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CASE REPORT

Reactive arthritis following tetanus vaccination: a case report

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Abstract We report a case of reactive arthritis following tetanus vaccination. A healthy 55-year-old woman presented with pain and acute swelling of the right knee two days after receiving a tetanus vaccination. Erythrocyte sedimentation rate and C-reactive protein were elevated. Rheumatoid factor and human leukocyte antigen B-27 were negative. Her arthritis improved with the administration of nonsteroidal anti-inflammatory drugs. One week later the knee swelling and pain had settled. Reactive arthritis may occur after tetanus vaccination.

Keywords Monoarthritis · Reactive arthritis · Tetanus vaccine

Introduction

Reactive arthritis (ReA) is a spondyloarthropathy that can develop after an infection. ReA is a disease that is characterized by inflammatory oligoarthritis, entheses and extra-articular manifestations. Human leukocyte antigen B-27 (HLA-B27) is positive in 70–90% of patients with ReA, but it can also occur in patients who are HLA-B27 negative [1–3]. ReA is diagnosed by anamnesis and physical examination. The prognosis is generally good, but recurrences are frequent [1]. The first-choice treatment is nonsteroidal anti-inflammatory drugs (NSAIDs) [1]. Cases of ReA following immunization against influenza, tetanus, rabies and bacillus Calmette–Guerin (BCG) have been reported [4].

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Case report

A 55-year-old previously healthy woman presented with acute swelling of the right knee. Her body weight and body mass index were 58 kg and 25.7 kg/m^2, respectively. The tetanus vaccine was prescribed as a prophylactic measure for the patient, who had her nail excised. Her articular complaint began less than two days after receiving a single dose of tetanus. She had only monoarthritis involving her right knee. There were no previous arthritic complaints. She had no history of recent infections or a relevant medical history such as inflammatory low back pain, inflammatory bowel disease, psoriasis or uveitis, and no history of neurological symptoms, trauma or falling. There was no family history of seronegative spondyloarthritis. At presentation she walked with a pronounced antalgic gait because of pain. On examination her right knee was hot, swollen and tender. The range of motion of the joint was decreased due to pain and swelling. The patient did not have constitutional symptoms such as fever, fatigue or malaise. Global assessment of the patient for pain based on the visual analog scale (VAS) was 85 mm. Her erythrocyte sedimentation rate (ESH) and C-reactive protein (CRP) were raised at 64 mm/h and 29.2 mg/dl, respectively. Screens for rheumatoid factor, anti-nuclear antibody and HLA-B27 gave negative results. Her neutrophil count was raised at 76.3%, but other laboratory results for the hemogram parameters were normal. Uric acid, hemoglobin, C3 and C4 complements, alanine aminotransferase, aspartate aminotransferase, sodium, potassium, urea, creatinine and glucose were all within their normal ranges.

Urine analyses were normal. The sacroiliac joint graph was insignificant, whereas the knee radiograph showed that the patient had Kellgren–Lawrence grade 2 osteoarthritis (Figs. 1, 2). Because of the patient's refusal to undergo any invasive procedures, we did not analyze the synovial fluid of the joint involved.

The patient was diagnosed with ReA based on the physical and laboratory examination and the absence of any other possible etiology. Indometacin 75 mg/day was prescribed, and the application of cold pack on the right knee was recommended for swelling. She did not accept treatment with a local steriod injection for the swelling in the right knee. She was given a cane to stop weight-bearing on the right knee. One week later her clinical and laboratory parameters were improved. VAS was 0 mm, ESR was 14 mm/h and CRP was within the normal range.

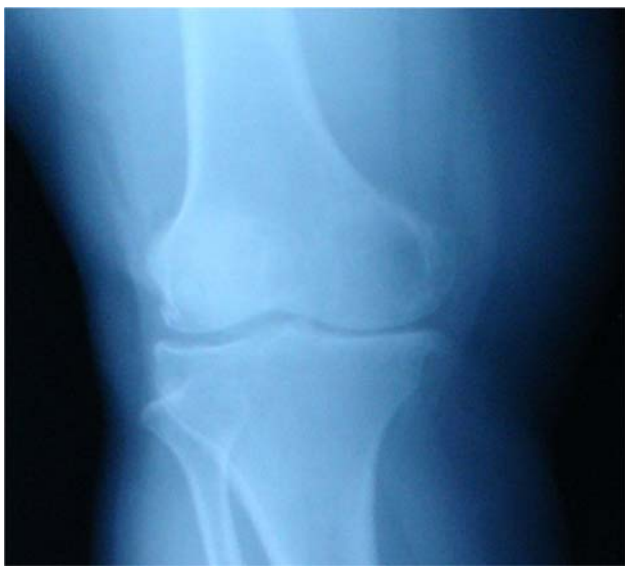

Fig. 1 Anteroposterior radiograph of right knee

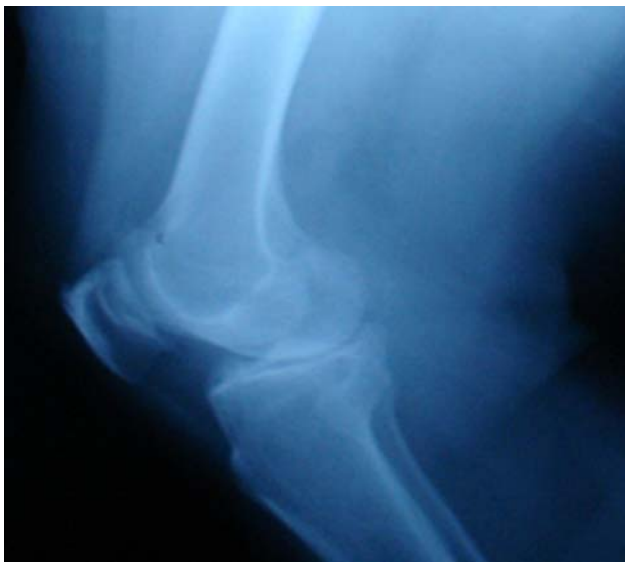

Fig. 2 Lateral radiograph of right knee

Discussion

Vaccinations have some rare complications. There is a relationship between vaccines and autoimmune disorders such as Guillain–Barré syndrome, multiple sclerosis and systemic lupus erythematosus [4]. Arthritis may also develop after receiving a vaccine. Arthritis can be induced by various vaccines, such as those for measles, mumps and rubella (MMR), polio, diphtheria, rubella, hepatitis B, BCG, influenza and tetanus [4–7]. Most cases of postvaccine arthritis usually improve without sequelae. On the other hand, while it was repoted that some vaccines may increase the incidence of rheumatoid arthritis (RA) development, some studies have disproven a causal relation between vaccination and RA [4, 8]. Some patients have developed persistent arthritis [9].

Although some possible mechanisms have been reported for the development of arthritis after vaccination, the reasons for vaccine-induced arthritis have not yet been clarified. Symmons et al. reported three mechanisms for the development of arthritis following vaccination: (1) immunization can trigger the arthritis; (2) vaccination and arthritis can co-occur, or; (3) the vaccine is one of the factors that can trigger arthritis development [4]. Harrison et al. have also reported that immunization can lead to the development of the disease [9]. In one of these mechanisms, the vaccine may resemble a host antigen. This structural resemblance causes the autoimmune process to start. The immunization can cause an increase in immune complexes. Vaccines may therefore cause autoimmune responses, in particular by triggering T cell proliferation. Vaccination affects the immune system, and it can result in autoimmunity. A synovial immune response to the vaccination may result in intra-articular antibodies and reactive T cells. In some studies, the involvement of T cells in the pathogenesis of ReA has been reported to be most likely [4, 10, 11]. This comparison may lead to a relationship between vaccination and arthritis.

Some cases who developed ReA after vaccination have been reported. There are also some reports of ReA developing following various immunizations, such as intravesical BCG, hepatitis B, influenza and rabies [5–7, 12]. BCG is used in the treatment of patients with bladder carcinoma. Although complications of BCG immunotherapy are rare, cases of ReA have been reported [13]. Kaul et al. reported a case who developed a reccurence

of ReA after a booster dose of tetanus toxoid [6]. It has been reported that some patients developed various rheumatologic complaints after receiving the hepatitis B vaccine. Autoimmune rheumatic diseases may be triggered by hepatitis B vaccine [14]. A causal relationship between vaccination and the development of arthritis has not been established [7]. Consequently, because the patient refused to undergo the invasive procedure needed to analyze the synovial fluid in the joint involved, we used our patient's history as well as her physical and laboratory examinations to diagnose ReA. The absence of any other possible explanations, the clinical progress observed and the effectiveness of the treatment further supported our diagnosis. We excluded pseudogout, as there were no calcifications of the soft tissue, cartilage, tendons or bursae on plain radiograph of the knee, and she developed arthritis two days after the vaccine, which improved within a week upon the prescription of the NSAID. She did not have any metabolic abnormalities that may trigger pseudogout attacks. Moreover, the white blood cell count is usually elevated in pseudogout, whereas in our case it was in the normal range [15]. Although in the majority of the reported cases ReA is seen within 2–3 months, and in some of them less than two weeks after the vaccination, our case developed ReA two days after receiving tetanus vaccine. The arthritis showed a rapid improvement with the administration of the NSAID and without local or systemic steroid treatment.

ReA can be a side effect of tetanus vaccination, which is also given as a prophylactic. Our case showed that tetanus vaccine may cause arthritis in a healthy person with no previous joint disorders.

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