Use of indomethacin as an adjuvant to surgery for recurrent temporomandibular joint ankylosis in adults

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ABSTRACT

Two cases with multiple recurrences of temporomandibular joint ankylosis and multiple failed interposition/gap arthroplasty procedures are presented here. Heterotopic bone formation was thought to be the reason. Indomethacin prophylaxis for prevention of heterotopic new bone formation at the osteoarthrectomy site was used as an adjuvant to surgery, in dosages of 75 mg/day for six weeks. Indomethacin is used frequently in hip and elbow arthroplasties to prevent heterotopic ossification, but its use in temporomandibular joint is not routine. The presented cases did not develop further recurrence and attained stable mouth opening over two-year follow-up after osteoarthrectomy and oral indomethacin.

Key words: Heterotopic bone, indomethacin, recurrent temporomandibular joint ankylosis

INTRODUCTION

Prevention of temporomandibular joint (TMJ) re-ankylosis is a challenge. Recurrence rates with different modalities have been reported from 0 to 100%.\(^1\)\(^-\)\(^2\) In joints undergoing multiple operations heterotopic bone formation similar to that in the hip or elbow is a reason for recurrence.\(^3\) Although Indomethacin is a known prophylaxis for prevention of heterotopic bone formation after hip arthroplasty, it is seldom used for recurrent TMJ ankylosis. Two cases with multiple failed operations and recurrences were treated using indomethacin prophylaxis to prevent heterotopic bone formation after osteoarthrectomy.

CASE REPORTS

Case 1

Presentation
A 40-year-old male patient reported in 2012, with a complaint of TMJ ankylosis since last nine years. The patient had sustained a road traffic accident in May 1990. He was treated conservatively for head injury and suspected condylar fracture. One year after trauma, the patient experienced gradual reduction in mouth opening. It became 0 mm in next seven years. In 1998, 1999, 2000, and 2003, the patient underwent surgical operations for the treatment of TMJ ankylosis [Table 1]. After every surgical intervention he did achieve some mouth opening, but it quickly reverted to 0 mm in three to six months’ time, in spite of good compliance with physiotherapy.

Investigation
In 2012, his mouth opening was 0 mm. A computed tomography (CT) scan examination showed a huge new bone in the previous 1.5 cm arthroplasty area [Figure 1]. The mediolateral dimension of ankylosic mass on the left side was 3.2 cm and the
anteroposterior dimension was 3.5 cm. On right side, there was relatively less amount of bone. His sequential radiographs showed adequate bone removal in the previous surgeries.

**Treatment**

The patient was operated via preauricular with extended temporal and submandibular approaches. To avoid two broad cut bone surfaces facing each other, a lower osteotomy cut was planned below the mid-ramus region. To maintain the ramus height a titanium mandibular condylar plate with 2.4 mm diameter screws was used. Buccal fat pad was interposed between the metal condyle and sclerosed temporal bone. On the right side, gap arthroplasty and coronoidectomy was performed. Intraoperative passive and active mouth openings were 30 mm and 35 mm, respectively. Exercises were started within 24 hours. The patient was started on oral indomethacin 25 mg thrice a day for six weeks, along with pantoprazole 40 mg once a day. He was advised to continue mouth-opening exercises as per the unit’s protocol.\[^2\]

**Outcome**

There were no complications other than gastritis six weeks postoperatively. Pantoprazole 40 mg and antacid syrups controlled this. Two years postoperatively, his passive mouth opening was 30 mm, with no signs of heterotopic bone formation [Figure 2].

**Case 2**

**Presentation**

A 19-year-old male, presented to us in June 2013, with less than a finger-width mouth opening. History revealed that he fell from the roof of his house and hit his chin at four years of age. Over one year following the trauma his parents noticed gradual reduction in the mouth opening. He was operated at the ages of five, nine, and sixteen years, but his mouth opening always reduced to nil in one to nine months’ time [Table 1]. In 2011, with nil mouth opening and an extremely short ramus and body, due to repeated operations, he had to be taken up for distraction osteogenesis prior to osteoarthrectomy of the bilateral TMJs [Figure 3]. In four to six months’ time he again experienced reduced mouth opening.

**Investigation and treatment**

CT scan examination showed extensive new bone in the previous osteoarthrectomy area causing a recurrence of left TMJ ankylosis. Medio-lateral dimension of the new bone was 1.5 cm, and antero-posterior dimension was 2.0 cm [Figure 4]. Left gap arthroplasty and coronoidectomy were done using a preauricular with extended temporal approach. Adequate mouth opening was achieved. Exercises and indomethacin in the same regimen were started within 24 hours.

**Outcome**

A postoperative period of eighteen months has shown no recurrence [Figure 5].

**DISCUSSION**

Use of indomethacin for the prevention of heterotopic ossification was described in 1975.\[^4\] Its use is a common practice in orthopedics. The mechanism of action proposed is inhibition of prostaglandin E2, COX-1, and 2.\[^3,4\] It should be started within 24 hours after surgery, because heterotopic ossification starts at around 16 hours and reaches a peak at 48 hours.\[^7\]

To date only one study mentions the use of indomethacin in prevention of TMJ re-ankylosis. This could be because TMJ ankylosis mainly affects children, where the drug must be used with caution, to avoid renal complications. Secondly, there is a high association of surgery for an acetabular fracture and hip ankylosis; but only 0.4–2% of the mandibular condylar fractures develop TMJ ankylosis.\[^7,8\] Therefore, giving indomethacin routinely to prevent ankylosis may not be justified. However, in recurrent TMJ ankylosis a medicinal inhibition of bone formation would be beneficial.
The reported cases developed re-ankylosis due to heterotopic bone formation after previous surgeries, where principles of adequate gap creation with or without interposition, parallel bone cuts, removal of the medially displaced condyle, removal of bone debris, and strict protocol for physiotherapy were all strictly followed. Total joint replacement would have been best for these patients, but was not done due to economic reasons. The condylar reconstruction plate was used in the first case to maintain the ramal height and as an alloplastic interposition material. However, in his case myofascial and silicon block interposition had failed to check the exuberant bone formation previously; so success with the use of a reconstruction plate could not be guaranteed. In addition to this, gap arthroplasty was done on the right side only; hence it was decided to couple the surgical treatment with indomethacin.

Radiation is another option and 10 Gy in five daily fractions, starting one to three days postoperatively, has been used in TMJ ankylosis. However, there are concerns over radiation for a benign condition and indomethacin is considered safer due to side effects of radiation like xerostomia, impairment of implant-bone healing, and chances of malignancy.

The presented cases had satisfactory outcomes 18- to 24-months postoperatively, well past the usual period of recurrence. The fact that they have still not developed.
any heterotopic new bone indicates that Indomethacin may have contributed to the success in prevention of re-ankylosis in TMJ, similar to its role in hip and elbow joints. This, however, needs to be tested in a larger number of adult TMJ ankylosis cases for better evidence.

**CONCLUSION**

Although good surgical practice remains the mainstay in preventing recurrence, addition of indomethacin as adjuvant may be beneficial in recurrent TMJ ankylosis in adults.

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