

Effects of Local Injection of Steroids in Treatment of Posttraumatic Temporalis Muscle Trismus

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ABSTRACT

Background: Trauma to the temporalis muscle sometimes associated with the trismus that may interfere with many daily activities like eating, speech and oral hygiene maintenance, so the treatment is necessary.

Aims of study : were to evaluate the effects of local injection of steroids triamcinolone in and around the scar in the temporalis muscle to alleviate the trismus.

Materials and methods : Thirty patients presented with trauma in Al-Salam teaching hospital to the temporal region. The procedure done by using local anesthetic agent injected by dental syringe around the scar. Then 1 ml of triamcinolone acetonide injected directly in the scar area and the injection site covered by surgical dressing. Jaw stretching exercise start immediately after injection and daily basis exercises. Two injections interval about 3 weeks repeated in the scar area. The exercise done four times daily for 10 minutes and lasting for four weeks. The improvement of mouth opening checked every five days and mean taken by measuring the inter incisal distance by a ruler. The follow up period continues for 3 months after treatment.

Results : There is significant post-operative improvement of mouth opening and the range of inter incisal distance became about 2-4 cm, The patients who start treatment within first two months after trauma show significant improvement in comparison with those who start treatment after 3 months were there is a certain relapse in spite of prolong time and frequency of muscle stretching exercise.

Conclusions : Post-traumatic trismus can be treated by early management of local steroid injection along with jaw stretching exercise for masticatory muscle if started in proliferating phase of wound healing.

Keywords : local injection, steroids, posttraumatic temporalis muscle, trismus.

آثار الحقن الموضعي للستيرويدات في علاج التصلب العضلي الصدغي التالي للرضح

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الخلاصة

الخلفية : أحياناً ما ترتبط الصدمة التي تصيب العضلة الصدغية بالضيق الذي قد يتداخل مع العديد من الأنشطة اليومية مثل الأكل والكلام والحفاظ على نظافة الفم ، لذا فإن العلاج ضروري.

أهداف الدراسة : كانت لتقييم آثار الحقن الموضعي للستيرويدات تريامسينولون داخل وحول الندبة في العضلة الصدغية للتخفيف من التلج عن طريق استخدام الإكلينيكية وقياس المسافة بين القطبين.

المواد وطرق العمل : ثلاثون مريضاً تعرضوا لصدمة في مستشفى السلام التعليمي للمنطقة الزمنية. تتم العملية باستخدام ٢ مل من عامل التخدير الموضعي عن طريق حقنة الأسنان حول الندبة. ثم يتم حقن ١ مل من تريامسينولون أسيتونيد مباشرة في منطقة الندبة وموقع الحقن المغطى بضمادة جراحية. تبدأ تمارين شد الفك مباشرة بعد الحقن وتمارين الأساس اليومية. حقنتان بين الفاصل الزمني حوالي ٣ أسابيع تتكرر في منطقة الندبة. يتم التمرين أربع مرات يومياً لمدة ١٠ دقائق ويستمر لمدة أربعة أسابيع. يتم فحص تحسين فتح الفم كل خمسة أيام والوسيلة المأخوذة عن طريق قياس المسافة القاطعة بواسطة مسطرة. تستمر فترة المتابعة لمدة ٣ أشهر بعد الانتهاء من مسار العلاج.

النتائج : هناك تحسن كبير بعد الجراحة في فتح الفم وأصبح مدى المسافة القاطعة حوالي ٢-٤ سم ، كيف يبدأ المرضى العلاج في غضون الشهرين الأولين بعد الصدمة يظهر تحسناً ملحوظاً مقارنةً بمن بدأوا العلاج بعد ٣ أشهر هل كان هناك انتكاسة معينة على الرغم من إطالة الوقت وتكرار تمارين شد العضلات.

الاستنتاجات : يمكن علاج التدافع اللاحق للصدمة (داء الأوعية الكاذبة من المفصل الفكي الصدغي) المرتبط بإعاقات وظيفية كبيرة عن طريق الإدارة المبكرة لحقن الستيرويد الموضعي جنباً إلى جنب مع تمرين شد الفك لقطع العضلات المضغية والتليف إذا بدأ في مرحلة تكاثر التئام الجروح.

الكلمات المفتاحية : الحقن الموضعي ، الستيرويدات ، العضلة الصدغية التالية للرضح ، التئاج.

INTRODUCTION

The craniofacial region considers one of the most complex anatomical regions in the body. It consists of a complex bony system and contains many vital organs like brain, eyes and ears. With temporomandibular joint (TMJ) exception, these bones fused with each other through a fixed craniofacial sutures. There are many skeletal muscles attached to the facial bones like masticatory muscles and muscles of facial expressions. These voluntary muscles have many functions like speech, mastication, swallowing, mouth opening and closure and facial expression like angry, laughing and sadness. There are four main masticatory muscles, these are the masseter, temporalis, medial and lateral pterygoid muscles. The lateral pterygoid muscle responsible for mouth opening while the temporalis, masseter and medial pterygoid muscles responsible for mouth closure. (The scope of this study is concentrated on temporalis muscle). The temporalis muscle is a fan shape like skeletal muscle originated from nuchal line of temporal bone and inserted in the coronoid process of mandible and covered by temporal fascia. The nerve supply of this muscle comes from the mandibular division of trigeminal nerve and the arterial supply from branches of maxillary artery. This muscle plays an important role in jaw closure. Trismus means restricted mouth opening (normal interincisal distance between 35-45 mm)¹. Many causes may be attributed to limited mouth opening like facial trauma, infection, temporomandibular joint dysfunction, dental treatment, tumors, tetanus and after radiotherapy of head and neck cancer². Trismus may interfere with many daily activities like eating, speech and oral hygiene maintenance³.

The temporal region trauma that occurs after shell injuries, road traffic accident (RTA), assault and after surgery specially neurosurgery and temporomandibular joint surgery may be associated with remarkable limited mouth opening as a result of cutting the fibers of temporalis muscle. Establishment of comfortable mouth opening is essential for better mastication, oral health care, speech, swallowing and enhance

psychological condition and quality of life in patient with post traumatic trismus⁴. Many treatment modalities have been suggested for management of trismus including medication like nonsteroidal anti-inflammatory drugs (NSAIDs), muscle relaxant and steroid¹, physical therapy like serial jaw stretching exercise with wooden tongue depressor or screw⁵, Ultra sound and laser⁶. The role of surgery in management of trismus induced by scarring and fibrosis illustrated by excision of affected tissue and grafting with myocutaneous or free microvascular flaps⁷.

The aims of the clinical study are to evaluate and assess the effects of local injection of steroids triamcinolone in and around the scar that created by trauma to the temporalis muscle to alleviate the trismus by employing clinical improvement and measuring the interincisal distance

MATERIALS AND METHODS

The study was done in the maxillofacial unit in Al-salaam teaching hospital/ Nineveh health directorate in Mosul/Iraq. Over all 30 patients presented with trauma to the temporal region because of shell injury, road traffic accident, assault, sport injuries and post-surgery had been selected in this study. The criteria of patient selection include those who presented with early trauma (within 1-5 months after trauma) not allergic to steroids, middle age, free from systemic steroid use, and agree to involve in study.

Exclusion criteria: late trauma more than 6 months of trauma, post scar maturation, child, mental retardation, uncooperative patient, refusal treatment, blunt trauma. Special case sheet performed for each patient including personal and demographic information, medical history, investigations and treatment plan. The procedure was done under local anesthesia (2% lidocaine and 1/80.000 epinephrine). Nonsteroidal anti-inflammatory drugs and muscle relaxant prescribed one hour before injection to reduce pain and enhance muscle stretching during jaw exercise. The injection site was shaved and disinfected by 10% povidone iodine and toileted, then two ml of local

anesthetic agent injected by dental syringe around the scar. After waiting for five minutes in order to obtain deep and effective anesthetic effect, a 1 ml of triamcinolone acetonide (40 mg kenacort ampule) diluted with 1 ml of anesthetic solution consist of 2%lidocain and 1/80.000 epinephrine injected directly in the scar area with multiple needle sticks within the non-matured scar tissue and the injection site covered by surgical dressing in order to control oozing blood from the injection sites. The patient kept on systemic nonsteroidal anti-inflammatory drugs for five days (400 mg Ibuprofen tablets three times daily post prandial). Jaw stretching exercise start immediately after injection and daily basis exercises. The muscle stretched by progressive increasing the number of wooden tongue spatula placed between both jaws in the incisal region. Two injections with in between interval about 3 weeks repeated in the scar area. The exercise done four times daily for 10 minutes and lasting for four weeks. The improvement of mouth opening checked every five days by measuring the inter incisal distance by a ruler and the reading recorded in special table designed for this purpose by two dependent specialist oral maxillofacial surgeon and mean taken to avoid bias. The injection starts between 3 weeks to 5 months after trauma. The follow up period continues for 3 months after completion the course of treatment. SPSS version 26 utilizing non-parametric tests /Wilcoxon test.

RESULTS

Thirty patient presented with trismus, because of trauma to the temporal region were included in this study. The age of the patients ranged between 15 to 55 years (mean 35 y). The right side of the temporal region affected more than left side (20 cases detected in the right side and 10 cases find out in the left side). Sex distribution show male preponderance (22 patients are male 73.34% and 8 patients are female 26.66%). The etiology of trauma in descending order are 50% of the cases due to shell injury, 20% patients presented with history of RTA, 13.33% patients has a history of assault injury, neurosurgery account for 10% cases and 6.66% patients exposed to sport injury. The range of inter incisal distances at patient presentation range between 5-15mm. There is significant post-operative improvement of mouth opening and the range of inter incisal distance became about 2-4 cm, as shown in (Table 1). Eighteen patients begin treatment within 3-8 weeks after trauma and 12 patient arrive hospital 3-6 months after accident. The patients who start treatment within first two months after trauma show significant improvement in comparism with those who start treatment after 3 months were there is a certain relapse in spite of prolong time and frequency of muscle stretching exercise. In addition, the patients who presented with severe trauma show less acceptable result comparing with minor trauma.

Table (1): Descriptive Statistics and Wilcoxon Signed Ranks Test Pre and post operatively

N		Mean	Std. Deviation	Minimum	Maximum	Sig. (2-tailed)
Pre-operative	30	9.9444	2.83823	5.00	15.00	0.000*
Post-operative	30	31.6111	5.44641	20.00	40.00	

*P value < 0.05 is significant

DISCUSSION

Traumatic injuries to the maxillofacial region may associated with significant, esthetic and functional dilemmas⁸. There may be vital organ loss, hard and soft tissue damage with subsequent complications like cranial nerves injuries and loss of sensory and motor function like smell, taste, mastication, swallowing and jaw movement that may affect the oral health care in addition to negative impact on psychological and social status of the victims⁹. The degree of damage depends on cause and severity of trauma¹⁰. Post traumatic facial scars have a significant cosmetic and function problems like trismus, lid retraction and

epiphora, anatomical lips distortion with subsequent drooling due to fibrosis and soft tissue retraction. The goals of management of the scars represented by fading, leveling, softening, increase elasticity and decrease discomfort of the scars. There are many modalities of treatment suggested for management of facial scars like application of certain creams and ointment, intralesional steroid injection, surgical excision, laser, chemotherapy and cryotherapy¹¹. Local steroid injection shows a promising results in management of keloid and hypertrophic scar with improvement of facial esthetic and function that have a positive impact in the psychological and social status of the

patients¹². The scientific concept that encourage us to adopt this line of treatment strategy in management of pseudoankylosis of temporomandibular joint due to post-traumatic scar in the temporal region that associated with functional disability, is the idea of steroid action as anti-inflammatory and decrease excess collagen synthesis during wound repair process. This action will help in softening of the fibrous tissues and increasing tissue elasticity that will improve jaw movement and mouth opening. This kind of scar management is simple, less invasive cheap and easily obtained. Minimum side effect associated with local steroid injection represented by pain, bleeding and bruising that are easily controlled and managed. The variation of results in our study may be related to severity of trauma and the time of treatment, less invasive trauma and early treatment that start between 3-8 weeks after trauma show better out come in comparism with severe trauma and delayed treatment protocol that start between 3-5 months after trauma due to muscle shortage and scar maturation. The delayed treatment in some cases lead to progressive decrease in mouth opening that associated with many functional problems in daily activities like speech, eating and oral care. Some literatures talking about using local injection of 5-flourouracil(5-FU) in management of post-traumatic scars but this kind of treatment associated with complication like hyperpigmentation, erythema and pruritus¹³. In a study done by Gassner et al they use a botulinum toxin injection in the scar management and they found that this treatment protocol enhances wound healing and reduce scar formation in addition to local muscle paralysis that improve jaw movement¹⁴, their result coincides with our finding that depends on local steroid injection. The problems with botulinum toxin is the transient effect of the toxin, cost, need experienced operator in calculating the dose and repeated injection every six months. A study performed by Heroki Y, et al they treat a case of extra-articular ankyloses of temporomandibular joint due to bilateral post-traumatic masseter muscle fibrosis by local steroid injection combined by massage and mouth opening exercise with little improvement in mouth opening¹⁵, this may be due to late presentation of the patient and delayed treatment protocol where there is complete scar maturation and muscle shortage and little or no effect of local steroid injection at this stage of wound healing and remodeling, their finding match our results especially in delayed treated patients.

The steroid has antimitotic effect therefor the scientific researchers believed that the mechanism of action of steroid represented by interfering with fibroblast and keratinocyte activity that responsible

for collagen fiber deposition that occur in randomized fashion in case of scar tissue formation in addition to its anti-inflammatory, immunosuppression and vasoconstriction effect, therefor the best time for obtaining acceptable results obtained when steroid injected during proliferative phase of wound healing where there is excessive collagen tissue formation¹⁶. From esthetic and functional perspective, understanding the physiology of wound healing and scar tissue formation is the mainstay in management of post-traumatic facial scar complication.

CONCLUSIONS

Pseudoankylosis of TMJ associated with significant functional disabilities like speech, mastication, swallowing and oral health care. Early management is crucial for better post-operative results. Local steroid injection along with jaw stretching exercise is of effective ways in management of post-traumatic trismus associated with masticatory muscle cut and fibrosis if started in proliferating phase of wound healing.

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