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Shoulder Septic Arthritis

Abstract

Background: Septic arthritis is an emergency in orthopedics. Several mechanisms have been described: hematogenous spread, extension from an adjacent focus and direct inoculation, being the first one the most frequent mechanism.
If not handled properly neither early, what can lead to the destruction of the articular cartilage and the production of sequelae. In an incipient case, good results can be got with conservative treatment, but usually surgical management is necessary for the resolution of the process.

Material and Methods: We present a case of a 5 year old child who suffered an episode of arthritis after the administration of vaccine against serogroup B Neisseria Meningitidis. Symptoms began 2 hours after vaccination with pain and fever of up to 39ºC. At this moment, arthrocentesis was performed and intravenous antimicrobial therapy was initiated.

Results: The evolution was favorable with no need of surgical treatment. Symptoms continued going down after the management with arthrocentesis and intravenous antibiotic treatment, until disappearing completely in a few days. During the follow-up, no signs of recurrence have appeared after 12 months.

Conclusions: despite the fact that the hematogenous spread is the most frequent mechanism of establishment of arthritis septic, direct inoculation can justify a case of arthritis after vaccination in the deltoid region. We must be careful during vaccination with bacteria toxoids in the deltoid region, due to the risk of reactive arthritis and its differential diagnosis with septic arthritis. More studies are needed to clarify the diagnoses in the borderline cases, being molecular biology techniques as protein chain reaction a fast and useful tool.

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Introduction

Septic arthritis (SA) is a joint inflammation caused by microorganisms that leads to the destruction of the articular cartilage. It appears preferably in neonates and children between the ages of 2 and 3 years [1,5,10], and even though it can affect every joint, the most common are the hip [1,2,4,5] , the knee and elbow [2] .Bacteria can penetrate to the joint for one of the three tracks: hematogenous, direct extension from an adjacent focus as a osteomyelitis and by direct inoculation of pathogens.

The causative microorganism tend to be Staphylococcus aureus [1,2,12,14] , Streptococcus haemolyticus, Haemophilus influenzae, pneumococcus and gonococcus. In recent years there has been an increase of Candida albicans due to prolonged intravenous catheterization in infants in critical condition [1] . In underdeveloped countries, it is frequently isolated non-typhoidal Salmonella, even being the most common pathogen in some regions [6] . In children older than 3 years, the germs are similar to adults: S. aureus, Streptococcus and N.gonorrheae. There are between a 20% and a 40% of septic arthritis in which the micro-organism is unknown.

Regarding to the pathology, the synovial membrane becomes swollen, edematous and hyperemic, and increases the volume of synovial fluid which distends the joint. This may be fluid and cloudy and contain polymorphonuclear leukocytes. In addition, decreases the glucose content of the synovial fluid and increases the proteins. Bacteria can be identified in the joint through the implementation of smears and Gram staining. The persistence of the infection may accumulate pus in the articular cavity quickly and produce destructive changes in the hyaline cartilage of the joint. In addition, the infection can spread the underlying bone, causing an osteomyelitis

The onset of symptoms is usually acute, posing as joint pain, limp in case of lower limb involvement, functional limitation and bad general condition. Irritability, lack of appetite and fever are frequent, although in neonates systemic symptoms may not appear. In the clinical exploration, the joint is distended and hot because of the joint effusion. The joint is presented in the position in which pressure is the less, generally with a certain degree of flexion at the hip, knee, ankle, elbow; but in the neutral position on the wrist, and in slight flexion and abduction in the shoulder.

To carry out the diagnosis, clinical suspicion is mandatory, and it must be supplemented with image tests. On plain x-ray we can observe indirect signs of intraarticular effusion, as distension of the joint capsule, explained by an increase of the synovial fluid, which will be displayed easily and measured with the ultrasonography. In certain cases it may also be useful scintigraphy with Tc99m, which will show increased uptake.

In the laboratory data are useful parameters of sepsis, the elevation of acute phase reactants in blood analysis (Complete Blood Count, C reactive Protein and Globular Sedimentation Velocity) and the analysis of joint fluid. The biochemistry will show data previously announced, and increased polymorphonuclear leukocytes. It is important to order cultures and Gram Stain, because it can guide the empirical treatment. The certainty diagnosis is given by the positivity of the crops but sometimes, it doesn't proliferate pathogenic microorganisms. In these cases, diagnosis is done indirectly with the results of microscopic examination of arthrocentesis, histological signs compatible with an acute inflammatory process, irritability and

effusion, increase of the local temperature, ultrasound or radiographic data compatible, systemic response, fever, elevated inflammatory parameters in the blood test, improvement of the symptoms and signs with empirical antibiotic therapy and surgical drainage, as well as the absence of other possible diagnoses.

To evacuate the bacterial products and the remains of the infectious material, surgical drainage of the joint must be done in almost all patients. Sometimes, however, the infection is diagnosed early and the micro-organism is very sensitive to treatment, and in these cases the improvement with conservative measures can be impressive with immediate pain relief, improvement of mobility, the normalization of the temperature and the disappearance of local symptoms of effusion and synovial thickening. In these cases there would be no need for surgical drainage [1] .

The synovial fluid culture remains the gold standard for diagnosis, but their results require time, so that the diagnosis in the emergency room, where normally are presented these cases, is based on the combination of clinical and laboratory parameters, being in many cases uncertain at the initial time.

Case Report

We present the case of a child of 5 year old without relevant clinical background, who went to the emergency department two days after having received the dose of vaccination against Neisseria meningitidis type B. Two hours after administration of the vaccine began with pain in the ipsilateral arm to the puncture site and fever of up to 39ºC the night of the event. In the first assessment, he received treatment with antihistamines (Hydroxyzine dihydrochloride) and antipyretics, without improvement of the symptomatology.

No other infection neither inflammation focus were detected in the general anamnesis and exploration. He only presented swelling of the shoulder and increment of the local temperature, with pain on passive abduction from 90º and the active abduction of 20º.

On the complementary tests, the results of ultrasonography showed abundant liquid (7.4cc intraarticular.) with increased echogenicity without evidence of cellulitis or abscess of the soft parts; on the analytical study, it highlights a CRP of 48 mg/L, procalcitonin (PCT) of 0.27 ng/mL, 14,200 leukocytes with a 78% of Neutrophils/µL and an erythrocyte sedimentation rate (ESR) of 44 mm/h. The joint fluid taken by arthrocentesis was eco-guided and a total of 4 cc. were obtained. It was cloudy, with a white blood cell count >150,000/µL and a 94% of neutrophils. Biochemistry, gram stain and culture were performed. Gram staining show leukocytes but not bacteria. The crops were negatives after four days.

During the period of hospitalization, treatment with cloxacillin iv was prescribed . After four days, objective clinical improvement was seen, and decrease of acute phase reactants were obtained, changing at this time to a vancomycin therapy.

One year after the episode, physical examination, laboratory and ultrasound images, were completely normal.

Discussion

Although the direct inoculation of the germ has been attributed classically to an invasive procedure that violate the joint, sometimes it can be produced by accidental injection of pathogens after a vaccination or by the invasion of a close infectious process as a cellulitis. It's difficult to differentiate between an inflammatory reactive arthritis and an incipient septic arthritis, but it's important because its influence in the initial treatment.

Due to relatively frequent septic arthritis with negative cultures (till 78% depending on the series [15]), there are authors who defend the use of polymerase chain reaction (PCR) in medical centers to improve the detection of bacteria in the joint fluid, [9] predominantly in those cases in which the criteria of septic arthritis is not met the strict. However, it is a method that requires of the aspiration of the fluid to be carried out and that it takes an average of 14 days [9] to obtain the result. The combination of blood culture joint fluid culture and PCR improves the rate of detection of microorganisms. Nevertheless the PCR provides additional information for the diagnosis confirmation and has a higher rate of detection of bacteria than joint fluid cultures, the delay of the results and the inability to provide sensitivity to antibiotics are factors that currently limit its clinical utility [9] .

With regard to the therapeutic management, the traditional treatment consists in a protracted course of intravenous antibiotics combined with aggressive debridement surgery. However, this approach is questioned by the tests that show satisfactory results with a shorter treatment and less invasive surgery.

We consider too dogmatic to assert that all septic arthritis should be dealt with by arthrotomy and cannot be treated with intravenous antibiotic therapy and washing with arthroscopy. Thus, arthrotomy allows full debridement with the elimination of remains and the rupture of the loculations, but carries the morbidity of an open surgery and general anesthesia.

An alternative to arthrotomy is the single joint aspiration, which carries a minimal morbidity and may not require general anesthesia in older children, but it can provide a less satisfactory drainage of the joint. The arthroscopic wash is another option with some potential advantages and is increasingly used, particularly in the knee [6] . The majority of authors argue that in the septic hip deep, difficult to aspire and in which the consequences of sepsis can be devastating, the arthrotomy and flushing is the best method of treatment. Many others, however, discuss the best way to drain the shoulder in children: while some recommend the aspiration of all the shoulders septic joints, others defend the realization of arthrotomy. Despite all of this, the role of the various therapies remains very discussed [7] .

If it seems clear that antibiotics should be administered parenterally initially and then orally by once the signs and symptoms of infection begin to be resolved [6] . The recommended duration of the antibacterial treatment varies from two weeks to more than three months, although the majority of the authors use a six week treatment[6] . Many authors argue that if the signs and symptoms subside in a few days, and the level of C-reactive protein in the serum drops below 20 mg/l, the antibiotic can usually be safely suspended [10].

Conclusion

The diagnosis of arthritis post-vaccination is an important diagnostic challenge due to its synovial inflammatory response. The relatively low specificity of indirect diagnosis methods worsens the therapeutic decision between an inflammatory arthritis and a septic arthritis. Cultures are considered the gold standard for its diagnosis, but it requires more time than we can wait before treating it. The use of molecular biology techniques such as PCR allows the diagnosis in a shorter time than cultures, being it very useful in the cases of arthritis post-vaccination with bacteria toxins.

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