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Research Article

Intra Articular Hyaluronic Acid (Hylan G-F 20) in patients with knee meniscal injuries: A retrospective cohort study

Abstract

Aim: To determine the outcomes and satisfaction of patients who presented to a primary care musculoskeletal clinic and sports medicine clinic with a clinical or magnetic resonance imaging confirmation of knee meniscal tear and who subsequently received an injection of intra articular hyaluronic acid.

Methods: This was a retrospective cohort study. Patients presenting to the clinics between January 2014 and July 2016 with an isolated diagnosis of knee meniscal tear and who subsequently received articular hyaluronic acid injection were selected. Evaluation of the pain was done using a numeric scale (0-10) before the injection and at least one year later. Duration of relief and patient satisfaction were also studied.

Results: 103 of 156 eligible patients were selected (66%). Sixty three (61.2%) patients had relief of symptoms at least one year after the injection. Mean pain scales decreased from 8.03+/-1.36 at pre-injection moment to 3.34+/-2.58, 14.4+/-1.1 month after injection ($p<0.005$). Mean satisfaction with the procedure was 3.8+/-1.4 on a Likert Scale ranging from 1(very unsatisfied) to 5 (very satisfied).

Eighty eight (85.4%) of patients would not consider surgical interventions as a first line treatment of their knee injury. Three patients (2.9%) eventually chose knee surgery.

Conclusion: Intra articular hyaluronic acid injections for isolated knee meniscal tears in primary care patients provides relief of symptoms in the majority of cases and is well accepted by these patients. It is recommended as part of the initial treatment options.

Introduction

Knee meniscal injury is a major cause of morbidity since it restricts patients' ability to work, to do exercise and to do some daily living activities. Intra articular hyaluronic acid (IAHA) has been approved for the treatment of knee osteoarthritis in human patients with minimal side effects [1]. In animal studies there has been evidence of meniscal lesions healing induced by IAHA [2]. There were however few data in the literature about IAHA in the treatment of knee meniscal injuries and patients' preferences for surgical or conservative treatment in the management of their meniscal injuries.

The aim of this study was to analyze the IAHA effect on knee pain, stiffness and swelling in patients with the diagnosis of meniscal tear after at least one year of follow up, to determine the percentage of patients who needed surgical treatment and to evaluate patients' preference of surgery vs conservative treatment of their meniscal tears.

Methods

This was a retrospective cohort study. Medical records of patients who presented to both a primary care sports medicine and musculo-skeletal injury clinic in Trinidad and Tobago with a diagnosis of a meniscal injury and who received IAHA between January 2014 and July 2016 were selected from a computer database. This allowed a minimum follow up at least about one year. Demographic data and whether the patient's diagnosis was made by magnetic resonance imaging (MRI) or by the clinical examination were noted. Presenting pain scales, the number of IAHA injections received and the patients' current level of physical activity they participated in (sedentary, recreational or exercise and amateur or professional sport involvement) were

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recorded. In addition, compliance with a six week post injection follow up and the clinical findings of the knee examination at this visit were noted. The Numeric Rating Scale (NRS) for pain was used to evaluate pain intensity [3]. Phone numbers were taken from the clinic databases and patients were called by trained phone interviewers. The information that they asked for were current symptoms and pain scales compared to pre-injury levels including what was the outcomes in terms of pain scores, swelling and stiffness. Patients who had physiotherapy sessions and/or surgical treatment after IAHA injection were identified. Patients' satisfaction with the IAHA injection was evaluated using the Likert scale ranging from 1(very unsatisfied) to 5 (very satisfied) with a score of 3 representing a neutral response [4]. Patients' preferences for surgery versus conservative treatment were determined.

The data were then entered into a spread sheet and simple frequencies and cross tabulations were done using SPSS version 20. Cross tabulations between mode of diagnosis (clinical vs MRI) AND time of relief (no relief, 1-12 months and >12 months) and Age (<40, >/= 40 years) versus time of relief were done. Student t test was done for the differences between pre and post pain scores. The level of significance was set at 5%.

Each IAHA injection was of 2 ml. Prior to the injection the skin overlying each patient's knee was cleaned with 5% iodine solution first and then 70% alcohol skin cleaning solution after. The medial patella injection approach was used where the needle and prefilled syringe unit was inserted behind the medial aspect of the patella and the contents deposited into the knee without resistance. If resistance to flow was encountered while injecting, the needle was repositioned until the resistance was not felt. All patients who received IAHA signed informed consent to receive the injections and all who responded gave consent to use their data for this research paper.

Results

A total of 156 patients were screened and called, of whom 103 were contacted and interviewed. The response rate was 66%. The mean period of follow up was 14.4+/-1.1 months post injection (range 12-17 months) Twenty five patients (24.7%) had MRI confirmation of diagnosis. The characteristics of the population are shown in Table 1.

All 103 (100%) of patients stated that the meniscal injury had limited their physical activity. When asked about whether they would consider surgical repair of their lesion as a first line treatment, 88 (85.4%) responded "no", 12 (11.7%) responded that they would only consider surgery if all other non-surgical procedures failed and 3 (2.9%) stated that they would not mind surgery.

Table 2 shows response to IAHA and patient satisfaction.

The change in mean pain scale between before the IAHA injection (8.03 +/-1.36) and after the injection at time of interview (3.14+/-2.58) at a mean time of 14.4 months later was significant at p<0.0005. The change in NPS is shown in (Figure 1).

After the IAHA, 35 patients had further treatment. Thirty two (31.1%) patients had physiotherapy and 3 (2.9%) patients had surgery.

Only 31 (30 %) of patients had repeat examination as recommended at 6 weeks post injection. These examination revealed negative clinical test for meniscal injury in 25 (81%) of responders. For cross tabulation, time of relief following IAHA was independent of both patients' age (chi square=0.81, p=0.67) and diagnosis mode (chi square=5.6, p=0.07).

Discussion

This retrospective cohort study showed that after at least one year of IAHA injection, about 62 % of the participants were still having significantly less pain. About 13% of patients did not respond at all to IAHA. The reduction of pain was significant

Table 1: The characteristics of the study population.

Characteristic	Frequency (%)
Gender	
Male	61(59.2)
Female	42(40.8)
Age	
<40 years	26(25.1)
>/=40 years	77(74.8)
Lesion	
Medial Meniscus	78(75.7)
Lateral Meniscus	25(24.3)
Activity level before injury	
Sedentary	18(17.3)
Exercise >/= 1 time per week	17(16.5)
Recreational sport/ amateur sport	47(43.6)
Professional sport	21(20.6)
Number of IAHA injections received	
One	81(78.6)
Two	16(15.5)
>/=3	6(5.9)

Table 2: Patients' response to and satisfaction with IAHA.

Question	Frequency (%)
How long did you get relief after IAHA?	
No relief	14(13.6)
< 6 months	16(15.5)
6-12 months	10(9.7)
>12 months	63(61.2)
Which symptom(s) changed with the IAHA*?	
Decreased pain	89(86.4)
Decreased swelling	64(62.1)
Increased activity	81(78.6)
*patient chose 1 or more responses	
How many symptoms improved with IAHA?	
Three symptom	7(6.8)
Two symptoms	23(19.4)
One symptom	62(60.2)
Level of satisfaction with IAHA	
1 very unsatisfied	13(12.6)
2 unsatisfied	6(5.8)
3 neither satisfied nor unsatisfied	14(13.6)
4 satisfied	30(29.2)
5 very satisfied	40(38.8)

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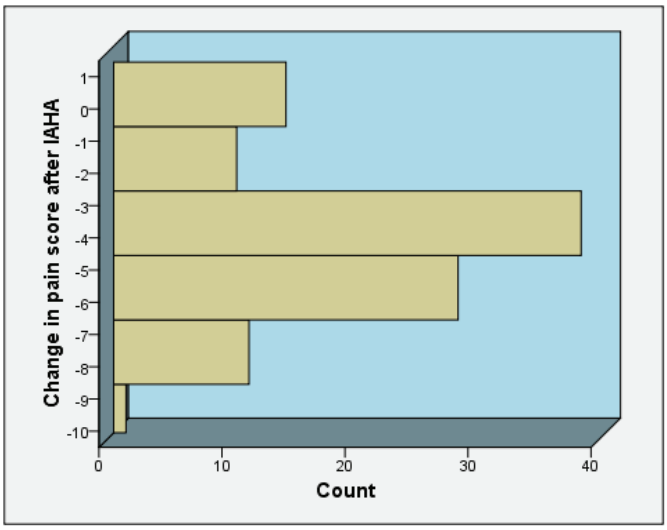

Figure 1: The change in Numeric Pain Scores between pre-injection scores and post injection scores at a mean of 14 months apart.

and was independent of whether the meniscal lesion was diagnosed by clinical or MRI exam and of the patients' age. It has been found that a 2 point reduction in this Numeric Pain Scale to be clinically important [3]. About a 1/3 of patients had to do physiotherapy after the injection but only 3% needed knee surgery. The injection was well received by the patients.

Most patients did not consider surgery as a first line treatment. About 1/10 would try surgery only if all conservative measures failed. A previous study showed that partial meniscectomy followed by supervised physiotherapy treatments was not found to be superior to supervised physiotherapy sessions alone in patients with meniscal tears [5]. It is still unknown the mechanism of action of the IAHA that leads to the resolution or reduction of knee symptoms but it has been found that IAHA has anti-inflammatory, anti oedematous and viscoelastic properties [6]. In addition there has been evidence of enhanced healing of meniscus in rabbits when IAHA injections was compared to saline after artificial lesions. IAHA attenuates cartilage damage in rabbits [7]. The patients in this study did not have any follow up of their injured knees after IAHA injection by MRI, arthroscopy or cartilage biopsy to confirm healing. It was impossible to determine whether the meniscal lesions were actually healed or not in our study. However the symptoms were better and allowed increased activity among most respondents which led to patient satisfaction. IAHA is not available in the drug formulary as part of free public health care available in Trinidad and Tobago so cost and affordability became a factor in patients' choice of treatment. Intra-articular corticosteroid injections which are far cheaper than IAHA for knee pains, was also an option available but the effects are short term when compared with IAHA at least in cases of osteoarthritis [8], and there are deleterious effects on the meniscus and cartilage seen post injection in middle aged persons with osteoarthritis [9]. It should not be used injudiciously in young patients.

The strengths of this study must be stated. The sample was representative of a variety of age groups, both genders, and persons of various activity levels ranging from sedentary to professional athletes. This study also had some limitations; the first was in different diagnosis modes. However it has been demonstrated that the clinical examination of patients to diagnose medial, lateral meniscal tears and ACL tear by experienced practitioners is just as sensitive and specific as an MRI [10]. The practitioner doing the examinations had over 15 years doing these examinations so this would have reduced this source of bias. Secondly, the exact location of the meniscal lesions was not recorded. The avascular areas are fairly resistant to healing effect of IAHA effect as opposed to the vascular peripheral areas which is receptive to healing in animal studies [11]. Thirdly, the retrospective nature of study could explain some data insufficiencies. A prospective randomized controlled trial of IAHA vs physiotherapy vs saline injections could be done in the future to give higher scientific evidence of the effect of IAHA on meniscal healing.

In conclusion, the use of IAHA in patients presenting to primary care musculoskeletal medicine and sports clinics seems to be an effective first line treatment for patients suffering with meniscal tears.

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