

CASE REPORT

TOTAL ELBOW ARTHROPLASTY USING BAKSHI'S FLOPPY HINGE PROSTHESIS FOR GCT OF LOWER END HUMERUS' – A CASE REPORT

Akash Saoji¹, Sonal Saoji², Amol Patil³, Samir Dwidhmuthe⁴, Sandeep Shrivastava⁵

HOW TO CITE THIS ARTICLE:

Akash Saoji, Sonal Saoji, Amol Patil, Samir Dwidhmuthe, Sandeep Shrivastava. "Total elbow arthroplasty using Bakshi's floppy hinge prosthesis for GCT of lower end humerus' – a case report". Journal of Evolution of Medical and Dental Sciences 2013; Vol2, Issue 32, August 12; Page: 5980-5983.

ABSTRACT: The elbow and distal humerus are unusual sites for primary bone tumours or metastatic disease.¹ Before the advent of limb-salvage surgery around 1980s, amputation or arthrodesis was the primary treatment for tumours of the upper limb and the ultimate result was not usually satisfactory. The outcome after reconstructive surgery improved with advances in imaging, staging of the bone tumours, chemotherapy and advancements in the prosthesis designs for arthroplasty. Now preservation of the upper limb with functional reconstruction with arthroplasty has become the standard treatment for patients with bone tumours.^{2,3}

Total elbow arthroplasty has been used extensively for malignancy, rheumatoid arthritis, osteoarthritis and trauma.⁴⁻⁶ Total elbow arthroplasty has continued to evolve over time. Elbow implants may be linked or unlinked. Unlinked implants are attractive for patients with relatively well preserved bone stock and ligaments, but many favor linked implants, since they prevent instability and allow replacement for a wider spectrum of indications.⁷⁻⁹

We present our experience of reconstruction with a custom-made elbow endoprosthesis (Bakshi's floppy Hinge Semi-constrained linked Prosthesis) after resection of giant cell tumour of the distal humerus with follow up of 6 and half years.

CASE HISTORY: 40 year old female patient, farmer by occupation presented to us with gross swelling and pain over Left elbow and gradually aggravating since last 6 months. There was no history of trauma, high grade fever and weight loss. Radiograph was suggestive of Campanacci Grade III GCT and diagnosis was conformed on histopathologically. Patient was posted for total elbow arthroplasty. Bakshi's floppy Hinge prosthesis with bone cement used which was cost effective and readily available.

OPERATIVE TECHNIQUE: General anaesthesia administered. Postero-lateral approach and excision of tumor and radial head was done. Sub-articular 'L' shaped cut at proximal ulna taken. Reaming of ulna and humerus was done. Component fixation at desired length with bone cement was done. Reconstruction of distal end humerus with cement was done. Components were assembled with hinged screw and locked. Post-operatively limb was immobilised in plaster of paris slab for 3 weeks and gradually elbow mobilization started over 6 weeks. Range of movement 10° to 130° with terminal mild discomfort achieved after 8 weeks. Patient could do routine activity of daily living and light wok with comfort. Patient was happy and satisfied with final outcome. Patient was followed for 6 and half years with no recurrence of bone tumour.

IMPLANTS DESIGN: Linked constrained and unlinked unconstrained implants are available. The difference is the physical linking of the hinge between humeral and ulnar components in order to

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avoid instability and sleeping of the prosthesis. Early linked implants were constrained hinges that only allowed uniaxial movement like flexion and extension. These implants were associated with a high failure rate due to the transmission of high stresses to the implant-cement-bone interface and other design flaws.

Currently, most linked implants are semi constrained. Their linking mechanism behaves as a sloppy hinge, allowing additional rotational and varus-valgus play. Semi constrained implants are believed to transmit less stress to the implant interfaces, and better long-term stable fixation.

Implant designs have been modifying to improve the outcome of elbow arthroplasty to provide potential advantages:

- Use of a thicker polyethylene in bearing surface causes less contact pressure and less wear.
- Use of navigation system provides exact centre of rotation and more anatomic reconstruction and better outcome.
- Modular designs give advantage of linking of the components after being completely seated.
- This modular system is linkable, meaning that the surgeon may choose at the end of the case to leave the implant linked or unlinked depending on his intraoperative assessment of stability. In addition, this system allows conversion of a distal humerus hemiarthroplasty to a total elbow arthroplasty without revising the humeral stem.

FUNCTIONAL OUTCOME: We have evaluated the patient in terms of pain, range of movement, hand positioning and lifting ability, emotional acceptance. Patient's economical constraint was also taken into consideration. After 6 and half years of follow up patient was able to do all activity of daily routine and household work with comfort.

Preoperative Clinical photograph of GCT Elbow

Fig-1



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Preoperative Anterio-Posterior Radiograph of Elbow

Fig-2



Post Operative Anterio-Posterior Radiograph of Elbow

Fig-3



SUMMARY: Total elbow arthroplasty has many advantages over traditional procedure of arthrodesis or amputation. It conserves normal anatomy, salvages the functional limb and emotional support.

The field of total elbow arthroplasty is continuously advancing. Currently, elbow replacement represents a successful treatment for patients with posttraumatic arthritis, rheumatoid arthritis, ankylosis of elbow and bone tumour around the elbow. There is interest in the development of improved linked designs which will decrease the rate of polyethylene wear and mechanical failure in higher demand patients and provide long term better functional outcome.

The success of elbow arthroplasty depends greatly on the surgeon's familiarity and surgical approaches to the elbow joint, the proper selection and implantation of prosthetic components. Although elbow arthroplasty is sometimes the only option to improve pain and function in a wide range of patients, this procedure may be associated with some complications like infection, loosening and osteolysis, inadequate range of movement, periprosthetic fractures which can be reduced with perfection in the operative procedure, postoperative rehabilitation, physiotherapy, protection of the limb from trauma.

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In most patients, local tumour resection and prosthetic reconstruction of the elbow can be done with oncologic safety, and provides good function with low rates of complications.

REFERENCES:

1. Little CP, Carr AJ, Graham AJ. Total elbow arthroplasty: a systematic review of the literature in the English language until the end of 2003. *J Bone Joint Surg Br.* 2005; 87(4):437-44.
2. Sperling JW, Pritchard DJ, Morrey BF. Total elbow arthroplasty after resection of tumours at the elbow. *Clin Orthop* 1999; 367:256-61.
3. Kulkarni A, Fiorenza F, Grimer RJ, Carter SR, Tillman RM. The results of endo prosthetic replacement for tumours of the distal humerus. *J Bone Joint Surg [Br]* 2003;85-B:240-3
4. Kamineni S, Morrey BF. Distal humeral fractures treated with non custom total elbow replacement. *J Bone Joint Surg Am.* 2004; 86-A (5):940-7.
5. Willems K, De Smet L. The Kudo total elbow arthroplasty in patients with rheumatoid arthritis. *J Shoulder Elbow Surg.* 2004; 13(5):542-7.
6. Blaine TA, Adams R, Morrey BF. Total elbow arthroplasty after interposition arthroplasty for elbow arthritis. *J Bone Joint Surg Am.* 2005; 87(2):286-92. [
7. Morrey BF, Adams RA. Semi constrained elbow replacement for distal humeral nonunion. *J Bone Joint Surg Br.* 1995;77(1):67
8. Garcia JA, Mykula R, Stanley D. Complex fractures of the distal humerus in the elderly. The role of total elbow replacement as primary treatment. *J Bone Joint Surg Br.* 2002; 84(6): 812-6.
9. Gambirasio R, Riand N, Stern R, Hoffmeyer P. Total elbow replacement for complex fractures of the distal humerus. An option for the elderly patient. *J Bone Joint Surg Br.* 2001; 83(7):974-8.

AUTHORS:

1. Akash Saoji
2. Sonal Saoji
3. Amol Patil
4. Samir Dwidhmuthe
5. Sandeep Shrivastava

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Orthopaedics, JNMC, Sawangi, Wardha, Maharashtra
2. Senior Resident, Department of Pathology, JNMC, Sawangi, Wardha, Maharashtra
3. Assistant Professor, Department of Orthopaedics, JNMC, Sawangi, Wardha, Maharashtra

4. Associate Professor, Department of Orthopaedics, JNMC, Sawangi, Wardha, Maharashtra
5. Dean & Professor, Department of Orthopaedics, JNMC, Sawangi, Wardha, Maharashtra

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Akash Saoji.
Assistant Professor,
JNMC, Sawangi, Wardha, Maharashtra.
Email – drakashsaoji@gmail.com

Date of Submission: 11/06/2013.
Date of Peer Review: 11/06/2013.
Date of Acceptance: 17/06/2013.
Date of Publishing: 07/08/2013