A COMPARATIVE STUDY OF GAP & INTERPOSITIONAL ARTHROPLASTY WITH TEMPORALIS MYOFACIAL FLAP FOR TMJ ANKYLOSIS TREATMENT

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ABSTRACT

The objects of this study were to evaluate the effectiveness of gap and interpositional arthroplasty with temporalis myofascial flap in the treatment of the temporomandibular joint (TMJ) ankylosis.

This descriptive case series study consisted of twenty five patients. It was carried out at Oral & Maxillofacial Surgical Department, Liaquat University of Medical & Health Sciences, Jamshoro, Sindh from January 2010 to December 2012. Orthopantomogram (OPG) and 3-D Scan was the standard radiograph and was taken in every case. Nineteen had unilateral and six bilateral TMJ ankylosis.

Most patients were in 2nd decade of life age group (16); followed by 3rd decade (05) and 1st decade of life (04). 18 were female and 7 were male; Major etiological factor was fall (21) followed by forceps delivery (03) and ear infection (01).

Inter-incisal distance (IID)/mouth opening were noted preoperatively, immediately after completion of operation that was 35mm and postoperatively at follow-up. The incidence of TMJ ankylosis varies from country to country and closely related to the social and financial issues of the patients. TMJ ankylosis is challenging problem for the patient, as for the surgeon.

Over the years many modifications were made in TMJ surgery for better results and Gap arthroplasty with temporalis myofascial flap as the interpositional graft is one of common treatment modality which is done at our center.

Key Words: TMJ ankylosis, Arthroplasty, Temporal Myofascial Flap.

INTRODUCTION

Ankylosis of the Temporomandibular joint (TMJ) is disfiguring and distressing condition which usually affects the growing childrens.1

Different factors have been attributed to the condition, such as intracapsular condylar fracture, advanced cases of arthritis, birth trauma from obstetric forceps, ear infection and most common etiological factor is previous trauma, particularly to the chin area in young age.2,3,4

According to Kazanjiian VH5 and Sawhney CP6 ankylosis is divided into two types; true (intra-articular) and false (extra-articular).

True ankylosis has been further divided as type I, II, III and IV. In type I condyle is medially angu- lated and deformed articular fossa together with a mild-to-moderate amount of new bone formation, Type II no recognizable condyle or fossa but a large mass of new bone is present, Type III ankylosis usually results from a medially displaced fracture dislocation with bone
bridging the mandibular ramus to the zygomatic arch, while type IV joint architecture is completely covered by bone with fusion of structures i.e.; zygomatic arch, glenoid fossa, coronoid fossa, condyle and sigmoid notch.\(^5\)

The patients with temporomandibular joint ankylosis usually have food intake, digestion, communication, maintaining oral hygiene, rampant caries, facial deformity and psychosocial problems due to limited mouth opening.\(^7\)

Various radiographs are taken for diagnosis purpose of TMJ ankylosis like; Posterio-anterior View, lateral oblique View, orthopentogram (OPG), CT scan and three dimensional CT scan but recently orthopentogram (OPG), three dimensional CT prior to surgery has been encouraged.\(^8,9\)

Timing, preference of type of procedure and the policy of treatment vary from one center to another however, the main principles of management of TMJ ankylosis consist of resection of the ankylosed segment, use of interpositional material either alloplastic or allogeneic, and early, aggressive and tenacious post-operative physiotherapy.\(^10\)

This study was first one done at this center and purpose was to evaluate the results of Gap arthroplasty with interpositional graft among patients operated at the Oral & Maxillofacial surgery Unit, Liaquat University of Medical & Health Sciences, Jamshoro, Sindh.

METHODOLOGY

This descriptive case series study consisted of twenty five patients and was carried out at Oral & Maxillofacial Surgical Unit of Liaquat University of Medical & Health Sciences, Jamshoro, Sindh from January 2010 to December 2012. A detailed history and systematic clinical examination was carried out after taking consent from patient or patient’s attendant. Orthopantomogram (OPG) and 3-D Scan were the standard radiographs and were taken in every case.

Only confirmed patients of TMJ ankylosis, irrespective of age and gender, were included in the study and recurrent cases of ankylosis were excluded.

All study subjects were operated under general anesthesia with blind nasotracheal intubation or fiberoptic nasotracheal intubation.

Surgical approach to the TMJ was Al-Kayat and Bramley and for joint capsule T-shaped incision used, after approaching to joint ankylosic mass was cut and at least 10mm gap created between the ramus and base of skull and finally temporalis myofascial flap was used as interpositional graft material.

Inter-incisal distance (IID)/mouth opening were noted immediately after completion of the operation and recorded, postoperatively. Patients were routinely administered antibiotics for minimum 7-10 days.

All patients were advised and guided for active and passive jaw exercises three to five times in a day. Patients were discharged on the 5th or 7th postoperative day with instructions and giving them wooden spatula for active and passive jaw physiotherapy with minimum inter-incisal mouth opening of 30 to 35mm. Every patient was reviewed up to six months.

DATA ANALYSIS PROCEDURE

Data were analyzed in statistical program for social sciences (SPSS) version 11.0. The frequency and percentage was computed for qualitative variables, like gender, etiologies. Mean± standard deviation was computed for qualitative variables, like age. No inferential test applied due to descriptive statistics.

RESULTS

Twenty five patients presented with TMJ ankylosis, nineteen had unilateral and six bilateral TMJ ankylosis.

Most patients were in 2\(^{nd}\) decade of life age group (16); followed by 3\(^{rd}\) decade (05) and 1\(^{st}\) decade of life (04). 18 were female and 7 were male; Major etiological factor was fall (21) followed by forceps delivery (03) and ear infection (01). Table 1 shows the results.

| Table 1 showing the characteristics before and after TMJ ankylosis Surgery |

DISCUSSION

There was not only the speech impairment issue with TMJ ankylosis but failure to treat properly could result in difficulties with mastication, poor oral hygiene, rampant caries, facial and mandibular growth disturbances and airway compromise which is constant threat to the patient’s life.\(^11,12\)

According to Sawhney CP\(^6\) and Li\(^13\) TMJ ankylosis is a quite common condition of younger age group, condylar fractures of mandible were main etiological factor.

In the present study 72% patients were female (n=18) and 28% were male (n=07). These results are similar to the studies conducted by Cheema\(^7\) and Tanrikulu\(^14\) but differ with the studies of Vasconcelos\(^15\) where gender was equally divided.

Some researchers have stated that the frequency of TMJ ankylosis in developing countries like Pakistan\(^16\),
China\textsuperscript{17}, and Africa\textsuperscript{18} is greater than seen in developed countries.

Usually treatment of TMJ ankylosis is divided into three main categories i.e, gap arthroplasty, interpositional arthroplasty, and total joint reconstruction with or auto or alloplastic materials.\textsuperscript{15} Every procedure has its advantages and disadvantages. Gap arthroplasty is simpler and less time consuming procedure as compared to other two procedures.\textsuperscript{19} Study conducted by Roychoudhury et al with the sample size of 50 patients treated with gap arthroplasty showed 30 mm postoperative mean of MIO and one patient had reankylosis.\textsuperscript{20}

Many materials like skin grafts, temporalis muscle or temporalis fascia, cartilage (homologous), silastic sheets, silicone or acrylic implants have been used since long time as interpositioning materials.\textsuperscript{14,21}

The overall choice of interpositioning material, easy availability and material which causes minimal donor site morbidity. Silastic is one of alloplastic material used as interpositional graft, the risk of foreign body

\begin{table}
\centering
\caption{Characteristics before and after TMJ ankylosis surgery}
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
S. No. & Age & Gender & Etiology & Joint Involvement & Mouth Opening Preoperatively & Mouth Opening Postoperatively & Coronoidectomy \\
\hline
01 & 11 & F & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
02 & 13 & F & fall & Unilateral & 11mm & <35mm & Ipsilateral \\
03 & 11 & F & fall & Unilateral & 11mm & <35mm & No \\
04 & 12 & F & fall & Unilateral & 12mm & <35mm & No \\
05 & 14 & F & Ear Infection & Unilateral & 10mm & <35mm & Ipsilateral \\
06 & 16 & F & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
07 & 18 & F & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
08 & 19 & M & fall & Bilateral & 10mm & <35mm & Ipsilateral \\
09 & 11 & M & Forceps Delivery & Bilateral & 10mm & <35mm & Ipsilateral \\
10 & 13 & M & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
11 & 14 & F & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
12 & 22 & F & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
13 & 27 & F & fall & Bilateral & 10mm & <35mm & Ipsilateral \\
14 & 28 & F & fall & Bilateral & 15mm & <35mm & Bilateral \\
15 & 25 & M & fall & Unilateral & 11mm & <35mm & Ipsilateral \\
16 & 24 & F & fall & Bilateral & 09mm & <35mm & Bilateral \\
17 & 09 & F & Forceps Delivery & Bilateral & 13mm & <35mm & Ipsilateral \\
18 & 13 & M & fall & Unilateral & 11mm & <35mm & Ipsilateral \\
19 & 11 & M & Forceps Delivery & Bilateral & 12mm & <35mm & Bilateral \\
20 & 12 & M & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
21 & 08 & F & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
22 & 16 & F & fall & Unilateral & 12mm & <35mm & Bilateral \\
23 & 09 & F & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
24 & 10 & F & fall & Unilateral & 10mm & <35mm & Ipsilateral \\
25 & 11 & F & fall & Unilateral & 08mm & <35mm & Ipsilateral \\
\hline
\end{tabular}
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reaction and extrusion exists while dermis autogenous material causes donor site morbidity. Third method used in the treatment of TMJ ankylosis is reconstruction with TMJ prosthesis.

Many studies have shown that Condylar replacement alone is not sufficient for reconstruction of temporomandibular joint because there are chances of eroding glenoid fossa and extensive heterotopic bone formation within the joint. Total joint replacement must be used, including ramus and fossa components but this method has also some side effects namely hardware loosening, foreign body reaction, and heterotropic bone formation around alloplastic devices.

In TMJ ankylosis postoperative rehabilitation is equally important and attention must be paid to prevent failure. Early mobilization or postoperative jaw exercises, use of analgesic and anti-inflammatory medications are necessary to reduce the postoperative pain. They play major role in prevention of reankylosis.

CONCLUSION

The incidence of TMJ ankylosis varies from country to country and is closely related to the social and financial issues of the patients.

TMJ ankylosis is challenging problem for the patient, for their parents as well as for the surgeon.

Over the years many modifications have been made in TMJ surgery for better results and Gap arthroplasty with temporalis myofascial flap as the interpositional graft is one of the common treatment modality which is done at this center.

REFERENCES