Together with an increase in beekeeping in many areas of Spain, there has been an increase in episodes of arthritis in beekeepers, related to certain tasks that they carry out near the beehives\(^1,2\).

Beekeepers’ arthropathy affects 32–43% of beekeepers\(^1,3\). It consists of episodes of acute or subacute asymmetric inflammatory arthropathy that affect one or several joints of the hands\(^2,4\). From 93–100% of cases present with arthritis subsequent to bee stings over a joint or in its vicinity\(^1,3\), 50% of the cases occur during August, the month when the honey is harvested from the hives\(^3\).

In this paper we present 3 cases of beekeepers’ arthropathy located in the interphalangeal joint of the thumb, the metacarpophalangeal joint of the index finger and the distal interphalangeal joint of the little finger.

**Key words:** arthropathy, beekeeper, sting, bee venom.

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**CLINICAL CASES**

**Case 1**

Male, 68 year old beekeeper, on oral antidiabetic drugs. In August 1997, without any previous history of trauma, the patient presents with pain and inflammation of the interphalangeal joint of the left thumb. The patient has a history of bee stings during the last honey harvest and also previous bee stings in other anatomical sites, though with less inflammatory reaction.

On clinical examination there were some marked signs of inflammation such as oedema and increase in local temperature of the thumb. Thumb movement was limited and painful. When the hand was held up, the inflammation decreased as well as the size of the thumb. An X-ray showed joint impingement with bone destruction of the proximal phalanx (Figure 1). Clinical chemistry only showed an increase in RBC sedimentation rate: 25 mm. An MRI was carried out, and it was seen that the interphalangeal joint, the epiphysis of the proximal phalanx and the base of the distal phalanx were affected; there was erosion and destruction of the cortical bone, with an associated soft tissue mass and an intense uptake of contrast medium. The patient was treated with ciprofloxacin and nimesulid for a period of 3 weeks. When the treatment was completed the inflamma-
tion had gone down and the patient felt less discomfort, but the joint had suffered ankylosis.

Case 2

Male, 66 year old beekeeper, on oral antidiabetic drugs. In April 1988, after suffering multiple bee stings on both hands, the patient had signs of inflammation of the metacarpophalangeal joints of the index and middle finger of the left hand. On diagnosis of arthritis, empirical treatment was administered with indometacin and colchicine. The patient remembered that the inflammatory process had begun approximately 1 week after the bee stings. On presenting for consultation the patient only had signs of inflammation of the metacarpophalangeal joint of the left index finger. Clinical chemistry findings were normal. After 4 weeks of treatment the discomfort disappeared and X-rays showed bone destruction of the radial rim of the head of the second metacarpal bone (Figure 2).

Case 3

Female, 31 year old, daughter of the patient presented in Case 2. On methotrexate for seronegative rheumatoid arthritis since 1995. In April 1998, after suffering several bee stings on her right hand (that occurred at the same time as her father’s), she presented with inflammation, pain and limited movement of the distal interphalangeal joint of the right fifth finger.

The patient continued treatment with methotrexate, and after 3 weeks there was clinical improvement. Clinical chemistry results were normal. An X-ray showed impingement of the joint space in the distal interphalangeal joint of the right fifth finger (Figure 3).

DISCUSSION

The first paper on a case of beekeepers’ arthropathy was published in Spain in 1989 by Peña et al. Subsequently there were several reports of isolated cases, epidemiological studies and larger series.

Many genera of bees are known, but in this study we refer to the genus *Apis*, specifically, *Apis mellifera subspecies mellifera* or the common bee. This type of bee is the one most commonly found in Spain and the species used for producing honey.
Beekeepers’ arthropathy is an acute or subacute asymmetric condition that can affect one or several joints of the hands, and occasionally the wrists. Acute episodes are usually recurrent. The arthritis disappears in a period of 1–6 weeks. The condition may undergo spontaneous remission without sequelae, but, usually, after several episodes of acute arthritis, the patients’ arthritis becomes chronic with pain on movement, deformity, ankylosis, and disability.

Of the group of beekeepers studied 8.0% suffered their first episode during their first year of working with bees, 26.7% during their first 3 years of working with bees, and 50% during their first 8 years of beekeeping.

After 15 years of activity, 80% of beekeepers had suffered their first episode of work-related arthritis. Of these, 22% had suffered only one episode, whereas most beekeepers (78%) spoke of multiple episodes. The disorder is acute on onset and was work-related in 95% of the cases. Bilateralism of this condition was seen in 78–67.7% of cases. The most affected joints were the proximal interphalangeal joints: from 59.8–40% of cases; in second place the distal interphalangeal joints: 34%. The most frequently affected finger is the middle finger.

Most frequently seen clinical signs were: swelling, pain, erythema and heat. The patients we saw had swelling, pain and limited movement of the affected joints.

Clinical chemistry results usually were normal. In some cases mild eosinophilia and basophilia were seen, with an increase in thromboplastin time (PTT) and alkaline phosphatase levels. In the patients we saw the only alteration detected by clinical chemistry was an increase in RBC sedimentation rate.

On X-ray, the most frequent images seen in our patients were: joint impingement, geode formation, sclerosis, oedema of soft tissues, bone erosion and osteophytes.

The pathogenesis of this condition is unknown, but a bee sting over, or in the vicinity of, the joint is necessary to trigger the process.

Several aetiological factors have been considered in the attempt to explain beekeeper’s arthritis: bee venom, foreign body synovitis, infection, repeated microtrauma and insecticides and pesticides.

Bee venom or apitoxin (Apis mellifera) is a complex mixture of proteins, enzymes, peptides and amines. These components of bee venom have both inflammatory and anti-inflammatory properties. On one hand bee venom causes an inflammatory reaction, due to its 2 main components: melitin and phospholipase-A2 that together add up to 50% of the mass of the venom.

Both of these substances have a potent inflammatory effect, causing pain and inflammation. On the other hand, it has been proved that bee venom also possesses anti-inflammatory activity and it has been used to alleviate pain and treat inflammatory processes such as rheumatoid arthritis in humans and laboratory animals. The water soluble portion of bee venom is anti-inflammatory and antinociceptive. The anti-inflammatory effect is due to inhibition of cyclooxygenase 2, blockage of pro-inflammatory cytokines and the release of catecholamines.

To try to explain this double effect a theory has evolved: bee venom is nociceptive and inflammatory under normal conditions, but has the opposite effect—anti-inflammatory and antinociceptive—when there is inflammation.

Another possibility is that this condition is a foreign body synovitis. Several substances have been described which could cause arthritis if they penetrate joints. In those cases of beekeepers’ arthritis in which a biopsy has been carried out no foreign body reaction has been found, only non-specific inflammatory changes were seen.

With reference to the third possibility, micro-organisms have been isolated in only 3 cases of beekeepers’ arthritis. These were Pseudomonas aeruginosa, though in 2 cases the authors think that this was due to contamination. The fourth possible cause of this condition is repeated microtraumas. Arthropathies due to repeated microtrauma have been reported, usually due to work or sports-related activities, a notable example is the Missouri syndrome that
affects farm workers in rural areas. The authors who described this condition believe that there is no relationship between beekeepers’ arthritis and repeated microtrauma.

The last factor is the effect of insecticides and pesticides used on crops whose flowers are visited by bees. The bees could, in theory, transport toxins in their venom and deposit them in the joints of the beekeepers whom they sting.

As a conclusion, it is necessary to point out that there is no specific treatment for beekeepers’ arthropathy. Topical and systemic non-steroid anti-inflammatory drugs (NSAIDs), antihistamines, antibiotics and steroids have all been used, with uncertain results.

REFERENCES


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