ORIGINAL ARTICLE

COMPARISON OF EFFICACY OF NSAIDS WITH INTRA- ARTICULAR INJECTION OF CORTICOSTEROIDS IN PATIENTS OF TEMPOROMANDIBULAR DISORDER WITH INTERNAL DISC DISPLACEMENT WITHOUT REDUCTION

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Background: Temporomandibular disorders (TMD) are a diverse set of musculoskeletal and neuromuscular problems involving the temporomandibular joint complex and surrounding muscles [1]. TMD prevalence has varied from one location to the next, with estimates ranging from 6 to 68 % in various types Objectives were to compare the efficacy of NSAIDs with intra-articular injection of corticosteroids in patients suffering from temporomandibular disorders (TMD) due to disc displacement without reduction in terms of mean pain score and mean mouth opening. This Randomized control trial was conducted at the Oral & Maxillofacial Surgery Department, PMC Dental institute, Faisalabad Medical University, Faisalabad, Pakistan, from 6th April 2018 to 6th April 2019. **Methods:** All the diagnosed cases of temporomandibular disorder due to disc displacement without reduction were included. Study group (Group1) was injected with 1ml of Triamcinolone acetonide 40 mg/ml once, every three weeks & Control group (Group 2) was given Naproxen 550 mg two times a day for 3 weeks. Pain and mouth opening were assessed at initial presentation & then after 3 weeks interval. **Results:** Total 80 patients were enrolled in the study (40 in each group). The mean age of patients in Control group was 28.73±4.88 years and in study group was 28.68±4.89 years. From 80 patients, 51 (63.80%) were females and 29 (36.20%) were males with 3:1 female to male ratio. Mean pain score was 4.18±0.93 in group 1 and 2.65±0.74 in group 2 after 3 weeks with p-value of 0.0011. Mean mouth opening after 3 weeks was seen as 34.93±1.82 mm in group 1 and 32.28±1.75 mm in group 2 with *p*-value of 0.0015. **Conclusion:** Intra-articular injections of corticosteroids are better than NSAIDs in reducing pain and improving mouth opening in patients suffering from TMD due to DDwoR.

Keywords: s-Temporomandibular joint disorders; Intra-articular; Corticosteroids; NSAIDs

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INTRODUCTION

Temporomandibular disorders (TMD) are a diverse set of musculoskeletal and neuromuscular problems involving the temporomandibular joint complex and surrounding muscles.[1] Temporomandibular disorders prevalence has varied from one location to the next, with estimates ranging from 6–68% in various types.[2] Temporomandibular joint disc displacement without reduction (TMJ, DDwoR) is a specific TMD which can be acute or chronic depending upon duration of disc displacement, its incidence among TMD patients is about 35.7%.[3]

Sign & symptoms include pain in temporo-mandibular joint, decrease in maximal interincisal opening (MIO), loss of previous joint sounds.[4,5] Diagnosis is most often based on a comprehensive history, an accurate physical examination & patient's symptoms.[6] Conservative therapy is less effective in some patients owing to structural abnormalities, therefore more complex treatments such as intra-articular injections with steroids and hyaluronic acid, arthrocentesis, arthroscopy, and open surgery for TMJ may have to be employed as therapeutic possibilities.[7]

Inflammation affects the disc attachment and several inflammatory mediators perform a vital role in pathogenesis of TMJ, DDwoR.[8] NSAIDs inhibit the release of these inflammatory mediators in masticatory muscles. However, NSAIDs should be used on short term basis to prevent their side effects and work best when used on regular basis for a period of 2–4 weeks.[9]

Corticosteroids have a powerful anti-inflammatory impact. Intra articular injections of corticosteroid is a minimally invasive procedure

that can be performed under local anesthesia & provides effective relief of symptoms.[10] NIH focus on a conservative & non-surgical treatment of TMD, DDwoR preferring pharmacological & less invasive treatment over surgical interventions.[11] Various interventions have been suggested for disc displacement without reduction, but no protocol has been reported yet to establish which treatment is most effective & which should be done first.[12] Therefore, the aim of this study was to compare the efficacy of treatment of NSAIDs & intra-articular injections of corticosteroids in patients of TMD due to DDwoR.

MATERIAL AND METHODS

The study was carried out in Oral and Maxillofacial Surgery department of Allied Hospital Faisalabad from 6th April 2018 till 06th April 2019. Permission to carry out study was taken from ERC of the hospital and informed written consent was taken from all patients. The lottery method was used to divide newly diagnosed TMD patients into two groups. Control group was given tab. Naproxen 550 mg two times a day for 3 weeks & study group was injected with 1 ml of Triamcinolone acetonide 40mg/ml once, every three weeks. Injections were given by the principal researcher. A line was drawn from tragus to lateral canthus of eye (Homlund line), under local anesthesia inj. triamcinolone was inserted using 3 cc syringe & (25G) needle 10 mm anterior to tragus & 2 mm below the homlund line. Before injecting the solution was aspirated to prevent injecting into a blood vessel.

Patients having known allergy to NSAIDs or steroids, pregnant females and patients with history of mandibular fracture were excluded from this study. Only newly diagnosed cases of temporomandibular disorder due to disc displacement without reduction were included in the study and previously diagnosed patients who were already undergoing any treatment were excluded. Pain of both groups was recorded at every visit using Visual Analogue Scale (VAS) and mouth opening was measured as the distance in millimeters between the incisal edges maxillary and mandibular central incisors using vernier caliper weekly for a period of 3 weeks. Follow-up was done by taking patient's contact number. The results were analyzed using SPSS-20.0. Categorical variable such as gender was expressed as frequency and percentage. Comparison of mean pain score and mouth opening at base line & after 3 weeks between both groups was done by Independent 't' test and *p*-value ≤0.05 was taken as significant.

Figure 1: Administration of Steroid Injection

RESULTS

Both groups consisted of 40 patients each. Age range was from 18 to 40 years with mean age of 28.70±4.88 years. The mean age of patients in control group was 28.73±4.88 years and in study group was 28.68 ± 4.89 years. Out of 80 patients, 51 (63.80%) were females and 29 (36.25 %) were males with female to male ratio 3.1.48. In 60% patients, right joint was involved while 25% cases involved the left joint. Bilateral involvement was seen in 15% of cases.

VAS at base line was 7.78±2.33 in control group & 7.60±1.56 in study group, after 3 weeks of treatment, mean VAS scores in control group were 4.18±0.93 while in the study group, mean VAS scores were 2.65±0.736 (*p*-value 0.0001). The results were statistically significant between both groups. (Table-1) In control group, baseline maximal interincisal opening was 16.38±2.94 mm while in study group it was 14.72±2.98mm. After 3 weeks of treatment, mouth opening in the control group improved to 32.35±1.84mm with *p*-value 0.036. In the study group, post treatment mouth opening was 34.98±1.874mm with *p*-value 0.0048. The results were statistically significant within the group and between the group (Table 2).

Table-1: Comparison of NSAIDs with intra-articular injection of corticosteroids in terms of mean pain score

	Group 1	**Group 2**	***p*-value**
	Mean ± SD	Mean ± SD	
Pain score at base line	7.78 ±2.337	7.60 ± 1.516	0.692
Pain score after 3 weeks	4.18 ± 0.931	2.65 ± 0.736	0.0001
***p*-value**	0.0001	0.0001	

Table-2: Comparison of NSAIDs with intra-articular injection of corticosteroids terms of mean mouth opening

	Group 1	Group 2	*p*-value
	Mean ± SD	Mean ± SD	
Mouth opening (mm) at base line	16.38 ± 2.924	14.72 ± 2.978	0.015
Mouth opening (mm) after 3 weeks	32.35 ±1.847	34.98 ±1.874	0.0001
***p*-value**	0.0001	0.0001	

DISCUSSION

Treatment of TMD with DDwOR ranges from initial treatment with self-management strategies, NSAIDs, antidepressants, muscle relaxants, opioids, occlusal therapy and physiotherapy to Intra-articular injections of corticosteroids, hyaluronic acid & botox.[13] NSAIDs are a class of drug that suppresses the synthesis of prostaglandins by inhibiting cyclo-oxygenases.[14] NSAIDs are used to treat mild to severe acute inflammatory disorders in the TMJ.[15] Ibuprofen, naproxen, diflunisal, and ketorolac are just a few of the NSAIDs that have been proven to help with dental pain[16]. The effect of NSAIDs on the gastrointestinal (GI) system is the most serious side effect.[17] As a result, prescription NSAIDs to a patient with active GI illness is not advised[18]. Ta and Dionne investigated the efficacy of NSAIDs in the treatment of TMD for 6 weeks in a study. Naproxen considerably improved the symptoms of painful TMJ disc dislocation when compared to a placebo.[18]

Corticosteroids are medications that are chemically similar to cortisol, a hormone generated by adrenal glands. These highly effective anti-inflammatory medications are used to treat moderate to severe TMD.[19] In order to reduce the discomfort and dysfunction associated with TMD, corticosteroids may be injected directly into the TMJ, taken orally, or used topically. For intra-articular injection, a variety of corticosteroid formulations are available.[21] Before injection into the TMJ, intra-articular corticosteroid formulations are frequently diluted with a local anesthetic. This method has been recommended to reduce the risk of soft tissue atrophy and associated problems.[19]

Our study was conducted to compare NSAIDs with intra-articular injection of corticosteroids in patients suffering from temporomandibular disorders (TMD) due to disc displacement without reduction in terms of mean pain score and mean mouth opening. Mean age of 28.70±4.88 years with age ranging from 18 to 40 years. 45 patients were 18 to 30 years of age. Literature review showed greater association between increasing age & DDWoR[23], severity of this condition increases with increasing age.

Out of 80 patients, 51 (63.80%) were females and 29 (36.20%) were males with female to male ratio of 3:1. Literature is full of studies comparing gender differences in TMD due to DDwOR and almost all of them also showed females being more prone to suffer from this condition than males[20]. Differences in collagen structure, hormonal, anatomic differences, behavioral & genetic variations have been linked to females being more affected than males.[21,22]

In our population out of total 80 patients 48 had involvement of right TMJ, while 20 had left & only 12 had bilateral joint involvement. These differences are attributed to geographical variations in eating pattern, type of food & parafunctional habits & overall lifestyle that collectively affects pathogenicity of TMD due to DDWoR. Type & severity of malocclusion also very closely correlates with a particular joint involvement whether right or left or both.[23]

In our study, mean pain score after 3 weeks was seen as 2.65±0.74 in intra- articular injection of corticosteroids group when compared with base line VAS 7.60±1.516 with p-value 0.0001 and 4.18 ± 0.93 in NSAIDs group where base line value was 7.78±2.337 with *p*-value of 0.692. when intra-group efficacy of drug was assessed applying paired t-test the p- value was 0.0001 in group 1 as well as in group 2. This shows that efficacy of both drugs in their own groups was statistically significant. But when group 1 was compared with group 2 through independent t - test, decrease in pain score after 3 weeks was remarkable in group 2 as compared to in group 1. These results regarding improvement in mouth opening again showed that NSAIDs does improve mouth opening in group 1 patients although it's less magical than that of intra -articular injections of corticosteroids.

In a study conducted by Aveed Samiee *et al*, intra-articular injection of corticosteroids were given to 48 diagnosed patients of TMD due to DDwOR mean mouth opening after treatment was 29mm±6.51 with *p*-value 0.0004 & VAS score ranged from 2 to 7 (average 4) after injection.[24] This mouth opening is far better when compare to our results that is 34.98mm±1.82 & VAS score is very less where average was 2.65±0.74 after treatment with intra-articular corticosteroid injections. In another study evaluating the role of NSAIDs in the management of TMD, mean mouth opening after 3 weeks of treatment was 30.06mm± 0.12 & mean pain on VAS score was 5.06±0.02.[25] These results when compared with results of our group 1(NSAID group) where mouth opening achieved after treatment was 32.28mm±1.75 & VAS

4.18±0.93 shows somehow equal efficacy of NSAIDs. These studies show comparable results to our study regarding efficacy of both treatment options but significantly showing corticosteroids a much better treatment modality.

Main complications reported with NSAIDs treatment are related to gastrointestinal system. All NSAIDs cause gastritis and bleeding in the gastrointestinal tract, and long - term usage raises the risk of renal insufficiency, especially in diabetic individuals [26]. In our group 1, we have not included patients with GI & Cardiovascular risk factors, while 4 out of 40 patients develop mild pain in epigastrium that was relieved by giving proton pump inhibitors (PPIs) & by not taking medicine on empty stomach.

It is extremely important to administer the intra-articular injection into the correct anatomical place, as most of the complications reported in literature are related to faulty technique owing to operator inefficiency. In short term treatments (up to 3 weeks), the complications related to corticosteroids are very less while in long term treatment other intra-articular injections i.e. sodium hyaluronic acid showed far better results with fewer side effects.[27] In our group 2, only two patient developed temporary facial nerve palsy, which persisted for appx 45 minutes. The patient's facial nerve function was normal during the follow-up visit.

This study has few limitations as well. The study was conducted at single center with small sample size. Further the follow-up period was also short.

CONCLUSION

Both treatment modalities in our study were effective in their own study groups but intra-articular injection of corticosteroids were better than NSAIDs in patients suffering from temporo-mandibular disorders (TMD) due to disc displacement without reduction. Decrease in pain was remarkable after injection & increase in mouth opening was significant.

Conflict of interest: None declared

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AUTHORS' CONTRIBUTION

AL: Concept, data collection. RS: Data collection, write-up. FZZ: Write-up, data analysis. MU: Data interpretation. HJ: Proof reading.

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