



CASE SERIES OF PROSPECTIVE STUDY OF FUNCTIONAL OUTCOMES OF RADIAL SHORTENING OSTEOTOMY FOR KIENBÖCK'S DISEASE

Orthopaedics

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ABSTRACT

Background: The treatment of Kienbocks disease has always been controversial, with options like radial shortening, ulnar lengthening, direct decompression, revascularization procedures, replacement and fusion. Lately of these radial shortening has been the most accepted treatment of this condition. We here have done a prospective study of 5 cases of radial shortening by done for stage I – III A of Kienbocks disease. **Materials and Methods:** 5 cases of Kienbocks disease came to our OPD from Jan 2026 to July 2026. 4 of them were in stage IIIA one in stage II. 3 of them have a negative ulnar variance while 2 had a neutral variance. All 5 patients were treated by radial shortening. The 3 with a negative variance were treated with a closing wedge osteotomy while the 2 with neutral variance with closing block osteotomy. The average shortening done in both the procedures was 3 mm. Results were evaluated on functional evaluation by range of motion and pain relief, radiographic evaluation and subjective evaluation by disabilities of arm shoulder and hand (DASH) score. **Results:** All 5 cases showed good results both in functional assessment by range of motion and relief of pain and subjective evaluation by DASH score while moderate improvement in radiographic findings. There were few complications like superficial infection in one and a dorsal gap with delayed union of the osteotomy site in one case but none of them led to any long term impairment. **Conclusion:** Radial shortening is now a simple and effective procedure with minimal complications and good results in patients requiring surgical management in kienbocks disease stage I-III A.

KEYWORDS

INTRODUCTION

Kienbocks disease is the collapse of the lunate due to vascular insufficiency and avascular necrosis first described in 1910 by Kienbock¹. It's a rare disease (incidence of less than 1/200,000²) but is often disabling in its later stages. The disease occurs most often in young adults between 15 and 40 years and is usually unilateral.

It has a vascular etiology either due to repetitive microfractures of the lunate or due to recurrent pressure over the lunate from the surrounding bones. Of particular interest for this paper is the association of negative ulnar variance found in 2/3 cases of all the symptomatic cases. This causes direct pressure over the lunate compartment leading to precarious blood supply and eventually avascular necrosis of the lunate bone.

Even in its centurion year of discovery the treatment of Kienbocks disease has always remains controversial, with options like joint leveling procedures(radial shortening and ulnar lengthening) revascularization procedures, excision, replacement and fusion. Lately of these radial shortening has been the most accepted treatment for this condition³. We here describe a series of 5 cases of radial shortening by done for stage I – III A of Kienbocks disease.

MATERIALS AND METHODS

5 cases of Kienbocks disease came to our OPD from Jan 2026 to July 2026. 4 of them were in stage IIIA one in stage II. 3 of them have a negative ulnar variance while 2 had a neutral variance.

Complete clinic radiographic examination was done and the findings noted. Following parameters were recorded 1) range of motion 2) pain (using visual analog scale) 3) radiographic grading using Litchmans classification 4) disabilities of arm shoulder and hand (DASH) score

After proper counselling the patient was informed about the impact and implications of the procedure of radial shortening, its mechanism, success and failure rates and its complications and along with that the other treatment options available. All 5 patients complied for this procedure.

Surgical Technique

The operation is done under regional anaesthesia with the patient in supine position and the wrist kept exposed supine for a volar approach on radiolucent side table. An incision is made over the flexor carpi radialis tendon from the wrist flexion crease, extending proximally variably for a length of 8-10 cm. Deep dissection is carried along the

radial side of flexor carpi radialis protecting the cutaneous branch of the median nerve running along its ulnar border. Flexor carpi radialis along with median nerve is retracted ulnarly while flexor pollicis longus is retracted radially to expose the pronator quadratus.

An L-shaped incision is made over the radial border of the pronator quadratus elevated sub-periosteally off the radius in a radial to ulnar direction.

After exposure of the distal radius a volar T-plate is placed on the surface and is fixed distally before making the osteotomy.



L Shaped Flap of Pronator Quadratus



Osteotomy Site Marked

Ulnar Negative or Neutral Variance: The plate is fixed distally parallel to the radial axis and then a transverse 2-3 mm cut is made proximal to the distal fixation. The small wafer of the bone is removed, the cut surfaces approximated and fixed with the proximal screws. The wafer of the bone can be used as a graft.

Ulnar Positive Variance: The plate is fixed distally with a slight ulnar deviation of 5-10° depending on the variance and then a wedge shaped osteotomy done. The wedge is around 1mm on the ulnar side while 3 mm on the radial side. After removing the wedge the plate is straightened and the cut surfaces apposed and fixed with the distal screws. This causes correction of the ulnar variance along with shortening of radius.

The shortening and variance is confirmed under C-arm. Wound is closed in layers over a suction drain. The L shaped incision of the pronator quadratus is repaired in order to cover the implants. The hand is kept in a below elbow POP back slab for 4 weeks after which active rehabilitation done and usually full activity is gained in 3 months.



Pre-op X-ray Immediate Post-op After Implant Removal(15m)

RESULTS

Mean follow up period was 21 months. Follow up examination was done at 2,4,6 weeks and thereafter every 3 months. They were given a set of questionnaires before the operation and 6 weeks after of operation and the results evaluated. All 5 cases were examined by the same person.

Mean range of motion increased by while the pain score decreases to minimum or none for all the cases. More importantly there was a significant improvement in DASH score of all five cases with an average increase of 10 points. All 5 cases returned to their previous job in a mean period of 5 weeks without any significant complaint.

Radiographic evaluation showed that 4 of the five cases were of Lichtman III A grade and one of grade II. Follow up showed that all 5 cases were stagnant in grade III A after 6 months follow up.

Case	Range of Motion		Pain Score		DASH Score	
	Pre op	Post op	Pre op	Post op(6wk)	Pre op	Post op
1	45	105	70	10	52	77
2	55	95	50	0	55	80
3	70	110	50	10	61	81
4	15	60	80	15	36	51
5	30	80	60	0	41	66

One case that had only 60° post op range of motion had a suspected joint impingement of one of the distal screws. We removed his implant at 10 months and the patient regained 100° movement soon after the operation. The usual time of implant removal for other cases was 18 months except one case who refused any re operation due to economic constraints.

DISCUSSION AND CONCLUSION

Kienbocks disease is simply the osteonecrosis of the lunate bone. Even though describes an exact 100 yrs ago the solution to this problem is still not very clear. Of the many approaches used radial shortening has been a relatively successful method in recent times. The proposed mechanism of this procedure is indirect reliever of pressure on lunate resulting in less destruction, collapse and probably revascularisation. Whatever be the mechanism it is clear from literature and supported by this study that this procedure leads to symptomatic relief of the patient.

Long term studies have shown the downside of this procedure to be instability caused due to excessive shortening of the radius which led us to limit our osteotomies to only 2-3 mm. Our approach using the volar L shaped flap of Palmaris longus does minimum damage to surrounding soft tissues helping in an early rehabilitation with least morbidity for the patients.

To reduce the length and correct the variance both transverse and wedge osteotomy are described for ulnar negative/neutral and positive variance respectively. We also used flakes of the osteotomy as graft.

Newer trends: We have also tried a diaphyseal step cut osteotomy for shortening in 2 new cases. We find this technique much simpler and stable with less implant bearing. We are still waiting for results of the union and pain relief of these osteotomies.

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