Original Article

OUTCOME OF TEMPOROMANDIBULAR JOINT ARTHROPLASTY WITH TEMPORALIS FSCIA INTERPOSITION

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ABSTRACT:

OBJECTIVE:

To assess the outcomes of temporomandibular joint arthroplasty with temporalis fascia interposition.

METHODOLOGY:

This is a prospective study carried out over a period of 1 year and twenty days on 65 patients reporting to the department of Oral & Maxillofacial Surgery, Mayo Hospital of Lahore. Jaw ankylosis was diagnosed by clinical as well as radiographic aids. A preauricular incision was given to expose the ankylosis. The ankylosis was released by creating a gap of 1cm between the temporal bone and mandibular condyle. Temporalis fascia flap was raised and interposed in the gap created between temporal bone and mandibular condyle and secured with vicryl sutures to the medial tissues. Interincisal distance was measured by using a ruler. The drain was secured and the incision was closed in layers. After surgery all the patients were kept under observation in the ward for 5-7 days till the removal of sutures and drains. Meanwhile jaw exercise was advised. Patients were followed after seven days, one month and six months postoperatively.

RESULTS:

The study included; 40 (61.53%) males and 25 (38.46%) females giving a male to female ratio of 8:5. Out of total 65 patients 59 (90.76%) had the history of trauma and only 6 (9.23%) gave the history of infection/disease in early childhood. Patients were operated to treat ankylosis by removal of the ankylotic mass and interposition of temporal fascia.
The final assessment of all the patients revealed that 4 patients (6.15%) had mouth opening in the range of 40-50 mm, while 41 patients (63.07%) had mouth opening in the range of 35-39 mm.

CONCLUSION:

The results of this study shows that temporomandibular joint ankylosis can be managed effectively with the arthroplasty of the affected joint and interposition of temporalis fascia in the newly created joint space.

KEY WORDS: TMJAnkylosis,TemporalFascia,Arthroplasty

INTRODUCTION:

Temporomandibular joint (TMJ) ankylosis is a disorder that leads to the restriction of mouth opening which ranges from partial reduction to complete immobility of the jaw. It is most commonly associated with trauma (13% to 100%), local or systemic infection (0% to 53%), or systemic disease, such as ankylosing spondylitis, rheumatoid arthrits, or

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psoriasis. [1, 2] Trauma is the major cause of the temporomandibular joint ankylosis in developing countries like Pakistan and India [3, 4] though post-traumatic temporomandibular joint ankylosis is not often encountered in the west, this is predominantly because of the delay in the treatment of the condylar fractures.[5]

The temporomandibular joint ankylosis occurs in both children and adults. Early ankylosis of temporomandibular joint in children can be a deterrent to normal mandibular growth.[6] Impairment of speech, difficulty with mastication, poor oral hygiene, disturbances of facial and mandibular growth, malocclusion, and acute compromise of airway invariably present unique challenges to the surgeon.

Preoperative evaluation for diagnosis of limited mouth opening usually consists of careful history, physical and radiological examination. The radiological diagnosis [7] is essential in differentiating and evaluating such conditions. It includes Orthopantomogram (OPG), plain lateral radiograph and tomogram. Computed tomography examination with 3 D reconstruction is of additional value in delineating the extent of pathology and its relationship to surrounding vital structures.[8, 9] The management of the temporomandibular joint ankylosis poses a significant challenge because of the technical difficulties and high incidence of recurrence.[10] Regardless of the age of the patient surgical intervention is the treatment of choice and subsequent post-surgical rehabilitation. The surgical modalities include gap arthroplasty[4, 11] interpositional arthroplasty[12, 13] and arthroplasty with costochondral graft.[6] Gap arthroplasty is a surgical procedure in which no material is interposed to the site after the arthroplasty. It consists of liberal resection of the ankylotic mass and creating a gap of about 1-1.5 cm[11]

Interpositional arthroplasty is the procedure in which arthroplasty with immediate interpositioning of some autogenous or alloplastic material is carried out. The purpose of interposed material is to lessen the possibility of recurrence in a newly established false joint.[14, 15] Temporal fascia is widely used as interpositional material and gave good results (mouth opening 40 mm) in 41.8% cases.[16]

METHODOLOGY:

It's a prospective clinical trial conducted over a period of one year and twenty days (11 January 2009 to 30 January 2010) in the Department of Oral and Maxillofacial Surgery, King Edward Medical University/Mayo Hospital, Lahore. Total Sixty five (65) patients participated in the study.

The eligibility criteria for enrollment in the study was i) patients of TMJ ankylosis having age 14-40 years of any gender ii) Patients with mouth opening less than 25mm iii) Ankylosis diagnosed by Orthopantomogram, lateral skull radiograph and C.T scan with 3 D reconstruction and iv) American Society of Anaesthiologists (ASA I) and (ASA II) patients however patients having recurrent temporomandibular joint ankylosis due to previous surgery and patients of ASA III, ASA IV and ASA V were excluded from the study.

DATA COLLECTION & ANALYSIS:

All enrolled patients coming to Maxillofacial Surgery department Mayo Hospital with TMJ ankylosis were screened based on inclusion exclusion criteria and 65 patients fulfilling the criteria were offered to be the part of study. Demographics data including name, age and gender was recorded. An informed consent was taken from all the participants of the study. Preoperatively facial nerve marking was done by using nerve stimulator to avoid iatrogenic nerve trauma. A preauricular incision was given to expose the ankylosis. The ankylosis was released by creating a gap of 1cm between the temporal bone and mandibular condyle. Temporal fascia was harvested and interposed in the gap created between temporal bone and mandibular condyle and secured with absorbable (vicryl) sutures. Interincisal distance was measured by using a ruler. The drain was secured and the incision was closed in layers. After surgery all the patients were kept under observation in the ward for 5-7 days till the removal of sutures and drains. Meanwhile jaw exercise was advised. Patients were followed after seven days, one month and six months postoperatively.

The collected information was entered and analyzed in SPSS version 17. The age was presented in mean. The gender was presented in frequency and percentage. The pre-operative mouth opening was presented by mean while the final outcome in terms of mouth opening was presented in frequency and percentage.

RESULTS:

Total 65 patients enrolled for the study out of which 40 (61.53%) were males and 25 (38.46%) were females giving a male to female ratio of 8:5 (Table1). Regarding the age, patients with age range of 14 to 20 years were the part of study; mean age was 16.04 ± 1.988 years. Regarding the etiology of TMJ ankylosis, out of total 65 patients 59 (90.76%) had the history of trauma and only 6 (9.23%) gave the history of infection/disease in early childhood (Table 2). In detailed examination about the site of TMJ ankylosis, unilateral temporomandibular joint ankylosis was more common. 35 (53.85%) patients presented with unilateral temporomandibular joint ankylosis, i.e.; 18 (27.69%) with the right temporomandibular joint ankylosis and 17 (26.15%) with left temporomandibular joint ankylosis. Whereas 30 (46.15%) had bilateral temporomandibular joint ankylosis (Table 3). The interincisal opening was assessed pre-operatively, per-operatively and post-operatively to see the difference created by surgery (Tables 4, 5, 6,7,8). For follow up, interincisal opening was assessed at 7th day, one month and after six months of surgical procedure (Table 6,7,8).
After the final assessment of all the patients, it was concluded that 4 patients (6.15%) had mouth opening 40-50 mm while 41 patients (63.07%) had mouth opening 35-39 mm which could be considered as good outcome (Table 8).

Table 1: Gender Distribution

Gender	Frequency	Percentage
Male	40	61.53
Female	25	38.46
Total	65	100

Table 2: Etiology of the TMJ Ankylosis

Etiology	Frequency	Percentage
Trauma	59	90.76
Infection	6	9.23
Total	65	100.0

Table 3: Side of TMJ Ankylosis

Side	Frequency	Percentage
Bilateral	30	46.15%
Unilateral (Left)	17	26.15%
Unilateral (Right)	18	27.69%
Total	65	100%

Table 4: Preoperative Mouth Opening

Number of Patients	Gender	Mouth Opening in mm	Mean mm
Male	40	0-24	12
Female	25	0-23	11
Total	65	0-23	11

Table 5: Per-Operative Mouth Opening

Number of Patients	Mouth opening in mm	Percentage
40	40-45	61.53%
21	35-39	32.30%
4	30-34	6.15%
0	25-29	0%

Table 6: Post-Operative Mouth Opening (7th day)

Number of Patients	Mouth opening in mm	Mean
4	40-45	6.1%
25	35-39	38.46%
32	30-34	49.23%
4	25-29	6.1%

Table 7: Post-Operative Mouth Opening (After One Month)

Number of Patients	Mouth opening in mm	Percentage
9	40-45	13.8%
37	35-39	56.92%
17	30-34	26.15%
2	25-29	3.07

Table 8: Post-Operative Mouth Opening (6 Months)

Number of Patients	Mouth opening in mm	Percentage
4	40-45	6.15%
41	35-39	63.07%
18	30-34	27.69%
2	25-29	3.07%

DISCUSSION:

Temporomandibular joint ankylosis is an intracapsular union of the disc condyle complex to the temporal articular surface that includes fibrous adhesion or bony fusion between condyle of mandible and glenoid fossa and articular eminence of squamous temporal bone.[17] The temporomandibular joint ankylosis causes misery particularly to young adult patients. Temporomandibular joint ankylosis effects the normal functions as chewing and speech. It also causes severe facial disfigurement that aggravates psychological stress.[18] TMJ ankylosis is associated with trauma (13% to 100%), local or systemic infection (0% to 53%), or systemic disease, such as ankylosing spondylitis, rheumatoid arthrits, or psoriasis.[2] Warraich RA [19] and Badar MA[20] et al in their studies emphasized the early treatment of condylar fractures to prevent the ankylosis of temporomandibular joint. A proper screening of maxillofacial injuries especially condylar injuries and referral to maxillofacial center for treatment should be sought which will ensure regular follow up have very important role in preventing temporomandibular joint ankylosis. correct statistics for etiology of temporomandibular joint ankylosis. Post injury physiotherapy and

The management of the temporomandibular joint ankylosis possesses a significant challenge because of the technical difficulties and high incidence of recurrence.[21] Regardless of age of the patient surgical intervention is the treatment of choice and subsequent post surgical rehabilitation. The surgical modalities include gap arthroplasty [4, 11] interpositional arthroplasty and arthroplasty with costochondral graft.

Interpositional arthroplasty is the choice of treatment in any type or stage of temporomandibular joint ankylosis regardless of the age and duration. Different materials are available and can be used for interposition. Interpositional arthroplasty is the procedure in which arthroplasty with immediate interpositioning of some autogenous or alloplastic material is carried out. Temporal fascia is widely used as interposition and gave excellent results (mouth opening 40 mm) in 41.8% cases.[16]

Use of temporal fascia as an interpositioning material seems to be simple and comfortable, as donor site is close to the operative field. As a result, time of surgery is reduced, there is less donor site morbidity and chances of post-operative complications are reduced. Thus periprosthesis calcification, excessive graft growth in cases of costochondral graft, extrusion of implants and infection with silastic material are reduced. Molla MR, Shrestha KR[22], had gone for analytical study of surgical management of the temporomandibular joint ankylosis. They compared the results of condylectomy with or without interpositional materials such as temporalis muscle flap to prevent re-ankylosis. Patients were divided into 3 groups. Group 1 with condylectomy, Group 2 with condylectomy accompanied by interpositioning of auricular cartilage, Group 3 six cases were treated with condylectomy along with interpositioning of temporalis muscle flap, they found good result in group 3.

A variety of interposition materials have been used for the prevention of recurrence after arthroplasty in the treatment of temporomandibular ankylosis. Chossegros C et al [12] Studied the comparison of homologous auricular cartilage graft, free skin graft and temporalis muscle flap. A total of 25 patients (32 joints) with at least 3 years of follow-up were included. Good results were achieved in 92% of cases using total full thickness skin graft, and 83% of cases using temporalis muscle flap. Homologous auricular cartilage gave poor results.

Warraich et al[19], in his study treated 107 patients of temporomandibular joint ankylosis with interpositional arthroplasty along with temporal fascia and reported 100% success with no reankylosis in 3 years follow up. In his study male patients predominates with ratio of 6:4.

Ahmed QG et[23] al in his study operated 60 cases of temporomandibular joint ankylosis and he also used temporal fascia as interpositioning material after gap arthroplasty. He showed 100% results with no recurrence. His sample of study had male predominance and the age group predominantly second decade. Ansari SR [24] compared the interpositional arthroplasty with gap arthroplasty. In his results there was no case of reankylosis where interpositional arthroplasty was done regardless of the age and duration of ankylosis. In cases where only gap arthroplasty was done there was recurrence of ankylosis and the maximum mouth opening achieved in adult patients at the end of follow up period was less than 30 mm (mean). He emphasized that Interpositional arthroplasty is the choice of treatment in any type or stage of ankylosis regardless of the age and duration.

Current study consists of 65 cases with male to female ratio of 8:5. All the patients underwent interpositional arthroplasty having temporal fascia as interpositional material. Temporalis fascia as interpositional material in temporomandibular joint arthroplasty showed very good results; reankylosis was not seen in any patient with good interincisal opening of 35-39 mm on follow-up postoperatively in 63.05 % cases while 6.15% showed interincisal mouth opening 40-45 mm. We did not find any case of reankylosis in all patients treated with interpositional arthroplasty by temporalis fascia. Which is the same as the study of Lei Z[25] Warraich et al[19], Ahmad QG[23], Su-Gwan, K[18], Ansari SR.[24]

Surgery is not the endpoint of treatment. The postoperative jaw exercises are very important to prevent the re-ankylosis of TMJ. Chidzonga MM [26] and Tanrikulu R, Gorgun B [27] explained the importance of early post-operative exercises, appropriate physiotherapy and close follow- up of the patients for the prevention of post-operative adhesions and re-ankylosis.

CONCLUSION:

The purpose of this surgery is of two fold. One is to achieve adequate interincisal mouth opening and other is to prevent the recurrence of TMJ ankylosis. Interposional temporalis fascia is a valuable tool to fill the surgical defect and helps to prevent the re-ankylosis. Key to success is the early postoperative physiotherapy and follows up. It can be concluded from this study that temporalis fascia as interposional material is a effective solution for TMJ ankylosis.

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