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Original Research Article

A retrospective study to assess the complications associated with surgical management of distal radius fracture by ligamentotaxis

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ABSTRACT

Background: Fractures of the distal radius are the most common upper limb fractures encountered by orthopedic surgeons. It constitutes about 75% of all the forearm fractures. There is steady increase in this type of fracture in all age groups but is the highest in children and elderly. There are multiple modalities of treatment available for distal end radius fractures, among which ligamentotaxis is one of the modalities, where the ligaments, retinaculum, tendons and periosteum that envelope the fracture serves as barrier during open reduction, helps achieve the reduction of the fracture. The objective is to study the most common complication associated with distal radius fractures treated by ligamentotaxis in this institution.

Methods: This hospital based retrospective study was conducted at MVJMC and RH after receiving ethical clearance from the institutional ethical committee. The study population contained 50 patients that met the inclusion criteria over a period of 4 years from March 2019 to March 2024.The administrative health data was collected from OPD and OT registers, and the collected data was entered in Microsoft excel and results were calculated and tabulated at the end of the period. All the patients with distal end radius fractures treated by ligamentotaxis over a period of 4 years were included

Results: According to the study distal end radius fracture was more prevalent among males than females and the highest percentage with 30% was seen among the age group of 31-40 years. The most common complication encountered was neuropathy and residual wrist pain which accounted for 14%.

Conclusions: The study concludes that most of the fractures and its complications are note among the active age group. The study helps understand the complications and find strategies to reduce the complication percentage.

Keywords: Ligamentotaxis, Distal end radius fracture, Pin tract infection, Neuropathy, Residual wrist pain

INTRODUCTION

Fractures of the distal radius are the most common upper limb fractures encountered by orthopedic surgeons.[1] It constitutes about 1.7% of all the fractures and 75% of all the forearm fractures.[2] There is a steady increase in these type of fractures in all age groups but is the highest in children and elderly, this is due to reduced amount of stronger cortical bone and increased amount of weaker cancellous bone at the metaphyseal border area of distal radius.[2] The main cause for distal end radius fracture is fall on outstretched hand.[2] Distal end radius fracture in younger individuals is an early sign of osteoporosis.[3] There are multiple treatment modalities available for the management of distal end radius fracture, the ultimate objective all the modes of management remain the same, which is to make sure the patients range of motion and grip strength are restored with early recovery and minimizing the chances of associated complications.[4] The optimal treatment modality remains controversial, while choosing

the modality of treatment fracture pattern, soft tissue injury ,mechanism of injury, patient characteristics and surgeons preference are taken into consideration.[5] One of the modalities of treatment of distal end radius is ligamentotaxis where the ligaments, retinaculae, tendons and periosteum that envelope the fracture serves as barrier during open reduction, helps achieve the reduction of the fracture.[6] Ligamentotaxis can be uniplanar or multi planar. In uniplanar ligamentotaxis, longitudinal traction is applied to the carpus and the tension is transmitted mostly through the radioscaphocapitate and long radiolunate ligaments, but the longitudinal traction alone does not restore the palmar tilt to the distal radius. Hence in multi planar ligamentotaxis the principle of longitudinal traction of uniplanar type is extended to include translation of hand in the dorsal-palmar and the radial-ulnar planes to effect oppositional and tilting a glimmer of the distal fragments.[7]

Objectives

The objectives were to study the most common complication associated with distal radius fractures treated by ligamentotaxis in this institution.

METHODS

This retrospective hospital-based study was conducted at MVJ Medical College and Research Hospital after receiving the ethical clearance from the institution ethical committee. The study population contained of 50 patients that met the inclusion criteria over a period of 4 years from March 2019 to March 2024. The study included all patients with distal radius fracture managed by ligamentotaxis and patients treated by other modalities like plate or open surgical procedures were excluded.

Administrative health data was collected from the OPD register and OT registers respectively.

All the relevant information like age, sex, complication that the patient presented with was collected and entered in Microsoft excel, the results were calculated and tabulated at the end of the period.

RESULTS

The data collected was analysed and documented and results were based on the complications that the patients presented in this institution and the age group and gender in which most complications were noted.

Table 1: Complications of ligamentotaxis.

Complications	N	Percentage (%)
Pin tract infection	6	12
Residual wrist pain	7	14
Malunion	2	4
Non-union	2	4
Loss of reduction	4	8
Neuropathy	7	14

Table 2: Age distribution of distal end radius fracture.

Age group (in years)	Number of patients with distal radius fracture	Percentage of patients with distal radius fracture (%)	Number of patients presenting with complications in age group	Percentage of patients presenting with complications in age group (%)	Percentage of complication in age group contributing to total (%)
11-20	8	16	5	62.5	10
21-30	13	26	7	53.8	14
31-40	15	30	8	53.3	16
41-50	5	10	2	40	4
52-60	4	8	3	75	6
61-70	3	6	2	66.6	4
71-80	2	4	1	50	2

Table 3: Gender distribution of distal end radius fracture.

Gender	N	Percentage (%)
Male	27	54
Female	23	46

Table 4: The affected side of distal end radius fracture in patients.

Side of fracture	N	Percentage (%)
Left	22	44
Right	28	56

A total 50 cases of distal radius fractures were managed by ligamentotaxis of which 28 patients presented with complications. In the present study 54% of the total patients were male patients with fractures which was greater than percentage of female patients which accounted upto 46% of the total patients. Among all the complications that the patients presented with the incidence of neuropathy and residual wrist pain was the highest with about 14% and the incidence of malunion and non-union was the lowest which accounted for only 4 percent which is 2 patients each of the 28 cases that presented with complications such as malunion and non-union. About 12% of the patients presented with pin tract

infection becoming the second most common complication patients presented with in the institution. The highest percentage of distal radius fractures was seen in the age group of 31-40 years with 30% of the total patients who presented with distal radius fracture, following which the second highest with 26% was seen in the age group of 21-30 years. This high incidence of distal radius fracture in the 2nd and 3rd decade maybe due to the high number off road traffic accidents being the cause of the fractures, but the highest number of complication is seen in the age group of 50-60 years which is about 75% of the total fractures seen in that age group and contributes about 6 percent of the total number of fractures and the least percentage of complications was seen in the age group of 41-50 years accounting about 40% of the total fractures seen that age group and contributing about 4% to the total number of fractures.

DISCUSSION

Distal end radius fracture is the most common fracture encountered by orthopaedic surgeons but is still a challenge as it poses therapeutic problem in terms of reduction of fracture, maintenance of reduction and the main goal is optimal restoration and quick return of hand function.[8] This is a retrospective hospital based study conducted on 50 patients with distal radius fracture treated by ligamentotaxis of which 28 patients presented with complications after the management of distal radius fracture by ligamentotaxis. Ligamentotaxis is one of many modalities of management of distal end radius fracture. In this study only patients who were managed by ligamentotaxis were considered. The main objective of the study is to find the most common complications associated with ligamentotaxis and the commonest age in which they occur, in order to improve patient care and come up with strategies to reduce the incidence of complications. According to the present study about 30% which included about 15 patients with fractures, was seen among patients between the age group of 31-40 years as compared with the study conducted by Banapatti et al majority of the cases were in between the age group of 41-50 years and the study conducted by Mudgal also showed increased incidence of fracture among the age group 51-60 years.[3,9] This trend of the fractures being more in the active age group is due the increased number of road traffic accidents encountered in the hospital and it being the cause of most fractures. Though the incidence of fracture is more among the age of 31-40 age group and is also the highest contributor to the complications among all age groups but the incidence of complications is highest among the age 51-60 age group with 2 of the 3 cases encountered presenting with complications. Though ligamentotaxis is less invasive procedure like any procedure has its own benefits and complications, the study showed that about 6 patients (12%) of the 28 patients presented with pin tract infections making it the second most common complication encountered in the institution and about 14 patients (14%) presented with residual wrist pain and neuropathy making it the commonest complication presented by patients with the least encountered complication being malunion and non-union, when compared to study conducted by Salama et al which also showed pin tract infection to be the highest encountered complication with about 25% and sundecks atrophy and radial nerve affection accounted for about 8% each.[6] Similar study conducted by Anderson showed pin tract infections to be the most common complication accounting for about 37.5%.[10] In distal end radius fractures about 28 patients of 50 patients presented with right side fractures when compared to study conducted by Kumar which also showed that in about 22 patients of 32 patients the right side was affected, indicating that distal end radius fractures are most commonly affected the right side.[11] The study also was able to calculate the prevalence of distal end radius fracture among males and females, and according to our study the incidence of distal end radius fractures was more prevalent among. Males accounting for about 54%, similar result of increased prevalence among males with about 90% was seen in the study conducted by Deepak et al.[12]

Our study like any other has its own limitations, as we have considered only the cases of ligamentotaxis and did not consider the other modalities that are used for the management of the distal radius fractures.

CONCLUSION

The result of this study concludes that most of the fractures and its complications are noted among the active age group and rate of pint tract infection is less compare to other studies. The study helps understand the complications and find strategies to reduce the complication percentage and the authors intend to repeat this audit of complications over time to monitor the change in percentage and incidence of complications noted.

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