Extracorporeal shock wave treatment for chronic calcific rotator cuff tendonitis.

From the Brisbane Hand & Upper Limb Clinic, Arnold Janssen Centre, Brisbane Private Hospital, 259 Wickham Terrace, Brisbane, Qld 4000, Australia.

C P Roberts FRCS (Tr. and Orth.), Upper Limb Fellow

K Cutbush FRACS, Upper Limb Fellow

J McCarthy DCRR, Lithotriptor

D Gilpin FRACS, Consultant Orthopaedic Surgeon

P F R Duke FRACS, Consultant Orthopaedic Surgeon

M Ross FRACS, Consultant Orthopaedic Surgeon

Please address correspondence to:

Dr C Roberts
Upper Limb Fellow
Princess Alexandra Hospital
Woolloongabba
Brisbane
QLD 4102
Australia

Tel: 00 61 7 3240 2111
Fax: 00 61 7 3240 5156
E-mail: chris_roberts@iclway.co.uk

Abstract

Surgery is commonly recommended for chronic painful calcific tendonitis of the shoulder unresponsive to standard non-operative treatments. We report on the use of extracorporeal shock wave treatment as an alternative to surgery.

Prospectively collected visual analogue pain scores of a consecutive series of 26 patients undergoing extracorporeal shock wave treatment for chronic calcific tendonitis of the shoulder were collected. Patients were later reviewed by follow-up questionnaire.

Visual analogue pain scores showed a symptomatic improvement by 6 weeks with further improvement by 3 months. This improvement was maintained in the longer term. Only 4 (15%) patients had to undergo surgery for recalcitrant pain. No complications of the treatment were observed.

Extracorporeal shock wave treatment is a safe and successful alternative to surgery in the treatment of chronic painful calcific tendonitis of the shoulder.

Introduction

Calcific tendonitis as a cause of shoulder pain was first described in 1872 as Maladie de Duplay. Its aetiology and pathogenesis remain unclear. Tendon calcifications have been observed in between 2.5 and 20% of patients without pain in their shoulders and in as many as 54% of patients with shoulder disorders [1]. The deposits are most commonly observed in the supraspinatus tendon. The disease is usually self-limiting but if symptoms persist after several months of non-operative treatment surgical removal has been recommended [2].

Traditional non-operative treatment of calcific tendonitis consists of physiotherapy, non-steroidal inflammatory drugs and steroid injections that can be guided by ultrasound. More recently interest has grown in the use of extracorporeal shock wave treatment (ESWT) for this condition with success rates of 58-80 % being reported [1,3,4].

Shock waves are transient pressure disturbances that in the medical setting are generated through a fluid medium with a coupling gel being used to facilitate transmission into biologic tissues [5]. Shock waves generate high stresses that act on boundary interfaces and, in addition generate tensile forces that cause cavitation.

The mechanism of the therapeutic effect of extracorporeal shock wave therapy for this condition is uncertain. Some authors favour the theory of direct mechanical disintegration of the deposit; others prefer long-lasting hyperstimulation analgesia [1].

Method

This study is a consecutive series of patients referred by our unit who underwent ESWT for chronic calcific tendonitis of the shoulder. All patients in whom the treatment was used from January 2001 to August 2002 were identified. Visual analogue pain score data was collected prospectively.

Inclusion criteria were shoulder pain for greater than six months in combination with a calcific deposit within the rotator cuff. All had tried at least one other non-operative treatment modality. Patients were individually assessed and the options of surgical removal of the deposit and ESWT were discussed. Patients then selected their treatment option.

Treatment was carried out using a Dornier EPOS Ultra lithotripsy machine by a single operator. The shockwave was formed as a cigar shaped focus which was centred on the calcification using ultrasound guidance. Treatment was started at the lowest energy for every treatment and progressively increased from 0.03mJ per shock at level 1 to 0.5mJ per shock at level 9 depending on patient tolerance. The shock rate was also changed from 60-240 shocks per second again depending on patient tolerance. Three treatments were given at weekly intervals.

Visual analogue pain scores were collected before treatment and at 6 and 12 weeks after commencing treatment. All patient notes were reviewed. Surgery or other further treatment was taken as failure of the ESWT. Patients were contacted by questionnaire a minimum of six months after completion of treatment to obtain further pain scores and

ensure whether or not patients had received further treatment unbeknownst to the clinician that had referred the patient for ESWT.

Visual analogue pain data for each patient was tabulated and analysed. The two-tailed paired t-test was used to compare paired data. Patients were excluded from analysis if they had undergone surgery. As multiple tests were performed the significance level was adjusted using Bonferroni's correction. The adjusted critical p-value for significance was taken as 0.0125.

Results

Twenty-six shoulders in 25 patients were treated. There were 9 males and 16 females with an average age of 50 years (range 28-66). Nineteen right shoulders and seven left shoulders were treated.

Patients had symptoms for an average of 22 months (range 6-70 months) before commencing treatment. Nineteen patients (73%) had previously received corticosteroid injections and 21 patients (81%) had received physiotherapy. All patients had tried one or other modality. Other treatments tried included acupuncture (two patients) and mistletoe injections (one patient).

Four patients (15%) underwent surgical excision of the calcific deposits for recalcitrant pain at an average of 5.4 months (range 1.9-7.4) from commencing treatment. In one patient this was before the 3-month pain score.

Patients that were not known to have undergone surgery were contacted by postal questionnaire or telephone. All 22 patients were contacted at an average of 18 months (range 7-26) after completing treatment. No patients had undergone surgery elsewhere. Three patients (12%) had received further physiotherapy but no patients had received further corticosteroid injections. One patient had subsequently received acupuncture treatment and two patients had undergone an additional session of ESWT.

Visual analogue pain scores are shown in Table 1. Pain scores were significantly reduced by six weeks ($p<0.001$). A further significant improvement in pain score was seen by three months ($p=0.001$). No significant deterioration is pain score was seen at final review by questionnaire ($p=0.43$). The pain scores remained significantly improved at final review if initial scores were compared with final scores ($p<0.001$).

There were no device related problems and no systemic or local complications of the ESWT.

If the definition of success of ESWT in our study was that the treatment allowed patients to avoid surgery then our success rate was 85%. If success was allowing patients to avoid any further intervention then the success rate was 69%.

Discussion

Extracorporeal shock wave treatment has proved successful and safe in the treatment of renal calculi since its introduction in 1980. These results lead to the use of ESWT in several other fields of surgery such as the treatment of biliary tract stones. More recently

ESWT has been used in the treatment of a variety of musculo-skeletal conditions such as enthesopathies, calcifying tendinopathies and fracture non-unions.

When traditional non-operative treatments for chronic calcific tendonitis of the shoulder, such as physiotherapy and corticosteroid injections, have proved unsuccessful surgery is usually offered. Open surgery is regarded as quick and dependable with good or excellent results in 79-89% [3]. Arthroscopic methods of removing the deposits have gained in popularity with the advantage of avoiding damage to deltoid. Success rates for arthroscopic surgery of 50-82% have been reported [3].

In this self-selected group of patients ESWT has enabled 85% of our patients to avoid surgery. Prospectively collected pain scores have shown that a symptomatic improvement was achieved by 6 weeks, further improvement was seen by 3 months and this was maintained in the longer term. No complications of the treatment were observed.

Our results have affirmed those of others that ESWT is a safe and successful alternative to surgery for chronic calcifying tendonitis of the shoulder for patients in whom other non-operative treatments have failed.

References

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Table 1

Visual Analogue Pain Scores				
	Mean	S.D.	Variance	Patients
Initial	5.77	1.99	3.94	26
Six weeks	2.97	2.27	5.14	26
Three months	1.65	1.52	2.32	25
Questionnaire	1.86	2.40	5.74	22