SEPTIC ARTHRITIS OF THE SMALL JOINTS OF THE HAND

M. SINHA, S. JAIN and D. A. WOODS

From the Department of Orthopaedics and Traumatology, Great Western Hospital, Swindon and Marlborough NHS Trust, Swindon, UK

Twenty-five patients with sepsis of 26 hand joints were treated by urgent debridement, antibiotics and early hand therapy. We reviewed 15 patients (16 joints) in a clinic and three patients by postal questionnaire after a mean follow-up of 54 (range 10–94) months. Of the 26 involved joints, 14 had restricted motion at discharge. Stiffness increased with increase in delay between onset and treatment. At final review, one joint with painful degenerative changes had been fused. Seven patients had regained full movements. The remaining six had some stiffness but, nevertheless, had undergone significant improvement in the ranges of movement. There were two cases with radiological joint degeneration in this group of six patients. Three patients had mild, intermittent pain. No patient had significant disability. While there is significant loss of motion after this joint pathology in the early recovery period, overall motion and function appears to improve over the longer term.

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Septic arthritis is a condition requiring urgent treatment, irrespective of the joint involved, as it can quickly lead to serious complications such as joint degeneration or osteomyelitis (Cooper and Cawley, 1986; Nade, 2003). The current literature on septic arthritis of the hand joints clearly describes the key treatment principles (Murray, 1998). Prompt surgical debridement and intravenous antibiotics followed by early mobilisation lead to early resolution of infection and return of function in the short term. However, the longer-term fate of hand joints affected by sepsis is less well documented.

In this study, we assessed patients treated for septic arthritis of hand joints over an 8 year period in our unit to investigate the longer-term results with respect to movements and function.

PATIENTS AND METHODS

This study included 26 hand joints in 25 patients treated for septic arthritis in the period between January 1996 and July 2004.

A suspected diagnosis of septic arthritis was made if patients presented with an acutely painful, swollen hand joint with localised tenderness and reduced range of movements (ROM).

A diagnosis of septic arthritis was confirmed if: (a) Pus or purulent fluid was found in the joint at surgery, and/or (b) swabs of joint fluid or tissue samples obtained during surgical debridement grew organisms on Gram stain or following culture. Frank pus was found in four joints and purulent fluid was found in seven joints. In the remaining 15 joints, microscopic examination and culture of fluid or tissue obtained during debridement confirmed the presence of organisms.

Patients were excluded from the study if there was no pus or fluid on exploration and culture of tissue obtained at exploration did not yield organisms.

All patients with a confirmed diagnosis of septic arthritis in the small joints of hands were entered into a database prospectively over an 8-year period, from January 1996 to July 2004. The database was updated every week in the departmental audit meeting.

In accordance with our protocol, all patients with a suspected diagnosis of septic arthritis were treated by exploration, debridement and irrigation of affected joints as early as possible on the first available emergency theatre list. Metacarpophalangeal (MCP) joints were explored through dorsal incisions and interphalangeal (IP) joints through mid-axial incisions, unless there was an existing wound which could be extended. Injury to joint surfaces or to soft tissues such as tendons or joint capsule was recorded. Swabs and tissue samples were obtained for urgent microscopy, culture and sensitivity examinations. Loose approximation skin sutures were used to close the wounds in 17 cases. Drains were not used. In three of these cases, a second debridement and irrigation of the wound was carried out in theatre following a review of the wound. A decision was made to leave the wound open following primary debridement in nine cases and a second debridement and delayed primary closure was carried out in these patients.

Intravenous antibiotic treatment was started immediately after debridement, using a combination of Benzyl Penicillin and Flucloxacillin to provide broad-spectrum cover. Metronidazole was added when human teeth had been involved in the injury.

Following surgery, all hands were rested in elevation on a plaster splint and the antibiotics started in theatre were continued intravenously. After 24 hours, the

dressing and plaster splint was taken down, the wounds checked and a smaller dressing applied. Active and passive hand mobilisation was started under the supervision of the physiotherapists. The wounds were checked every day thereafter and the patient was discharged if wounds were healing well.

At discharge, the intravenous antibiotics were changed to the oral form of the same antibiotics. Oral antibiotics were given for a mean duration of 4.2 (range 3.4–6) weeks after discharge from hospital. The patients were initially seen for follow-up at weekly intervals, but less frequently later if progress was good. Patients were discharged from follow-up when all wounds had healed, at a mean of 6.4 (range 4.4–8.3) weeks.

The following data was recorded after admission and as treatment progressed: patient demographics, causative factors, predisposing conditions, time of onset of symptoms, organisms isolated from pus swabs or tissue specimens obtained at surgery, timing of surgery, delay between onset and treatment, reasons for delay, findings at surgery, type and duration of antibiotic treatment and results at discharge. At discharge, we recorded the condition of wounds, presence of any symptoms and the ROM of the affected joints.

We attempted to contact all of the patients by letter (including information sheets) to arrange attendance at a review clinic. Fifteen agreed to attend the clinic, three agreed to answer a postal questionnaire and two patients refused to do either. Four patients had moved out of the area and were not contactable and one patient had died from unrelated causes.

The 15 patients, with involvement of 16 joints, who attended the review clinic were assessed using a proforma which recorded the condition of the joint on examination, including redness, local warmth, condition of scars, swelling, cold intolerance, pain and tenderness. We also recorded the ROM of the affected joint and of the adjacent MCP and IP joints of the affected digit and assessed the activities of daily living (ADL).

Radiographs were obtained at review if the patient had significant pain, with or without swelling, deformity or stiffness of joints involved.

Range of movement was recorded by placing a goniometer on the dorsal aspect of the MCP, the proximal interphalangeal (PIP) joint and distal interphalangeal (DIP) joint of the involved digit. These measurements were then used to calculate the total active motion (TAM) by the method described by the American Society for Surgery of the Hand (1976), as shown in Table 1. The TAM was graded as Excellent: 100%, Good: >75%, Fair: >50%, Poor: <50% (ASSH, 1976).

Assessment of pain was done using a visual-analogue scale (VAS). The patients were asked to mark the level of their pain on a 100 mm, non-hatched VAS scale, anchored with the phrases "no pain" at 0 mm and "worst pain" at 100 mm.The pain severity categories were defined as follows: 30 mm or less was defined as mild pain, 70 mm or more was defined as severe pain, and from 31 to 69 mm was defined as moderate pain. (Collins et al., 1997).

We assessed ADL by asking patients to complete a simple questionnaire (Fig 1) which includes questions taken from the Arthritis Impact Measurement Score (Meenan, 1982) and the Health Measurement Questionnaire (Kind and Gudex, 1991). This questionnaire has been previously used by Colville et al. (1999) for the subjective assessment of ADL, while studying the outcome in patients who had surgery to the hand.

Statistical analysis was done using Fisher's exact test to compare groups, Spearman's rank correlation test and the Mann–Whitney test to compare means. Data are provided as means and standard deviation. A *P*-value of less than 0.05 was considered significant.

RESULTS

Twenty-five patients with involvement of 26 joints were treated for septic arthritis of hand joints in the period between January 1996 and July 2004. There were 16 men and nine women with a mean age of 36 (range 20–68) years. The causative factors for all 26 cases of joint sepsis are recorded in Fig 2. The causative factors were further subdivided into two broad groups, viz. "Open", in which the joint capsule had been penetrated, with variable associated damage to the articular surface and/or tendons and overlying soft tissues (16 patients) and "Closed", in which the joint capsule had not been violated and there was no injury to tendons or overlying soft tissues (10 patients). One patient was a diabetic. No other predisposing factors, such as rheumatoid arthritis or immunosuppressive conditions, were present. The most frequently involved joint was the MCP joint (11 joints) and the middle finger was the most commonly involved digit (Fig 3). Of the 25 patients, 12 patients with involvement of 13 joints presented at less than 3 days following onset of symptoms. Of the remaining patients, 10 were seen at between 3 and 4 days, two patients at 5 days and one patient at 6 days after start of symptoms.

The organisms isolated from culture were *Streptococcus* species (seven patients), *Staphylococcus aureus* (three patients), *Staphylococcus* + *Streptococcus* (three patients), Coagulase −ve S*taphylococcus* (two patients), mouth flora (three patients) and *Pasteurella multocida* (two patients). Eleven patients had received antibiotics before presentation, either from their GPs or in Accident and Emergency Departments. In five of these 11 cases, we were unable to identify an organism on culture of specimens from the joint, but these patients fulfilled the criteria for septic arthritis because of the physical signs on admission and presence of purulent fluid on joint exploration, so were treated with the same combination of broad-spectrum antibiotics as the other patients in the study.