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Inflammation II - Notes

Thursday, April 17, 2008

1:00 PM

- **Infection vs. Inflammation**
 - **Inflammation** – response to **infection**, or necrosis, or foreign body, etc.
 - **Early inflammation** – fluid and cells (usually PMNs)
 - **Late inflammation** - macrophages
 - **Infection** – bacterial, causes inflammation, and inflammation can create opportunity for infection
 - Purulent pneumococcal meningitis - pus and hemorrhaging
- **Granulomas – Caseating, Non-caseating, FB, Sarcoidosis, TB, Fungus, Histoplasmosis**
 - If you spot a **granuloma**, determine if **caseating** (crumbled cheesy center) or **non-caseating**
 - **Caseating** – could be **TB, fungus (aspergillus), or Histoplasmosis**, among others
 - ◆ **Aspergillus** – can see 45° angle hyphae
 - ◆ **Histoplasmosis** – *can stain*, see dark flecks
 - ◆ **TB** – *can stain*, see acid-fast bacilli
 - **Non-caseating** – could be **foreign body, or sarcoidosis**
 - ◆ **Foreign body** – look for it in the center! Usually sutures
 - ◆ **Sarcoidosis** – unexplained, related to immune response
- **Stains**
 - H&E - regular stain; can show colonies of bacteria
 - Gram Stain
 - Silver stain - helpful w/ spirochetes --> syphilis
 - Acid Fast - mycobacteria tuberculosis (hot dog shaped)
 - Although the hpf slide may not show, don't rule out presence of bacteria
 - Fungi
 - H&E
 - Gridley carb stain
 - Silver stain
- **Outcomes of Inflammatory Response**
 - **Resolution** – everything looks awesome again, re-epithelialization (which can occur with any outcome)
 - **Healing with scar formation** – replaces necrotic tissue
 - **Granulation tissue** – new CT having **new vessels** (from **vascular endothelial cells = angiogenesis**) and proliferating **fibroblasts making collagen** --> **KNOW FOR QUIZ**
 - Early - inflammatory cells, fibroblast proliferation, angiogenesis; no collagen yet
 - **Organization** - process of forming granulation tissue; **macrophages disappear** as **fibroblasts enter**
 - Maturing scar - no inflammation; well organized collagen
 - 1-2 weeks later --> collagen deposition
 - **Chronic inflammation** - **all aspects** of inflammation persist
 - **Abscess** (PMNs) or **granuloma** (macrophages)
- **Wound Healing**
 - **Inflammation** – early (PMN) and late (macrophages)
 - **Granulation Tissue Formation = organization**
 - **1st Intention** – wound closed already
 - **2nd Intention** – wound open, need not only fibroblasts, but also **myofibroblasts to pull closed!**
 - ◆ Heals from the **base to the surface**, epithelium may look similar to 1st intention though
 - ◆ **Wound contraction**
 - **Re-epithelialization** – looks **flat**, rather than having **rete ridge pattern**
 - **Remodeling** – forming nice scar
 - **Timeline**
 - **24 hours** – PMNs appear
 - **72 hours** – Macrophages appear
 - **5-7 days** – Organization (forming granulation tissue) in full swing, angiogenesis, incision filled
 - **2 weeks** – Fibroblasts have made scar tissue
 - **Local Factors** – size, location, **stress/mobility, blood supply, foreign/necrotic material**, infection
 - **Systemic Factors** – malnutrition (protein lack), ascorbic acid deficiency (scurvy)
 - **Complications – Collagen, Fibroblasts, Neuroma**
 - **Deficient Collagen** – can lead to **excess granulation tissue, dehiscence, hernia**

- **Dehiscence** – previously closed wound re-opens; doesn't mean repair starts over at day 1 though
- **Hernia** – weakened areas without adequate collagen may herniated (bowel)
- **Scurvy** - Vit C deficiency - can't make collagen
- **Excessive Fibroblasts** – can lead to **intra-abdominal adhesions** (lung/pleura or epi/pericardium too)
- **“Proud flesh”** – granulation tissue expands beyond epithelium, necessitates surgical removal
- **Traumatic Neuroma** – collection of nerve buds forms, not ordered in lines like regular peripheral nerves
- **Excessive Collagen** – hypertrophic scar or **keloid** (huge collagen plates, not ordered in lines like scar)