Manipulation and injection for hallux rigidus

IS IT WORTHWHILE?

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Manipulation of the metatarsophalangeal joint and injection with steroid and local anaesthetic are widely practised in the treatment of hallux rigidus, but there is little information on the outcome. We report the results of this procedure carried out on 37 joints, with a minimum follow-up of one year (mean, 41.2 months). Patients with mild (grade-1) changes gained symptomatic relief for a median of six months and only one-third required surgery. Two-thirds of patients with moderate (grade-2) disease proceeded to open surgery. In advanced (grade-III) hallux rigidus, little symptomatic relief was obtained and all patients required operative treatment. We recommend that joints are graded before treatment and that manipulation under anaesthetic and injection be used only in early (grades I and II) hallux rigidus.

Received 12 June 2000; Accepted after revision 8 January 2001

Hallux rigidus is a common condition with an estimated incidence of 1 in 40 in subjects aged over 50 years. Many aetiologies have been proposed including trauma, but most cases are idiopathic. The patient presents with gradual onset of pain, swelling and stiffness of the first metatarsophalangeal joint (MTPJ). There is limited dorsiflexion due to the formation of osteophytes around the dorsal aspect of the articular margin on the head of the first metatarsal. A fixed plantar flexion deformity may occur, hence the original name of hallux flexus.

Plain radiographs may show flattening of the distal articular surface of the first metatarsal, a narrowed joint space, osteophytes on the medial, lateral and dorsal aspects of the metatarsal head and proximal phalanx with sclerosis and cyst formation in the subchondral regions as the condition advances. These radiological changes have been divided into mild (grade 1), moderate (grade 2) and severe (grade 3) (Table I).

Non-operative treatment includes the use of non-steroidal anti-inflammatory agents, and orthoses which aim to reduce the movement that produces pain. Surgical treatment includes resection arthroplasty, metal or ceramic hemiarthroplasty, silastic interposition arthroplasty, soft-tissue interposition arthroplasty, metatarsophalangeal arthrodesis, phalangeal and metatarsal osteotomy, cheilectomy and arthroscopic debridement.

Manipulation under anaesthetic (MUA) and injection with steroid and local anaesthetic may be used either as an empirical treatment or in an attempt to delay operative intervention. Despite many review articles, little mention is made of the efficacy or otherwise of this technique, and there are no reports which support its use.

We have investigated the outcome after MUA and injection of the first MTPJ in patients with hallux rigidus.

Patients and Methods

A total of 31 consecutive patients with hallux rigidus (37 MTPJs) had MUA of the MTPJ and injection, under general anaesthesia. The injection was a mixture of 40 mg of depotmedrone (2 ml) made up in 3 ml of 0.5% bupivacaine. Distension of the joint and flexion of the toe were considered to be signs of a successful intra-articular injection. Imaging was not used routinely to confirm this. Preoperative radiographs were assessed for the severity of degenerative changes (Table I). The grading was undertaken by an experienced observer (JDFC) who was not aware of the outcome of the MUA and injection.

Failure was determined by the return of significant symptoms or the decision to recommend surgery. All patients who remained symptom-free were followed up at a minimum of one year in order to confirm that they were still improved, and had not sought further treatment elsewhere. The time to failure could thus be calculated for all patients.

Kaplan-Meier survival estimates were calculated, and statistical analysis was made by comparison of the survivor
functions for the three grades by the log-rank test. The length of symptomatic relief for all groups was compared using the Kruskal-Wallis test, and individual groups were compared using the Wilcoxon rank-sum test. Statistical significance was taken at the level of $p < 0.05$.

**Results**

One patient (1 MTPJ) died and her preoperative radiograph was missing. A second patient (1 MTPJ) could not be contacted. Although both were asymptomatic after six weeks they were excluded from further analysis.

Therefore, 29 patients (35 MTPJs) were available for review at a mean of $41.2 \pm 15.6$ months after MUA and injection. The mean age of the 18 men and 17 women was $52.3 \pm 11.04$ years.

Classification of the preoperative plain radiographs revealed 12 MTPJs with grade-1 changes, 18 with grade-2 and five with grade-3.

Of the 35 MTPJs, 21 had or were scheduled for an operation. Four of 12 MTPJs with grade-1 changes, 12 of 18 with grade-2 changes and all five with grade-3 changes required surgery. The median duration of symptomatic relief for those patients with grade-1 changes was six months (1 to 12) and for those with grade-2 changes three months (1 to 12). Minimal benefit was obtained in patients with grade-3 changes; the median time to surgical treatment being recommended was two months (1 to 3) and this was significantly shorter than for those patients with grade-2 changes ($p = 0.025$). There was no significant difference between patients with grade-1 and grade-2 changes in the time to surgical treatment being recommended ($p = 0.107$). Survival estimates are shown in Figure 1.

Minimal symptomatic relief was obtained for patients with grade-3 changes. The median symptomatic relief for this group was zero months (0 to 1) and this was significantly poorer than for those patients with grade-1 or grade-2 changes ($p = 0.014$). No significant difference in symptomatic relief was demonstrated between those patients with grade-1 and grade-2 changes ($p = 0.357$).

**Discussion**

Many operations have been described for the treatment of hallux rigidus. Those which preserve the joint include open and arthroscopic dorsal cheilectomy, for which excellent results have been reported. $^{3,6,8,13,16}$ In 1927 Cochrane, $^{17}$ and Watson Jones $^{18}$ first proposed MUA of the MTPJ as a means of breaking down the capsular adhesions responsible for the flexion contracture. MUA and injection with steroid
and local anaesthetic are an attractive proposition due to the simplicity and relative safety of the procedure and the fact that if it fails to provide symptomatic relief it does not complicate subsequent operative procedures. Repeated intra-articular injection of steroid is not advisable.19

The results of our study show that those patients with mild hallux rigidus (grade 1) enjoy symptomatic relief for a median of six months after MUA and injection. Even in this group up to one-third will eventually request surgical treatment. No patients were considered of their discomfort for longer than one year, but many were improved sufficiently to manage without further treatment. All the patients who did not require surgical treatment stated that they would accept another MUA and injection if their symptoms warranted it. Thus for grade-1 hallux rigidus the treatment may be considered worthwhile.

When MUA and injection are used to treat patients with moderate (grade-2) changes symptomatic benefit may be achieved for a median of three months, but approximately two-thirds will require an operation. Grade-3 hallux rigidus has been divided into two subgroups, depending on the presence or absence of a dorsal osteophyte.18 Because of the small numbers in this study, grade-2 joints were not subdivided. MUA and injection may, however, be expected to be less useful in patients with grade-2 changes in whom dorsal impingement occurs as a consequence of a large dorsal osteophyte. When considering grade-2 patients as a whole, these results suggest that MUA and injection are of limited benefit.

Patients with grade-3 hallux rigidus all had surgical treatment planned within three months and enjoyed limited, if any, symptomatic relief. It is clear that MUA and injection are not indicated for this group.

The outcome of treatment varies dramatically between patients with different preoperative radiological grades. Radiological assessment is essential before treatment. Two standard views allow adequate visualisation of the joint space. A dorsal osteophyte may obscure a well-preserved joint space if the anteroposterior view alone is relied upon.19 This may lead to a grade-2 joint being mistaken for one with grade-3 changes.

The authors would like to thank Mr M. Patterson, FRCS and Mr E. Parnell, FRCS for permission to include their patients in this study, and Dr Paul Bassett from the Department of Medical Statistics, Imperial College School of Medicine Science and Technology, University of London for statistical advice.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References