OFFICE EVALUATION OF THE POTENTIAL RHEUMATOLOGICAL PATIENT

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The purpose of this paper is to offer some guidelines for the office evaluation of the patient who presents with a musculoskeletal complaint and in which you doubt that his or her complaint is all mechanically induced. There may be a possibility of a potentially progressive underlying disease for which local intervention may be inappropriate until the underlying process is identified and better controlled.

In all of our practices it is easy to lose sight of fields of expertise in other areas and assume that everything is as it seems. What makes the evaluation more difficult is that it is not unreasonable to believe that the patient or referring individual is sophisticated enough to have made the correct decisions and, in fact, the patient *is* in the right office. However, just as one would not want to misdiagnose the tachycardia of hyperthyroidism for the tachycardia of anxiety, or the nausea and vomiting of an obstructed bowel for the nausea and vomiting of pregnancy; neither would one want to misdiagnose rheumatoid arthritis for a bunion and the wrong pair of shoes.

Correcting the bunion deformity of the rheumatoid patient without taking the whole potentially progressive disease with its overall dynamics into consideration could be a mistake. This would leave one's technically expert procedure open to possible failure and a subsequently more difficult procedure (in a patient who now may be less likely satisfied) in the future.

Bearing that somewhat dismal introduction in mind, a review of the most commonly presenting podiatric-rheumatological diseases/conditions is in order. While this list is neither complete nor exhaustive, these are the conditions most likely to cause common concern:

1. Septic arthritis
2. Acute gouty arthritis
3. Chronic gouty arthritis
4. Rheumatoid arthritis (RA)
5. Seronegative spondyloarthropathies
6. Juvenile rheumatoid arthritis (JRA)
7. Osteoarthritis (OA)
8. Neuropathic arthropathy
9. Lupus arthritis (SLE arthritis)
10. Pseudogout

Other conditions that are less likely to present in either of our offices, but certainly of no less consequence if they do, might include the following:

1. Hydroxyapatite crystal deposit disease
2. Hemochromatosis
3. Lyme arthritis (at least in Georgia)
4. Leukemia and lymphoma
5. Hyperparathyroidism
6. Hypertrophic pulmonary osteoarthropathy
7. Sarcoidosis
8. Scleroderma
9. Raynaud's disease/phenomenon
10. Pigmented villonodular synovitis
11. Behcet's Disease

This whole topic needs to be approached from the standpoint of the tools most likely to be available to you when a patient presents with a possible underlying systemic process. These are:

1. Your ears
   -Listen closely; the patient will often provide the answers even without your asking
2. Your mouth
   -ask the "right" questions
3. Your eyes
   -look for clues to other problems
4. Your hands
   -certain problems "feel" differently than do others
5. Clinical laboratory findings
   -blood
   -urine
   -synovial fluid
6. Synovial fluid
   -appearance grossly and microscopically, etc.
7. Radiologic studies
   -x-ray and other modalities

This could be broken down more simply so as to avoid the need for extensive and expensive studies in patients who might be more appropriately referred early. For example, it would not be reasonable to expect the surgeon to be familiar with the proper antibody studies, the proper complement studies or the appropriate scans for systemic rheumatologic diseases: but it would be reasonable to expect a certain index of suspicion in any

patient who presents with any symptom.

The *history* should include the following:

1. Onset
   A. Gradual as may be found with osteoarthritis or a neuropathic joint
   B. Subacute or acute as may occur in rheumatoid arthritis
   C. Explosive as may occur in gout
   D. Other
2. Progression
   A. Slow as is frequent with OA or neuropathic joints, often over years
   B. Intermittent as may be found with the explosions of gout or the flares of juvenile rheumatoid or the seronegative spondyloarthropathies
   C. Intermittent but yet overall progressive as may be seen with RA or chronic gouty arthritis
   D. Progressive in a subacute manner as is not infrequently seen in RA or in the relentless manner of untreated sepsis
   E. Other combinations
3. Symptoms
   A. Pain as one would expect with acute gouty arthritis, septic arthritis, pseudogout, etc.
   B. Swelling as may be found without too much pain in a neuropathic joint
   C. Stiffness as is oftentimes the initial complaint of those with RA, JRA, seronegative spondyloarthropathies, lupus arthritis, etc.
   D. Any and all combinations
4. Timing
   A. Morning is most often the time for severest stiffness in RA, JRA, lupus arthritis, etc.
   B. Late afternoon and evening are often worse for osteoarthritis, neuropathic joints, etc.
   C. Anytime and without pattern may be the case with sepsis, pseudogout, and gout. But even the latter is more predictably found in the first two or three days after surgery or the first day or two after an eating or alcoholic "binge" in the susceptible individual
5. Distribution
   A. Monoarticular disease is seen usually with acute gouty arthritis, septic arthritis, pseudogout and occasionally most of the others
   B. Monoarticular or pauciarticular findings as is frequent with JRA, neuropathic joints, osteo arthritis, the seronegative spondyloarthropathies and also possibly, but less frequently, the others
   C. Polyarticular involvement is more classical of RA, lupus arthritis, some of the seronegative spondyloarthropathies, chronic gouty arthritis, etc.
   D. Axial findings and symptoms are more frequently associated with the non-systemically involved conditions such as OA with the not uncommon exception of the seronegative spondyloarthropathies
   E. Peripheral involvement is, however, the hallmark of such systemic inflammatory diseases as RA, JRA, SLE arthritis, etc.; but is also found with such metabolic conditions as gout (acute or chronic) or pseudogout, and with degenerative diseases such as OA as well as inflammatory diseases such as the seronegative spondyloarthropathies
   F. Symmetry (or the lack thereof) is important in the polyarticular or pauciarticular conditions with diseases such as RA, chronic gouty arthritis, and lupus arthritis usually being symmetrical, while JRA and the seronegative spondyloarthropathies are not uncommonly asymmetrical.

The physical examination, even a cursory one, is no less important though it is not likely to be as revealing as the history. Things that are most closely sought on superficial examination should include:

1. Swelling
   (using your hands or how things "feel")
   A. Bony overgrowth as is common in OA and neuropathic arthritis
   B. Synovitis as is common in RA, JRA, lupus arthritis, pseudogout and acute gouty arthritis
   C. Effusion alone as may occur with septic arthritis, pseudogout, and acute gouty arthritis
   D. Combination of any of the above can occur as well
2. Distribution
   (observation of what was outlined above in the review of the patient's history)
3. Symptoms
   (are the patient's complaints consistent with your findings or out of proportion one to the other in either direction?)
4. Other Areas
   A. Skin findings may be important in lupus (rash), RA (subcutaneous nodules), gout (tophi, xanthomata), JRA (rash), seronegative spondyloarthropathies (psoriasis of psoriatic arthritis, erythema nodosum or pyoderma gangrenosum of arthritis of inflammatory bowel disease and keratodermia blennor-

rhagicum of Reiter's Syndrome to name those that do not require the patient to disrobe)

B. Eyes should be grossly examined for many inflammatory findings (iritis, iridocyclitis, uveitis, conjunctivitis, keratitis, scleritis, episcleritis) that can be found in a multitude of diseases (RA, JRA, and seronegative spondyloarthropathies from our list); though it is emphasized that it is certainly not expected that one who does not specialize in diseases of the eye should be able to specifically differentiate the various eye manifestations.

C. Mucus membrane involvement (most frequently ulcerations) are found occasionally in JRA, SLE, seronegative spondyloarthropathies, RA and others.

Once the history and physical examination are complete, one can delve into other clues as to the appropriateness of that patient's presence in your office. Evaluation of the *synovial fluid* (joint fluid) is best divided into three sections as follows:

1. Bedside Evaluation/Gross Appearance
   A. *Clear* as is common with OA, neuropathic joints, etc.
   B. *Mild to moderately cloudy* as may be seen in RA, JRA, gout, (acute or chronic), seronegative spondyloarthropathies, lupus, pseudogout, etc.
   C. *Very cloudy* as is classical for sepsis but may also be seen with acute gouty arthritis or RA or any of the other systemic inflammatory diseases less frequently
   D. *Bloody* as may be noted in trauma, bleeding disorders, tumors, pigmented villonodular synovitis, etc.
   E. *Large solid bits* can be seen with the degenerative calcium "shavings" of OA or pseudogout and "rice bodies" as are not uncommonly seen in RA and are probably from infarcted synovial tissue
   F. *Mucin clot* (1% acetic acid added to the joint fluid and shaken) can vary anywhere from a firm clot (normal) to a ropey mass to a friable mass to multiple flecks (each of which represents a greater level of inflammation)
   G. *String sign* ranges from a long sticky string (normal) to the extremely poor string or watery consistency of markedly inflammatory fluid

2. Microscopy
   A. *Crystals* under compensated polarizing light microscopy are found in gout and pseudogout
   B. *Bacteria* should be sought after Gram's stain

3. Laboratory
   A. *White blood cell* (WBC) counts will help quantitate what was noted grossly by observation of the cloudiness of the fluid at the bedside and the type of WBC's may also add some information [all standard texts discuss approximate numbers of white cells found in synovial fluid in various conditions and so will not be discussed here]
   B. *Glucose* is normally slightly lower than concomitant serum glucose, and grossly lower numbers should suggest sepsis or severely active RA
   C. *Protein* is mainly albumin and is increased with almost all type of inflammation
   D. *Culture* for at least "routine" organisms should be done on almost every fluid obtained where there is even a remote chance of infection
   E. Special cultures may be necessary in certain circumstances (e.g., TB, fungal, etc.)
   F. Serological studies are usually not useful and are probably not a valuable screening tool at all (e.g., VDRL, ANA, RF, complement studies, etc.) and if it is felt they are needed, the patient should probably be referred.

Although it is the author's opinion that the greatest bulk of the information necessary to decide whether the patient needs referral comes from the history and physical examination, the laboratory can provide valuable information as well. This section discusses what we feel is far and away the most important blood and urine screening studies followed by those that are less important (and why) and finally by those of least importance.

I. Most Important (for screening)
   A. CBC with differential and platelet count
      1. High WBC especially in septic arthritis
      2. Normal WBC in most conditions
      3. Low WBC especially in SLE but occasionally in RA
      4. Anemia of the normochromic normocytic variety in most chronic inflammatory diseases (RA, SLE, JRA, seronegative spondyloarthropathies, etc.)
      5. Low platelet count, especially in SLE but possibly in RA as well

   B. Urinalysis with microscopic examination
      1. Proteinuria may be found in any of the inflammatory diseases but especially in SLE
      2. Glycosuria in diabetes may be a clue to a neuropathic joint
      3. Pyuria and/or bacteriuria can help localize a source of infection
      4. Hematuria may be found in SLE and other less common inflammatory diseases (Goodpasture's Syndrome, Wegener's Granulomatosis, etc.)

5. Urinary casts may be a clue to more serious renal involvement of any of the inflammatory diseases, but especially SLE and other vasculitides

C. Biochemical profile
   1. Glucose - elevated in diabetes (neuropathic)
   2. BUN - elevated in renal dysfunction of inflammatory disease (SLE)
   3. Creatinine - elevated in renal dysfunction of inflammatory disease (SLE)
   4. Calcium - elevated in hyperparathyroidism
   5. Albumin - low in chronic disease (RA, SLE, etc.)
   6. Globulin - high in chronic disease (RA, SLE, etc.)
   7. Uric acid - high in gout
   8. Cholesterol - elevated not infrequently in gout and low in active inflammatory diseases (RA, SLE, etc.)
   9. Triglyceride - elevated not infrequently in gout and low in active inflammatory diseases (RA, SLE, etc.)
   10. CO_2 - low in acidosis of diabetes
   11. SGOT - elevated in viral arthritides, especially hepatitis and mono
   12. SGPT - elevated in viral arthritides, especially hepatitis and mono
   13. Bilirubin - elevated in hepatitis and hemolysis (SLE)

D. Westergren Erythrocyte Sedimentation Rate (ESR) is only of value if it is performed within a few hours after the blood is drawn; results are never diagnostic of anything

II. Less Important (for screening)

A. Rheumatoid Factor (RF) - since there are various ways of running the test (Waaler-Rose, latex, bentonite) with varying degrees of sensitivity and specificity and many false positives and negatives, the main value as a screen comes in its relative economy and availability

B. Anti-Nuclear Antibody (ANA) - this test has even more ways of being run than the RF and with even a greater range of specificity and sensitivity and false positives and negatives, it is open to even more interpretation and greater error; however, ease of obtaining it and relative economy are strong reasons to consider it when screening patients

C. Venereal Disease Research Laboratory (VDRL) - a true positive in syphilis (neuropathic joint) and a false positive in SLE are the main reasons to obtain this quite inexpensive and readily available test

III. Least Important (for screening)

A. ANA Subsets (AntiDNA Ab, RNP, Sm, SS-A, SS-B, anticentromere Ab, PM-1, Scl-70, and many others)

B. Complement studies (C3, C4, CH50, etc.)

C. 24 Hour Urine Studies (creatinine clearance, protein, uric acid)

D. HLA-B27 (fraught with interpretation problems depending upon symptoms, race, clinical findings, family concerns, etc.)

Finally, a discussion of radiologic modalities is in order when screening for systemic rheumatologic disease. While these modalities may range from plain x-rays to bone scans to computed tomography (CT) scans to magnetic resonance imaging (MRI) scans to arthrography, it is the plain film that is really the screening procedure and a discussion of the others will not be undertaken at this time.

The general plea from the rheumatologist will simply be for paired films. If you know the patient is going to be referred, it is probably best to obtain no films and leave specifics to the referral doctor. But, if you are using the films to decide whether to refer, then it is best to obtain bilateral films. Most systemic diseases will have diffuse manifestations and it is not unlikely that similar abnormalities will be noted on the contralateral unaffected or asymptomatic side. This is oftentimes true for RA, gout (even though symptoms are frequently unilateral), neuropathic disease, pseudogout (again frequently associated with unilateral symptoms), seronegative spondyloarthropathies, osteoarthritis and others. It is the case for cysts, erosions, osteophytes, periosteal elevation and so forth. The presence of such bilateral abnormalities, even in the absence of symptoms, is cause to at least suspect systemic involvement.

Further, obtaining paired films also helps one decide whether a particular symptom may be related to a particular radiological finding. For example, it is difficult to totally ascribe a particular complaint to a specific deformity or spur when an equivalent or even worse contralateral deformity or spur is noted on the paired film. The practical implication of this has been noted by any of us who has seen a technically excellent surgical procedure with a cosmetically successful result in a patient that then has the same symptoms afterwards as he or she did before the procedure. Neither the patient nor the doctor is pleased in that instance.

While you may not feel comfortable obtaining films of other parts of the body than lower extremity, a quick review of the films more likely to be helpful in the most frequently encountered conditions follows:

1. Septic arthritis - the contralateral joint should be normal
2. Acute gouty arthritis - foot films may be normal or may show symmetrical or asymmetrical cysts or tophi
3. Chronic gouty arthritis - foot films frequently show bilateral (though not necessarily symmetrical) cysts or erosions
4. Rheumatoid arthritis - hand films that include the wrists and taken in dorsal/palmar projection (laterals rarely add anything) are most likely to show the periarticular osteoporotic or cystic or erosive changes that are most often symmetrical
5. Seronegative spondyloarthropathies - lateral heel films looking for the unusual spurs, and sacroiliac films looking for symmetrical (ankylosing spondylitis and arthritis of inflammatory bowel disease) or asymmetrical (Reiter's syndrome and psoriatic arthritis) sacroiliitis are overall most helpful; hand or foot films in the dorsal/ventral projection may be best in psoriatic arthritis where bilateral but asymmetrical findings are common
6. Juvenile rheumatoid arthritis - the affected area is the best to x-ray; this may be hands in the polyarticular variety, knees in the pauciarticular variety, or anywhere in the systemic onset variety (Still's Disease)
7. Osteoarthritis - the affected joint(s)
8. Neuropathic arthritis - the affected joints are usually weight-bearing lower extremity joints, especially knees, ankles, and/or tarsi
9. Lupus arthritis - x-rays are rarely helpful; though periarticular osteoporosis may be noted, cystic or erosive disease is unusual and even then is frequently a late finding
10. Pseudogout - knee and/or wrist x-rays are most likely to show the changes of chondrocalcinosis, which is the most frequent radiologic change seen in association with pseudogout

Hopefully this has provided an overview of one suggested way of screening patients with musculoskeletal complaints for evidence of underlying etiology or systemic involvement. It is basically outlined as follows:

1. Listen to the patient, take a good history.
2. Examine the patient, know what to look for.
3. Blood and urine studies
   A. CBC with differential
   B. Urinalysis with microscopic exam
   C. Biochemical profile of some sort (SMA-22, SMA-18, etc.)
   D. Westergren Sedimentation Rate (Don't bother if it is not Westergren or cannot be run shortly after drawing)
   E. Other less likely to be helpful but yet readily available and relatively inexpensive studies outlined above
4. Synovial fluid
   A. Look at it grossly, it only takes a second
   B. Look at it microscopically, it only takes a drop
   C. Send it to the lab for studies in the following order of importance:
      1) routine culture
      2) WBC and differential
      3) glucose
      4) protein
5. X-rays of paired joints even if symptoms are unilateral (you may not need all projections for the unaffected side and the anteroposterior view will usually suffice)

When all else fails, have a good working relationship with a rheumatologist. A simple telephone conversation between professionals is oftentimes the best, least expensive, and most productive way to gain information, save time, and more easily decide how to screen, when and whether to refer, and how to give your patient the best care at the most economical price.

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