gout (Maurice et al. 1988, Taconis et al. 1997). Synovial chondromatosis should not be confused with lesions of degenerative joint disease that secondarily give rise to the presence of loose bodies in the joint cavity (Ballet et al. 1984, Unni 1996). On the other hand, synovial chondromatosis may give rise to degenerative joint disease. When the radiographs and MRI images fail to demonstrate the typical features of synovial chondromatosis, one should always consider a malignancy (Sakellariou et al. 1998). In such situations, a biopsy must be taken before any operative procedure.

Synovectomy and excision of loose bodies is the most current treatment of synovial chondromatosis (DeBenedetti and Schwinn 1979). Milgram (1977), however, classified synovial chondromatosis into three phases and based treatment on this classification (Milgram 1977). In the early phase, there is active intrasynovial disease, but no loose bodies. Synovectomy is recommended in this phase. In the second, transitional phase, there is active disease combined with loose bodies and treatment consists of synovectomy and excision of loose bodies. In the third, late phase, there are multiple loose bodies but no intrasynovial disease, for which excision of the loose bodies alone is performed. Spontaneous regression, recurrence as well as malignant transformation of synovial chondromatosis have all been reported, but the exact rates are unknown (Swan and Owens 1972, DeBenedetti and Schwinn 1979, Hamilton et al. 1987, Maurice et al. 1988, Perry et al. 1988, Unni 1996). Long-term follow-up therefore seems indicated.

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Accidental *Salmonella enteritidis* vaccine injection leading to finger necrosis—a report of 4 cases

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Case 1

A 24-year-old man presented with a painful, discolored and markedly swollen index finger of his dominant right hand, 2 days after being accidentally stabbed at the level of the distal palmar crease, during poultry vaccination with Salmonel-

la enteritidis vaccine, while using an automatic injection machine. Tetanus vaccine and antibiotic prophylaxis were administered. Using a midlateral ulnar incision, both of the neurovascular bundles were released. The surrounding tissue was edematous, grayish and fragile. Dextran-40 infusion was administered for 3 days. Tissue cultures were negative. On the fifth day after the operation, the pulp of the finger had become necrotic and a cross-finger flap was transferred from the long finger to the pulp. The midlateral incision was covered with a split-thickness skin graft. Three months after the operation, he had full metacarpophalangeal joint motion, 0–90 degrees of proximal interphalangeal joint motion and a stiff distal interphalangeal joint.

Case 2

A 23-year-old man suffered an accidental injection into the index finger of his right dominant hand. He presented 6 hours after the injury and had marked swelling, redness and pain. Tetanus vaccine and antibiotic prophylaxis had been given before he was taken to the operating room for a fasciotomy, using an ulnar midlateral incision. Dextran-40 was administered after the operation. Tissue cultures were negative. Symptoms subsided and the finger healed uneventfully, after closure of the fasciotomy incision on the eighth day.

Case 3

A 28-year-old man sustained the same kind of accidental injection injury to the thumb of his right dominant hand. He was admitted to our clinic, 2 hours after the injury. We found swelling, pain and redness in his thumb, but relatively less than in the other patients. Tetanus vaccine and antibiotic prophylaxis were given and a Dextran-40 infusion was started. He was not operated on, and on the third day, he was discharged from the hospital with complete resolution of symptoms.

Case 4

A 28-year-old man presented on the third day after an accidental injection into the pulp of the right index finger of his dominant hand. The pulp was gangrenous. Tetanus vaccine, antibiotic prophylaxis and Dextran-40 infusion were administered. Necrosis, distal to the level of the distal interphalangeal joint ensued and disarticulation was performed at that level.

Discussion

We present 4 patients who were veterinary technicians and accidentally stabbed their fingers during vaccination of poultry for Salmonella enteritidis. All developed severe inflammations, which led to a compartment syndrome and local tissue necrosis of the finger. We did a survey of the current English literature, but found no similar case.

The accidentally-injected vaccine contains a minimum of 2.4×10^9 colony-forming units of inactivated Salmonella enteritidis bacteria, a maximum of 0.20% formaldehyde, a maximum of 0.05 mg thiomersal and a maximum of 0.40 mL oil adjuvants. It is used for active immunization of chickens against Salmonella enteritidis infections. The volume injected is 0.5 cc for each squeeze of the handle of the injector. Local tissue reactions to the antigen itself or to formaldehyde and thimerosal are well documented. However, they usually develop at the injection site and disappear in a week, without any further treatment (Hsiang-Pih 1987, Aydın 1994). Inactivated vaccine of gram negative bacteria can induce systemic toxic reactions. Hypersensitivity reactions have also been reported, especially after the second or later vaccinations with inactivated vaccines (Dresser 1986, Goodman 1991, Diker 1998).

Adjuvants are agents which enhance the immunologic response to the antigen, although the exact mechanism is still uncertain. Freund's complete adjuvant (FCA), a water-in-oil emulsion containing killed mycobacteria, aluminum hydroxide suspensions, mixed lipopolysaccharides, cytokines, RNA polymers are among the well-known adjuvants. Oil-based adjuvants may also be responsible for the tissue reaction. They have been shown to cause granulomas at the injection site. Allergic encephalomyelitis and multiple myeloma have also been reported (Hsiang-Pih 1987, Aydın 1994). A common interesting point was that all the patients stated that they had experienced this type of injury several times in the past, but that it subsided after a few days, leaving a small non-tender mass at the injection site.

Whatever the reason, this uncommon cause of compartment syndrome or local tissue necrosis in the finger seems to respond well to early treatment, including fasciotomy, if necessary. In cases presenting immediately after the injury, excision and drainage of the injected material seems to be a low price compared with the probable complications. In late presenting cases, close follow-up and treatment according to the severity of symptoms seem to be the best approach.

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The role of prophylactic pinning in the treatment of slipped capital femoral epiphysis—a case report

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A 9-year-old girl had dragged her left leg for 3 weeks. 2 days before hospitalization she complained of pain in the left groin. She had a 30° restriction in internal rotation and 20° in abduction, in comparison with the right side. A shortening of the left leg by 1 cm was found. A metabolic or endocrinologic disease could not be diagnosed. The radiographs showed a 30° dorsocaudal displacement of the left physeal plate. (Figure 1). An immediate simultaneous physiodesis of both hip joints with threaded wires was performed (Figure 2). After uneventful clinical and radiographic follow-ups, the implants were removed 12 months later at the age of 10 years. Retrospectively, the reason for this early removal is unclear. The radiographs, which were taken before and after this operation, showed no sign of a new dislocation of the epiphyseal plate.

Only 3 months later, the girl started to drag her right leg, without pain. The clinical examination showed a positive "Drehmann" sign (external rotation of the hip during passive flexion) and no internal rotation. Radiographs showed a slipped capital femoral epiphysis on the right side (Figure 3). The hip joint was stabilized with 4 threaded wires, because the parents would not agree to a physeodesis of the left hip.

6 months later, the girl spontaneously complained about pain in the left hip once again. The reason was further slippage of the left epiphysis (Figure 4). Because of large displacement, stabilization was performed with 3 threaded wires and an intertrochanteric osteotomy according to Imhäuser (1987) and Southwick (1967) with internal rotation and 30° flexion of the distal fragment.

The implants were removed after closure of the physeal plates at the age of 16 years (Figure 5). At this time, the girl had no pain. The hip joints showed a similar range of motion with flexion 130°/extension 5°, abduction 60°/adduction 30° and internal rotation 50°/external rotation 60°. The only residuum was a shortening of the left leg by 1 cm. 2 years after the last surgery, the girl has no hip problems.

Discussion

Slipped capital femoral epiphysis occurs bilaterally in 20% up to 80%. The incidence differs ac-