Septic until proven otherwise

Approach to and treatment of the septic joint in adult patients

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A 50-year-old man with a history of gout presents to your clinic complaining of a flare-up of his arthritis. He describes a 2-day history of pain, redness, and swelling of his right knee. He is unable to bear weight on the affected side. He denies trauma, surgery, or a history of puncture to the joint. He has not traveled and has no other systemic symptoms.

On physical examination, the patient walks with an antalgic gait. He is febrile (38.5°C) and has a pulse of 90 beats/min. His other vital signs are normal. His right knee is warm to the touch, erythematous, swollen, and tender to palpation. There is a markedly decreased range of motion of the joint. Results of the remainder of his physical examination are normal.

He is requesting a stronger arthritis medication. What is your prescription for this patient?

Acute monoarthritis is the presenting complaint for a variety of disorders that range from benign to life threatening. Bacterial arthritis is the most potentially dangerous and destructive form of acute monoarthritis and can result in cartilage destruction, septicemia, and death within a few days if unrecognized. Therefore, acute monoarticular arthritis should be considered infectious until proven otherwise.

Septic arthritis

Septic arthritis is defined as bacterial invasion of the synovial space. There are several routes by which this can occur. The most common causes are hematologic spread or direct invasion. The knee is the most commonly affected joint in adults, and the hip is the most frequently infected in children.[1] Once inside the joint, bacterial growth and invasion can occur essentially unchecked.

There has been little change in the pathogens causing septic arthritis over the past 20 years.[2] The top 3 pathogens cultured from adults remain *Staphylococcus aureus*, *Streptococcus pneumoniae*, and Gram-negative bacilli. Over the past 2 to 3 years, reports in the literature show an increased incidence of methicillin-resistant *S aureus* (MRSA) causing cellulitis. There is no clear consensus on whether or not MRSA is becoming an increasingly common cause of septic arthritis.

Neisseria gonorrhoeae is the most common cause of nontraumatic acute monoarthritis in young, sexually active people.[3] *Neisseria gonorrhoeae* grows very poorly in cultured joint fluid. Obtain cultures from the oral pharynx, anus, and vagina of high-risk individuals.

Diagnosis

You cannot reliably diagnose or exclude a septic joint on history alone; however, you can facilitate your diagnosis by ascertaining the patient's risk factors and determining the acuity of onset of symptoms, any associated trauma, associated systemic symptoms, recent surgery, and travel and sexual history.[3]

There are no specific physical findings that will enable you to make a definitive diagnosis. The classically taught symptoms of septic arthritis include fever, chills, and an acutely red, exquisitely tender, warm, swollen joint. However, these markers are not specific and cannot differentiate crystalline and infectious etiologies.[1] Fever has been found to be a poor indicator of septic arthritis. The literature reports only 50% of patients who present with septic joints have fevers.[1] The other frequently quoted diagnostic signs are decreased range of motion and severe pain with manual compression of the joint; however, well-designed studies have yet to show any correlation between these classically taught findings and the diagnosis of a septic joint.

There is no absolute white blood cell (WBC) count, erythrocyte sedimentation rate, or C-reactive protein value that is sensitive or specific enough to make the diagnosis of septic arthritis.[1] This is a particularly important point, as we are frequently asked by consultants to order these tests to exclude underlying infection. You must not rely on these tests alone to exclude the diagnosis of a septic joint. Radiographs of the affected joint are not routinely warranted in the workup of acute monoarthritis.

Arthrocentesis and synovial fluid analysis

The definition of an infected joint remains a positive bacterial culture test result arising from synovial fluid analysis; therefore, the most important laboratory test in the evaluation of monoarticular joint pain is the synovial fluid analysis.[4]

Arthrocentesis involves procuring synovial fluid from an inflamed joint. The joint line is identified, the skin cleansed, and, under sterile conditions, a needle inserted into the joint space. The aspirated fluid should then be sent for WBC count as well as differential, crystal analysis, Gram stain, and culture. There are no absolute contraindications to arthrocentesis, but relative contraindications include overlying cellulitis and a patient with a prosthetic joint.[1] When faced with one of these conditions it is best to discuss the case with your consultant.

Analysis of the synovial fluid is interpreted based on the gross appearance, colour, viscosity, WBC count, and Gram stain results. Traditionally, the cutoff value for synovial WBC count for diagnosis of septic arthritis has been greater than 50 000/mm^3; however, lower WBC counts can occur early in infectious arthritis or in partially treated infections.[5] High WBC counts can occur in rheumatoid arthritis, gout, and pseudogout. Therefore, cell count should not be used to rule out a septic etiology.

Other markers that are frequently discussed in synovial fluid analysis are decreased glucose and increased synovial protein; however, the discriminating abilities of these tests are very poor and they are no longer routinely recommended in the workup of a septic joint.[6]

Recommendations

The goal of treatment is to rapidly eradicate the infection and protect the joint. It is universally accepted that antibiotics should be promptly administered once the diagnosis is strongly suspected. The currently recommended choice of antibiotics is a third-generation cephalosporin or vancomycin if MRSA is a concern.[7] For patients who are allergic to cephalosporins, a fluoroquinolone, such as levofloxacin or ciprofloxacin, is suggested.[7]

The literature is unclear as to how long intravenous antibiotics should be continued. Most protocols recommend an intravenous course of 2 to 4 weeks' duration followed by an additional 2 to 6 weeks of oral antibiotics.

Septic arthritis is an orthopedic emergency. There continues to be controversy regarding medical versus surgical joint decompression. Medical management consists of needle aspiration of the joint. If pus reaccumulates, repeat aspiration is performed. Surgical drainage is accomplished by arthrotomy or arthroscopy and the possible placement of tubes to drain the joint. No randomized controlled studies have evaluated joint drainage procedures compared with no-drainage procedures.

Conclusion

Mortality from septic arthritis is reported to be between 8% and 15%.[1] Unfortunately, this has not changed dramatically despite the advent of intravenous antibiotics. The patient's outcome depends on a host of factors, such as previous joint damage, the virulence of the infecting organism, and the speed with which adequate treatment is begun.

This patient must be considered to have septic arthritis until proven otherwise. It is critical to promptly diagnose and treat the joint infection, which has a potentially devastating course. As laboratory tests are neither sensitive nor specific in diagnosing or excluding septic arthritis, arthrocentesis and synovial fluid analysis are mandatory. Give the patient broad-spectrum antibiotics immediately and consult an orthopedic surgeon.

BOTTOM LINE

- Bacterial arthritis is the most dangerous form of acute monoarthritis; it can result in cartilage destruction, septicemia, and death within a few days if unrecognized. Prompt diagnosis and treatment are critical.
- Laboratory tests are neither sensitive nor specific in diagnosing or excluding septic arthritis. Arthrocentesis and synovial fluid analysis are mandatory for this differential.
- Immediately give broad-spectrum antibiotics to at-risk patients and consult an orthopedic surgeon.

POINTS SAILLANTS

- L'arthrite bactérienne est la forme la plus dangereuse de la mono-arthrite aiguë; elle peut causer la destruction du cartilage, une septicémie et la mort en quelques jours seulement si elle n'est pas reconnue. Il est essentiel de poser un diagnostic et d'administrer un traitement sans délai.
- Les analyses de laboratoire ne sont ni sensibles ni spécifiques pour poser ou écarter un diagnostic d'arthrite septique. Il est obligatoire de procéder à une arthrocentèse et à une analyse du liquide synovial pour le diagnostic différentiel.
- Il faut administrer immédiatement un antibiotique à large spectre aux patients à risque et consulter un chirurgien orthopédique.

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Competing interests
None declared

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