Humerus fracture in an elder patient without movement disability: A case report

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Abstract

A 75 years old patient visited the emergency department of a rural health center due to right shoulder pain after a severe fall occurred one year ago causing humerus fracture. Due to COVID-19 pandemic never showed his x-rays to a physician or visited another primary care setting. Describing his symptoms referred pain and movement disability only for the first 10 days after the fall, then recovery took another two weeks without immobilization in a sling or physiotherapy. Regarding this case report there is a huge heterogeneity in humerus treatment especially in elder population without specific recommendations for the proper procedure.

Introduction

Humerus fractures are common osteoporotic fractures in the elderly. The majority of the fractures are minimally displaced and respond acceptably to non operative management [1]. An assessment of the patient’s bone quality, social independence, and surgical risk factors is needed [1]. It is referred that social independence is a predictor of outcome, whereas age is not [1]. Due to the unclear evidence-based treatment of choice the surgeon should consider the comfort level with the specific procedures in order to choose [1].

Humerus fractures account for 6% of all fractures in the Western world [2]. Around 85% occur in people older than 50, and the incidence peaks in the 60- to 90-year-old age-group with a female to male ratio of 70:30 [2]. The anatomy of the area helps stabilizing the shoulder due to tendons that produce reliable deforming forces on bone fragments [3]. The gleno-humeral joint is stabilized by the articular cartilage, labrum, ligaments, rotator cuff, and deltoid [3]. Most humeral heads have a diameter between 4 and 5 cm, and the head is slightly offset medially and posteriorly in relation to the humeral shaft [3]. The pectoralis major tendon inserts 5 to 6 cm from the top of the humeral head, which is a tool for estimating prosthetic stem length in severe fractures without landmarks [4]. Humeral shortening greater than 1 cm can impair deltoid function, whereas humeral lengthening and retroversion can impair tuberosity healing [4]. The supraspinatus and teres minor insert on the greater tuberosity and produce a posterosuperior deformity [4]. The subscapularis inserts on the lesser tuberosity and produces medial deformity [4]. The pectoralis major inserts into the medial humeral shaft and deforms medially, while the deltoid inserts into the lateral humerus and deforms laterally [5]. The most commonly injured nerves in descending order are the axillary, suprascapular, radial, musculocutaneous, median, and ulnar nerves [6]. These are most commonly traction injuries that fully recover [6].

There is a widely used classification for humerus fractures (Neer classification) based on 4 fracture parts: the greater tuberosity, the lesser tuberosity, the humeral head, and the humeral shaft [7]. A full description of the classification and its subtypes can be found in an article by Carofino and Lepold [7]. A fragment is considered displaced if it is separated more than 1 cm or angulated more than 45 but there is no evidence-based indication for this definition of displacement [8]. Outcomes and rates of rotator cuff injury correlate with the classification [8].
**Case presentation**

A 75 years old male patient with hypertension known from his medical history visited the emergency department of our rural health center because he felt pain in the right shoulder. He referred a fall a year ago with severe pain and movement disability for the first two weeks. He was never examined for osteoporosis and never immobilized after the accident the shoulder with a sling or visited a physiotherapist or a physician. The past x-rays showed right humerus fracture while the present did not. There was a full recovery without any special treatment or medical advice. The patient referred that due to COVID-19 pandemic did not visited a medical center or other primary care setting. He was advised to visit an orthopedic specialized in shoulder pain rehabilitation but the patient denied. He was also advised to be examined for osteoporosis.

**Figure 1:** Presents the humerus fracture after the fall a year ago.

**Figure 2:** Presents the humerus bone, fully recovered.

There are not specific recommendations for humerus fracture treatment especially in elder patients. There is a lot of debate whether should the fracture surgically be repaired or conservatively. This unique case report that the patient experienced no severe pain or movement disability (there was no fragment displacement though) two weeks after the fall helps to conduct the conclusion that for elder patients conservative treatment may be cost effective for health systems.

**Discussion**

The main finding of Heath Technology Assessment (HTA), which is a scientific methodology used to gather and summarize scientific data to influence clinical decision making on the use of health technologies, for measuring the effectiveness of humerus treatment is that there was no proven benefit with surgical intervention of moderately displaced humerus fractures compared to non-operative treatment with immobilization in a sling [9]. Moreover, the health economic evaluation showed that surgical treatment of a proximal humeral fracture was considerably more expensive (USD 3478 to USD 7688) than non-operative treatment9. Many areas under investigation in this HTA analysis lacks sufficient scientific data to express any certitude regarding efficacy, effectiveness, complications and cost-effectiveness [9].

In addition Launonen et al., found no benefit of surgical treatment in patients over 60 years of age, with 3- or 4-parts fracture as compared to non-surgical treatment [10]. Instead they found more complications in the group of surgically treated patients than in the non-operative group [10]. Equal findings regarding functional outcome and complications were reported in a systematic review by Bek et al., 2018 [11]. Indicators of physiologic age are bone quality and social independence, which is more important than chronologic age when weighing treatment options [1]. In a prospective study of 30 patients, nearly 40% of proximal humerus fractures were associated with rotator cuff tears [12]. Functional loss correlated with tears at the time of injury [13].

Regarding outcomes between elderly patients and younger patients following surgical fixation of humerus fractures there is no significant difference [14-16]. A study of 637 proximal humerus fractures showed that social independence, not age, was a predictor of outcome [17]. There is a 2012 Cochrane review of 23 randomized controlled trials with significant heterogeneity among studies [18] supporting what already mentioned before that there is insufficient evidence to provide individual recommendations for humerus fractures proper treatment. In general, minimally displaced fractures, poor surgical candidates, and low demand patients are treated conservatively [1]. Displaced, comminuted, or angulated fractures occurring in good surgical candidates are treated with percutaneous techniques, intramedullary nailing, plating, or arthroplasty [1]. Around 50% to 65% of all humerus fractures are minimally displaced fractures of the greater tuberosity and/or surgical neck that respond well to nonoperative management [19]. On the other hand for displaced fractures fixation with percutaneous techniques, intramedullary nails, locking plates, and arthroplasty are all acceptable treatment options [1].

The few studies that have been published about the proper treatment and outcomes regarding to humerus fracture have had short time perspectives and showed conflicting results [20-22]. This underlines the need for more well-designed cost-effectiveness studies [9]. It is preferable instead of prolonged hospital stays, home care and short time stays in home for the elderly in contrast to younger population that rehabilitation costs may be a higher priority [9]. It seems controversial that the incidence of expensive fracture surgery is increasing despite the lack of scientific evidence of its effectiveness [9]. A British study showed that a great amount of resources could be saved if non-operative treatment is chosen instead [23]. In addition over the past decade, most of older adults with proximal humerus fractures continue to receive non operative treatment [24].

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