A one-year case series of arthrocentesis with hyaluronic acid injections for temporomandibular joint osteoarthritis

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Abstract

Objective The present study presented a case series on the efficacy of arthrocentesis with hyaluronic acid injections for the treatment of TMJ osteoarthritis by providing patients evaluations at a one-year follow-up.

Materials Twenty-five patients with a diagnosis of osteoarthritis according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) Axis I (Group IIIb) underwent a cycle of five arthrocentesis with injections (one per week) of 1 ml hyaluronic acid. A number of clinical parameters (pain at rest and mastication; masticatory efficiency; maximum non-assisted and assisted mouth opening; functional limitation; subjective efficacy and tolerability of the treatment) were assessed by the same blinded operator at the time of the diagnosis (baseline), at each appointment during the treatment and at one-week, one-month, three-months, six-months and one-year follow-up appointments.

Results Descriptive analysis showed improvements which were maintained over time for all the study parameters. Permutation tests evidenced the significance of changes which occurred in many clinical parameters within the first two injections. Differences with baseline levels remained significant at the end of the follow-up period, in particular for the masticatory efficiency and pain at mastication (minimum and maximum).

Conclusions Data from the present investigation supported findings from studies on other joints, which showed the efficacy of serial injections of hyaluronic acid after arthrocentesis to reduce symptoms of osteoarthritis and to maintain improvements over time.

Materials and Methods

Study design

Criteria for inclusion in the study were the presence of a diagnosis of osteoarthritis according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) Axis I (Group IIIb) in the absence of TMJ RDC/TMD muscle disorders (Group I diagnoses) and rheumatic diseases. According to RDC/TMD guidelines, a Group IIIb diagnosis of osteoarthritis was made when the following signs and symptoms were present:

- arthritis (TMJ pain with lateral and/or posterior palpatation plus anamnestic reporting of TMJ pain during maximum voluntary mouth opening and/or maximum assisted mouth opening and/or lateral excursions);
- crepitus sounds;
- radiological signs of TMJ bone structures abnormalities, such as erosions, sclerosis, flattening, osteophytes.

Twenty-five patients (23 females, 2 males; mean age 60.8; range 40-75) satisfying inclusion criteria gave informed consent to the treatment received and took part to the study. The study design provided a cycle of five arthrocentesis with injections (one per week) of 1 ml hyaluronic acid (Hyalgan, Fidia, Abano Terme, Italy) according to the technique described by Guarda-Nardini et al. and five follow-up assessments after the end of the treatment (at one week, at one month, at three months, at six months, at one year).

A number of clinical parameters were assessed by the same blinded operator at the time of the diagnosis (baseline), at each appointment during the treatment and at each appointment during the follow-up period:

- pain at rest and mastication, assessed by means of a Visual Analogue Scale (VAS) from 0 to 10, with the extremes being "no pain" and "pain as bad as the patient ever experienced" respectively;
- mastication efficiency, assessed by a VAS from 0 to 10, the extremes of which were "eating only semi-liquid and "eating solid hard food";
- maximum non-assisted and assisted mouth opening (in mm);
- functional limitation during usual jaw movements (0, absent; 1, slight; 2, moderate; 3, intense, 4, severe);
- subjective efficacy of the treatment (0, poor; 1, slight; 2, moderate; 3, good; 4, excellent);
- tolerability of the treatment (0, poor; 1, slight; 2, moderate; 3, good; 4, excellent).

Statistical analysis

We implemented a new nonparametric permutation approach, as proposed by Pesarin, for multivariate repeated measure problems. The purpose of our analysis was to evaluate the treatment effects both during the cycle of injections and during the follow-up period.

Results

Table 1. Mean and standard deviation values of minimum and maximum pain at mastication and pain at rest (VAS values), and maximum non-assisted (voluntary, MVMO) and assisted (MAMO) mouth opening in mm.

Table 2. Mean and standard deviation values of minimum and maximum pain at mastication and pain at rest (VAS values), and maximum non-assisted (voluntary, MVMO) and assisted (MAMO) mouth opening in mm.

Conclusions

Data from the present investigation supported the usefulness of serial hyaluronic acid injections performed after arthrocentesis for the treatment of TMJ osteoarthritis and for the maintenance of improvements over a 1-year follow-up period in a case series of 25 patients. Besides, the treatment protocol was well tolerated by the patients, who also reported a good subjective efficacy. These findings need to be re-evaluated by future researches with an appropriate design to overcome the present study’s limitations. Indeed, further investigations are needed to determine which is the effective part of the protocol; to generalize findings to larger samples; to compare the efficacy of this protocol with that of simple treatments alone, placebo, and other intrarticular medications.