TREATMENT OF PROXIMAL HUMERAL FRACTURES USING “TELEGRAPH” ROD: RETROSPECTIVE STUDY OF 47 CASES

O. Alexa, B. Puha, Dana Chirilă, B. Veliçeasa
University of Medicine and Pharmacy "Grigore T. Popa" – Iasi
Faculty of Medicine
Department of Surgery

TREATMENT OF PROXIMAL HUMERAL FRACTURES USING THE “TELEGRAPH” ROD: RETROSPECTIVE STUDY OF 47 CASES (Abstract): Aim: To assess the early results observed in a series of patients treated with a first-intention Telegraph rod. Material and methods: In the interval 2011-2013 forty-seven patients with fractures of the upper extremity of the humerus were assessed both clinically and radiologically. Mean follow-up was 8.9 months. The median age was 61 years. The study group included 39 women and 8 men, the left shoulder being most commonly affected (33 cases). Cause of injury was accidental fall in 39 cases, sports injury in 6 cases, and car crash injury in 2 cases. Neer classification was used to assess the type of fracture. For qualitative analysis, we used the functional Constant-Murley score in comparison with the contralateral side. The analysis of fracture reduction was based on plain X-rays in anterior-posterior plane and measurement of humeral head tilt relative to diaphyseal shaft. Results: No case showed infection, humeral head necrosis occurred in 2 cases, loss of reduction in 3 cases which required repeat reduction, and a subacromial impingement syndrome in 2 cases. Average Constant-Murley score was 70.33 points for the injured and 86.4 points for the healthy shoulder. Mean value of reduction angle of the humeral head relative to diaphyseal shaft was 33.75 degrees (range 3 to 81 degrees). Conclusions: Telegraph rods provide a secure fit in extra-articular and simple articular fractures of the proximal humerus. When performing a closed anatomical reduction, the method provides good functional results in most patients. This option should be considered in young patients and even in the elderly, the results being comparable to those obtained by hemiarthroplasty. Keywords: HUMERAL FRACTURES, RETROSPECTIVE STUDY, TELEGRAPH ROD

The incidence of proximal humeral fractures is increasing accounting for 5.7% of all fractures (1). This increase occurs mainly in the elderly, osteoporotic people (1-5). Treatment options range from orthopedic treatment to intra medullary rods, open reduction with internal fixation or arthroplasty. Fractures without/with minimal displacement should usually be treated conservatively, a good functional outcome for this group of fractures being reported (6). Fortunately, 70-80% of these fractures can be treated conservatively. On the other hand, there is a consensus that displaced for four-part fractures and/or comminuted fractures, fractures-dislocations in the elderly should be treated with primary hemiarthroplasty (7).

Minimally invasive techniques with closed reduction began to be supported in order to preserve the soft tissue, vascularization of the humeral head and fracture
fragments. Therefore, many surgeons choose to use intramedullary rods suitable for fixing the fracture, while others tend to favor the use of locked plates (8-11).

**AIM**

The purpose of this study was to evaluate the early results observed in a number of patients treated with a first intention Telegraph rod.

**MATERIAL AND METHODS**

In the interval 2011-2013, 47 patients with fractures of the upper extremity of the humerus were assessed clinically and radiological. Mean follow-up was 8.9 months (range 7 -12 months). The median age was 61 years (range 29-87 years). The study group included 39 women and 8 men, the left shoulder being most commonly affected (33 cases). Cause of injury was accidental fall in 39 cases (82.97%), sports injury in 6 cases (12.76%) and car crash injury in 2 cases (4.25%). To assess the type of fracture we used Neer classification (group A - fractures with two fragments, 31/47 cases (65.95%), group B - 3 fracture fragments, 13/47 cases (27.65%), group C - 4 fracture fragments, 3/47 cases (6.38%).

The surgical technique consisted of: loco-regional anesthesia, the patient in supine position, closed/open reduction, incision of about 4 cm above the acromion, based on the greater tuberosity, transdeltoidian. Site of rod insertion was at the edge of the articular surface between it and the greater tuberosity, in the middle of the humeral head. The rod was inserted with gentle movements of rotation. It was positioned in the center of the humeral head under Rx-TV control and fixed with screws. Distally the rod was fixed with one or two screws.

The average time of surgery was 30 minutes (range 25-47 minutes). Postoperatively the affected upper limb was immobilized in a scarf for two weeks and physiotherapy was initiated after 2-4 weeks depending on fracture characteristics. Clinical and radiological follow up was performed at 1, 3, 6, 12 months (fig. 1, 2).

**Fig. 1.** Patient M.R., M, 46 years old: A – bifocal fracture of the proximal humeral extremity, B - fluoroscopic control immediately after surgery, C – X-ray control at 3 months.
All fractures healed within 1 to 3 months. For qualitative analysis we used the functional Constant-Murley score in comparison with the contralateral side. For the analysis of fracture reduction we used plane X-rays in anterior-posterior view and measured the humeral head tilt relative to diaphyseal shaft. Normally this angle is 45 degrees. Reduction was considered adequate for an angle between 30 degrees and 60 degrees.

**RESULTS**

No case showed infection, humeral head necrosis occurred in 2 cases, loss of reduction in 3 cases requiring repeat reduction, and subacromial impingement syndrome in 2 cases that led to rod removal at 6 months (fig. 3).

**Fig. 2.** Patient A.E., F, 59 years old: A – fracture-dislocation of the proximal humeral extremity Neer IV, B – X-ray control at 1 month.

**Fig. 3.** Patient R.I., F, 65 years old: A – fracture of the proximal humeral extremity Neer III, B - X-ray control at 1 month, C – X-ray control at 3 months - loss of reduction with subacromial impingement syndrome.
Average *Constant-Murley score* was 70.33 points (range 39-98 points) for the injured and 86.4 points the healthy shoulder. Average *Constant-Murley score* for group A was 78.5 points (range 59-98 points), group B - 70.5 points (range 36-82 points), and group C - 62 points (range 49-75 points).

The mean head-shaft angle reduction 33.75 degrees (range 3 to 81 degrees). In group A reduction was considered good in 24 cases (77.41%) and poor in 7 cases (22.58%), in group B the reduction was considered good in 7 cases (53.84%) and poor in 5 cases (38.46%), and in group C reduction was considered good in 2 cases (66.66%) and poor in 1 case (33.33%).

**DISCUSSION**

A good surgical fixation should include anatomic reduction of the tuberosities, restoration of length, alignment and rotation of fragments. This should be done with minimal trauma to soft tissue, preserving the medial periosteal hinge and blood supply. To prevent impingement, the amount of hardware to the cortical surface should be minimal. In a biomechanical cadaver study, intramedullary fixation proved to be more stable and more resistant than traditional plate or plate locked with screws (12). This allows for stable fixation through a small incision with minimal soft tissue damage, facilitating early mobilization and functional recovery of the shoulder.

Cuny et al. (13) followed the results obtained after using 64 telegraph rods. They were favorable, including patients with complex fractures involving three or four pieces. In addition to providing a stable anatomic reconstruction, Telegraph rod has the advantage of allowing early mobilization of the shoulder joint, this method being considered a useful alternative to prosthetic reconstruction for traumatic fractures of the proximal humerus.

Blum et al. (14) treated 151 unstable fractures of the proximal humerus with two and three fragments, and observed as complications: articular surface piercing (n=8), pain related to the implant (n=10), secondary displacement (n=2), nonunion (n=2), necrosis of the humeral head (n=3) and superficial infection (n=1). Functional results obtained were good, *Constant-Murley score* having an average value of 75.3 compared with 89.9 in the healthy shoulder. Cuny et al. (15) retrospectively analyzed 67 patients with proximal humerus fractures treated with telegraph rod and noticed that this technique provides a reproducible and satisfactory surgical result for cervical and valgus impacted fractures, the result being less satisfactory for unstable fractures or fracture-dislocations joint (avascular necrosis - 37.5%, secondary displacement in all 6 cases tuberosity fractures with four sides, subacromial impingement in 8 cases).

Popescu et al. (16), based on the results obtained after treating 21 fractures of the proximal humerus through osteosynthesis with T2 PHN, indicate that it is a safe and reliable method in the treatment of two- and three-parts proximal humeral fractures. Proximal fixation mechanism decreases the rate of screw slippage, a common complication described in the literature. Good functional results were obtained in patients younger than 70 years, but these were not statistically significant.

Thomazeau et al. (17), treating 51 patients with unstable 3-part or 4-part proximal humerus fractures, concluded that telegraph rod fixation can be recommended for 3-part fractures, because osteonecrosis
is uncommon and well tolerated in this subgroup. However, this method was not more beneficial than other techniques of internal fixation to prevent osteonecrosis or mal-union in patients with 4-part fractures.

CONCLUSIONS
In our study, telegraph rods provides a secure fit in extra-articular and simple articular fractures of the proximal humerus. When performing a closed anatomical reduction, the method provides good functional results in most patients. This option should be considered in young patients and even in the elderly, the results being comparable to those obtained by hemiarthroplasty.

REFERENCES
Treatment of proximal humeral fractures using “Telegraph” rod: retrospective study of 47 cases


HISTOLOGIC AND IMMUNOHISTOCHEMICAL ANALYSES OF ENDOMETRIAL CARCINOMAS

Endometrial cancer is one of the most common malignancies of the gynecologic tract. Endometrial cancers are classified into 2 broad histologic types, defined as type I and type II. Type I consists of endometrioid carcinoma (EMC) and its histologic variants; type II endometrial cancer includes serous carcinoma, clear cell carcinoma, and carcino sarcoma. Uterine serous carcinoma (ESC), type II, accounts for approximately 10% of cases, whereas EMC, type I, encompasses about 80% to 85% of cases. Clear cell carcinoma and other rare forms of endometrial carcinoma comprise the few remaining cases. Type I and type II endometrial carcinomas are considered biologically distinct disease entities, characterized by their divergent histology, molecular genetics, tumor genesis, and clinical behavior. Different patterns of molecular alterations are now thought to underlie the pathogenesis and/or progression of type I and type II uterine carcinomas. For example, the most common genetic alterations in EMC include microsatellite instability, mutations of PTEN, b-catenin, PIK3CA, and K-ras. In contrast, in the case of ESC, p53 mutations are common and ERBB2 (formerly HER2) overexpression or amplification is also frequently seen. Clinically, ESC has a higher propensity for lymphovascular invasion and intraperitoneal as well as extra-abdominal spread than EMC. During presentation, approximately 40% to 70% of women with ESC will have disease beyond the uterus. Accurate diagnosis of tumor type in endometrial biopsies/curetting specimens is critical for patient management. Tumor classification in endometrial adenocarcinoma based on histology and immunohistochemistry has some limitations, particularly in lesions with mixed epithelial differentiation or vague morphology. Moving forward, development of molecular biomarkers may be the next step in refining our classification of these tumors in general and on a case-by-case basis (Wei JJ, Painta AI, Keh P. Histologic and Immunohistochemical Analyses of Endometrial Carcinomas. Arch Pathol Lab Med. 2013; 137: 1574-1583).

Doina Butcovian