



Outcomes of war related femoral neck fractures



Richard L. Purcell^{a,1,*}, John P. Cody^{b,2}, Wade Gordon^{c,3}, Kelly Kilcoyne^{d,4}

^a Walter Reed National Military Medical Center, 8901 Wisconsin Ave, Bethesda, MD, 20889

^b Walter Reed National Military Medical Center, 8901 Wisconsin Ave, Bethesda, MD, 20889

^c Walter Reed National Military Medical Center, 8901 Wisconsin Ave, Bethesda, MD, 20889

^d Walter Reed National Military Medical Center, 8901 Wisconsin Ave, Bethesda, MD, 20889

ARTICLE INFO

Article history:

Accepted 8 October 2015

Keywords:

Femoral neck fracture

Combat

Avascular necrosis

ABSTRACT

Introduction: In the civilian trauma literature, femoral neck fractures in young adults are considered an orthopedic ‘urgency’. To our knowledge, there have been no studies looking at the outcomes of these injuries in the combat setting. The purpose of this study is to determine the outcomes of war related femoral neck fractures; the rates avascular necrosis associated with these injuries as well as the effect time to fixation has on the development of avascular necrosis.

Methods: We performed a retrospective review of 21 patients who sustained combat related femoral neck fractures from October 2001 through October 2013. We collected demographic data, time to fixation, time to union, incidence of avascular necrosis, as well as complications and final recreational activity status.

Results: Our study included 21 males (100%). The average length of follow up was 19.0 (2.7–62.3) months, and the average length of radiographic follow up was 21.4 months. The average age was 25.2 (21–36) years. Displaced fractures were sustained in 71.4% of patients and 95.2% had a Pauwels’ type 3 fracture. 56.9% had initial reduction and fixation within 24 h of injury. Percutaneous screw fixation and dynamic hip screws were definitive fixation in 57.1% and 23.8% of patients, respectively, while the remainder had a cephalomedullary device or a salvage procedure. The average time to union was 5.5 months. There was 1 case of nonunion and 1 case of delayed union. Three of the patients (16.7%) developed avascular necrosis of the femoral head, 2 of which were initially reduced within 24 h of injury. There were no statistically significant differences between time to fixation, type of reduction, or presence of displacement as a predictor of the development of avascular necrosis.

Discussion: We found a high rate of displaced and high Pauwels’ angle fractures, consistent with the high-energy injury mechanisms. With nearly a two-year average radiographic follow-up, the incidence of avascular necrosis was 16.7%, despite only half of our patients receiving initial reduction within 24 h of injury. Urgent reduction and fixation continues to be of utmost importance to decrease the risk of femoral head avascular necrosis.

Published by Elsevier Ltd.

Introduction

Femoral neck fractures in the young adult population are challenging injuries to treat and are treated urgently by most

surgeons in an effort to mitigate the risk of devastating complications such as avascular necrosis (AVN) and nonunion [1]. While intra-capsular femoral neck fractures only compromise a small fraction of the hip fractures seen in the young adult population, they are frequently associated with significant complications and disabilities resulting from disruption of blood flow to the femoral head [2].

Due to the uncommon occurrence of these injuries, there are relatively few series in the literature regarding the rates of nonunion and avascular necrosis. The limited available data demonstrate nonunion and AVN rates from 0–20% and 10%–36%, respectively, with some sources citing AVN rates of up to 80% [1,3–8]. While there is general consensus that anatomic reduction and stable internal fixation constitutes the standard of care for

* Corresponding author. Tel.: +1 2623659209.

E-mail addresses: rpurcell43@gmail.com (R.L. Purcell),

John.patrick.cody@gmail.com (J.P. Cody),

t.gordon.mil@mail.mil">Wade.&t.gordon.mil@mail.mil (W. Gordon),

Kelly.kilcoyne@gmail.com (K. Kilcoyne).

¹ Fax: 301 295 4141, Phone: 301 319 8777.

² Fax: 301 295 4141, Phone: 301 319 8777.

³ Fax: 301 295 4141, Phone: 301 319 8777.

⁴ Fax: 301 295 4141, Phone: 301 319 8777.

displaced femoral neck fractures in the young adult [9,10], the timing of reduction and fixation remains unclear, with mixed results in the literature regarding the timing of surgical intervention and the subsequent development of AVN [11–13].

The purpose of this study was to evaluate a specific cohort of young, active patients sustaining femoral neck fractures secondary to war trauma, many which were subjected to delayed surgical fixation, as is commonly seen in combat environments due to high patient inflow and life-threatening concomitant injuries. Our primary goal was to evaluate the rates of nonunion, delayed union, and avascular necrosis. Secondly, we hoped to find what effect, if any, the timing of fracture reduction and fixation had on the development of these complications in our patient population.

Materials and methods

After approval was obtained from our institutions review board we performed a database search utilizing the Joint Theater Trauma Registry as well as our institution's surgical scheduling system to identify patients that had sustained a subcapital femoral neck fracture as a result of combat related activities while serving in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) between the dates of October 2001 through October 2013.

We identified 21 patients who sustained a subcapital femoral neck fracture. We then collected demographic information, time to reduction and provisional fixation, time to definitive fixation, presence of avascular necrosis, complications to include nonunion, delayed union, hardware failure and infection as well as final patient recreational activity level through our electronic medical record system and surgeon operative reports.

Radiologic reports were examined to determine whether AVN had developed with an average length of radiographic follow up of 21.4 months. Avascular necrosis was diagnosed by the presence of either femoral head subchondral sclerosis, subchondral collapse or flattening of the femoral head. No patients were contacted during this study.

Statistical analysis

The data was analyzed to determine the rates of AVN and to determine the effect time from injury to initial reduction and fixation had on the development of AVN. The patients were sub-categorized into two groups based on time from injury to initial reduction, either less than or greater than 24 h. This time frame has been used previously in the literature as a cutoff for early versus delayed fixation. [5,14] The presence of avascular necrosis between the two groups was analyzed through a chi-square test.

Age, fracture displacement, time to initial reduction (less or greater than 24 h), use of temporary fixation, method of reduction (open or closed) were analyzed in a logistic regression model to determine predictors of the development of avascular necrosis.

Results

Demographics

Twenty-one patients with combat-related femoral neck fractures were identified through our search of the Joint Theater Trauma Registry and our institution's medical record system. The average patient age was 25.2 years (21–36 years) and all patients were males. Displaced femoral neck fractures were seen in 71.4% of patients and 95.2% were classified as type 3 fractures as according

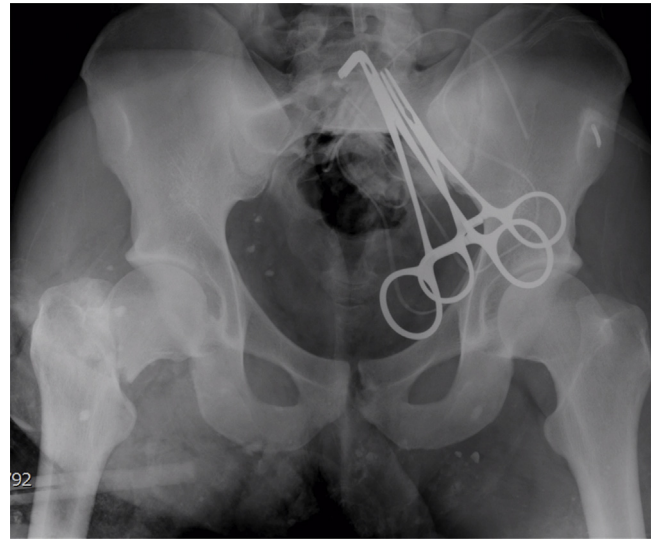


Fig. 1. Representative radiograph of a displaced Pauwels' 3 femoral neck fracture.

to Pauwels' classification (Fig. 1). [15] The majority (71.4%) of our patients sustained their injuries due to improvised explosive device (IED), and only three patients had an isolated femoral neck fracture. Concomitant ipsilateral above knee amputations were sustained in 38.1% of our patients and 23.8% sustained bilateral lower extremity amputations. Percutaneous screw fixation and dynamic hip screws were definitive fixation in 57.1% and 23.8% of patients, respectively, while the remainder were treated with a cephalomedullary device (9.5%) or a salvage-type procedure (one patient had a hip disarticulation and another had a resection hip arthroplasty due to infection). The average length of orthopaedic clinical follow up was 19.0 months (range 2.7–62.3) and the average length of radiographic follow up was 21.4 months. The average time to radiographic evidence of union was 5.5 months (Table 1).

Three patients were excluded from further data analysis due to the loss of their native femoral head from factors other than AVN. One of these patients had significant neurovascular compromise of the extremity and a hip disarticulation was performed 41 days after injury. The second patient developed an enterococcal septic hip following provisional fixation with kirschner wires and ultimately went on to a resection arthroplasty with delayed total hip arthroplasty 170 days after initial injury. The final excluded patient was discharged to a civilian neurological rehabilitation facility one month after arrival at our institution and was lost to follow up. After removal of these patients, 18 remained for further data collection and analysis.

Table 1
Demographic Information. Mechanism of Injury (MOI). Improvised Explosive Device (IED). Gun Shot Wound (GSW).

Patients	21 (all males)
Age	25.2 years
MOI	IED–71.4%
	GSW–23.8%
	Other–4.8%
Concomitant Injuries	17/21 (80.9%)
Ipsilateral amputation	8/21 (38.1%)
Bilateral amputations	5/21 (23.8%)
Modified Garden Classification	Displaced–15/21 (71.4%)
	Non-displaced–6/21 (28.6%)
Pauwels' Classification	1–0/21 (0%)
	2–1/21 (4.8%)
	3–20/21 (95.2%)

Download English Version:

<https://daneshyari.com/en/article/6082999>

Download Persian Version:

<https://daneshyari.com/article/6082999>

[Daneshyari.com](https://daneshyari.com)