

Injections and physiotherapy for the painful stiff shoulder

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SUMMARY Cost effective treatment is needed for common self limiting rheumatological conditions. Periarthritis of the shoulder is an example. There is no consensus for one type of treatment, though local steroids or physiotherapy are conventionally used. Their cost and efficacy were compared in a prospective randomised observer-blind trial—in essence a medical audit of the treatment of a common rheumatological problem. Sixty two consecutive patients presenting with a painful stiff shoulder were studied. Patients with coexistent diseases like cervical spondylosis or a stroke were excluded. They were randomly allocated to receive local steroids, six weeks' physiotherapy, or both. The three groups were of similar age, sex, and disease severity. Assessments of pain and shoulder movement were made initially, at six weeks, and at six months by a 'blinded' observer. Physiotherapy was given by one therapist and injections by one physician. All three groups showed significant improvements by six weeks, with further improvement at six months. Improvements were identical in all three groups. No treatment gave complications. The costs of treatment varied: an injection of triamcinolone cost £2.10; a six week course of physiotherapy cost £48.50; combination treatment cost £50.60. Patients expect treatment for a painful stiff shoulder. The results show that local steroid injections are as effective as physiotherapy alone or a combination. They provide rapid treatment and are less expensive. In the uncomplicated case a local steroid injection is the most cost effective treatment.

Key words: periarthritis of the shoulder, local steroids.

The painful stiff shoulder is a common reason for referral to a rheumatology clinic.¹ It is more common in general practice.² There is no current consensus in favour of one form of treatment, and several different therapeutic regimens are used. This suggests there is no major advantage with any single treatment. In view of the prevalence of such shoulder problems it is important to determine the most cost effective remedy. We compared local steroids, physiotherapy, or a combination of the two in the treatment of the painful stiff shoulder and evaluated their costs and efficacy in a prospective randomised observer-blind trial. This is an evaluation of treatment as an exercise in medical audit.

Patients and methods

Sixty six consecutive patients with a clinical diagno-

sis of periarthritis of the shoulder were studied. Inclusion criteria were based on those of Bulgen *et al.*³ They consisted of the following three items: (a) a painful stiff shoulder for at least four weeks; (b) inability to use the affected arm with restriction of movement and loss of full function; (c) pain at night causing sleep disturbance and inability to lie on the affected side. Patients with predisposing causes such as a stroke, generalised arthritis, or cervical spondylosis, or a highly localised lesion, such as bicipital tendinitis, were excluded. Four patients dropped out of the study before completion. They failed to attend for review at six weeks or six months. The analysis was based on 62 patients (34 female, 28 male). Twenty two received local steroids, 20 received physiotherapy, and 20 had both treatments.

Thirty five patients had right shoulder involvement and 27 the left. Four patients had related conditions; three had diabetes mellitus and one

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Table 1 Clinical features in the three treatment groups

| Clinical features | Both treatments (n=20) | Injection (n=22) | Physiotherapy (n=20) |
|-------------------------------|------------------------|------------------|----------------------|
| Mean age (years) | 58.8 | 55.8 | 53.0 |
| Sex: | | | |
| Female | 12 | 11 | 11 |
| Male | 8 | 11 | 9 |
| Affected side: | | | |
| Right | 8 | 14 | 13 |
| Left | 12 | 8 | 7 |
| x Ray changes | 11 | 12 | 6 |
| Mean haemoglobin (g/l) | 135 | 143 | 141 |
| Mean WBC* ($\times 10^9/l$) | 7.5 | 8.1 | 6.9 |
| Mean ESR* (mm/h) | 23 | 10 | 14 |
| Rheumatoid factor positive | 0 | 2 | 1 |

*WBC=white blood cell count; ESR=erythrocyte sedimentation rate.

thyrotoxicosis. Plain radiographs of the shoulder were obtained in all cases. Twenty nine patients had minor radiological abnormalities of the affected shoulder. None had calcific subacromial bursae. All patients had normal haemoglobin and white blood cell count. Their mean erythrocyte sedimentation rate was 15 mm/h. Three patients had a positive rheumatoid factor, but in low titre, with a low erythrocyte sedimentation rate, and no clinical evidence of rheumatoid arthritis. Table 1 shows the patient details.

Patients were randomly allocated to receive physiotherapy alone, local steroid injection alone, or a combination of the two. Physiotherapy was performed for four to six weeks by one therapist, who used the method of physical treatment thought most appropriate. Mobilisation was the mainstay of physiotherapy. This approach was chosen because

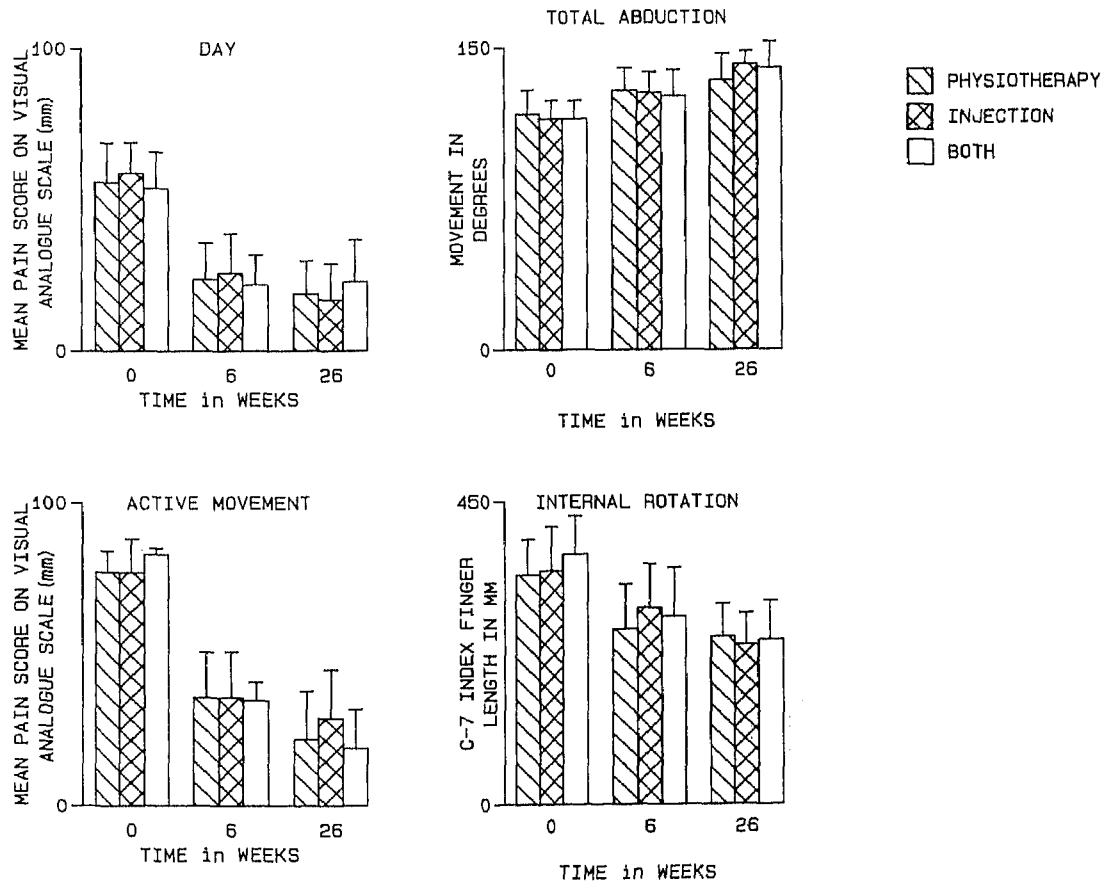


Fig. 1 Improvements in some pain scores and some movements with time in the three treatment groups. Means and SEMs are shown.

individual treatment programmes most closely resemble routine clinical practice. Local steroid injections of 20 mg triamcinolone with 1 ml 2% lignocaine were injected anteriorly around the shoulder joint by one physician. Patients were assessed initially, at six weeks, and at six months by an independent observer unaware of the treatment given.

Pain was assessed on a 10 cm visual analogue scale, with separate scores for day pain, night pain, and pain during active and passive movement. Passive movement of both affected and unaffected shoulders obtained with a goniometer measured complete shoulder abduction, glenohumeral abduction, and external rotation. Internal rotation was quantified by measuring the distance between the spine of C7 and the index finger with the arm fully internally rotated.

Treatment costs were determined using data from the hospital supplies department and the physiotherapy department. For an injection we added the mean cost of 20 mg of triamcinolone, an ampoule of 2% lignocaine, two needles, and a syringe. For physiotherapy we calculated the mean number of hours of treatment for each patient and determined the cost of the physiotherapist's time using standard district internal auditing figures. This excludes the running costs of the physiotherapy department and the use of machines such as ultrasound.

Results were recorded on a standard proforma and analysed by Student's paired *t* tests and the Mann-Whitney U test for non-parametric data—that is, pain scores.

Results

All treatment groups showed significant reductions in pain after six weeks ($p < 0.001$ in all groups). There were further improvements at six months. Mean measures of pain improved by 49–66% at six weeks and by 57–86% at six months. There were increases in shoulder movement on the affected side by six weeks. There were further increases in movements by six months: mean measures of movement improved by between 11 and 31% at six weeks and by between 10 and 34% at six months. There were no changes in movement on the non-affected side. Figure 1 shows examples of the changes.

The improvements in pain scores and the degree of movement were similar in all three treatment groups. For example, pain on active movement improved by means of between 53 and 58% after six weeks and by 62–78% at six months in the three groups. Similarly, total abduction improved by means of between 10 and 11% after six weeks and by 15–23% at six months in the three groups. No

treatment showed any advantage which was clinically relevant and significant at the 5% level.

The costs of treatment varied substantially. An injection of triamcinolone around a shoulder cost £2.10. The main component was £1.80 for 20 mg triamcinolone. The mean cost of a six week course of physiotherapy was £48.50 for each patient. Combination treatment cost £50.60.

Discussion

Patients treated with physiotherapy, steroid injection, or a combination all had less pain and showed improved movement at six weeks and six months. There were no consistent differences between the treatment groups. There was no evidence of a type II statistical error. Our findings agree with other studies comparing different treatment strategies for the painful stiff shoulder. Bulgen *et al* showed that there was little long term advantage in using intra-articular steroids, mobilisations, ice therapy, or no treatment; but steroid injections benefited pain and range of movement in the early stages.³ Lee *et al* found no advantage in steroid injection plus physiotherapy against heat and physiotherapy.⁴ Berry *et al* showed no difference between steroid injection, acupuncture, and placebo.⁵ Richardson showed no difference in pain relief or pain on resisted movement after treatment with steroids or placebo.⁶ There was no evidence for any additive effect when steroids were given with physiotherapy. This implies that improvement cannot be maximised above a certain level.

None of our patients had an adverse reaction to either local injections or physiotherapy. Occasionally, ruptured tendons or infections can occur after local steroids. These are so uncommon that a formal risk-benefit analysis is impossible. Problems after physiotherapy are even less common.

Difficulties in establishing the ideal treatment may be related to imprecise diagnoses. These will remain until the pathogenesis of the shoulder and its related conditions have been better defined. Our patients were less severely involved than those described by Bulgen *et al*³ and Binder *et al*.⁷ Their patients had substantially less movement and were described as having 'frozen shoulders'. For medical audit to have meaning it must deal with mild and severe cases, and hence we looked at consecutive patients with a similar pattern of disease. Those with highly localised lesions such as bicipital tendonitis or marked calcific changes were excluded. Rheumatologists are unlikely to give no treatment to patients with painful stiff shoulders, and in an audit study the use of a placebo group is invalid in an analysis of cost effectiveness.

It could be argued that no treatment is by far the cheapest alternative and that as prospective trials do not support any form of treatment as better than placebo this justifies giving no treatment. But we consider that almost all rheumatologists use one type of treatment or another to treat a painful stiff shoulder. Our analysis of the costs and benefits of treatment is inevitably primarily related to our own hospitals. Many centres, especially outside London, provide open access physiotherapy for referrals from general practitioners, and this will influence the relative costs because the costs of outpatient treatment will be avoided by direct referral.^{8 9} Similarly, the duration of treatment given by physiotherapists can vary, and this too influences costs. Nevertheless, our results suggest that local steroid injections are as effective as physiotherapy alone or a combination of both; they provide rapid treatment and are less expensive.

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References

- 1 Bulgen D Y, Hazleman B L, Voak D. HLA-B27 and frozen shoulder. *Lancet* 1976; i: 1042-4.
- 2 Mogensen E F. Painful shoulder. *Acta Med Scand* 1956; 155: 195-203.
- 3 Bulgen D Y, Binder A I, Hazleman B L, Dutton J, Robert S. Frozen shoulder: prospective clinical study with an evaluation of three treatment regimens. *Ann Rheum Dis* 1984; 43: 353-60.
- 4 Lee M, Haq A M, Wright V, Longton E. Periarthritis of the shoulder: a controlled trial of physiotherapy. *Physiotherapy* 1973; 59: 312-5.
- 5 Berry H, Fernandes I, Bloom B, et al. Clinical study comparing acupuncture, physiotherapy, injection and oral anti-inflammatory therapy in shoulder cuff lesions. *Curr Med Res Opin* 1980; 7: 121-6.
- 6 Richardson A T. The painful shoulder. *Proc R Soc Med* 1975; 68: 731-6.
- 7 Binder A I, Bulgen D Y, Hazleman B L, Robert S. Frozen shoulder: a long term prospective study. *Ann Rheum Dis* 1984; 43: 361-4.
- 8 Bedi S, Crook P R, Dick W C, Griffiths I D, Platt P N. Costs of providing a rheumatology service. *Br J Rheumatol* 1987; 26: 454-7.
- 9 Huston G J. An offer of rheumatology training: failure to influence clinic referrals. *Br Med J* 1988; 296: 1773-4.