IJMAHS

RESEARCH ARTICLE

Surgical management of fracture shaft humerus with LCDCP and screws.

I. Suresh[1], Ravish V.N.[2], Taha Ahmed[3], Vinod Kumar A.C.[4], Bharat Raju G.[5]

Correspondence to: Taha Ahmed (taha_ahmed1108@hotmail.com)

ABSTRACT:

The fractures of the shaft of humerus are one of the commonest fractures found and can be treated by different methods. Plate osteosynthesis remains the "gold standard" of fixation for humeral shaft fractures.[1] A prospective study was carried out from November 2012 to April 2014 in Kempegowda Institute of Medical Sciences, Bangalore. 36 cases of fracture shaft humerus, meeting the inclusion and exclusion criteria, were treated by open reduction and internal fixation using Limited Contact Dynamic Compression Plate.

In the study, R.T.A. was the commonest mode of injury. Majority of fractures united between 13-15 weeks (69.4%). 84% cases had excellent to good functional outcome with good range of movement. There were 2 cases of iatrogenic Radial nerve palsy and one case of non-union.

By the analysis of the data collected in the present study, Open Reduction Internal Fixation with Limited Contact Dynamic compression plate & screw remains procedure of choice in the management of diaphyseal fractures of humerus.

Keywords: Humeral shaft fractures, LCDCP, Open reduction and internal fixation.

INTRODUCTION :

Fractures of the humeral shaft account for roughly 3% of all fractures; most can be treated nonoperatively. Charnley stated, "It is perhaps the easiest of the major long bones to treat by conservative methods." The range of motion afforded by the shoulder and elbow joints, coupled with a tolerance for small amounts of shortening, allow radiographic imperfections that cause minimal functional deficit and are well tolerated by the patient. Historically, methods of conservative treatment have included skeletal traction, abduction casting and splinting, Velpeau dressing, and hanging arm cast, each with its own advantages and disadvantages. Functional bracing has essentially replaced all other conservative methods and has become the "gold standard" for nonoperative treatment because of its ease of application, adjustability, allowance of shoulder and elbow motion, relatively low cost, and reproducible results.[1]

The choice of operative treatment for a humeral shaft fracture depends on multiple factors. McKee divided the indications for operative treatment into three categories: (1) fracture indications, (2) associated injuries, and (3) patient indications. Some indications are more absolute than others. Failure of conservative treatment, pathological fracture, displaced intraarticular extension, vascular injury, and brachial plexus injury almost always require surgery. Other conditions, such as minimally displaced segmental fractures and obesity, are only relative indications. Our most common indication for operative treatment is early mobilization of patients with polytrauma. Treatment decisions must take all factors into consideration, tailoring the treatment to the specific patient.[1]

The goal of operative treatment of humeral shaft fractures is to reestablish length, alignment, and rotation with stable fixation that allows early motion and ideally early weight bearing on the fractured extremity. Options for fixation include plate osteosynthesis, intramedullary nailing, and external fixation.[3]

Plate osteosynthesis remains the "gold standard" of fixation for humeral shaft fractures.

The successful treatment of a humeral shaft fracture may not end with bony union. In the current emphasis on a holistic approach to patient care the treating Orthopaedic surgeon may be in an ideal position to intervene and improve a patient's life beyond what is traditionally recognized as the surgeon's role. As with most orthopaedic injuries, the successful treatment of a humeral shaft fracture demands a knowledge of anatomy, surgical indications, techniques and implants, patient functions and expectations.

With this background, this study was done to determine the efficacy of Limited Contact Dynamic compression plate in the treatment of humeral shaft fractures.

MATERIALS AND METHODS:

The clinical material for the study of Surgical Management of fracture shaft of humerus in adults with Limited Contact Dynamic Compression Plate" consists of 36 cases of Fracture shaft of humerus of traumatic etiology meeting the inclusion and exclusion criteria , admitted to KIMS hospital between November 2012 to November 2014.

On admission, a detailed history was taken and examination of the patient done and entered in the proforma. The patient's arm radiographs were taken in AP and lateral views. Diagnosis was established by clinical and radiological examination.

Shaft humerus fractures were classified according to L.Klenerman's anatomical classification.[2]

Posterior approach was adopted for all the cases and ORIF with LCDCP and screws was done.

Patients were followed up postoperatively at 6, 12, 18 and 24 weeks and assessed on the following parameters:

1. Pain, 2. Deformity, 3. Range of motion of shoulder and elbow, 4. Complications such as infection, neurological deficits, 5. Fracture union

Final assessment was done at 24 weeks based on the American Shoulder and Elbow Surgeon's scoring system.

Fig1: Case1 : Preop Xray- Klenermans type 2 fracture shaft left humerus
6 months postop xray showing united fracture with LCDCP in situ.

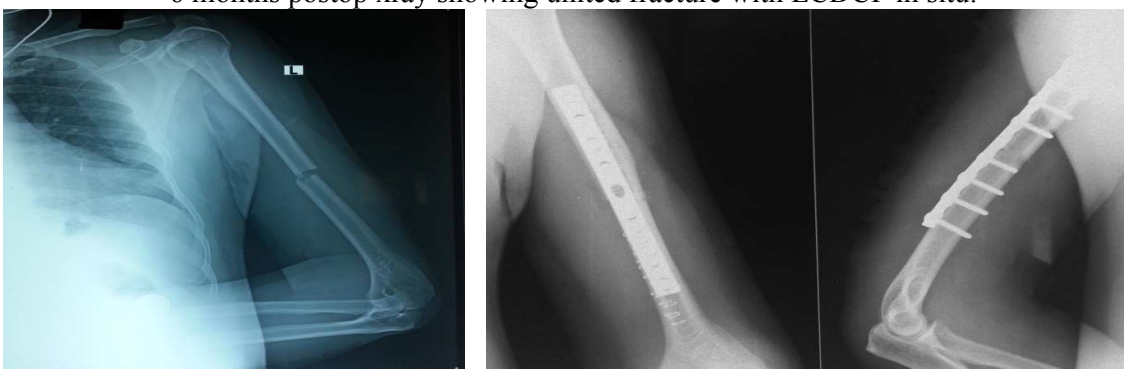


Fig2: Case 2 Preop Xray- Klenermans type 3 fracture shaft left humerus
6 months postop xray showing united fracture with LCDCP in situ.

Fig3: Case 3 Preop Xray- Klenermans type 4 fracture shaft left humerus
6 months postop xray showing united fracture with LCDCP in situ.

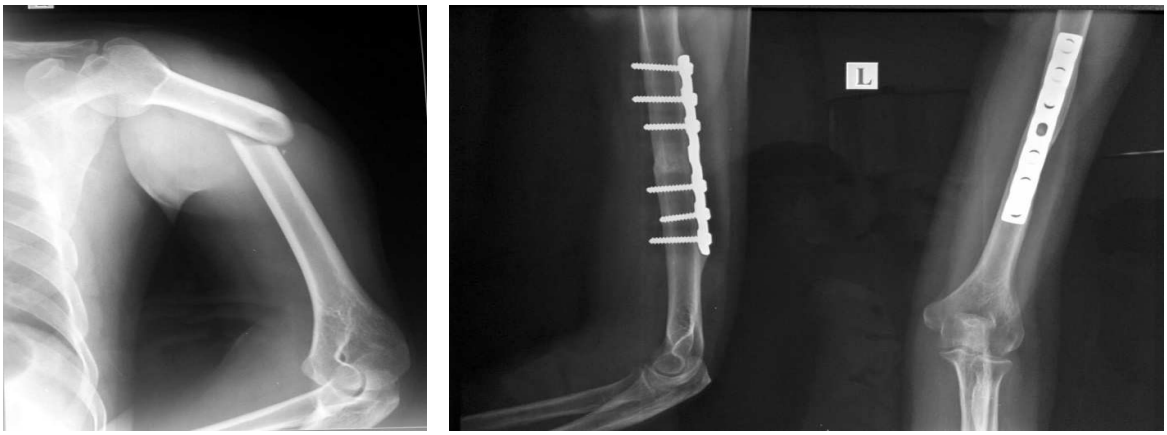


Fig 4: Case 4 Preop Xray- Klenermans type 2 fracture shaft left humerus
6 months postop xray showing united fracture with LCDCP in situ.

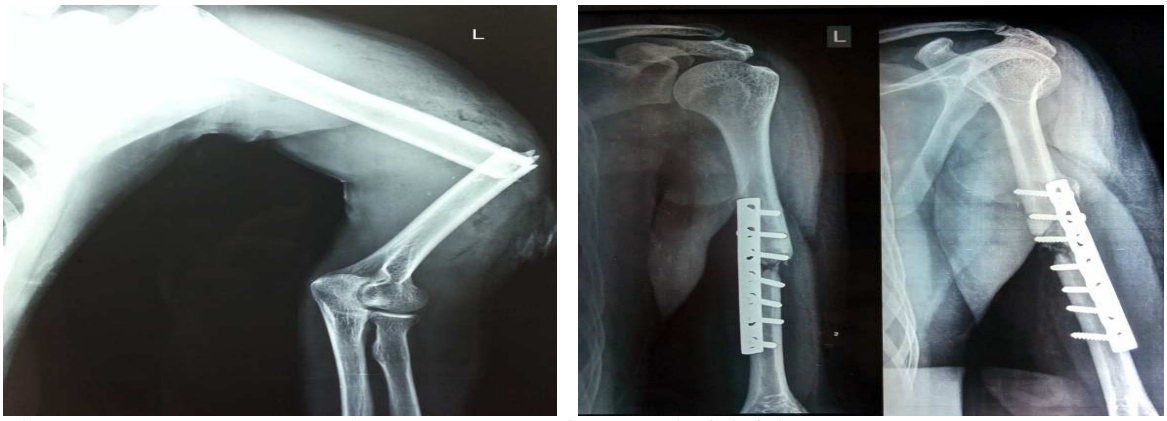
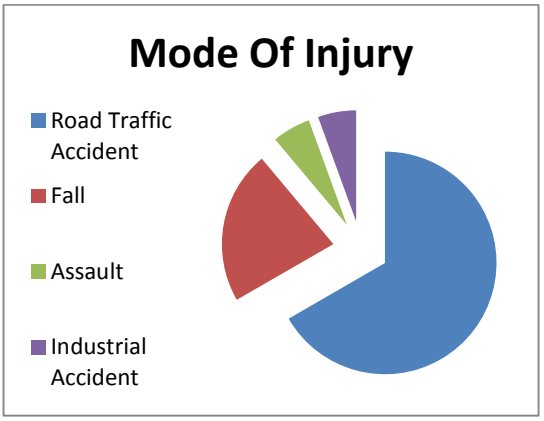


Fig 5: Case 4 Preop Xray- Klenermans type 3 fracture shaft left humerus
6 months postop xray showing un-uniting fracture. Patient was subsequent operated again where cancellous bone grafting was done. The fracture showed complete union after 16 weeks.

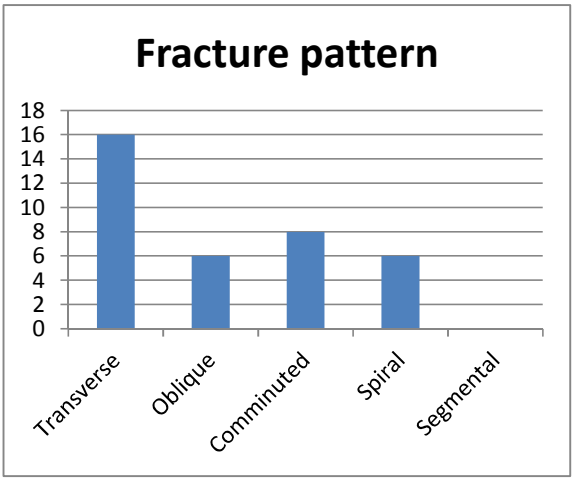
RESULTS:

In the present study, thirty six cases of Diaphyseal fracture of Humerus treated with Limited Contact Dynamic compression plate & screws between November 2012 to November 2014 at K.I.M.S. Hospital, Bangalore were included.

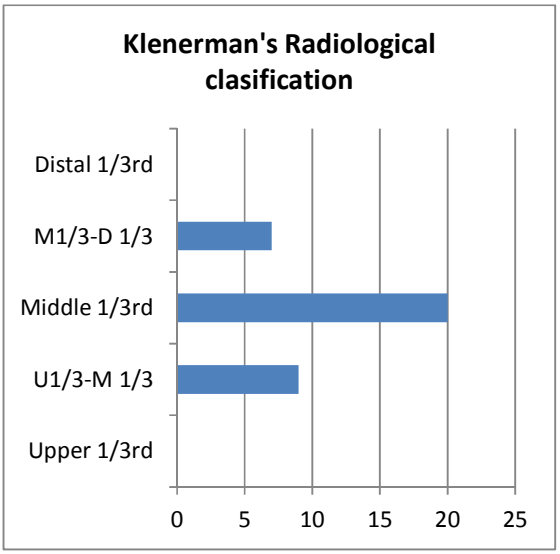
The following observations were made in the present study.



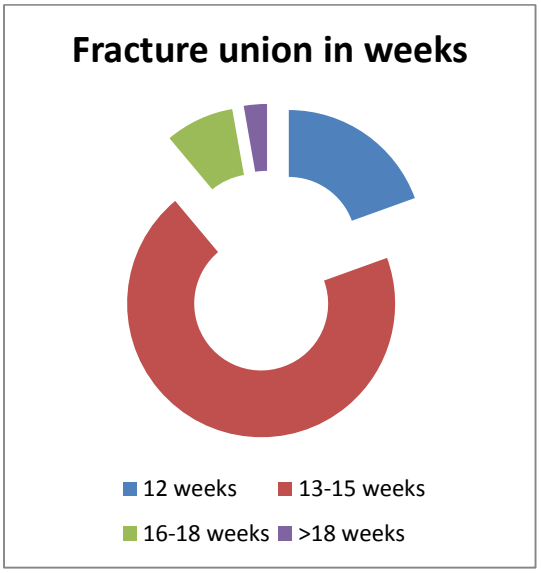
Out of thirty six patients the maximum i.e. twenty four patients sustained road traffic accident, eight fall, two assault and two patients sustained industrial injuries.



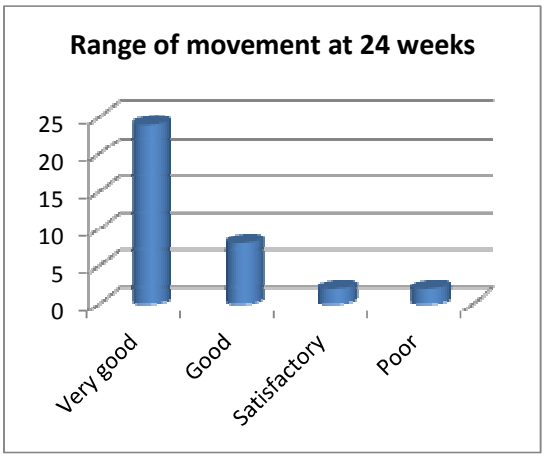
A majority of patients (16) had a transvere fracture.



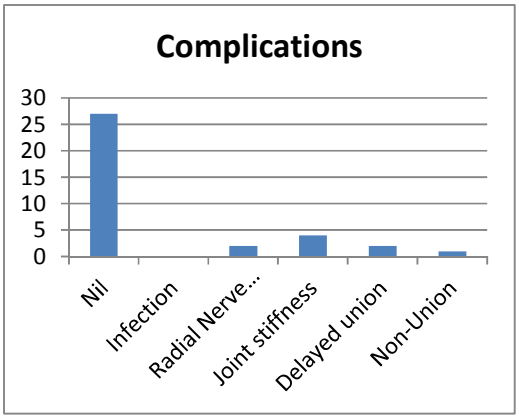
Middle 1/3rd shaft humerus was the most predominant fracture level (20 cases)



69.4 % i.e 25 cases showed union at 13-15 weeks.

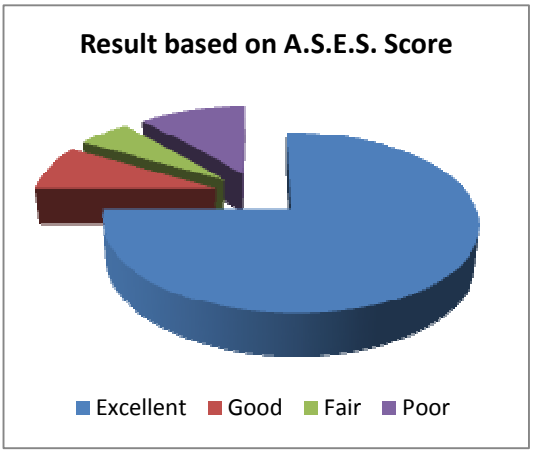


32 cases had very good to good range of motion at the shoulder and elbow joints.



27 cases reported no complications. 2 cases had radial nerve palsy, 4 patients complained of joint stiffness. There were 2 cases of delayed union and one case of non-union.

Non-union was treated with revision plating with bone grafting. 2 cases of Radial nerve palsy were put on dynamic splint and a course of physiotherapy.



27 cases were graded to have excellent outcome, 3 case had good outcome, 2 cases had fair outcome and 4 cases had poor outcome.

DISCUSSION:

Diaphyseal fracture of humerus is a relatively common injury among adults. The management of fracture shaft of humerus forms an important daily routine of the orthopaedic surgeon. Concepts in the management of trauma in Orthopaedics are very rapidly changing to keep pace with the increasing severity and complexities of the fractures.

The management of humeral shaft fractures is always a challenging problem to orthopaedic surgeon, as they are very frequently associated with multiple injuries, leading to complications.

Union rates:

Series	no. of patients	Delayed union	Non-Union	Overall union
Heim D et al (1993)	127	-	2 (1.5%)	125 (98.5%)
Rodriguez et al (1995)	20	1 (5%)	-	20 (100%)
Griend RV et al (1999)	36	5 (14.6%)	1 (3%)	35 (97%)
Tingstad et al (2000)	83	-	5 (6%)	78 (94%)
Gongol et al (2002)	32	-	1 (3.1%)	31 (96.9%)
Changulani et al(2007)	24	1 (4.2%)	3 (12.5%)	21 (87.5%)
Present study (2014)	36	2 (5.6%)	1 (2.8%)	33 (97.2%)

Range of mobility of the elbow and shoulder:

Series	No. of patients	Very good/good range of motion
Griend RV et al (1986)	36	30 (85.4%)
Heim D et al (1993)	127	111 (87.3%)
McCornack et al (2000)	44	44 (100%)
Gongol T et al (2002)	32	31 (97%)
Changulani M et al (2007)	24	24 (100%)
Present study (2014)	36	32 (88.9%)

ASES Score:

The average ASES score obtained was 46. This is comparable to the score. This is comparable to the ASES score of 48 obtained by McCormack RG et al when treating humeral shaft fractures with plate and a score of 47 when treating with interlocking intramedullary nail fixation.

Series	No. of patients	Excellent/Good outcome
Bell MJ et al[21] (1985)	34	91.2%
Heim D et al[30] (1993)	127	87.3%
Rodruguez-Merchan EC[74] (1995)	20	95%
Dayez J[77] (1999)	36	89%
Tingstad et al[75] (2000)	83	94%
McCormack et al[72] (2000)	44	95.7%
Gongol T at al[73] (2002)	32	93.8%
Changulani M et al[56] (2007)	24	87.5%
Present study (2014)	36	83.3%

The results obtained from various studies show excellent to good outcome varying from 80% to 95%. Our study had an excellent to good outcome in 83.3% of the cases.

The causes of poor results were non-union, severe joint stiffness and radial nerve palsy. These

were preventable and could have been avoided by strictly adhering to AO principles, attention to
asepsis, patient education and good postoperative rehabilitation.

CONCLUSION:

- Fracture shaft of humerus in adults has an overall incidence of around 3 % in all fractures.
- Road traffic accidents & fall are common modes of injury.
- A detailed neurovascular examination is a must at presentation.
- Majority of the fractures were transverse and comminuted in the middle third and most of them were closed injuries.
- Transverse fractures are the common patterns of fractures.
- Junction of middle & lower third fractures are prone for radial nerve injury.
- Excessive manipulation & traction should be avoided during closed reduction.
- Limited Compression Dynamic compression plating is a superior methods of surgical management of Diaphyseal fractures of Humerus .
- Posterior approach is preferred approach as the Dynamic compression plate is placed on the tensile side of the bone.
- Rigid fixation of the fracture of humerus, with LCDCP allows early mobilization.
- Proper preoperative planning, minimal soft tissue dissection, adherence to AO principles, strict asepsis, proper post operative rehabilitation and patient education are more important to obtain excellent results..

Conflict of Interest: None

Ethical standards The patient gave informed consent for publication of his medical records prior being included into this case study.

REFRENCES:

1. McKee MD, "Fractures of The Shaft of The Humerus" Rockwood & Green's Fractures in Adults, 6th Edition, Bucholz, Robert W.; Heckman, James D.; Court-Brown, Charles M. Lippincott 2006: 1118-1159
2. Klennermann, L. Fractures of shaft of humerus. J Bone and J Surg Br 1966; 48: 105-111
3. Zuckerman JD, Koval JK. Fractures of the shaft of the humerus. 4th ed. In: Rockwood and Green's Fractures in Adults, Rockwood CA Jr, Green DP, Bucholz RW, Heckman JD (eds). New York: Lippincott-Raven Publishers; 1996. P. 1025.

Cite this article as: I. Suresh, Ravish V.N., Taha Ahmed, Vinod Kumar A.C., Bharat Raju G., *Surgical management of fracture shaft humerus with LCDCP and screws,* Int J Medicine and Allied Health Sciences, 2015; 4: 428-433