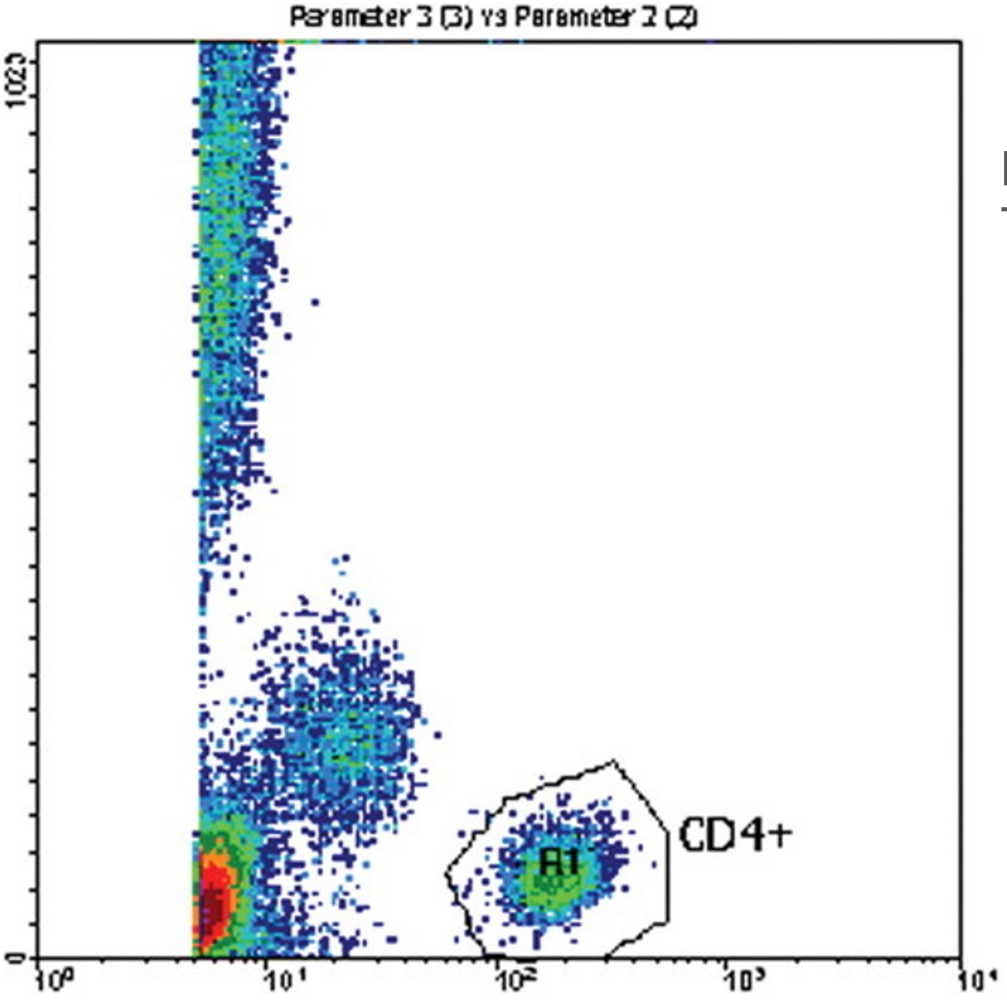
   HIV, Pneumocystis, CMV, or Helicobacter. ?

2. How is the CD4 count measured (normal is 500 to 1500)

3. How is the HIV viral load measured (normal is 0. 30,000 is moderately elevated)

4. What is the job -- Medical Technologist

5. What is the job -- Clinical Pathologist



Flow Cytometry enumeration of T4+
T Helper Lymphocytes

CASE 2. TRAUMA IN PREGNANCY

A 28 year old woman, 30 weeks pregnant is brought to the ER following a MVA (motor vehicle accident). She has previously had a spontaneous abortion (G2, P1 , SAb1)

Physical exam: HR. 110/min. BP 80/40. R. 20/min. T. 36C

Pain, tenderness, and distension of the abdomeN

Labs. Hgb. 7.0 g/dL. Ultrasound suggests splenic rupture and hemorrhage

Patient taken to OR for emergency exploration and splenectomy

Surgeon request 3 units of blood at end of procedurE

Blood Bank. patient was blood type A neg when a donor 3 years ago

Discussion Case 2. Trauma in Pregnancy

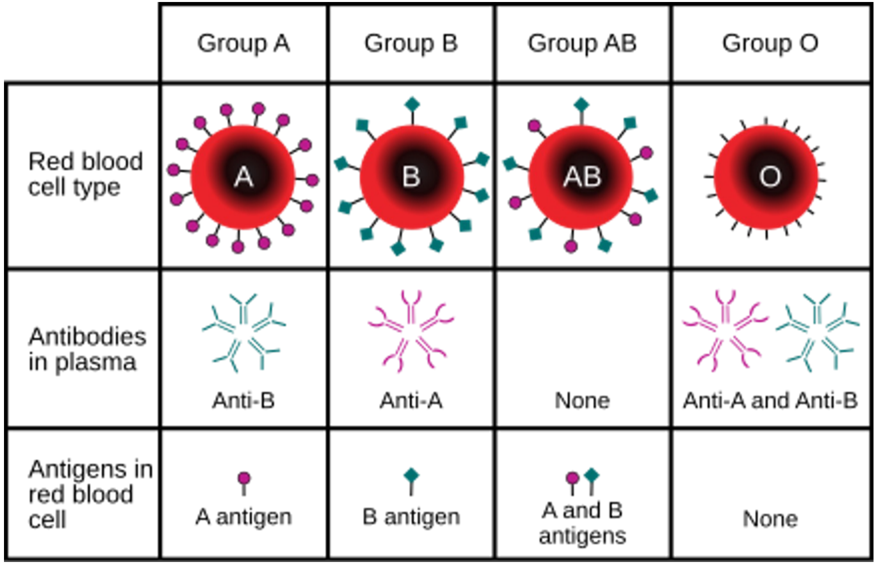
1 What autoantibodies does the patient have to blood products

2 An OB consult recommends a screen for HbF on mother's blood and NO TRANSFUSION.

3 HbF stain reveals fetal blood cells in mother's circulation suggestion a fetal bleed into mother.

4. Can you transfuse the fetus

5 Should the Blood Bank release blood products and if so what type



Why do Red Blood Cell Group Surface Ag’s Exist?

I. Complexity of the INFLAMMATORY SYSTEM

input (sees Ag's, neural connections)
output (produces humoral and cellular Ab's; cytokines)
memory (remembers past experiences, innate knowledge)
distributed processing (modulates responses based on all of the above)

II. Plan

clinical examples to demonstrate various immune reactions

III. Tissue repair

IV. Bee Sting and Peanut Butter

V. Poison Ivy

VI. Rheumatoid Arthritis

VII. Immune Therapies

VIII. Conclusion

VINDICATE.

A **small** number of pathologic processes in a **large** number of various organs and tissues explains a **very large** number of diseases

INFLAMMATION. ==. ‘ITIS

hepatitis
myocarditis
pneumonitis

VII. IMMUNE THERAPIES

Non Specific

Corticosteroid -- slightly depresses T cell function and other effectors

diphenylhydramine (Benadryl). -- slightly depresses histamine release

Specific

Monoclonal antibodies. MAb

for Rheumatoid Arthritis and other auto immune diseases

Rhogam

helps prevent immunization of an Rh neg pregnant woman by Rh pos fetal cells

MANY new agents in trials

ingestion of the microbes and the activation of the complement system. Other proteins called collectins also bind to and combat microbes.

KEY CONCEPTS

GENERAL FEATURES AND CAUSES OF INFLAMMATION

- Inflammation is a beneficial host response to foreign invaders and necrotic tissue, but it may also cause tissue damage.
- The main components of inflammation are a vascular reaction and a cellular response, both activated by mediators that are derived from plasma proteins and various cells.
- The steps of the inflammatory response can be remembered as the five R's: (1) recognition of the injurious agent, (2) recruitment of leukocytes, (3) removal of the agent, (4) regulation (control) of the response, and (5) repair (resolution).
- Acute and chronic inflammation differ in the kinetics of the reaction, the principal cells involved, and the degree of injury. The outcome of acute inflammation is either elimination of the noxious stimulus followed by decline of the reaction and repair of the damaged tissue or persistent injury resulting in chronic inflammation.
- Causes of inflammation include infections, tissue necrosis, foreign bodies, trauma, and immune responses.
- Epithelial cells, tissue macrophages and dendritic cells, leukocytes, and other cell types express receptors that sense the presence of microbes and substances released from damaged cells. Circulating proteins recognize microbes that have entered the blood.

produced in response to loss of liver mass and inflammation. In different situations, regeneration may occur by proliferation of surviving hepatocytes or repopulation from progenitor cells.

Repair by Connective Tissue Deposition

If repair cannot be accomplished by regeneration alone, it occurs by replacement of the injured cells with connective tissue, leading to the formation of a scar, or by a combination of regeneration of some residual cells and scar

- *Epithelial cells* respond to locally produced growth factors and migrate over the wound to cover it up.
- *Endothelial cells and pericytes* proliferate to form new blood vessels, a process known as *angiogenesis*. Because of the importance of this process in physiologic host responses and in many pathologic conditions, it is described in more detail subsequently.
- *Fibroblasts* proliferate and migrate into the site of injury and lay down collagen fibers that form the scar.
- *Formation of granulation tissue.* Migration and proliferation of fibroblasts and deposition of loose connective tissue,

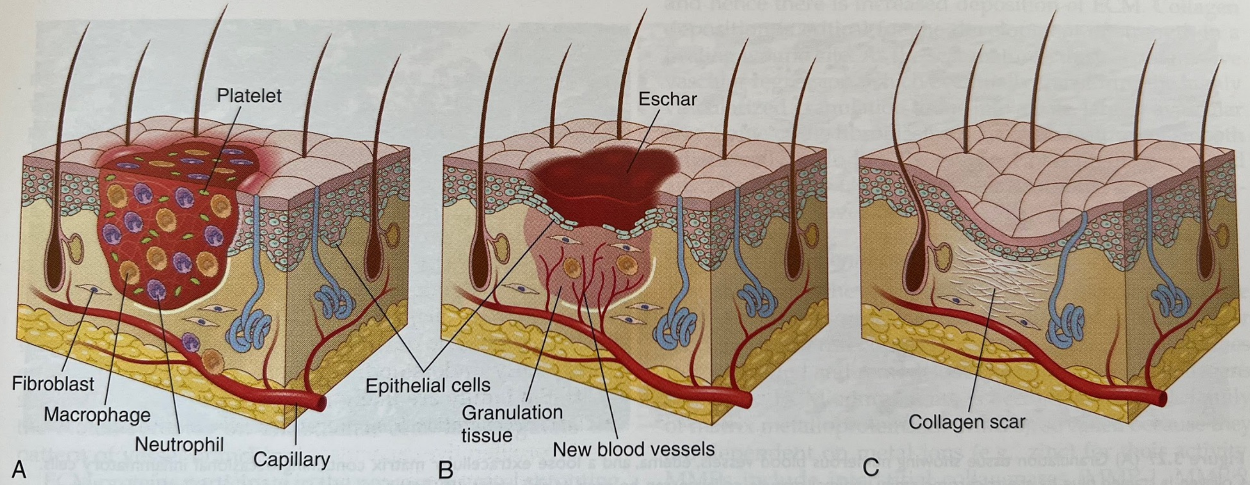


Figure 3.26 Steps in repair by scar formation: wound healing in the skin. (A) Inflammation. (B) Proliferation of epithelial cells; formation of granulation tissue by vessel growth and proliferating fibroblasts. (C) Remodeling to produce the fibrous scar.

III. TISSUE REPAIR
Immune System maintains the integrity of all tissues in the body; repairing all injuries as well as routine wear and tear.

IV. IMMEDIATE HYPERSENSITIVITY. bee sting

BEE STING

1-3 uL of venom, toxic local damage, then presentation of foreign Ag

IgE antibody + eosinophil response

small local swelling to anaphylactic shock and death

Do you have to have been exposed to a bee sting once before in order for an antibody to exist? Will the reaction always bee the same, ie serious bee allergy

Rx. Epipen on Essy

PEANUT BUTTER

Ag in peanuts is exposed via columnar epithelium in the GI tract

{SQUAMOUS vs COLUMNAR EPITHELIUM}

Do you have to be exposed to peanut butter once before

in 2020. recommendation. no peanut butter before age 4 years

in 2024. recommendation. peanut butter mandatory before 4 months

V. DELAYED HYPERSENSITIVITY. poison ivy

Allergen is urishol oil on plant
Antigen is presented by cutaneous dendritic cells
activated Help T cells from previous exposure, respond

Rx. anti itching OTC. or topical steroids

? Can an HIV patient with a very low Helper T cell count respond to poison ivy?

VI. AUTOIMMUNE DISEASE. Rheumatoid arthritis

Although the exact cause of RA is unknown, initiation of disease seems to result from an interaction among genetic susceptibility, environmental triggers, and chance.

smoking, female, certain HLA-DR subtypes, infection with many agents

Major Histocompatibility Complex. (MHC)

why do we have auto antibodies against everyone else

VIII. CONCLUSIONS

IMMUNE SYSTEM is marvelously complex and involves the entire body on a minute by minute basis

BUT

I don't know"

"What is know is at least partially incorrect"

are good attitudes