Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: xyz

AUTOLOGOUS BLOOD INJECTION FOR TREATMENT OF CHRONIC RECURRENT TMJ DISLOCATION

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Abstract

Background-Whenever the condyle crosses the articular eminence and travels far anteriorly during opening, the temporomandibular joint (TMJ) becomes dislocated. An intra-articular effusion then frequently stretches the ligaments surrounding the joint, resulting in excruciating pain, difficulties speaking and eating, and spasms in the muscles surrounding the joint.

Methodology: Thirty individuals who had recurrent chronic total joint dislocation were split into two groups of equal size at random (15 participants each). The second group got autologous blood infusions to the two pericapsular tissues (PT) and the superior joint space (SJS), while Group A received just autologous blood infusions to the SJS.

Results: The present investigation's findings at the completion of the one-year follow-up phase indicated that injecting autologous blood into both the PT and the SJS had a higher success rate (80%) than injecting it into the SJS alone (60%). Additionally, the B in cohort individuals' optimum mouth opening decreased on average by 5.3 +/- 2.1, compared to group A participants' 3.6 +/- 1.5. Additionally, as opposed to being anterior to the articular eminence prior to the injection, the condylar head was only visible posterior to it in its open state on the computerised radiography imaging of the joints in group B. No detrimental alterations to the joint's skeletal elements have been seen in either cohort.

Conclusions: The research presented here suggests that injecting autologous blood into the TMJ of patients experiencing recurrent chronic dislocations is a straightforward, secure, and economical procedure.

Introduction

When the mouth is opened, the disk-condyle complex extends abnormally far from its normal path, causing a temporal eminence and partial separation of the articular surfaces. This depression in front of the tragus indicates that the glenoid fossa is empty, and it locks or briefly catches in that position before returning to the glenoid fossa. This condition is known as temporomandibular joint subluxation.[1,2] Preauricular discomfort and a harsh, loud clicking are typically present with this. Recurrent subluxations are subluxations that happen again, either at short or lengthy intervals. The

stability of any joint depends on three main factors—the integrity of its capsule and ligaments, neuromuscular mechanism of the joint function and the osseous morphology of its bony components, such as the condyle, glenoid fossa, articular eminence, zygomatic arch and squamo-tympanic fissure. TMJ subluxation is typically caused by a variety of factors, such as abnormal osseous morphology, such as a hypoplastic zygomatic arch with a superficial and poorly grooved glenoid fossa; a small, atrophic, or malformed condylar head that readily slips out of the glenoid fossa; or an elongated, steep, and obliquely inclined articular eminence that evokes recurrent dislocations and makes their reduction and redirecting especially challenging. The condition may be brought on by a traumatic episode like forceful mouth opening during laryngoscopy/endoscopy[3], prolonged dental/ENT procedures, excessive mouth opening during yawning/laughing/vomiting or seizure/epileptic episodes, or abnormal chewing movements. Predisposing/aggravating factors include Ehlers-Danlos and Marfan's syndrome[4], patients on neuroleptic analgesics[5], etc.

Around 80.5% of autologous blood injections are found to be successful overall. TMJ autologous blood injection's mode of action is not entirely understood. However, scarring and the creation of fibrous tissue would constitute the pathophysiological response to blood injected into the TMJ's pericapsular tissue and superior joint space. Thus, the idea behind autologous blood injection is to promote fibrosis within the capsular tissue, which in turn limits the range of motion for the mandible. For patients with repeated TMJ dislocation who are not candidates for surgery, autologous blood injection may be an acceptable substitute to surgery. The process is not yet commonly employed, though.[5]

Methodology

In an attempt to standardise the management of recurrent TMJ dislocation, the present investigation was conducted at the Department of Oral and Maxillofacial Surgery, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow. The purpose of the research was to assess the safety, stability, and effectiveness of TMJ autologous blood injection. The Declaration of Helsinki on medical protocol and ethics is adhered to in this investigation. Nineteen patients in all were diagnosed with chronic recurrent TMJ dislocation based on the clinical and radiological criteria of Nitzan when they came to our hospital. People who are older than eighteen and have been diagnosed with recurrent TMJ dislocation according to the Nitzan clinical criteria episodes of multiple condylar dislocations, The research included the inadequate conservative techniques, such as chin cap restriction, facial bandage, maxillomandibular fixation, or mouth opening training based on the self-reduce TMJ dislocation, with signed consent. In addition, temporomandibular joint inflammatory disorders like rheumatoid arthritis and tuberculous arthritis, signs of a tumour or lesion resembling a tumour in the TMJ, Metabolism disorders that produce temporomandibular issues, among which are crystal deposition diseases like gout, pseudogout, or crystal arthritis, simultaneous facial palsy, A significant concurrent systemic condition, such as malignant hypertension, a previous episode of serious cardiovascular illness, or a cerebrovascular accident within the last six months, hemorrhagic gastric ulcers, uncontrolled diabetes, apparent bleeding tendency and Under anticoagulant therapy were excluded from this research**.**

Figure 1: Preoperative mouth opening (approximately 60 mm)

The individual had to be placed supine, and after cleaning the skin surrounding the TMJ with an antiseptic solution, the auriculotemporal nerve was given a local anaesthetic. The mandibular branch of the trigeminal nerve's posterior branch is called the auriculotemporal nerve. It ascends with the superficial temporal artery across the zygomatic arch after passing via the parotid gland and the external auditory canal and TMJ. It provides feeling to the skin of the temporal area and lateral section of the head, as well as to the external auditory meatus, tympanic membrane, parts of the pinna, and the TMJ. The closest method is to palpate the temporal artery as it passes over the zygomatic arch close to the zygoma root. In order to have the finest view of the ceiling of the glenoid fossa, a sterile US probe was positioned over the TMJ, parallel to the zygomatic arch, and inclined towards the ramus. Assessments, both static and dynamic, were carried out following probe placement. The Diasonics (Milpitas, CA) CV 400, equipped with a 10 MHz probe, was utilised for the examinations. This device offers the highest resolution power for scrutinising the superficial components. Although connective and muscle tissues were isoechoic and showed grey in US visuals, cortical bone tissues and metallic objects like needles were typically hyperechoic and appeared white. The articular disc was visualised as a thin, hyperechoic region inside a hypoechogeneous space.

The articular fossa was then found to be 2 mm inferior to the canthotragal line and 10 mm anterior to the ear's tragus. In order to move the mandibular condyles partially down the glenoid slope and provide access to the superior joint space (SJS), the patient was forced to close their anterior teeth on a small biting block. Five millilitres of Ringer's lactate were then used to swell the joint capsule. Here, a 16-gauge, one-inch-long needle was introduced into the SJS with US guidance. The needle's position inside the SJS was verified by draining the lactated Ringer's solution. The patient's antecubital fossa was used to take about 3 ml of blood, of which 2 ml were administered into the SJS and 1 ml in the pericapsular tissue (PT) in a peppering fashion with needle touching the bone at all times. The procedure was repeated on the opposite side in case of bilateral involvement.

To limit the mouth opening to 20 mm, an elastic head bandage was placed, and the patient was instructed to wear it for 24 hours during the first week and at night during the second. Analgesics and antibiotics were administered, along with a two-week soft diet. After two weeks, the patients progressed their diet as tolerated and started doing controlled range-of-motion exercises in front of a mirror. At the end of two weeks, three months, six months, and a year, the patients were assessed for the decrease in the frequency of dislocation events, maximal mouth opening, discomfort (visual analogue scale [VAS]), and TMJ sounds (present or absent). A statistical analysis was performed on the gathered data to evaluate the precision and potency of this method.

Results

The mean age of the 14 female and 5 male participants in the investigation was 28.58 ± 7.53 years (range: 18–42 years). Four patients experienced the issue independently, while 15 patients had bilateral chronic recurring dislocation. Of the patients, 5 needed assistance, while 14 were able to self-reduce their dislocation. The average length of the signs and symptoms was determined to be 12.74 ± 4.70 months (with an interval of 06–24 months), and the mean number of episodes per week (6–20/weeks) prior to surgery was 10.15 ± 3.86. 18 patients (95%) were asymptomatic two weeks after surgery, and only 1 patient (5%) reported a dislocation recurring, which was successfully managed with a follow-up injection. At the ensuing follow-up appointments, nobody mentioned dislocation [Table 1].

Table 1: Details of the patients-Preoperative and Postoperative

S. No	Age (yrs)	Sex	TMJ Sounds	Involvement(side)	Dislocation episodes (per week)			Duration (month)	Mouth opening (mm)		VAS score	
					Pre-op	Post-op (2 weeks)	Post-op (1 year)		Pre-op	Post- op (1 year)	Pre-op	Post-op (1 year)
1	29	F	Present	Bilateral	10	Nil	Nil	12	51	34	6	0
2	19	M	Absent	Bilateral	6	Nil	Nil	12	49	32	4	0

3	38	F	Present	Bilateral	8	Nil	Nil	18	55	35	0	0
4	40	M	Present	Bilateral	8	Nil	Nil	15	60	35	0	0
5	34	F	Absent	Bilateral	8	Nil	Nil	06	56	40	4	0
6	23	F	Absent	Left	10	Nil	Nil	09	59	42	4	0
7	28	F	Present	Right	10	Nil	Nil	15	47	35	5	0
8	28	F	Absent	Bilateral	06	Nil	Nil	12	48	32	0	0
9	29	F	Present	Bilateral	12	Nil	Nil	24	62	45	5	0
10	21	F	Present	Bilateral	20	Nil	Nil	20	53	31	4	0
11	37	M	Absent	Bilateral	10	Nil	Nil	16	55	35	0	0
12	42	F	Absent	Bilateral	08	Nil	Nil	12	57	35	4	0
13	18	F	Absent	Left	08	Nil	Nil	12	60	40	4	0
14	26	F	Absent	Bilateral	07	Nil	Nil	12	47	42	0	0
15	24	M	Absent	Bilateral	10	Nil	Nil	09	49	36	4	0
16	20	M	Absent	Bilateral	10	Nil	Nil	06	51	35	0	0
17	32	F	Absent	Bilateral	12	3	Nil	06	50	35	3	0
18	35	F	Present	Right	20	Nil	Nil	14	66	42	0	0
19	20	F	Absent	Bilateral	10	Nil	Nil	12	48	38	4	0

The patients did not exhibit any signs of scarring, irreversible deviation in mouth opening, or significant decrease in mouth opening. Two of the patients experienced a flare-up of their postoperative pain, which was effectively managed with narcotic medicine. All of the patients had a transient posterior open bite, which went away in a day.

Discussion

Initial report of ABI prolotherapy for the treatment of TMJ hypermobility was made by Brachmann[6] in 1964. It continues to be heavily marketed as a straightforward, safe, noninvasive, and affordable treatment choice ever since it was introduced, yet the outcomes have always been somewhat variable. The intricate anatomic structure of the TMJ leads to poor precision when using clinical judgement and palpatory skills, necessitating the use of imaging guidance for intra-articular blood injections. Because ultrasonography visualises tissue dynamically, it can help to extend these palpatory skills. When a patient detects pressure sensitivity, the US probe is used to concurrently evaluate the tissues and the needle's progress, a technique known as sonographic palpation.[7]

With good outcomes, USG has been utilized as a guide in maxillofacial surgery for salivary stone recoveries, injections into salivary glands, and biopsies.[8] Dayisoylu et al. recommended arthrocentesis guidelines for the United States.[9] It has never been utilised, nevertheless, to guide intra-articular blood injection for the treatment of persistent TMJ dislocation. Because the needle's movement is no longer dependent on palpatory skills, ABI can be carried out by surgeons with less experience underneath US direction, which lowers method sensitivity and postoperative problems.

Intra-articular blood injections to the temporal lobe of the jaw share a pathophysiology with joint bleeding in other body parts, such the elbow or knee. Using an arthroscope, Matsumoto et al. (2010)[11] detected the growth of fibrous tissue between the disc surface and posterior slope of the articular eminence following an ABI three months postoperatively. When cartilage is exposed to blood, chondrocyte metabolic is reduced and cartilage matrix renewal is disrupted, leading to localized contraction. Lately, Candrl et al.[12] found no histological proof of joint cartilage deterioration following ABI, just fibrin accumulations in the tissue specimens.

It is challenging to standardize a US protocol for the TMJ because of the intricate anatomy and wide patient variability. The authors suggest that this could be obtained by using flexible intraoral US probes, which are being employed in the fields of pulmonary and gastrointestinal medicine and may offer a clear and detailed picture of the superior joint compartment.[13] With relative ease, these US probes can be inserted into the buccal vestibule of the oral cavity to acquire a more precise sagittal section image of the glenoid fossa and condylar head. The study's findings might have been impacted by the free-hand technique employed for autologous blood delivery because of an inadvertent hand movement during injection using an automated delivery system can be devised.

This is a landmark research to describe how individuals with persistent, recurrent TMJ dislocations can benefit by using US guidelines for ABI. However, bigger sample sizes for randomized controlled

studies are advised in order to establish a solid procedure for US-guided ABI**.**

Conclusion

As a substitute, minimally invasive, extremely efficient, and precise therapy method, US-guided ABI for individuals with chronic recurrent TMJ dislocations can be carried out as an outpatient and includes radiation-free exposure, real-time visualisation of soft tissues, visualisation of the needle tip promotion, and local anaesthetic propagated pertinent to the adjacent structures.

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