



E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2019; 5(4): 971-975
© 2019 IJOS
www.orthopaper.com
Received: 05-08-2019
Accepted: 08-09-2019

Dr. Himanshu C Panchal
Associate Professor and HOU,
Dept. of Orthopaedics, B J
medical College, Civil Hospital,
Ahmedabad, Gujarat, India

Dr Pratikumar Bhabhor
Resident doctor, Dept. of
orthopaedics, B J Medical
College, Ahmedabad, Gujarat,
India

6.5mm cancellous screw with washer vs tension band wiring for fractures of the olecranon

Dr. Himanshu C Panchal and Dr. Pratik kumar Bhabhor

DOI: <https://doi.org/10.22271/ortho.2019.v5.i4q.1803>

Abstract

Introduction: Olecranon fractures are one of the most commonly seen orthopaedic injuries in the emergency room. The K-wire which is used in the AO Tension Band Wiring (TBW) technique resists the shear better than the figure of eight wire alone, but, it does not add compression to the fixation strength. But, the 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

Our study is retrospective as well as prospective done between 1 September 2018 to 30 September 2019 for 13 months at B J Medical College, civil Hospital Ahmedabad with 34 cases.

Objective

- To clinically evaluate the result of the 6.5 mm cancellous screw with washer V/s tension band wiring for fractures of the olecranon
- To assess Functional outcome and union rate among two methods In Mayo Type IB and IIA Fractures

Material and Methods: sixteen cases of fractures of the olecranon which were treated by using 6.5mm AO cancellous screws with 32 mm threads, screw length of 80-105mm and 6.5 mm washer and 18 cases are treated with a 16 gauge TBW, were evaluated. All the cases were followed up and the results were analyzed by using a Mayo Elbow Performance Index.

Results: Excellent results were achieved with 6.5mm CCS with Washer in 13(38.23%) patients while with TBW K wire 12(35.29%) patients, good results were achieved with 6.5mm CCS with Washer in 2(5.88%) patients while with TBW K wire 4(11.76%) patients fair results were achieved 6.5mm CCS with Washer in 1(2.94%) patients while with TBW K wire 2(5.88%) patients There were no poor results

Conclusion: The technique of close reduction and internal fixation with 6.5 mm CCS is as effective method than open reduction and internal fixation with TBW.

Keywords: Olecranon fractures, cancellous screw, tension band wiring

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 and 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.

In the past, closed reduction and a plaster cast application was the treatment for fractures of the olecranon. But, a prolonged immobilization, with its own complications, increased the morbidity and the mortality of the patients. So, considering this, it has become important to intervene surgically. The active mobilization after surgery will restore the patient to normal functions as early as possible. The early and active movement not only prevents the tissue from fracture disease, but it greatly influences the quality and the rapidity of the fracture union.

Many methods which have been described are tension band wiring, intrafragmentary 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]. AO tension band wiring is the most common method which is 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

Corresponding Author:
Dr. Himanshu C Panchal
Associate Professor and HOU,
Dept. of Orthopaedics, B J
medical College, Civil Hospital,
Ahmedabad, Gujarat, India

hardware prominence which requires removal, loss of motion and loss of fixation. The K-wire which is used in the AO tension band technique, resists the shear better than the figure of eight wire alone, but, it does not add compression to the fixation strength. But, a 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 as compare to TBW K wire

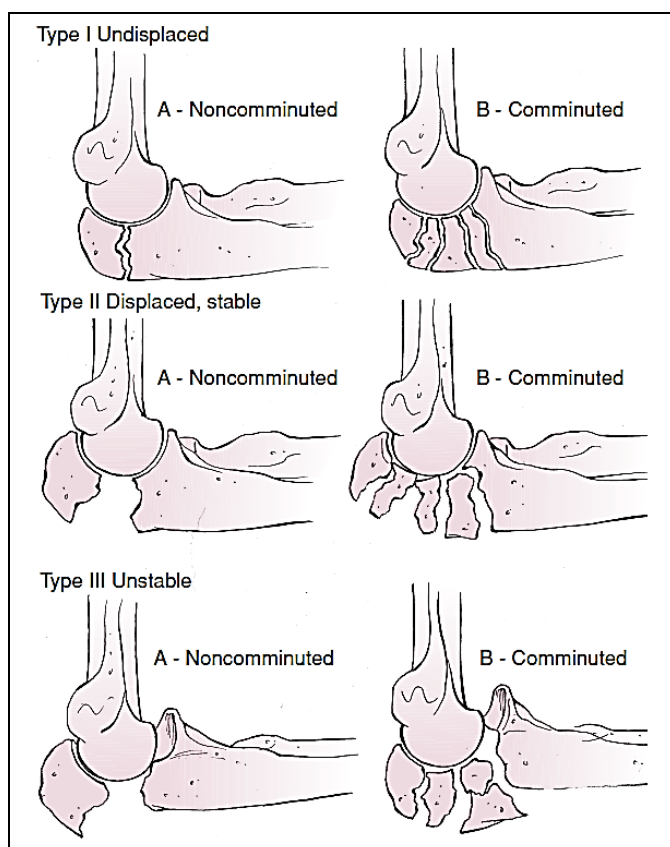


Fig 1: Mayo classification of fractures [3]

Materials and Methods

The present study consisted of 34 cases of fractures of the olecranon of which 16 were treated with 6.5mm AO cancellous screws 32 mm threads with washer, screw length of 80-105mm and 18 were treated with a with a 16 gauge

TBW, which were treated at the B J Medical College Civil Hospital Ahmedabad during the period from 1 Sept 2018 to 30 Sept 2019, after taking ethical committee clearance from the hospital authorities.

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 with washer 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 Washer 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 Surgical Procedure: 34 cases of fractures of the olecranon were treated by using 6.5mm cancellous screws of 32 threads with a screw length of 80-105mm with washer and a 16 gauge TBW 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 with humerus on humerus post and elbow flexed to 90°
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 Xrays showed union, the implants were removed. Results are compared using Mayo Elbow Performance Index [5]

Criteria	No. of points
PAIN (max., 60 points)	
None	60
Mild to occasional, no medication	40
Moderate to occasional, activity limited, medication	20
Severe to incapacitating	0
MOTION (max. 30 points)	
Arc of extension/flexion:	
>90	30
60-89	20
30-59	10
<30	0
STABILITY (max., 10 points)	
Effect on function of the elbow	
None or mild (does not limit activity)	10
Moderate (impairs certain functions)	5
Severe (markedly limits activity)	0

Fig 2: Mayo Elbow Performance index⁵

Interpretation of Mayo Elbow Performance Index⁵

- 91- 100: excellent
- 90 – 81: good
- 80 – 71: fair
- <70: poor

Results

Although there are many methods of evaluation of the results, which are given by many authors, for the sake of simplicity and ease, the results of all the fractures of the olecranon which were treated by using a cancellous screw with washer and TBW, were evaluated in our study

Table 1: sex incidence

Sex/procedure	Male	Female
6.5mm CCS with washer	10 (29.41%)	6 (17.64%)
TBW K wire	12 (35.29%)	6 (17.64%)

There was a significant male predominance in the present study (22 patients-64.70%) as more young people are speed crazy leads to road traffic accidents

Table 2: Mechanism of injury

Mechanism of Injury/procedure	Road traffic Accident	Direct Blow	Fall from Height
6.5mm CCS with washer	12	2	2
TBW K wire	10	5	3

Table 3: Side Incidence

Side/procedure	Right	Left
6.5mm CCS with washer	12 (35.29%)	4 (11.76%)
TBW K wire	10 (29.41%)	8 (25.53%)

Right side olecranon fractures were common 22 (67.70%) than left side fractures 12 (32.3%) in the present study.

In the present study, road traffic accidents were more common 22 (67.70%) than indirect injuries.

Table 4: Post operative complications

Post op complications/procedure	6.5 mm CCS with Washer	TBW K wire
Superficial Infection	1 (2.94%)	4(11.76%)
Impingement	2(5.88%)	3 (8.82%)
Implant loosening	0	2(5.88%)
Restricted mobility	1 (2.94%)	4(11.76%)
Pain	2(5.88%)	6 (17.64%)

In the present study chance of

- Superficial infection with 6.5mm CCS with washer way less 1 (2.94%) as compared to tbw k wire 4 (11.76%) as incision is large in tbw as compared to stab incision in CCS
- Impingement with 6.5mm CCS with washer is less 2 (5.88%) as compared to tbw k wire 3(8.82%) as implant remaining outside the bone inside triceps muscle is less in CCS as comared to 2 curved k wire heads and knot in TBW K wire
- Restricted Mobility with 6.5mm CCS with washer less 1 (2.94%) as compared to tbw k wire 4 (11.76%) as in some unstable comminuted fractures, fracture was immobilised in POP Cast for 1 month
- Pain with 6.5mm CCS with washer is less 2 (5.88%) as compared to tbw k wire 6(17.64%) as there is irritation to anterior interosseus nerve when k wire penetrates the opposite cortex

All the patients were operated between 2-3 days, with an average period of 2 days after the injury. All the cases were followed up and the findings were recorded regularly. The results were analysed according to Mayo Elbow Performance index

Table 5 Results of the Procedure

Results/Procedure	Excellent	Good	Fair
6.5mm CCS with washer	13(38.23%)	2(5.88%)	1(2.94%)
TBW K wire	12(35.29%)	4(11.76%)	2(5.88%)

P Value is 0.6295 which is >0.05 and not significant

- Excellent results were achieved with 6.5mm CCS with Washer in 13 (38.23%) patients while with TBW K wire 12(35.29%) patients achieved excellent result
- Good results were achieved with 6.5mm CCS with Washer in 2 (5.88%) patients while with TBW K wire 4(11.76%) patients achieved good result
- Fair results were achieved 6.5mm CCS with Washer in 1 (2.94%) patients while with TBW K wire 2(5.88%) patients achieved fair result
- There were no poor results.
- The complications like superficial infections and a symptomatic metal prominence were, which were treated accordingly.



Fig 3: Pre op Xray of ccs with washer

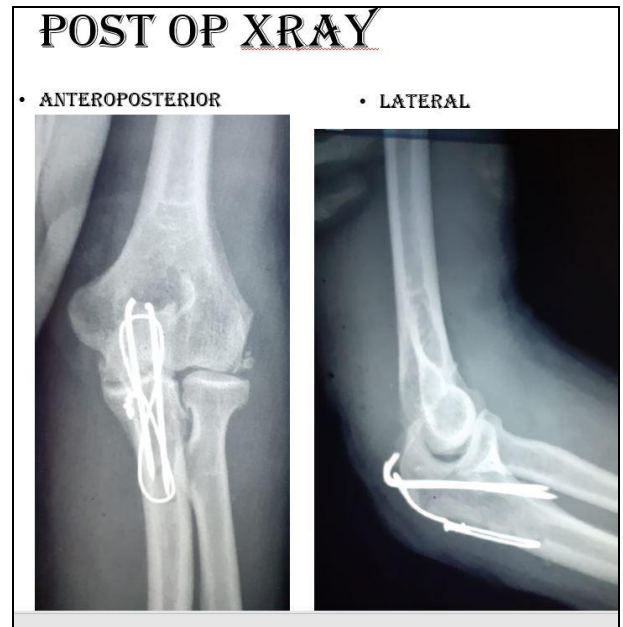


Fig 6: post op TBW Xray

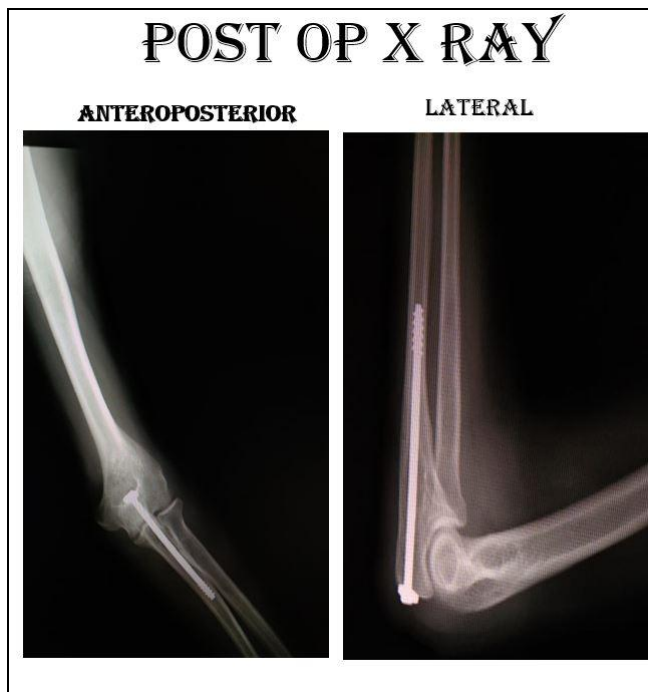


Fig 4: Post op 6.5mm CCS with washer x-ray



Fig 5: Pre op Xray of TBW K wire

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 (22 patients-64.70%) as more young people are speed crazy leads to road traffic accidents.
2. In the present study, road traffic accidents were more common 22(67.70%) than indirect injuries.
3. Superficial infection with 6.5mm CCS with washer way less 1 (2.94%) as compared to TBW k wire 4 (11.76%) as incision is large in TBW as compared to stab incision in CCS.
4. Impingement with 6.5mm CCS with washer is less 2 (5.88%) as compared to TBW k wire 3(8.82%) 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 1 (2.94%) as compared to TBW k wire 4 (11.76%) as in some unstable fractures POP Cast in 70° flexion was applied for 1 month.
6. Pain with 6.5mm CCS with washer is less 2 (5.88%) as compared to TBW k wire 6(17.64%) 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 13 (38.23%) patients while with TBW K wire

- 12(35.29%) patients achieved excellent result.
8. Good results were achieved with 6.5mm CCS with Washer in 2 (5.88%) patients while with TBW K wire 4(11.76%) patients achieved good result
 9. Fair results were achieved 6.5mm CCS with Washer in 1 (2.94%) patients while with TBW K wire 2(5.88%) patients achieved fair result
 10. P Value IS 0.6295 which is not significant suggesting that CCS with washer is not superior than TBW and Vice Versa, Both as effective method of treatment

Conclusions

- It is concluded that there is reduced chances of infection with 6.5 mm ccs with washer as compare to TBW k wire
- Reduced chances of mobility restriction in 6.5 mm ccs as compared to TBW k wire
- Reduced chances of impingement as compared to TBW k wire
- It has advantage to be used in immunocompromised patients, patient having morbid conditions
- Blood loss is not a concern with CCS as small incision is placed to insert screw as compared to large incision in TBW k wire
- CCS can be done under Local anesthesia
- 6.5mm CCS with washer is as effective as TBW K wire

References

1. Hak DJ, Gollady GJ. Olecranon fractures: treatment options. J Am Acad Orthop Surg. 2000; 8:266-75.
2. Heim U, Pfeiffer K. Small fragment set manual: technique recommended by the ASIF-Group. New York: Springer. 1974, 743.
3. Kenneth Covell, Handbook of fractures 5th edition, Walters Kluwer, p-241.
4. Campbell's operative orthopaedics, 13th edition
5. online reference https://www.physio-pedia.com/Mayo_Elbow_Performance_Index