

Original research article

Submandibular, preauricular and the transparotid surgical approaches to fractures of the mandibular condyle: a comparative studyDr. Shazia Khatoon^{1*}, Dr. Samir Jain²¹Senior Resident, Department of Dentistry, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India.²Professor and HOD, Department of Dentistry, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India

Corresponding Author: Dr. Shazia Khatoon

Abstract

Aim: The purpose of this study was to compare the submandibular, preauricular and the transparotid approaches to the condyle with respect to these parameters and correlate them with the specific features of condylar fractures.

Material and methods: A Retrospective study was conducted in the Department of Dentistry, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India from May 2019 to October 2019. 120 Patients with condylar fracture that required open reduction and internal fixation were included in this study. All patients were classified based on Spiessl and Schroll classification of condylar fractures, using radiological examination, into three groups- preauricular group (type VI), submandibular group (type II and type IV), and the transparotid group (type IIIb, type IIIc, and type V). Parameters like post-op IMF, palsy of facial nerve, scar, wound infection, malocclusion and plate retrieval were noted.

Results: 120 condylar fractures were included in this study. 26(21.67%) of them were women whereas 94(78.33%) were men with a p value of 0.41. The mean age in the preauricular group was 37.06 years, 34.52 years in the submandibular group and 36.07 years in the transparotid group with a standard deviation of 10.96, 9.97, and 8.67 respectively. RTA was the major aetiology of injury (78.33%) in all the three groups followed by self-fall and assault. 92.5% of fractures in the pre-auricular group, 82.5% of fractures in the submandibular group and 55% of the fractures in the trans-parotid group were associated with other fractures of the facial skeleton. Post-op IMF was present in 15% of preauricular group when compared 0% in the other two groups facial nerve palsy was seen in 7.5% of preauricular cases, 25% of submandibular group and 17.5% of trans-parotid group. Unfavorable scar formation was recorded in 12.5% of pre-auricular group, 37.5% of submandibular group and 40% trans-parotid group. Wound infection was seen in 12.5% of preauricular group, 22.5% of submandibular group and 7.5% of transparotid group.

Conclusion: The inferior neck fractures seem to benefit from ORIF via submandibular approach, high neck fractures via the transparotid fractures and the condylar head fractures via the preauricular approach with a low rate of complications.

Keywords: Condylar fractures, Open reduction, Pre-auricular, Sub-mandibular, Transparotid

Introduction

Condylar fractures of the mandible are one of the most frequent injuries observed in the facial skeleton.¹ Therapy is difficult, and a large number of patients do not achieve correct bite conditions after treatment. Biomechanical evaluation shows that the treatment of mandibular neck fractures cannot resolve malocclusion outcomes, as the fixation is not sufficiently rigid.² Therefore, currently, open reduction and rigid internal plate fixation (ORIF) has become the first choice of therapy.³ The goals of treatment of condylar fractures are pain free mandibular

motion, good occlusion, and symmetry and have said that as long as these goals can be achieved, it is prudent that the easiest and the least invasive treatment method should be selected.⁴ But the severity of condylar injuries is often underestimated and the clinical outcome can be suboptimal particularly with regard to occlusion following conservative treatment. Also there is reduced incisal opening, deviation of the mandible, impaired mastication, ankylosis, and internal derangement. Consequently the pendulum has swung towards accurate anatomical reduction in the hope that this will improve the outcome.

There are various approaches to the condyle as explained in the literature. When choosing between them the simplest approach among them, should be the treatment of choice provided all else is equal. Six types of condylar fractures were identified by Spiessl and Schroll which included displacement and dislocation of the fracture fragments. Two main treatment modalities are advised for the treatment of condylar fractures, one being closed reduction and the other open reduction with internal fixation. Open reduction can be performed by various approaches. To assess the most appropriate surgical approach for condylar fractures aesthetic and the functional outcomes should be considered. Hence in our study we have compared the submandibular, preauricular and the transparotid approaches to the condyle with respect to these parameters and correlated them with the specific features of condylar fractures.

Material and methods

A Retrospective study was conducted in the Department of Dentistry, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India from May 2019 to October 2019, after taking the approval of the protocol review committee and institutional ethics committee.

Inclusion criteria

Patients with condylar fracture that required open reduction and internal fixation

Exclusion criteria

- Patients with pre-existing medical conditions
- Infected fracture site,
- Patients who were treated by closed reduction

Methodology

A total of 120 cases were included in the study. All patients were classified based on Spiessl and Schroll classification of condylar fractures, using radiological examination, into three groups- preauricular group (type VI), submandibular group (type II and type IV), and the transparotid group (type IIIb, type IIIc, and type V). In all the cases miniplates were used for internal fixation. Preauricular approach was performed according to Eckelt. For submandibular approach the incision was given two fingers below the mandible and for the transparotid approach incision was given 2-3 cm vertically below the lobule of the ear. All patients' records were followed up for 6 months. All data were evaluated using the patient's records including the radiological imaging. Parameters like post-op IMF, palsy of facial nerve, scar, wound infection, malocclusion and plate retrieval were noted.

Results

120 condylar fractures were included in this study. 26(21.67%) of them were women whereas 94(78.33%) were men with a p value of 0.41 The mean age in the preauricular group was 37.06 years, 34.52 years in the submandibular group and 36.07 years in the transparotid group with a standard deviation of 10.96, 9.97, and 8.67 respectively. RTA was the major etiology of injury(78.33%) in all the three groups followed by self- fall and assault. P-value was found to be significant (p- 0.01). 10% of case in the submandibular group was bilateral,

which was managed by closed reduction on one side. 65% of the cases in pre-auricular and trans-parotid and 60% of cases in the submandibular group were on the right side. (p- value – 0.93). 92.5% of fractures in the pre-auricular group, 82.5% of fractures in the sub-mandibular group and 55% of the fractures in the trans-parotid group were associated with other fractures of the facial skeleton. A p-value of 0.026 was obtained which was found to be significant.

Table 1: Demographic Profile of Patients

Gender	N=120	%	P value
Male	94	78.33	0.41
Female	26	21.67	
Age			
0-20	7	5.83	
20-40	97	80.83	
Above 40	16	13.33	
RTA injury	94	78.33	0.01
Other	26	21.67	

Post-op IMF was present in 15% of preauricular group when compared 0% in the other two groups with a p-value of 0.14 facial nerve palsy was seen in 7.5% of preauricular cases, 25% of submandibular group and 17.5% of trans-parotid group with a p-value of 0.45. unfavorable scar formation was recorded in 12.5% of pre-auricular group, 37.5% of submandibular group and 40% trans-parotid group (p-value- 0.15). Wound infection was seen in 12.5% of preauricular group, 22.5% of submandibular group and 7.5% of transparotid group with a p-value of 0.17. Malocclusion was seen in 15% of preauricular cases, and none in the other two groups. (p- value- 0.17). 12.5% of cases in the preauricular group and 5% of cases in the transparotid group had to undergo plate retrieval with a p-value of 0.57.

Table 2: Comparison of three group

		Pre-auricular		Sub-mandibular		Transparotid		Chi-square value	P value
		Frequency	Percent	Frequency	Percent	Frequency	Percent		
Post op infection	No	34	85	40	100.0	40	100.0	4.12	0.14
	Yes	6	15	0	0	0	0		
Palsy of facial nerve	No	37	92.5	30	75	33	82.5	2.22	0.45
	Yes	3	7.5	10	25	7	17.5		
Scar	No	35	87.5	25	62.5	24	60	3.26	0.15
	Yes	5	12.5	15	37.5	16	40		
Wound infection	No	35	87.5	31	77.5	37	92.5	3.87	0.17
	Yes	5	12.5	9	22.5	3	7.5		
Malocclusion	No	34	85	40	100.0	40	100.0	4.33	0.17
	Yes	6	15	0	0	0	0		
Plate retrieval	No	35	87.5	40	100.0	38	95	2.42	0.57
	Yes	5	12.5	0	0	2	5		

Discussion

About one third of all mandibular fractures are of the mandibular condylar.⁵ Treatment plan of these fractures are controversial, either to treat surgically (open reduction and internal fixation) or functionally (closed reduction).⁶ In adult patients surgical treatment depends on the type and displacement of the fracture.⁷ Based on the height and position of the fractured

segment, various approaches to the condylar process are described. The only criterion for selection of the approach is done with the distance between the incision and level of fracture.⁸ The choice of surgical approach to the condyle depends upon the individual maxillofacial surgeon and is based on their experience with technique and their personal beliefs. In this study Spiessl and schroll⁹ classification of condylar fractures was used. Practically, all the fractures were divided into 3 groups, based on the type of fracture and the most suitable approach for it. Spiessl and schroll type I condylar fractures were not included in the study as they could be managed with closed reduction. The mean age for condylar fractures to occur was between 25-35 years in all the 3 groups when compared to a study by Newman et al where it ranged between 17-32 years.¹⁰ In this study males constituted 78.33% of the total cases, indicating the fact that men constitute the main working force in our society. This supports the statistics of Wong and Badar and Syed where there was male predominance.^{11,12} On the other hand, Zachariades et al., in a review study of 466 condylar fractures cases found no significant difference between males and females.⁵ This can be attributed to the fact that more women work outdoors in some occupations which leads to more exposure to craniomaxillofacial fractures. RTA was the most common cause of condylar fracture with (78.33%). This data were similar to a study done by Sawazakiet al.¹³ who mentioned that RTA was the most common cause of condylar fracture (55.33%). In our study, falls, assault and violence were of less frequency. 92.5% of fractures in the pre-auricular group, 82.5% of fractures in the sub-mandibular group and 55% of the fractures in the trans-parotid group were associated with other fractures of the facial skeleton. A p-value of 0.026 was obtained which was found to be significant. Zachariadeset al.⁵ had mentioned that condylar fractures resulted from the transmission of force which is not fully absorbed in the area of its primary application. 8% of case in the submandibular group was bilateral. The presence of bilateral condylar fractures in isolation did not mandate an ORIF. This was in accordance with management of Kellman.¹⁴ In contrast, Ellis believed that any unilateral condylar fracture could be treated with MMF only.¹⁵ In addition, he did not believe that he could manage bilateral condylar fractures efficiently by MMF. The complication rates found in this study are within reported ranges. The incidence of facial nerve injury has ranged from 0-25%. It was seen more in the submandibular approach (25%). This could be attributed to the subcutaneous dissection which traverses the marginal mandibular nerve deeply, in the submandibular approach when compared to the superficial traversing in the transparotid group.¹⁶ The least was found to be in the pre-auricular approach (7.5%). Unfavorable scarring was recorded the most for submandibular and transparotid approaches in comparison to the preauricular group. Owing to the fact that the pre auricular incision lies in the pre auricular fold making it inconspicuous. Wound infection was more in the submandibular group (22.5%) when compared to 12.5% and 7.5% in the pre auricular and transparotid group respectively. It could be attributed to the fact that submandibular approach requires, long incision, more exposure, deep tunneling to reach the subcondylar area, due to its increased distance from the fracture line. Transient Malocclusion was seen in only in 15% of the case in the pre auricular group, which could be due to improper anatomic reduction and plate fixation of the fracture fragments, which is usually difficult using the preauricular approach. These cases were managed with post-op IMF for 4 weeks thereby settling occlusion. Implant retrieval was done in 5 of the cases in pre auricular group and 2 case in the transparotid group due to the presence of continued infection.

Conclusion

Open reduction and internal fixation of condylar fractures have proven to provide better results. The preferred surgical approach should be the one that allows straight forward fracture management whilst minimizing the potential risks. The inferior neck fractures seem to benefit from ORIF via submandibular approach, high neck fractures via the transparotid

fractures and the condylar head fractures via the pre auricular approach with a low rate of complications.

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