



COMPARATIVE STUDY OF FUNCTIONAL OUTCOME OF OLECRANON FRACTURE TREATED WITH TENSION BAND WIRING AND CANNULATED COMPRESSIVE SCREW

Orthopaedics

Dr. Ranjeet Kumar*	Assistant professor, Department of Orthopaedic, Anugrah Narayan Magadh Medical College & Hospital, Gaya, Bihar, India. *Corresponding Author
Dr. Shambhu Prasad	Senior resident, department of orthopaedics, Anugrah Narayan Magadh Medical College & Hospital, Gaya, Bihar, India.
Dr. Shailendra Kumar	Associate professor, Department of orthopaedics, Anugrah Narayan Magadh Medical College & Hospital, Gaya, Bihar, India.

ABSTRACT

Olecranon fractures are one of the most commonly seen orthopaedic injuries in the emergency room. There are various types of management including non-operative, TBW using k wire, TBW using Cancellous screw, plating, intramedullary screw fixation, olecranon excision (1). Our study is to compare functional outcome of two operative methods namely TBW and intramedullary CCS fixation. 25 patients were retrospectively analysed and divided into two groups. Group A (n = 13) patients were treated by TBW and group B (n = 12) by CCS. All the cases were followed up and the results were analysed by using a Mayo Elbow Performance Index. The mean operation time in group A was 46.63 minutes and 35.40 minutes in group B. The mean fracture union time in group A was 15.62 weeks (range 8–24 weeks), and 14.24 weeks in group B. Excellent results were achieved with 6.5mm CCS in 8(66.6%) patients while with TBW K wire 7(53.8%) patients, good results were achieved with 6.5mm CCS with Washer in 3(25%) patients while with TBW K wire 4(30.7%) patients fair results were achieved 6.5mm CCS in 1(8.33%) patients while with TBW K wire 2(15.38%) patients. The technique of close reduction and internal fixation with CCS is as effective as open reduction and internal fixation with TBW.

KEYWORDS

INTRODUCTION

Olecranon fractures are one of the most commonly seen orthopaedic injuries in the emergency room. When they are displaced, open reduction and internal fixation are usually required to obtain an anatomical realignment of the articular surface to restore the normal elbow function. The fixation should be stable, it should allow an active elbow flexion and extension and it should promote union of the fracture. The active mobilization after surgery will restore the patient to normal functions as early as possible. Many methods which have been described are tension band wiring, intra fragmentary screws with or without wires, wires alone, plates, rush pin with tension band wiring, intramedullary screws with or without tension bands and bone fragment excision with reattachment triceps [1]. Tension band wiring is the most common method used; it involves the use of a tension band and two K wires [2]. But it is not free of complications, the most common being hardware prominence which requires removal, loss of motion and loss of fixation. The K-wire which is used in the tension band technique, resists the shear better than the figure of eight wire alone, but, it does not add compression to the fixation strength. Cancellous screw provides the strength of fixation i.e., by converting the tensile force to a compressive force at the fracture site, with additional resistance to the displacement due to the lag screw compression.

Advantages of TBW K wire 1. Rigid fixation 2. Early mobilization 3. Higher union rate 4. Higher Range of motion Disadvantages of TBW K wire 1. Increased chances of infection 2. More blood loss. Advantages of CCS 1. Less chances of infection 2. can be done under local anaesthesia 3. can be done in immunocompromised patients Disadvantages of CCS 1. Union rate low 2. Late mobilization as compared to TBW K wire 3. Lesser range of motion

MATERIALS AND METHODS

The present study consisted of 25 cases of fractures of the olecranon of which 12 were treated with 6.5mm cancellous screws 32 mm threads (length of 80-105mm) and 13 were treated with a 16 gauge TBW, which were treated at the Anugrah Narayan Magadh Medical College, Gaya during the period from 1 June 2019 to 30 Jan 2020. Immediately, on the arrival of the patients, if he/she was in shock, the level of the shock was noted and it was managed accordingly. An X-ray of the part was taken and the elbow was immobilized in whatever position the patients presented, in a A/E POP posterior slab. The affected limb was kept elevated. Analgesics and antibiotics were given if necessary. The necessary investigations were carried out. All the patients were informed regarding the procedure and their informed

consents were taken. The patients were then prepared for surgery and anaesthesia after their pre anaesthetic check-ups. Selection of the Cases for the Cancellous Screw and Tension Band Wiring: The following points were considered: Age of the patient, The extent of damage to the articular surface, the degree of comminution. The patients of extreme ages and the patients in whom the operative risk was great, were not taken up for surgery. The severely comminuted fractures with larger articular surface damages, where restoration of the normal anatomy was not possible, were not taken up for the cancellous screw and TBW. Mayo type IB and IIA patients are included in this study Type IIA non comminuted fracture are operated using 6.5 mm CCS with 32 mm thread with length of CCS not less than 7 cm distal to fracture site Type IB fractures are treated with TBW-K wire. The procedure of TBW was done under general anaesthesia or a brachial block. The exposure of the olecranon was achieved by using Campbell's posterolateral approach.

Surgical procedure of 6.5 mm CCS with Washer [4] 1. Keep the patient in lateral position and elbow flexed to 90 degree and kept over side post 2. Make a stab incision in triceps tendon and drill a hole with 2 mm k wire 3. Insert a guide pin 4. Insert 6.5 mm CCS with 32 mm thread and Washer over it in such a way that screw will cross the fracture site by atleast 7 cm 5. Closure done. The accuracy of the reduction was checked and its stability was tested by moving the joint. The affected limb was elevated and the patient was asked to perform finger movements on day one. Elbow movements were advised on the 2nd post-operative day for TBW –K wire patients and 5th post-operative day for 6.5 mm CCS with washer patients For the minimal comminuted fractures and the unstable fixations, the limb was immobilized in A/E POP posterior slab with the elbow in 70° flexion for 2 weeks. For other fractures, the limb was mobilized by about the 3rd postoperative day. In our study, the patients who were to be discharged were advised to report for follow up after 6 weeks and 12 weeks and thereafter, every 3 months. The result was assessed 12 months after the procedure. At follow up, a detailed clinical examination was done and the patients were assessed subjectively for symptoms like pain, swelling and restriction of the joint motion. On clinical examination, the swelling of the joint, its tenderness, the movements of the elbow joint, prominence of the head of the cancellous screw, nutrition and power of the muscles which were acting on the joint, were noted.

The patients were instructed to carry out physiotherapy in the form of active flexion-extension and pronation supination without loading. Check X-rays were taken and when the final Xray showed union, the

implants were removed. Results are compared using Mayo elbow performance index.

RESULTS

There is no superficial infection in pateint group B and 3 in group A(12%) as incision is large in tbw as compared to stab incision in CCS

Impingement in group B is less 1 (4%) as compared to GROUP A 2(8%) as implant remaining outside the bone inside triceps muscle is less in CCS as compared to 2 curved k wire heads and knot in TBW K wire.

Restricted Mobility IN GROUP B 0(2.94%) as compared to GROUP A 2 (8%) as in some unstable comminuted fractures, fracture was immobilised in POP Cast for 1 month.

Pain IN GROUP B is less 1(4%) as compared to group A 4(16%) as there is irritation to anterior interosseus nerve when k wire penetrates the opposite cortex.

Excellent results were achieved in group B in 9 (36%) patients while with TBW K wire 8(32%) patients achieved excellent result

Good results were achieved with 6.5mm CCS with Washer in 2(8%) patients while with TBW K wire 4(16%) patients achieved good result

Fair results were achieved 6.5mm CCS with Washer in 1 (4%) patients while with TBW K wire 1(4%) patients achieved fair result

There were no poor results.

DISCUSSION

The main aim behind the treatment of fractures is not only achieving a joint union but also preserving the optimum function of the adjacent soft tissues and joints. In the management of intraarticular fractures like fractures of the olecranon, a perfect anatomical reduction of the fragments, for obtaining articular congruity and rigid fixation of the fragments, is of utmost importance, if early movements are to be instituted to prevent complications like traumatic arthritis and joint stiffness. 6.5mm AO cancellous screws with washer V/s TBW K wire, provides the strength of fixation, that is, by converting the tensile force to a compressive force at the fracture site, with additional resistance to the displacement due to the lag screw compression. In our study, 34 cases of fractures of the olecranon were treated with 6.5mm AO cancellous screws with washer and tension band wiring. Our experience with this method of fixation has given favourable results.

1. There was a significant male predominance in the present study 18 patients (72%).
2. road traffic accidents were more common 19(76%) than indirect injuries.
3. Superficial infection with 6.5mm CCS with washer was 0(0%) as compared to TBW k wire 3 (12%) as incision is large in TBW as compared to stab incision in CCS.
4. Impingement with 6.5mm CCS with washer is less 1 (4%) as compared to TBW k wire 2(8%) as implant remaining outside the bone inside triceps muscle is less in CCS as compared to 2 curved k wire heads and knot in TBW K wire.
5. Restricted Mobility with 6.5mm CCS with washer less 0 (0%) as compared to TBW k wire 2 (8%) as in some unstable fractures POP Cast in 700 flexion was applied for 1 month.
6. Pain with 6.5mm CCS with washer is less 1 (4%) as compared to TBW k wire 4(16%) as there is irritation to anterior interosseous nerve when k wire penetrates the opposite cortex.
7. Excellent results were achieved with 6.5mm CCS with Washer in 9 (36%) patients while with TBW K wire 8(32%) patients achieved excellent result.
8. Good results were achieved with 6.5mm CCS with Washer in 2 (8%) patients while with TBW K wire 4(16%) patients achieved good result
9. Fair results were achieved 6.5mm CCS with Washer in 1 (4%) patient while with TBW K wire 1(4%) patients achieved fair result
10. P Value IS 0.6495 which is not significant suggesting that CCS with washer is not superior than TBW and Vice Versa, Both as effective method of treatment.

CONCLUSION

From this retrospective comparative study, olecranon fractures could be effectively treated with the CCS, with advantages of less superficial

infection rate, lower incidence of restricted mobility, less blood loss. This study is small when considered statistically.

REFERENCES

1. Donegan RP, Bell J. Operative Techniques in Orthopaedics: Olecranon Fractures. Elsevier, 2010. p.17-23
2. Hak DJ, Gollady GJ. Olecranon fractures: treatment options. J Am Acad Orthop Surg. 2000; 8:266-75.
3. Heim U, Pfeiffer K. Small fragment set manual: technique recommended by the ASIF-Group. New York: Springer. 1974, 743.
4. Kenneth Covell, Handbook of fractures 5th edition, Walters Kluwer, p-241.
5. Campbell's operative orthopaedics, 13th edition
6. https://www.physioopedia.com/Mayo_Elbow_Performance_Index