Change in operative workload for rheumatoid disease of the hand: 1,109 procedures over 13 years

M. Dafydd*, I.S. Whitaker, M.S. Murison, D.E. Boyce

The Hand Unit, Welsh Centre for Burns and Plastic Surgery, Morriston Hospital, Swansea, United Kingdom

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Rheumatoid arthritis; Hand surgery

Summary
Orthopaedic literature regarding lower limb joints reports a decline in operative management of rheumatoid arthritis since the 1980s. We investigated whether the demand for hand surgery for rheumatoid disease had changed over the last 13 years in our unit. Data for all patients undergoing operative treatment for rheumatoid arthritis of the hand and wrist over a 13-year period were analysed. Between 1996 and 2009, 1,069 patients with rheumatoid disease (182 men, 887 women) underwent a total of 1,109 hand surgery procedures. The operations were synovectomy (430, 39%), arthroplasty (252, 23%), arthrodesis (194, 18%) and tendon surgery (233, 21.0%). Linear regression analysis showed a statistically significant decrease in the number of synovectomies, arthroplasties and arthrodeses between 1996 and 2009, but no decrease in tendon surgery. We explore possible factors responsible for this change in operative workload.

Introduction
In England and Wales, more than 400,000 people are affected by rheumatoid arthritis, and with over two-thirds of patients developing symptoms before the age of 60 years, this often presents difficulties with continued employment as well as putting a significant burden upon health care systems. As part of a multidisciplinary team, the hand surgeon has an important role in caring for patients with rheumatoid arthritis: relieving pain, correcting deformities, retarding disease progression and improving cosmesis, using a range of soft tissue and orthopaedic techniques. The need for orthopaedic surgery is a marker of disease severity, and the number of lower limb procedures, including arthroplasty, for rheumatoid arthritis has declined since the 1980s and 1990s.

We examined changes in number of operative hand procedures for patients with rheumatoid disease over a 13-year period in our plastic surgery unit, which provides specialist services to a population of over 1.5 million.

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* Corresponding author. Welsh Centre for Burns and Plastic Surgery Morriston Hospital, Swansea, United Kingdom.
E-mail address: meilyrdafydd@gmail.com (M. Dafydd).
Methods

Data were extracted from the operative database for all patients having hand or wrist surgery for rheumatoid disease between 1996 and 2009. The name, date of birth, date of procedure, and specific procedure were obtained for each case. The procedures included in our study were arthroplasty, arthrodesis, synovectomy, tendon transfer, flexor and extensor tendon reconstructions. Patients having operations on more than one joint on the same hand were registered as having a separate procedure for each joint (Figure 1).

Linear regression analysis (Microsoft Excel, 2004) was used to identify trends in the number of operative procedures in each subgroup over the 13-year period. We used an alpha level of 5%.

Results

Hand surgery procedures were performed on 1,069 patients with rheumatoid disease between 1996 and 2009. Eighty-three percent of the patients were women. The 1,109 hand surgery procedures were synovectomy (430; 39%) arthroplasty (252; 23%), arthrodesis (194; 18%) and tendon surgery (233; 21%). There was a statistically significant decrease in the number of synovectomies ($p = 0.0027$), arthroplasties ($p = 0.0019$) and arthrodeses ($p = 0.0001$) carried out between 1996 and 2009 for rheumatoid disease of the hand. We found no decrease in the number of tendon procedures ($p = 0.34$) (Table 1).

Discussion

Reports from Sweden and Norway within the orthopaedic literature have also shown a decline in the number of lower limb arthroplasties and synovectomies for rheumatoid arthritis since 1980.4,5 The decline is attributed to improved medical management, the decreasing incidence of rheumatoid arthritis over the past fifty years, and a postulated trend towards a milder form of rheumatoid arthritis over the past two decades.

During the past two decades, the pathophysiology of rheumatoid arthritis has been further elucidated, allowing novel pharmacological strategies to protect against disease progression and joint destruction. Methotrexate has been used to treat rheumatoid arthritis since the late 1970s, reaching a peak in the 1990s following favourable clinical trials.5 The proportion of patients in a 3,035 cohort in Canada being treated with methotrexate increased from 0.5% in 1977 to 49% in 2000.6 Since the turn of the 21st century the potent tumour necrosis factor α inhibitors have gained acceptance by rheumatologists: both infliximab and etanercept have proved to be effective at retarding disease progression.

Figure 1  Graphs showing the number of hand surgery cases between 1996 and 2009: (a) all rheumatoid hand surgery (b) arthroplasty (c) synovectomy (d) arthrodesis (e) tendon surgery.
articulal damage.\textsuperscript{7} In addition to these contemporary treatments, rheumatological services have improved with general practitioners referring to specialists early, allowing prompt diagnosis and prognostic assessment. Timely, aggressive treatment and follow-up to achieve tight disease control benefits newly diagnosed patients by minimising the local and systemic effects of inflammation and resulting functional disability.\textsuperscript{8,9}

If joint destruction can be halted or reduced by advances in medical management, referral patterns to surgeons may alter accordingly. In a study of rheumatoid patients in one small geographical area, patients diagnosed after 1985 were less likely to require joint surgery, an observation that was attributed to better medical management.\textsuperscript{2} Furthermore a longitudinal study of over 3000 rheumatoid patients estimated average disability levels to have declined by approximately 40\% since the late 1970's and attributed the decline to improved medical treatment.\textsuperscript{6}

Studies on the changing incidence of rheumatoid arthritis have provided conflicting results. Population studies from the United States,\textsuperscript{10} Japan\textsuperscript{11} and Finland\textsuperscript{12} indicate a decrease in incidence, but studies from Norway\textsuperscript{13} and Sweden\textsuperscript{14} found no change. A study from the United States reports a rise in incidence.\textsuperscript{5}

There is also evidence for a trend to milder disease in recent years. Among a cohort of patients diagnosed with rheumatoid arthritis, the prevalence of rheumatoid factor positivity and prevalence of joint erosions were lower than quoted in earlier reports.\textsuperscript{16} This suggests a less severe disease at presentation. The decreasing rheumatoid factor positivity was also noted among Pima Indians living in the United States in 2002,\textsuperscript{10} but in the same year a similar report failed to show a decline in Rochester, Minnesota.\textsuperscript{17}

It is unclear whether any trend towards milder disease is due to patients presenting earlier to specialist services, with less inflammatory burden and fewer destructive sequelae.\textsuperscript{18}

There are limitations with this retrospective analysis. We are unable to say whether the incidence of rheumatoid arthritis has changed significantly in our region recently. It is possible that the observed decline reflects a change in general practice, rheumatologic and orthopedic practice and referral patterns. Despite the number of referrals to our hand surgery unit increasing over the last decade, patients with rheumatoid arthritis requiring surgery may have been referred elsewhere within the region. Referral patterns may also explain why we did not observe a decrease in the number of procedures on tendons. To our knowledge, other hand surgeons in our region do not perform tendon reconstructions, therefore relatively more patients may be referred to our department for tendon surgery than for orthopaedic surgery. The low numbers of tendon surgical procedures in our study may also account for the observed small decline failing to reach statistical significance.

The long-term impact that tumour necrosis factor $\alpha$ inhibitors will have on the destructive nature of rheumatoid arthritis and the resulting demands for surgery is not clear. If the inflammatory burden can be halted early and remission achieved, then patients may now undergo fewer disease related hand surgery procedures than previously seen. Augmenting the pathological process with medical management may however simply delay advanced disease. These patients may still require surgery but at an older age.

### Conflict of interest

None declared.

### Funding

N/A.

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Table 1

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Slope $-0.91$ $-1.47$ $-2.49$ $-0.43$ $-5.17$

95\% C.I $-1.27, -0.54$ $-2.28, -0.66$ $-3.93, -1.05$ $-1.40, 0.52$ $-7.90, -2.44$

R $0.84$ $0.75$ $0.74$ $0.75$ $0.77$

C.I. = Confidence interval, R = Correlation Coefficient.
References


