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Complications of temporomandibular joint arthroscopy using two-portal coblation technologies: A prospective study of 475 procedures

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ABSTRACT

Purpose: To study the complications of temporomandibular joint (TMJ) arthroscopic procedures using two-portal coblation technologies.
Materials and methods: The 397 consecutive patients (475 joints) who underwent arthroscopic surgery were prospectively analyzed.
Results: Complications were observed in 39 (8.21%) procedures. Complications recognized during or immediately after surgery were observed in 25 cases (5.26%). Vascular injury in the points of trocar insertion was observed in seven cases. Lesions of the fibrocartilage layer of the joint secondary to introduction of instruments were observed in 12 cases. Bleeding within the superior joint space was observed in 21 cases. Extravasation of irrigation fluid appeared in five patients, affecting the oropharyngeal space in one case. In 20 patients, more than one complication at the time of surgery occurred. Delay postoperative complications were noted in 14 patients. Blood clots in the external auditory canal were found in eight cases and lacerations in two cases. One patient experienced partial hearing loss, and two patients experienced vertigo. Temporary hypoesthesia of the auriculotemporal nerve was seen in two patients. Temporary damage to the V cranial nerve was observed in four patients. Temporary paralysis of the zygomatic branch of the facial nerve was seen in one patient.
Conclusion: TMJ arthroscopy using coblation technologies is a safe surgical procedure when performed by experienced surgeons.

1. Introduction

TMJ arthroscopy is a minimally invasive surgical intervention that is usually performed under general anesthesia as an ambulatory procedure. However, as with any surgical procedure, various complications have been reported (McCain et al., 1992; Carls et al., 1996; Tsuyama et al., 2000; Indresano, 2001; González-García et al., 2006). Intraoperative complications have been described including instrument failures (McCain and De La Rua, 1989), damage of the joint surfaces (Rodriguez Campo, 2011), bleeding, vascular or neural injuries (Weinberg and Kryshtalskj, 1996; González-García et al., 2006; Zhang et al., 2011), otological lesions (Van Sickels et al., 1987; Applebaum et al., 1988), extravasation of the irrigation solution used (McCain et al., 1992), parotid gland injuries, and even perforation of the middle cranial fossa (Murphy et al., 1993). Postoperative complications such as infections (joint, temporal, otitis media) (McCain et al., 1993; Chossegros et al., 1995), cranial nerve injuries (auriculotemporal, trigeminal and facial nerves) (Weinberg and Kryshtalskj, 1996; Hoffman and Puig, 2015; Fernández Sanromán et al., 2016), and arteriovenous fistulas (Martín-Granizo et al., 2004), have also been reported.

There have been several studies that included a relatively large number of arthroscopy cases, but prospective studies in a large number of patients treated using the same surgical technique are lacking.

The aim of this prospective clinical study was to evaluate the rate of complications in two-portal arthroscopy of the TMJ using radiofrequency technologies.

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2. Materials and methods

The study group consisted of 397 consecutive patients (49 male, 348 female) undergoing TMJ arthroscopic procedures performed in the Department of Oral and Maxillofacial Surgery, Povisa Hospital, Vigo, Spain, between 2005 and 2014. These patients had not responded to nonsurgical treatment, and preoperative magnetic resonance imaging showed that they all had anterior disc displacements with or without reduction (II–IV Wilkes stages). Arthroscopy was performed on 475 joints (right joints: 272; left joints: 203) using the triangulation technique (McCain and Hossameldin, 2011). The average age was 31.67 years (range 16–72 years).

This study was approved by the Ethics Committee of Povisa Hospital.

2.1. Arthroscopy

All operations were performed under general anesthesia as an ambulatory procedure by a single surgeon (J.F.S.) with different assistants in a single hospital using the same types of instruments. The double-channel arthroscopic technique with two 2.3-mm cannulas was used in all cases. A 1.9-mm Dyonics 30° arthroscope (Smith & Nephew, Melbourne, Australia) was used. Exploration of the superior joint space was performed, and the following arthroscopic findings were recorded: hypervascularization of the posterior disc attachment, synovitis and hyperemia of the capsule, presence of adhesions, perforation of the disc and fibrillation or denudation of the bone. After lysis and lavage of the superior joint space, a coblation probe (ArthroCare System 2000; ArthoCare, Sunnyvale, CA, USA) was used to release the anterior attachment of the disc and a portion of the lateral pterygoid muscle (capsulotomy with myotomy) when needed. Posterior mobilization of the disc was performed with a blunt probe, and then superficial vaporization of the posterior disc attachment was done. In some (145) cases, sodium hyaluronate was injected at the end of the surgical procedure, and in other (115) cases, plasma rich in growth factors (PRGF) was injected into both the superior and inferior joint spaces before retiring the arthoscopic cannula.

All of the patients received antibiotics (amoxicillin and clavulanic acid 2 g or clindamycin plus gentamicin (in case of penicillin allergy) and 8 mg of dexamethasone intravenously) before surgery. Patients began physiotherapy 48 h after surgery for 2 months.

Complications that were recognized during surgery, hospitalization, and the follow-up period were documented. The postoperative follow-up period was between 6 and 43 months. Complications were collected using the File Maker database used for TMJ surgery in our department.

3. Results

Preoperative magnetic resonance images revealed that all of the joints had discs that were anteriorly displaced with (231 joints) or without (244 joints) reduction.

Complications were observed in 39 (8.21%) of the 475 cases of arthroscopy (Table 1). Of these, complications recognized during or immediately after the operation were observed in 25 cases (5.26%). Vascular injury with secondary hemorrhage in the points of trocar insertion was observed in 7 cases (compression over the area was enough to stop bleeding in all cases). Lesions of the fibrocartilage layer of the articular eminence or fossa secondary to the introduction of instruments were observed in 12 cases (Fig. 1). Vaporization of the area was performed using the coblation probe. Bleeding within the superior joint space was observed in 21 cases. In 10 cases, bleeding was secondary to capsular injury caused by the insertion of the trocar; in all of these cases, bleeding stopped during the surgical operation due to the high-pressure irrigation used. The other 11 cases occurred during the anterior release procedure and could be treated with direct coagulation of the vessels affected (Fig. 2). Extraction of the blood clots within the superior joint space after hemorrhage was performed in all cases (Fig. 3). No instrumental breakage occurred. Extravasation of irrigation fluid appeared in 5 patients. In one patient, perforation of the medial capsule with extravasation of the irrigation fluid into the oropharyngeal space occurred, so a delay of intubation (2 h) was advised. In 20 patients, more than one complication at the time of surgery occurred.

Table 1
Complications after arthroscopic surgery.

Complications	Cases (%)		
	2005–2009 n = 210	2010–2014 n = 265	Total N = 475
Vascular/bleeding			
Puncture sites	7 (1.47)		7 (1.47)
External capsule	6 (1.26)	4 (0.84)	10 (2.10)
Intra-articular	5 (1.26)	6 (1.51)	11 (2.32)
Fibrocartilage lesions	12 (2.53)		12 (2.53)
Extravasation of irrigation fluid	5 (1.05)		5 (1.05)
Otologic			
Blood clots in external auditory canal	8 (1.68)	1 (0.21)	8 (1.68)
Lacerations of external auditory canal	2 (0.42)		2 (0.42)
Lesions of tympanic membrane	0		0
Hearing loss	1 (0.21)		1 (0.21)
Vertigo	2 (0.42)		2 (0.42)
Neurologic			
Auriculotemporal nerve hypoesthesia	2 (0.42)		2 (0.42)
Lesion of the V cranial nerve	4 (0.85)		4 (0.85)
Lesion of the VII cranial nerve	0		0
Infection	0		0
Instrument breakage	0		0
Other	0		0

Delayed postoperative complications were noted in 14 patients. Blood clots in the external auditory canal were the most frequent and were found in 8 cases. Removal of the clots was performed on postoperative day 7, if necessary. In all cases, the associated hearing loss improved completely within a few days after surgery. Lacerations of the external auditory canal were found in 2 cases. The laceration sites were completely healed within a few weeks postoperatively after conservative treatment. One patient experienced partial hearing loss that did not recover completely after 1 year of the surgical intervention (no alterations in the tympanic membrane or middle ear was found). Two patients experienced vertigo after the surgical procedure; both of them responded to the antidinic treatment prescribed.

Neurologic injury was observed in 7 cases. Temporary hypoesthesia (30–120 days) in the region of the auriculotemporal nerve was seen in 2 cases. In 4 patients, temporary (20–150 days) damage to the V cranial nerve (third division) with numbness of the teeth and skin was observed. Temporary paralysis of the zygomatic branch of the facial nerve was seen in 1 case.

Infection after the arthroscopic procedures was not observed.

Most of the complications (28 in 210 arthroscopies) occurred during the first 5 years of the study (2005–2010). Only 11 minor complications (10 bleeding into the joint, one blood clot in the external auditory canal) were diagnosed during the period 2010 to 2015 (Table 1).

4. Discussion

Arthroscopic disc repositioning with coblation technology appears to be a useful technique for the treatment of patients with