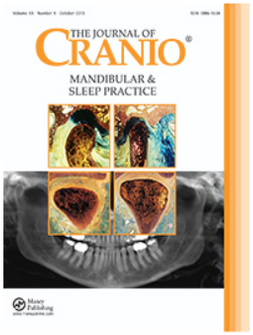

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TMJ

Complications and post-operative sequelae of temporomandibular joint arthrocentesis

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ABSTRACT

Objective: To evaluate intraoperative complications and postsurgical sequelae associated with arthrocentesis of the TMJ, including injection of Sodium Hyaluronate.

Methods: This retrospective study evaluated 433 arthrocentesis procedures performed in 315 patients between January 2009 and August 2016. The authors reviewed the complications identified during the procedure and the follow-up period.

Results: Temporary swelling of the periarticular tissues (95.1%) or the external auditory canal (23.5%), ipsilateral temporary open bite (68.8%), frontalis and orbicularis oculis paresis (65.1%), preauricular hematoma (0.4%), and a case of vertigo (0.2%) were the complications detected.

Conclusions: TMJ arthrocentesis remains a procedure with a minimum number of important complications. If present, complications are generally temporary, caused by the anesthetic effect or by the soft tissue edema created by the fluid extravasation created by the irrigation procedure, and can be managed on an outpatient basis.

KEYWORDS

TMJ; temporomandibular joint; temporomandibular disorders; temporomandibular arthrocentesis; temporomandibular arthrocentesis complications

Introduction

Temporomandibular disorders (TMDs) represent a wide range of functional changes and pathological conditions affecting the temporomandibular joint (TMJ), masticatory muscles, and other components of the oral-maxillofacial region. In recent years, TMDs have become a frequent cause for seeking medical assistance, probably due to psychological tension in modern society [1].

TMDs may be treated conservatively or surgically. Conservative treatments include the use of bite wafers, rehabilitation exercises, isometric exercises, masticatory muscle massage, medical (NSAID, Diazepam, etc.), thermal, and laser therapy. Surgical treatments can be invasive (open approaches) or minimally invasive, including arthrocentesis and arthroscopy. These latter are less invasive and associated with minimal complications, and for this reason they have recently exceeded open operations for patients with TMDs who failed to respond to conservative treatments [2,3]. The efficacy of arthrocentesis in reestablishing normal mouth opening and reducing pain and dysfunction levels has been reported by several authors [1,4–7], and it is similar to that of arthroscopy. Yet, arthroscopy has more frequent complications than arthrocentesis, which is cost-effective and can be performed on an outpatient basis under local anesthesia [2,8–11]. Unlike arthroscopy, there are no large studies that provide data on the frequencies of arthrocentesis' possible complications or sequelae. A proper knowledge of their frequency is crucial in order to obtain an informed consent from the patient and to make the surgeon aware of the procedure risks.

The purpose of this study was to determine the occurrence of surgical complications and post-surgical sequelae in performing arthrocentesis of the TMJ, including the injection of Sodium Hyaluronate.

Materials and methods

In the Maxillofacial Unit of the University Hospital of Sassari, between January 2009 and August 2016, 433 arthrocentesis procedures were performed on 315 patients (252 females, 63 males, mean age: 44.3 years). The same surgeon performed all the procedures. In all patients, a two-needle lavage with 100 cc of Ringer's lactate solution was performed under local anesthesia (Mepivacaine + Adrenaline), as described by Nitzan in

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1991, [12]. Sodium hyaluronate (approximately 1.5–2 cc) was injected inside the articulation at the end of the irrigation [4]. Patients were observed for three hours and then discharged with a prescription of a soft diet for seven days and pain-relieving therapy, as needed. A clinical control was carried out 3, 5 and 30 days after the procedure. Complications detected during the follow-up period were noted. Facial swelling was evaluated by an independent researcher, as described by Baxendale [13].

The study was approved by University of Sassari Ethical Committee and conducted in accordance with the Helsinki Declaration of 1973, as revised in 1983. All patients enrolled in this study signed informed consent forms.

Results

A summary of complications and post-operative sequelae identified is reported in Table 1. Complications detected included temporary swelling of the periarticular tissues (95.1%) and external auditory canal (23.5%), ipsilateral temporary open bite (68.8%), frontalis and orbicularis oculis paresis (65.1%), preauricular hematoma (0.4%), and a case of vertigo (0.2%).

Table 1. Complications detected during and after TMJ arthrocentesis.

Complication	Cases
Temporary local swelling	412 (95.1%)
Mild	213 (51.7%)
Moderate	106 (25.7%)
Severe	93 (22.6%)
Local swelling > 3 days	112 (25.8%)
Mild	80 (71.4%)
Moderate	32 (28.6%)
Severe	0 (0%)
Temporary ipsilateral open bite	298 (68.8%)
Neurologic complications	
VII cranial nerve paresis	282 (65.1%)
VII cranial nerve paralysis	0 (0%)
Auriculotemporal nerve lesion	0 (0%)
Lingual nerve lesion	0 (0%)
Inferior alveolar nerve lesion	0 (0%)
Trigemino-cardiac reflex	0 (0%)
Otologic complications	
External auditory canal lacerations	0 (0%)
Blood clots in external auditory canal	0 (0%)
External auditory canal swelling	102 (23.5%)
Tympanic membrane lesion	0 (0%)
Hearing loss	0 (0%)
Vertigo	1 (0.2%)
Vascular	
Preauricular hematoma	2 (0.4%)
Superficial temporal artery aneurism	0 (0%)
Arteriovenous fistula	0 (0%)
Extradural hematoma	0 (0%)
Parapharyngeal swelling	0 (0%)
Hemarthrosis	0 (0%)
Arthritis	0 (0%)
Intra-articular bacterial infection	0 (0%)
Instrument breakage	0 (0%)

Discussion

TMJ arthrocentesis, first described by Nitzan in 1991 [12], is a simple and effective surgical procedure with the aim of washing out inflammatory mediators, releasing the articular disc, and disrupting adhesions between the surface of the disc and the joint fossa by hydraulic pressure of the lavage solution. The success rate of arthrocentesis in reducing pain and restoring articular function mentioned in the literature ranges between 70 and 90% [4,14,15]. Over time, several changes of the technique have been introduced, such as new entry point of the second needle [16,17], single needle arthrocentesis [18], or the use of double needle cannulas that allow contemporary irrigation and washout through the same device [19–21]. Lavage is commonly performed with at least 100 ml of lactate Ringer's solution that is better tolerated than isotonic solution for cells derived from human meniscus tissue [2]. After the lavage, corticosteroids [16], morphine [22], bupivacaine [23], mepivacaine [24], or sodium hyaluronate [4] can be injected inside the joint as a long-acting analgesic. Finally, computed tomography [25], magnetic resonance imaging [26], or ultrasonography [27] can be used as an imaging guidance during the procedure.

However, all studies presented in the literature analyzed the efficacy of the arthrocentesis in pain relief and other TMDs symptoms without a systematical analysis of the complications. The complication frequency has not previously been defined, but has been considered to be less than that for arthroscopy [2,3,28,29].

The complication rate following arthroscopy has been the subject of numerous studies and is given as between 1.8 and 10.3% [8–11,30]. Some of the possible complications described are temporary or permanent nerve injuries (V or VII cranial nerve), otologic injuries (tympanic membrane perforation, hemotympanum, blood clots in the external auditory canal, laceration of external auditory canal, hearing loss, fullness of the ear), preauricular hematoma, superficial temporal artery aneurism, arteriovenous fistula, transarticular perforation, intracranial perforation, extradural hematoma, parapharyngeal swelling, intra-articular problems (hemarthrosis, arthritis, bacterial infection), and intra-articular instrument breakdown.

As regards arthrocentesis, Nitzan [12] stated that temporary facial paresis or paralysis caused by the use of local anesthetic or swelling of the neighboring tissues are a common consequence of the procedure. Other complications described for arthrocentesis are extradural hematoma [28], severe bradycardia [6], and preauricular infected swelling [12].

In this series of 433 procedures, temporary swelling of the periarticular tissues, due to local dispersion of

irrigation solution, was detected in 95.1% of the patients, also affecting the external auditory canal in 23.5%, but it completely regressed within a few days. In 77.4% of the procedures, swelling was mild to moderate and well tolerated by the patient. In 25.8% of the cases, local swelling lasted more than three days. The increase of the articular vertical dimension, resulting from enlargement of the upper joint space, caused an ipsilateral open bite in 68.8% of the cases, which could persist for a few days. Frontalis and orbicularis oculis paresis was noted in 65.1% of the procedures, but it completely regressed with the end of the local anesthesia effect. Preauricular hematoma was reported two times; in one case, surgical drainage was necessary. However, none of these complications required the hospitalization of the patient, resolving without additional treatment. In only one case, a patient developed objective vertigo, probably due to trans-articular puncture of the semicircular canals with inoculation of the anesthetic solution, which required support therapy, regressing after seven hours [31].

Conclusion

TMJ arthrocentesis remains a method with a minimum number of significant complications. Generally, when present complications are temporary, due to the anesthetic effect or soft tissue fluid extravasation related to the irrigation technique, they can be managed on an outpatient basis. Even if arthrocentesis is a minimally invasive procedure, great attention should be paid to avoiding vascular and nerve injury and respecting the thin bony lamina that separate the upper joint space from the above neurocranial structures. Infringement of these structures can lead to major complications requiring immediate hospitalization for patient monitoring and establishing an appropriate therapy. A proper knowledge of the possible complications and their frequency helps the surgeon achieve the procedure successfully.

Contributors statement

All the authors contributed to the article drafting and approved its final version.

Disclosure statement

The authors declare that they have no conflict of interest.

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