MYCOTIC KNEE INFECTION IN AN INFANT

Taking a closer look at *Candida* arthritis and diagnostic markers in septic arthritis

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Disclosure

- I have no actual or potential conflict of interest in relation to this presentation
- I have no financial relationships to disclose

The Case

DR is a 5mo infant with complicated PMH including TOF + long NICU stay presenting to office with refusal to move her left leg

- No redness or warmth
- No swelling
- No fevers
- No change in activity
- Recent cath

- PMH
  - Term VSD 22yo G2P1, no preg complications
  - TOF with Pulmonary Atresia
  - NICU (4 months)
    - Central Shunt, PDA Ligation at 2 weeks
    - Complete Repair at 3.5 months
    - Prolonged ventilation, thrombosis of LFV-infrahepatic IVC, central line infection with Candidemia
  - Cath: Bilat fem vv occlusion, no visualized subhepatic IVC

The Case

- Medications
  - Aspirin 40.5mg qd
  - Ranitidine 20mg BID
- Vital Signs
  - HR: 151
  - R: 40
  - T: 36.9 °C
  - BP: 99/54
- Physical Exam - Pert
  - NAD, well-nourished
  - RRR, II/VI sys M + Soft early dia M, 2+ pulses, Cap refill <3 seconds
  - R leg normal
  - L knee difficult to straighten, crying with manipulation. L hip + foot normal. No erythema, no swelling.
  - L groin cath site well healed

The Case

- Labs

WBC	**12**
Hb	**10.8**
Plt	**640**
Gran	**51%**
Lym	**31%**
Mon	**13%**

ESR	**76**
CRP	**82**

WBC knee	**70,047/ mm^3**
Gran	**91%**
Lym	**8%**

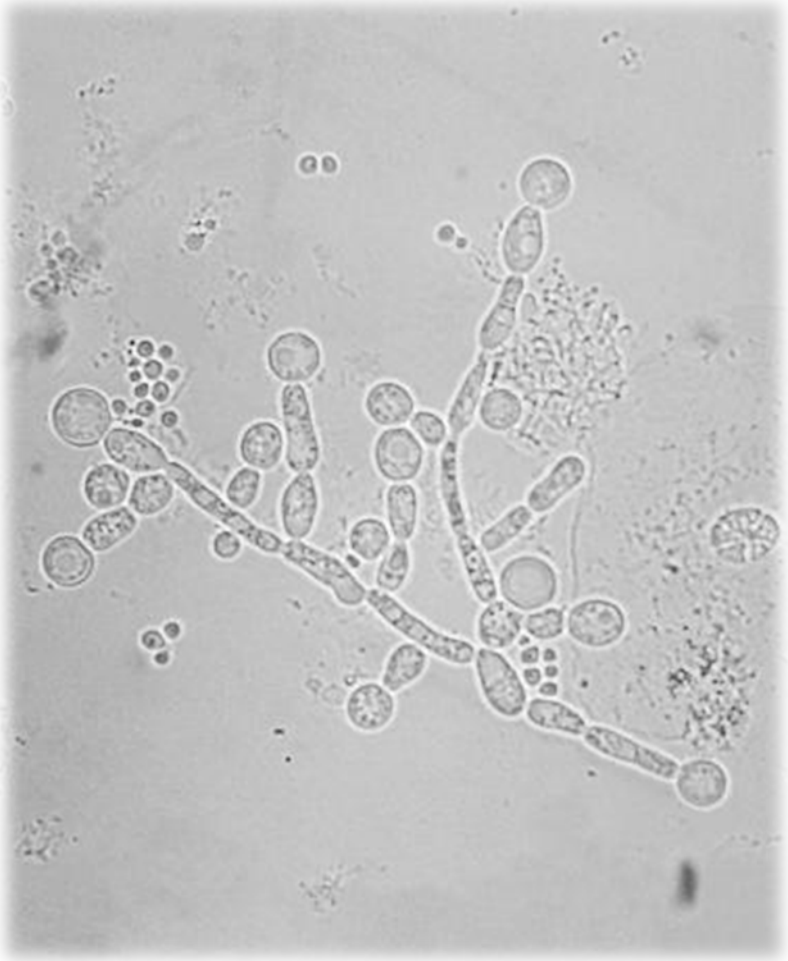
- Imaging
  - Ultrasound: Left hip unremarkable. Right hip unremarkable. Right knee unremarkable. Left knee complex suprapatellar joint effusion measuring 3.0 x 0.7 x 2.5 cm.

Hospital Course

- **Day 1:** Ceftriaxone + Vancomycin initially, with Linezolid and Cefdinir for a period of time when IV access was lost
- **Day 4:** Culture grew *Candida albicans*, discontinued antibiotics and started IV fluconazole
- **Day 7:** CRP continued to rise (144.1), fluconazole dc'd, started micafungin, restarted linezolid + ceftriaxone; repeat aspiration of knee (again grew Candida albicans)
- **Day 7-13:** Downtrend of CRP to 56.1
- **Day 13:** Discontinued linezolid + ceftriaxone; Micafungin continued for full 14 day course
- **Day 15:** CRP 8.7
- **Day 16:** Repeat aspiration of joint fluid – negative for any growth
- **Day 18:** Discharged home

Candidal Septic Arthritis

- 63% h/o candidemia
- Hematogenous (81%, children 90%) vs direct inoculation (19%)
- Usually monoarticular
- Knee > Hip > Shoulder
- 63% *Candida albicans*
- Only 13% had fever
- Among children, 70% were neonates or infants



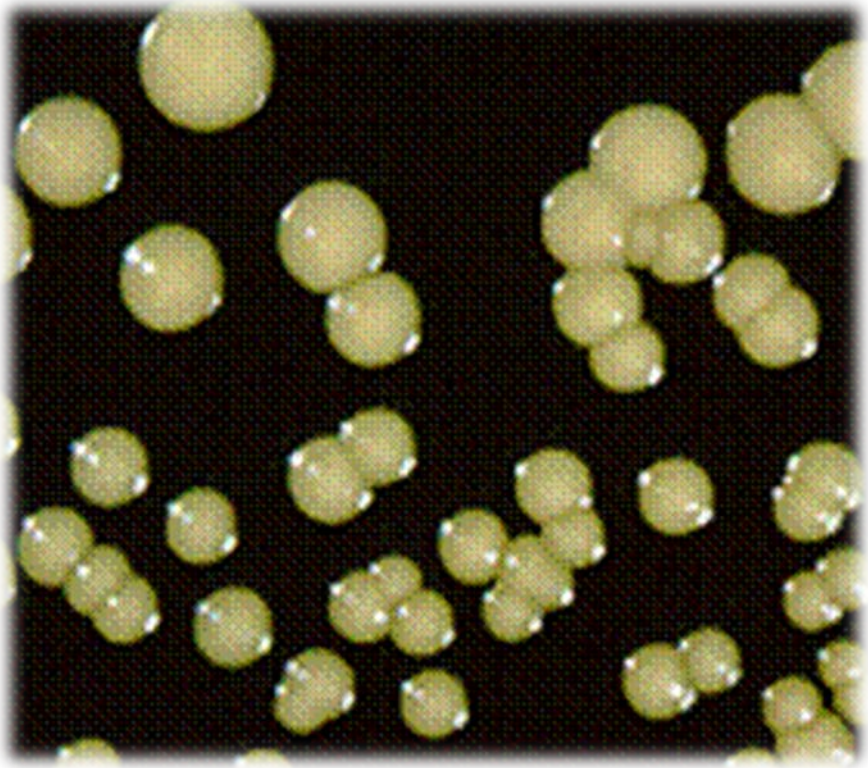
CDC/Brinkman 1963

IDSA Candida Guidelines

- 1. Fluconazole daily for 6 weeks OR echinocandin for 2 weeks followed by fluconazole for at least 4 weeks
- 2. Lipid formulation AmB followed by fluconazole is a less desirable, but acceptable alternative
- 3. Surgical drainage is indicated in all cases of septic arthritis

When to consider Candida?

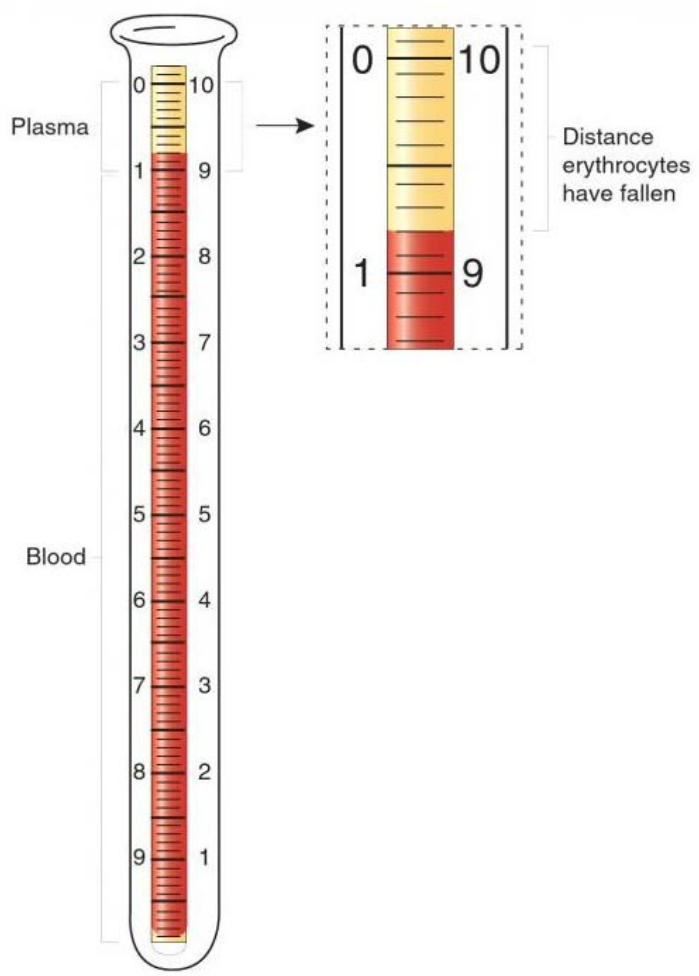
- History of Candidemia
- Patient with underlying immunosupression, or recent neutropenia
- Presence of central venous catheters
- Lack of favorable response to treatment with antibiotics



http://www.life-worldwide.org/fungal-diseases/candida-albicans

ESR – Erythrocyte Sedimentation Rate

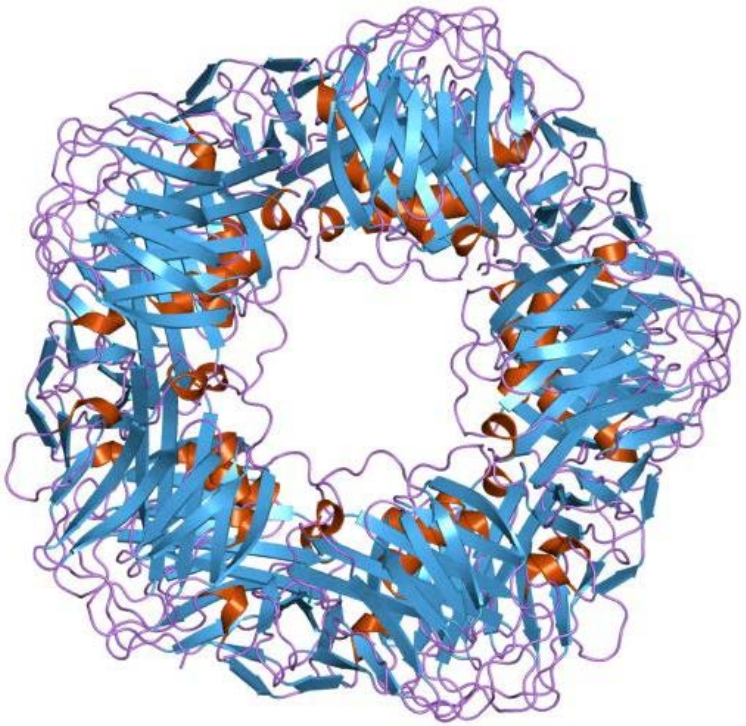
- Rate of fall of erythrocytes, mm/hr
- Inflammation = lower electrostatic charge on RBC surface
- Part of Kocher criteria
- Better for diagnosis than for trending
- Moderately elevated in Candidal septic arthritis



http://laboratoryinfo.com/esr/

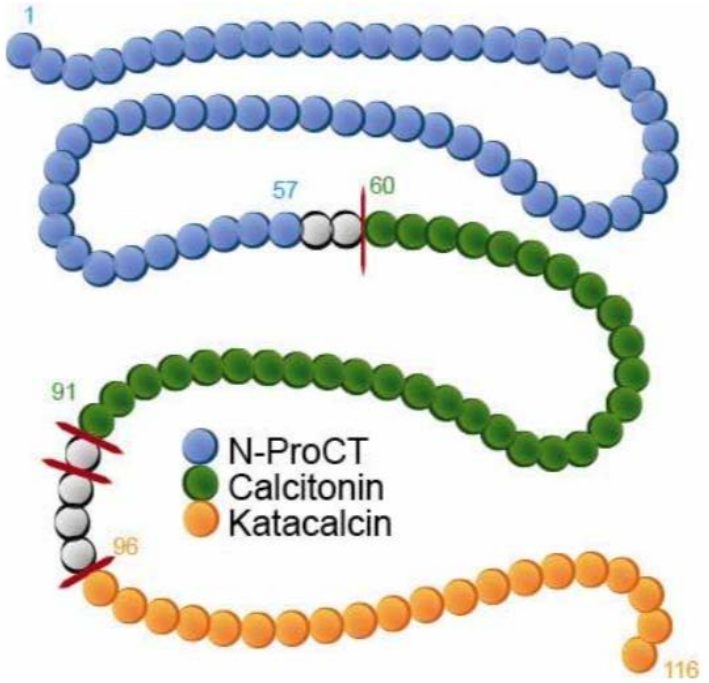
CRP – C-Reactive Protein

- Binds to “C” polysaccharide
- Synthesized by hepatocytes
- Peaks 2-3 days, half-life 19 hours
- Marked increase >10mg/dL, most studies >20mg/dL
- Use to ensure adequacy of therapy, and transition to oral therapy



Procalcitonin

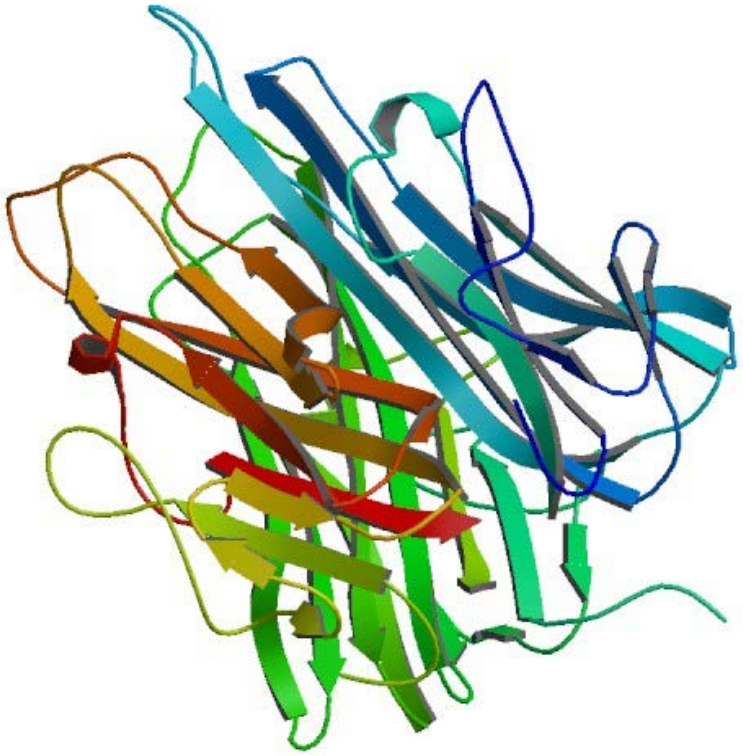
- Detectable within 4 hours, half-life 22 to 29 hours
- In general, only increases in presence of bacterial infections
- Fungal infections? Arthritis?
- Significant potential as a biomarker



https://www.aacc.org/

Novel Inflammatory Markers

- Leukocyte esterase via urine dipstick
- PCT in synovial fluid
- TNF-α
- IL-6
- CD-64



TNF-α

http://www.rcsb.org/pdb/explore/explore.do?structureId=1TNF

CONCLUSIONS

- Baby DR fully recovered
- Likely an exciting future for biomarkers
- New IDSA guidelines Spring 2017

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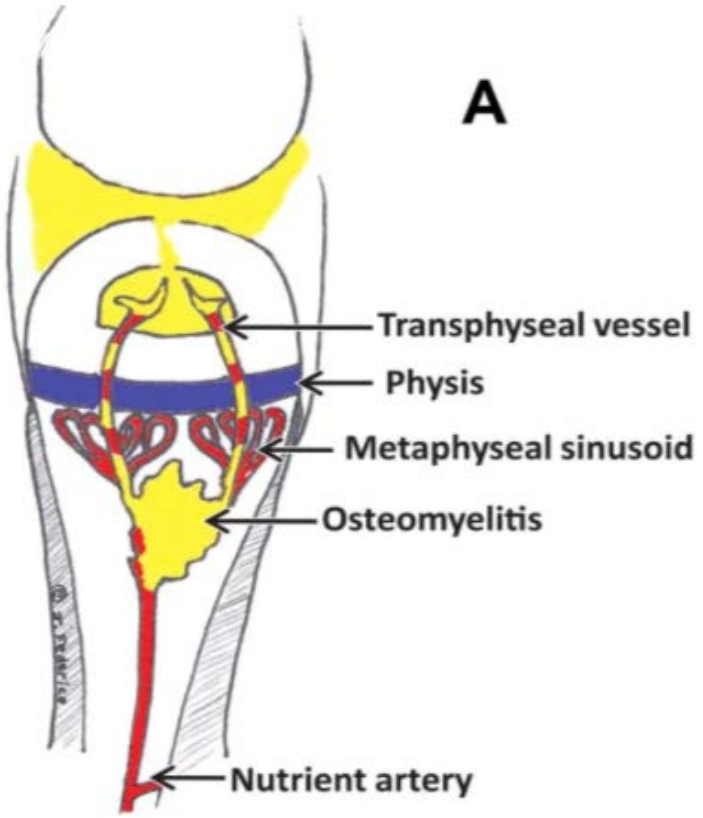
Neonates and Infants

- <18moa Transphyseal vessels – increased risk of mixed septic arthritis + osteomyelitis
- Reduced rate of blood flow – more susceptible to seeding
- Thinner periosteum



http://elearning.sumdu.edu.ua/free_content/

ESR and CRP

- Both very sensitive, especially when used together
- ESR = Diagnosis
- CRP = Diagnosis + Trending during treatment
- Neither is very specific
- Negative predictor > Positive predictor
- Candidal arthritis: Both are moderately elevated