



A RESTROSPECTIVE STUDY AND REVIEW ON MANAGEMENT OF CONDYLAR FRACTURES

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ABSTRACT

Background: The treatment of condylar fractures have always been a topic of discussion in the field of oral and maxillofacial trauma. The causes for these fractures includes road traffic accident, assault or inter personal violence, sporting injury, fall, workplace related mishaps etc., however there has been a lack of consensus on the most common cause of these fractures. Irrespective of the cause, an impact force of higher magnitude is known to cause bilateral fractures. Other factors that govern the bilateral or unilateral distribution include the direction of force, position of the jaws when trauma incurred, general or systemic condition of the patient.

Aims & Objectives: The aims and objectives were to analyze the best treatment option for mandibular condyle fracture.

Material and Methods: In this study we have retrospectively analyzed cases of condylar fractures treated at Jubilee Mission Medical College Hospital and Research Institute, Thrissur, Kerala, India in the period of 2 years from 2015 to 2017. A total of 156 patients (34 female patients and 122 male patients) were included in the study. This includes 42 patients of bilateral condylar fractures and 104 patients with unilateral condylar fractures. The fracture was seen from an age of 6 yrs to 76 years.

Results: 58 patients of Group CR were treated using conservative management option. 46 patients were treated by archbars and elastic inter-maxillary fixation for an average period of 4 weeks. 6 pediatric patients with bilateral condylar fractures and 4 edentulous patients were advised active joint mobilization and soft diet. These patients were kept on routine follow up of every two weeks. Amongst the 98 operated patients in Group OR, satisfactory occlusal relationship was achievable immediate postoperatively in 78 patients. Deflection of jaws during function was minimal. Occlusion was functionally stable in an average period of 1week. Pain persisted during function for an average period of 2 weeks. Maximum and minimum post operative mouth opening recorded was 42mm and 30mm respectively. Average post operative mouth opening according to data is 35mm.

Conclusion: Open reduction and internal fixation of the mandibular condylar fractures provides the most definitive treatment that allows patients to return to early function and restores normal posterior facial height.

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INTRODUCTION

Mandibular condylar fractures are extremely frequent, accounting for between 29% and 52% of all mandibular fractures in previous reported studies.^{1,2,3} There is a dilemma in every step of management of condylar fractures starting from the basic option of management to selection of techniques within the respective options either surgical or conservative.

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configuration of fixation of hardware and necessity of intermaxillary fixation. In this study, an attempt is made to simplify the selection of treatment options rationally and to share our experience of management of condylar fractures at Jubilee Mission Medical College Hospital and Research Institute, Thrissur, Kerala, India

MATERIALS AND METHODS

In this study we have retrospectively analyzed cases of condylar fractures treated at Jubilee Mission Medical College Hospital and Research Institute, Thrissur, Kerala, India in the period of 2 years from 2015 to 2017. The management option

chosen for each of these patients were retrospectively analyzed with the corresponding results. For the purpose of statistical evaluation, patients were split in to two groups: Group CR- closed reduction and Group OR- open reduction. The selection of patients into Group CR was based on certain factors which include the nature of condylar fracture, ability to achieve occlusion on assistance, age of the patient, general and systemic condition of the patient, facial asymmetry, pain and patient's consent. Patients were treated by archbars and elastic inter-maxillary fixation for an average period of 4 weeks. Modifications to plan was done according to the clinical requirement and healing; in the best interest of the patients. Group OR includes all patients indicated for open reduction as per the already devised protocol of Mathes. Patients of these group were analyzed for the surgical approach used, number of hardware fixed, configuration of fixation, site of condylar fixation, need for post surgical inter-maxillary fixation. All patients were recalled every month for the first three months after getting discharged following which they were recalled every 6 months for 24 months. An average period of follow up for this study is 14 months. On follow up visit patients were evaluated for post operative occlusion, maximum mouth opening, pain free joint movement, facial nerve deficit, and scarring. Routine orthopantomogram was done to check the reduction and healing after 1 month and 6 months post operatively. The criteria for successful treatment were based on post operative occlusion, degree of joint mobility, pain free joint movement, early reinstallation of function, treatment complications which include hardware failure and infection.

RESULTS

A total of 156 patients (34 female patients and 122 male patients) were included in the study. This includes 42 patients of bilateral condylar fractures and 104 patients with unilateral condylar fractures. The fracture was seen from an age of 6 yrs to 76 years. Maximum incidence of fracture incidence is in third decade. 58 patients of Group CR were treated using conservative management option. 46 patients were treated by archbars and elastic inter-maxillary fixation for an average period of 4 weeks. 6 pediatric patients with bilateral condylar fractures and 4 edentulous patients were advised active joint mobilization and soft diet. These patients were kept on routine follow up of every two weeks. In 2 patients the concomitant systemic conditions rendered surgical procedure as nonadvisable. Amongst the 48 dentulous adult patients, satisfactory occlusal relationship was achievable in 38 patients. Deflection of jaws during function was observed in 12 of these patients. Occlusion was stable in an average period of 3 weeks. Pain persisted during function for an average period of 10 weeks. Maximum and minimum post operative mouth opening recorded was 36mm and 24mm respectively. Average post operative mouth opening according to data is 31mm. 98 patients of Group OR treated by open reduction internal fixation under general anaesthesia. The shortest and the longest condylar stump length operated were 23mm and 31 mm respectively. Condylar stump length of 27mm is adequate for convenient exposure, reduction and fixation as per our experience. The incisions used for exposure were retromandibular incision, mini-retromandibular incision, preauricular incision, a preauricular extension to retromandibular incision. As per our study retromandibular incision with anterior parotid transmassetric approach gives adequate approach and exposure of subcondylar fractures for

open reduction and internal fixation. In fractures with condylar stump length less than 25mm, a preauricular extension might be required. Fixation was done using single 1mm thick miniplates, two 1mm thick miniplates, single 1.25mm thick miniplates, two 1.25mm miniplate, T-shaped plate, 2mm Dynamic compression plates. These plates were fixed in various configurations. These include fixation along posterior border, lateral border, two plates arranged in lambda configuration along lateral border, two parallel plates along the lateral border. As per our study two 1.25mm plates along the lateral border in lambda shape gives the best fixation with minimal gap in anterior tension band region on subsequent post operative radiographs. If a single plate is to be used, then it should be atleast 1.25mm thick to sustain the high stress during condylar function. 2 of our case have shown fracture of 1mm thick fixation miniplates, one of which has fracture of miniplates bilaterally. Fixation screws should not be engaged in thin cortical bone of sigmoid notch region. This may lead to loosening of screws on starting joint function. An inverted T-plate may be used in high condylar fracture with its long arm aligned along the condylar axis. All patients are kept on elastic intermaxillary fixation for 1 week with immediate functional loading. The postoperative complications include infection of hardware, hardware breakage, parotid sialoceles, malocclusion, facial nerve deficit, scars. The salivary gland complications were managed conservatively and none warrant a second surgery. Hardware failure cases were taken up for hardware removal followed by a period of rigid intermaxillary fixation for 2 weeks, followed by elastic intermaxillary fixation for 3 weeks. 2 cases of facial nerve weakness were reported. The branches commonly involved were temporal and zygomatic branch. Preauricular incision was used for both these patients. The function of the nerve was near normal in a period of 9 months. Amongst the 98 operated patients, satisfactory occlusal relationship was achievable immediately postoperatively in 78 patients. Deflection of jaws during function was minimal. Occlusion was functionally stable in an average period of 1 week. Pain persisted during function for an average period of 2 weeks. Maximum and minimum post operative mouth opening recorded was 42mm and 30mm respectively. Average post operative mouth opening according to data is 35mm.

DISCUSSION

The mandibular condylar fracture has generated great discussion in the field of maxillofacial trauma. If not properly treated, this injury can cause TMD, ankylosis of the TMJ, occlusal disorders, and mandible deviation, and it may lead to severe impairment of the stomatognathic system.⁴ In paediatric cases the commonest cause of condylar fracture is fall or bicycle accident, while in adults the commonest cause is road traffic accident. There is a lack of consistency associated with the open or closed treatment of these fractures among surgeons and researchers.^{5,6,7} A number of studies have been published on the subject of management of mandibular condylar fractures, however, a review of publications showed a paucity of good quality scientific evidence to support either treatment.^{8,9} Ellis and Throckmorton felt the reason there were so many techniques advocated for treating the same fracture was based mostly on tradition and experience.¹⁰ As stated by Malkin "Concerning the treatment of condylar fractures, it seems that the battle will rage forever between the extremists who urge non operative treatment in practically every case and

the other extremists who advocate open reduction in almost every case.” In our unit a patient of condylar fracture is assessed for following parameters, Ability to occlude with minimal assisted guidance, Nature of fracture- dicapitular or intracapsular fractures are treated conservatively, Reduction in posterior facial height or facial asymmetry, Functional limitation and pain, Age and general condition of the patient. In cases of bilateral condylar fractures with minimal condylar stump length in a young patient, an attempt is made to perform an open reduction and internal fixation of atleast one side. Conservative management still holds importance in the management of condylar fractures when used in the right type of cases with the right elastic forces and vectors. When compared to open reduction and internal fixation the conservative management demands more time for recovery and reinstating function. The functional movements are marginally reduced as compared to surgical management. A surgeon should attempt an open reduction and internal fixation in indicated case of open reduction. Our study shows that a retro mandibular incision with anterior parotid transmassetric approach provides adequate access for convenient reduction and fixation of subcondylar fractures.^{11,12} This validates the study done by Vinod Narayan *et al.*¹¹ In fractures with condylar stump length less than 25mm, a preauricular extension might be required. The pre auricular extension is associated with added risk of facial nerve injury. This injury can be easily avoided by careful dissection. The open reduction and internal fixation has evolved from a single plate fixation on the posterior border to two plates on lateral border, arranged in lambda configuration. Recent studies have also developed specialized A-shaped plates, trapezoidal condylar plates, mechanically optimized plates for management of condylar fractures after studies on photoelastic models of mandibular condyle.^{13,14,15} the various configurations have been studied and tested regarding the efficacy of various plating systems.^{16,17} As per our study two 1.25mm plates along the lateral border in lambda shape gives the best fixation with minimal gap in anterior tension band region on subsequent post operative radiographs. If a single plate is to be used, then it should be atleast 1.25mm thick to sustain the high stress during condylar function. 2 of our case have shown fracture of 1mm thick fixation miniplates, one of which has fracture of miniplates bilaterally. Fixation screws should not be engaged in thin cortical bone of sigmoid notch region. This may lead to loosening of screws on starting joint function. An inverted T-plate may be used in high condylar fracture with its long arm aligned along the condylar axis. The postoperative complications include infection of hardware, hardware breakage, parotid sialocele, malocclusion, facial nerve deficit, scars. The salivary gland complications were managed conservatively and none warrant a second surgery. Hardware failure cases were taken up for hardware removal followed by a period of rigid Intermaxillary fixation for 2 weeks, followed by elastic intermaxillary fixation for 3 weeks. 2 cases of facial nerve weakness were reported. The branches commonly involved were temporal and zygomatic branch. Preauricular incision was used for both these patients. The function of the nerve was near normal in a period of 9 months. The study suggests that the complications associated with open reduction and internal fixation is minimal and can be managed with minimal measures.

CONCLUSION

Open reduction and internal fixation of the mandibular condylar fractures provides the most definitive treatment that allows patients to return to early function and restores normal posterior facial height. Surgeon should not refrain from treating a case of condylar fracture with open reduction and internal fixation when indicated. A condylar stump length of 27mm is adequate for conveniently managing condylar fractures by open technique. A retromandibular incision and anterior parotid transmassetric approach is an excellent technique for providing exposure to sub condylar fractures with condylar stump length greater than 25mm. fixation is best achieved by lambda configuration plating. Open reduction has minimal complications if performed by an experienced and skilled surgeon.

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