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Review

Treatment of Morton's neuroma: A systematic review

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ABSTRACT

Background: The treatment of Morton's neuroma (MN) can be operative, conservative and infiltrative. Our aim was the evaluation of evidence on outcomes with different types of conservative, infiltrative and surgical treatment in patients affected by primary MN.
Methods: The bibliographic search was conducted in MEDLINE, Cochrane Library, DARE. Only studies in English were collected. The last search was in August 2015. Case series and randomized controlled trials (RCTs) assessing patients' satisfaction or pain improvement at an average follow-up of at least 6 months after treatment of primary MN were included. Two reviewers selected the studies, evaluated their methodological quality, and retrieved data independently.
Results: Of 283 titles found, only 29 met the inclusion criteria. Data showed better outcomes with operative treatment.
Conclusions: The evaluated case series and few RCTs showed better results with invasive treatment. More and better RCTs which evaluate risk-benefit ratio are required to confirm these results.

Contents

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1. Introduction

Morton's neuroma (MN) is a degenerative neuropathy featuring fibrosis of the common interdigital nerve [1]. It is a common pathology mainly affecting middle age women, although there is lack of data on its frequency [2]. Its incidence in UK was 50.2% for men and 87.2% for women per 100,000 of patients presenting to primary care [3].

Four aetiopathogenetic theories have been proposed [4], chronic traction damage [2], inflammatory environment due to intermetatarsal bursitis [5], compression by the deep transverse intermetatarsal ligament [6,7], and ischemia of vasa nervorum [8].

The treatment for MN is initially conservative, progressing to infiltrations and then surgery, if the previous steps fail, according to the therapeutical algorithm available in literature [2,9,10].

The treatments considered as conservative consist in patients' education on avoidance of tight shoes, manipulation and use of insoles or other special orthotic appliances.

The infiltrative treatments include injections of local anaesthetics, steroids or alcohol and percutaneous radio-frequency ablation.

The surgical treatments consist of neurectomy or neurolysis, which can be performed open, either via a dorsal or plantar approach, or mini-invasive. The latter is aimed at decompressing the nerve by division of the deep intermetatarsal ligament, either endoscopically or percutaneously.

The studies, which assess the results of treatment, have a follow-up from one week [11] to 10 years [12,13].

The length of follow-up allows to identify durable results and to define complications of treatment, failures and recurrences. According to Mann, it takes one year following neurectomy to develop a symptomatic amputation neuroma, after a pain-free postoperative period [14].

The aim of this review is to compare the outcomes of the different types of Morton's neuroma treatment. Primary outcome defines which treatment provides the best result at an average follow-up of at least 6 months in terms of patients' satisfaction, improvement of pain and other symptoms. Patients' satisfaction is based on Johnson's scale [15] and other scales. Pain was measured with VAS and other scales (number rating scale, NRS). The follow-up of studies on conservative treatment usually lasts for few weeks to 6 months, in case of infiltrations 6–12 months, for surgical studies it can last for years. To compare the results of all types of therapy we have chosen a 6-month follow-up.

Secondary outcome defines the evaluation of complications, recurrences and failures for each type of treatment. Such events are complementary to the primary outcome. It is important to distinguish between mere adverse events and recurrences. The first, such as haematoma, infection, postoperative pain, allergic reactions to injected drugs are only a temporary setback, whereas the second can have a long-term impact on patients' quality of life.

2. Methods

2.1. Criteria for considering studies for this review

Studies were identified by searches in electronic libraries, trial registries and bibliographic quotations. Two reviewers (A.F. and S. V.) independently carried out the bibliographic searches and studies' selections, holding into account the inclusion and exclusion criteria (described later). Cases of disagreement were arbitrated by a third reviewer (G.J.P.). The authors of the selected studies were never contacted. Searches were carried out on MEDLINE (1946 to August 2015), Cochrane Library (1979 to August 2015), DARE (1995 to August 2015), ClinicalTrials.gov and PROSPERO by combining "Morton's neuroma", "neuroma", "surgery", "infiltrative", "conservative", "treatment".

We have included prospective and retrospective case series and randomized controlled trials (RCTs) which assess the results of conservative, infiltrative and operative treatments in patients with diagnosis of primary MN, excluding stump neuroma and recurrences, with a mean follow-up of at least 6 months.

We excluded papers in languages other than English, case reports and animal studies.

We excluded studies in which X-rays and histology showed that a sizable proportion of patients presented pathologies other than Morton's (usually bursitis and synovitis) and in which the results were cumulative and did not differentiated the neuroma from the other forms of metatarsalgia. One such study, even if excellent from a methodological point of view, was excluded on account of 31% ultrasound confirmed bursitis [16]. Many studies on primary MN exclude patients with rheumatoid arthritis, diabetes mellitus and foot deformities. Many others do not state whether such conditions are cause for exclusion. A few studies do include some such patients. Because of such disparity we decided not to consider those conditions as exclusion criteria. We did not exclude papers on the basis of publication date or status.

We excluded studies which presented bias with overestimation of results, as for protocol analysis in controlled randomized trials.

One important requirement for inclusion was that the primary outcome be assessed after a mean follow-up of 6 months. This was an arbitrary choice based on the observation that studies on conservative and infiltrative treatment have a mean follow-up usually inferior to 6 months. Therefore our choice of 6 months allowed us to compare studies on the three types of treatment. Furthermore, it is twice the length of follow-up reported in a previous Cochrane Review [17]. Studies with follow-up periods and outcomes not clearly defined were excluded.

The evaluation of the secondary outcome was added to our protocol secondarily because, during selection of the articles, we often noticed that complications and recurrences were either unreported or cumulated as adverse events. Moreover, some authors report reoperation rates without naming their causes. Assessing the correct reporting of complications and recurrences is useful to identify cases of excessively positive reporting of results.

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