DIAGNOSTIC TEST I

Septic Arthritis

Objectives:

1. To enhance skills in assessing studies of diagnostic test performance for validity.
2. To learn to apply the results of a study of diagnostic test performance to clinical decision making:
   - Calculating a series of likelihood ratios directly from the data in a paper
   - Considering the importance of treatment thresholds in interpreting the results of a diagnostic test
3. To gain experience in utilizing likelihood ratios in relationship to treatment thresholds to decide whether a test will help you treat, understand or advise your patient.

Assignment:

1. Read the attached scenario.
2. Read the attached guidelines for reading articles concerning diagnostic tests.
3. Critically appraise the attached article using the accompanying worksheet.
4. Describe how you would deal with the consultant regarding the patient's management, taking into account your review of the article.

Clinical Scenario:

A 75-year old male presents with 2-days of excruciating left knee pain. His past medical history includes hypertension and GERD. He notes no history of prior knee injuries or surgeries. He has no history of crystalloid arthropathy or connective tissue disease. He leads an exceptionally active life style, playing tennis with his son-in-law twice per week year round. In fact, he is a retired professional tennis player and recently won his age-division's annual tournament at the local health club. Tylenol, his typical analgesic-of-choice, has been ineffective for his knee pain. He adamantly denies any injury to the knee playing tennis or otherwise. Although he has never been to an Emergency Department for anything, the pain was just too excruciating to wait for the appointment offered by his PCP in three weeks.

On physical exam you note, hypertension (190/110) and no fever (36.7° C), sinus rhythm, clear lungs, and a red, swollen left knee measuring about 1.5x the size of the asymptomatic right knee. He has moderate pain with passive range-of-motion and you suspect a suprapatellar and infrapatellar effusion. His ligaments appear stable on a limited exam (due to pain) compared with the right side.

Your local Orthopedic surgeon happens to be in the department evaluating another patient so you curbside her about the knee pain. While discussing the differential diagnosis of an acutely erythematous, swollen, painful single joint with your consultant you wonder what the diagnostic utility of various laboratory tests are in distinguishing septic arthritis from crystalloid or non-crystalloid/non-septic arthropathy. Your Orthopedic consultant insists

upon an array of inflammatory markers before she will be able to make any decisions about the merits of an arthrocentesis and/or operative evaluation. You therefore devise the following PICO question.

PICO Question:

Population: ED patients presenting suspected septic arthritis
Intervention: Diagnostic testing with serum WBC, synovial WBC/gram stain/crystal analysis
Comparison: Clinical gestalt alone without ancillary testing **Outcome:** Diagnostic accuracy, morbidity, mortality of delayed/missed diagnosis, false-positive rates and related sequelae.

Search strategy:

Using PUBMED Clinical Queries you perform the following search: ("infectious arthritis"[Text Word] OR "arthritis, infectious"[MeSH Terms] OR septic arthritis[Text Word]) AND specificity[Title/Abstract]) you locate seven recent reviews on this topic. Reviewing the references for each of these reviews, you note additional primary studies addressing this question and pull one.

Citations:

1. Guyatt G, Rennie D, Meade MO, Cook DJ Editors, The Users' Guides to the Medical Literature, A Manual for Evidence-Based Clinical Practice. 3rd Edition. McGraw-Hill 2015, Chapter 18. (pp 345-357)
2. Newman TB, Kohn MA; Evidence-Based Diagnosis, Cambridge Medicine 2009, Chapter 12 Challenges for evidence-based diagnosis (pp 239-253).
3. Shah K, Spear J, Nathanson LA, et al; Does the presence of crystal arthritis rule out septic arthritis? J Emerg Med 2007;32:23-26.
4. Söderquist B, Jones I, Fredlund H, et al; Bacterial or crystal-associated arthritis? Discriminating ability of serum inflammatory markers, Scand J Infect Dis 1998; 30: 591-596.
5. Li SF, Chang C, Gharib S, et al; Diagnostic utility of laboratory tests in septic arthritis, Emerg Med J 2007;24:75-77.
6. Margaretten ME, Kohlwes J, Moore D, et al; Does this adult patient have septic arthritis? JAMA 2007;297:1478-1488.
7. Worksheet for the evaluation of an article on diagnosis test performance.