



Management of Elbow Ankylosis using Ilizarov Device: A case report and review of literature.

Dr Enemudo R.E.T

Department of Orthopaedic and Trauma, Delta State University Teaching Hospital, Oghara, Delta State, Nigeria.

ABSTRACT

Elbow ankylosis is a complication of delayed treatment of elbow injuries especially in patients with associated traumatic brain injury and thermal burns. This is a case report of a 22 year old young man with traumatic right elbow ankylosis of 6 years following a fall. The range of movement (ROM) of the elbow joint was 100-300. He was treated by different traditional bone setters for 6 years without success. He was managed by use of Ilizarov device after excision of heterotopic bone in the joint to achieve a forearm arc of 100-1400. Indomethacin tablet was given to prevent new heterotopic bone and physiotherapy was done to maintain the ROM. At 14 months post-operation, the ROM has remained the same.

KEYWORDS

elbow ankylosis, heterotopic ossification, Ilizarov device, Indomethacin, range of movement

INTRODUCTION

Ankylosis of the elbow usually results from heterotopic ossification¹⁻³. Heterotopic ossification occurs when bone is laid down in a previous hematoma in a joint¹⁻³. This leads to joint stiffness¹⁻³. Heterotopic ossification frequently occurs after traumatic brain injury, burns injury, massive trauma and prolonged immobilization of the joint²⁻³. Normal anatomic structures in the joint like collateral ligament get mineralized in the process⁴. Several methods of treatment have been used with varying outcomes. These include excision of ectopic bone in the joint, soft tissue release with tendon elongation⁵. The use of indomethacin⁶ and irradiation of the joint are useful in preventing new heterotopic bone formation in joint⁷⁻¹⁰.

This article presents a case report of 22 year old man with a 6 year old history of a right elbow ankylosis following a traumatic fall on his elbow that was managed by using Ilizarov device.

CASE REPORT

A 22 year old man presented at our clinic with a 6 year old history of stiffness of the right elbow joint in extension. He fell down on his right elbow joint while fighting. He was treated by different traditional bone setters on different occasions over the 6 year period with no avail of his problem. Scarification marks were made on the elbow and herbs were applied. He said his elbow was forcefully manipulated and splinted in extension. He was brought to the clinic by a relation who is a doctor. Patient was a secondary school leaver who wants to be a soldier. His dominant hand was the right hand.

Examination findings revealed healed scarification marks on the elbow and no neurovascular deficit was seen. The range of movement of his elbow joint was 10-30°. X-rays showed presence of ectopic bone in the joint with minimally displaced medial condyle fracture injury seen.

Surgical excision of the ectopic bone was done through medial and lateral approaches of the elbow joint and a hinged Ilizarov device was inserted on the elbow involving the distal humerus and proximal ulna bones (Fig 1). Distraction was commenced after 5 days at 1.5mm/day, turned at the rate of 135° every 6hours to achieve flexion of the elbow joint. Stitches were removed after 10days. Patient was put on indomethacin tablets, antibiotics, muscle relaxant, tramadol and hematinics. Patient and his mother were taught how to turn the distractor and care for the pins and pin sites. He was discharged after two weeks on admission and seen in out-patient clinic once a week for a month and thereafter once 2weekly until a flexion of 140° (Fig 2) was achieved. This was to correct any mistake made by the patient during distrac-

tion. The device was removed (Fig 3) and physiotherapy commenced to maintain the range of movement achieved. Patient continued with the indomethacin to prevent heterotopic ossification in the elbow joint and muscle relaxant to relieve muscle spasms. It is now 14months post-operation and patient is doing very well. The range is 10-140°



Fig 1: Pre-operation X-ray of right elbow



Fig 2: Right elbow in Ilizarov device



Fig 3: At the end of procedure



Fig 4: Elbow extended after procedure



Fig 5: Elbow flexed after procedure

DISCUSSION

Heterotopic ossification is commonly seen in traumatized elbow of patients with associated traumatic brain injury. This is due to the delay in identifying and treating the elbow injury because of the head injury¹⁰⁻¹¹. There is ample time for ossification of the elbow hematoma to occur. In this case study, the patient's elbow was splinted in extension by traditional bone for a very long time, restricting the joint movement. This provided enough time for heterotopic ossification of the joint to take place. Equally important, is the forceful bending of the joint the often carried out in the course of their treatment. This act provokes more bleeding into the joint and so more ossification. The pain caused by their treatment hinders the patient from moving the joint. A vicious cycle is created that result in elbow stiffness.

Ilahi et al¹¹ carried out a study in 41 patients to determine the relationship between timing of fracture fixation and development of heterotopic ossification. They found out that 11 patients treated before 4 hours did not have heterotopic ossification while 8 of the 24 (33%) treated after 48 hours developed heterotopic ossification grade ii-iv. They concluded that fixation of unstable elbow fractures within 48 hours decreased the incidence of ectopic bone formation.

Kushwada¹² and Garland¹³ discovered in their study that traumatic brain injury not only delayed the evaluation and treatment of extremity injuries, it also caused some extremity injuries to be missed. This led to the incidence of 20% heterotopic ossification in extremity injuries.

Several methods of treatment have been documented by different authors. They include surgical excision of ectopic bone from the joint and prevention of new heterotopic ossification by use of indomethacin and irradiation of the joint with 500-1000cGy of radiation after surgery⁷⁻¹⁰. Beingsnesner et al¹⁴ managed 5 patients by excision of heterotopic bone and radiation therapy and use of indomethacin. The causes of ectopic bone formation in their study were distal biceps tendon repair and fracture of the ulna and radius. Their treatment improved the forearm rotation arc from 17° to 136°.

In this case study, excision of heterotopic bone was done at a time the ectopic bone had fully matured hence ensuring its complete removal. The stretching of the contracted extensor tendon by gradual method of Ilizarov technique was very less traumatic to instigate new heterotopic ossification. The use of indomethacin suppressed new heterotopic ossification. The treatment increased the forearm rotation arc from 20° to 140° and this was maintained by physiotherapy and adequate analgesia and muscle relaxant. The possible complication of neurovascular impalement associated with the use of Ilizarov device was prevented by avoiding the neurovascular plane¹⁵. The other problems associated with this device like pains, pin tract infection and muscle spasms were adequately treated¹⁶.

This study has highlighted one of the complications created by the activities of traditional bone setters in Nigeria¹⁶. This is a 22 years old young man whose dreams and aspiration were kept on hold for 6 years and would have been lost if not for his relation that brought him to the right place for treatment. His initial problem after the fall would have been resolved in 3-4 weeks with just adequate analgesics after resting the elbow for 1-2 weeks for the pains and swelling to subside. Thereafter physiotherapy is commenced for the range of motion to be restored. The patient would have been put on indomethacin from the onset of treatment to prevent heterotopic ossification of the elbow joint and radiotherapy would have been used if available.

CONCLUSION

The use of Ilizarov technique together with surgical excision of mature heterotopic bone and use of indomethacin are effective in the treatment of post-traumatic elbow stiffness. The addition of radiation therapy will further aid prevention of heterotopic ossification if available. The public should be enlightened about this problem among others associated with patronage of traditional bone setter treatment and advised to seek treatment from qualified personnel in the hospital whenever they have joint trauma of any sort.

Correspondence: Dr Enemudo R.T.E (FWACS, FICS)
Consultant Orthopaedic Surgeon.
Department of Orthopaedics and Trauma,
Delta State University Teaching Hospital,
Oghara, Delta State, Nigeria.
Phone: +2348036771764
Email: royenemudo@yahoo.com

REFERENCES

1. Morrey BF. Ectopic ossification about the elbow. In: Morrey BF, ed. *The Elbow and its Disorders*. 3rd ed. Philadelphia, PA: WB Saunders Co; 200:437-446. | 2. Goodman TA, Merkel PA, Perlmutter G, Doyle MK, Krange SM, Polisson RP. Heterotopic ossification in the setting of neuromuscular blockade. *Arthritis Rheum*. 1997; 40(9):1619-1627. | 3. Munin MC, Balu G, Sotereanos DG. Elbow complications after organ transplantation. Case reports. *Am J Phys Med Rehab*. 1995; 74(1):67-72. | 4. Foruria AM, Augustin S, Morrey BF, Sanchez-Sotelo J. Heterotopic ossification after surgery for fractures and fracture-dislocations involving proximal aspect of the radius and ulna. *J. Bone Joint Surg* 2013; 95: e66 (1-7) | 5. Hamid N, Ashraf N, Bosse MJ, Connor PM, et al. Radiation therapy for heterotopic ossification prophylaxis acutely after elbow trauma: a prospective randomized study. *J. Bone Joint Surg Am*. 2010; 92(11):2032-8 | 6. Jee WS, Ma YF. The in vivo anabolic actions of prostaglandins in bone. *Bone*. 1997;21(4):297-304 | 7. Pakos EE, Ionnidis JP. Radiotherapy vs. nonsteroidal anti-inflammatory drugs for the prevention of heterotopic ossification after major hip procedures: meta-analysis of randomized trials. *Int J Radiat Oncol Biol Phys*. 2004; 60(3): 888-895 | 8. Grohs JG, Shmidt M, Wanivenhaus A. Selective COX-2 inhibitor versus indomethacin for the prevention of heterotopic ossification after hip replacement: a double-blind randomized trial of 100 patients with 1-year follow-up. *Acta Ortho*. 2007;78(1):95-8 | 9. Saudan M, Saudan P, Perneger T, Riand N, Keller A, Hoffmeyer P. Celecoxib versus ibuprofen in the prevention of heterotopic ossification following total hip replacement. *J. Bone Joint Surg Br*. 2007;89(2):155-9 | 10. Bonavac K, William JM, Patrick LD, Levi A. Prevention of heterotopic ossification after spinal cord injury with COX-2 selective inhibitor (rofecoxib). *Spinal Cord*. 2004;42(12):707-10. | 11. Ilahi OA, Strausser DW, Gabel GT. Post-traumatic heterotopic ossification about the elbow. *Orthopedics*. 1998; 21(3):265-268. | 12. Kushwaha VP, Garland DG. Extremity fractures in the patient with a traumatic brain injury. *J Am Acad Orthop Surg*. 1998; 6(5):298-307. | 13. Beingsner DM, Patterson SD, King GJ. Early excision of heterotopic bone in the forearm. *J Hand Surg [Am]*. 2000; 25(3):483-488. | 14. Mosca V, Moseley CF. "Complications of Wagner leg lengthening and their avoidance." *Orthop Trans*. 1986;10:462. | 15. Paley D. "Problems, Obstacles and Complications of Limb lengthening by Ilizarov Technique" 1990; 250:81-104 |