

An Epidemiological Study of Femur Fracture in Road Traffic Accident Cases

Vijay Kumar AG*, Shivaramu MG, Kumar U

¹Assistant Professor, Department of Forensic Medicine & Toxicology, Adichunchanagiri Institute of Medical Sciences, B G Nagara, Nagamangala Taluk, Mandya, Karnataka State, India

²Principal and Professor, Department of Forensic Medicine & Toxicology, Adichunchanagiri Institute of Medical Sciences, B G Nagara, Nagamangala Taluk, Mandya, Karnataka State, India

³Associate Professor, Department of Forensic Medicine & Toxicology, Adichunchanagiri Institute of Medical Sciences, B G Nagara, Nagamangala Taluk, Mandya, Karnataka State, India

*Corresponding Author:

Name: Vijay Kumar AG

Email: vijay.fmt@rediffmail.com

Abstract: The femur is one of the largest and strongest bones in the body. Because the femur is such a strong bone, it usually requires significant force to cause a femur fracture. In this retrospective study, fatal road traffic accident cases autopsied during the period 1st January 2011 to 31st December 2014 were analyzed at the Department of Forensic Medicine & Toxicology, AIMS, B G Nagar, and Karnataka. The incidence, age wise distribution of cases and types of femur fracture were noted. In our study total numbers of autopsied cases during 2011 to 2014 are 453. Maximum number of cases occurred in the year 2013 (147 cases). In that 45 cases had femur fracture. Maximum number of victims belongs to 31-40 years (16 cases) decade followed by 21-30 years (11 cases). 21 cases had Femoral Shaft Fractures and 11 cases had distal femur fractures. In the case of a fractured femur that results in bone breaking the skin, there is an increased risk of infection. If the bones are not well aligned or there is irritation to the bone due to infection, the healing process may be delayed and require further surgery.

Keywords: femur, fracture, road traffic accident.

INTRODUCTION

The femur bone is longest and strongest bone in the body. The femur is such a strong bone, it usually requires great force to produce a fracture [1]. Fractures of the femur are involves femoral neck, the femoral shaft or distal femur. Fractures of the femoral neck are common in the elderly people and fractures of the femoral shaft and distal femoral fractures are usually caused by road traffic accident and most often occur in young generation. Proximal femoral fractures occur between the edge of the femoral head and 5 cm below the lesser trochanter [1].

In patients with normal bone strength, the most common causes of femur fractures include: Car accidents, Falls from a high places [2]. Because of the great blood circulation of femur bone, fractures can result in significant blood loss into the thigh. Most of isolated fractures may require transfusion, as such injuries can result in loss of up to 3 units of blood. This factor is more important in elderly patients who have less cardiac reserve [2].

Femoral Head Fractures

It is a rare fracture pattern and is usually associated with hip dislocations [3]. The incidence is

increasing because of more traumas like road traffic accidents.

Femoral Neck Fractures

Are common due in aged population [4]. Women are more prone to this type of fracture compare to men because of osteoporosis [4, 5].

Mechanism [4]

- High energy in young patients such as road traffic accidents
- Low energy falls in older patients

Intertrochanteric Fractures

Extracapsular fractures of the proximal femur between the greater and lesser trochanters. The incidence is roughly the same as femoral neck fractures. female:male ratio between 2:1 and 8:1[6].

Subtrochanteric Fractures

Subtrochanteric typically defined as area from lesser trochanter to 5cm distal [7]. Usually occurs in younger patients with a road traffic accident.

Femoral Shaft Fractures [8]

- High energy injuries frequently associated with road traffic accidents
- Epidemiology - 37.1 per 100,000 person-year
- Mechanism: Traumatic
 - High-energy: Most common in younger population, often a result of high-speed motor vehicle accidents
 - Low-energy: More common in elderly, often a result of a fall from standing

Distal Femur Fractures

Involves fracture from articular surface to 5cm above metaphyseal flare [9]. Usually occurs in younger patients with a road traffic accident.

MATERIAL AND METHODS

In this retrospective study, fatal road traffic accident cases autopsied during the period 1st January 2011 to 31st December 2014 were analyzed at the Department of Forensic Medicine & Toxicology, AIMS, B G Nagar, and Karnataka. The incidence, age wise distribution of cases and types of femur fracture were noted.

RESULTS

Table 1: Year wise distribution of autopsied cases

Year	Total no. of autopsied cases
2011	76
2012	100
2013	147
2014	130
Total	453

Table 2: Incidence of femur fracture cases

Total no. of autopsied cases	Total no. of humerus fracture cases
453	45

Table 3: Age and Sex wise distribution of cases

Sl. No.	Age group	No. of cases	Male	Female	Total
1	< 20 Yrs	04	03	01	04
2	21 – 30 Yrs	11	09	02	11
3	31- 40 Yrs	16	13	03	16
4	41- 50 Yrs	07	05	02	07
5	>50 Yrs	07	04	03	07
Total		45	34	11	45

Table 4: Type of Fracture

Type of fracture	No. of cases
Femoral Head Fractures	0
Femoral Neck Fractures	3
Intertrochanteric Fractures	4
Subtrochanteric Fractures	6

Femoral Shaft Fractures	21
Distal Femur Fractures	11

DISCUSSION

In our study total numbers of autopsied cases during 2011 to 2014 are 453. Maximum number of cases occurred in the year 2013 (147 cases). In that 45 cases had femur fracture. Maximum number of victims belongs to 31-40 years (16 cases) decade followed by 21-30 years (11 cases). 21 cases had Femoral Shaft Fractures and 11 cases had distal femur fractures.

Fracture of femur varies according to the type, direction and the quantity of force applied. A perpendicular force results in a transverse fracture pattern, rotational forces may cause spiral or oblique fracture patterns and an axial force may injure the hip or knee. The intensity of comminution of bone increases with the amount of energy absorbed by the femur at the time of fracture [10].

The femoral fractures incidence is reported as 1-1.33 fractures per 10,000 populations per year in USA. In younger individuals (<25 years) and older people (> 65 years), the rate of femoral fractures has been reported to be 3 fractures per 10,000 populations annually. These injuries are most common in younger males because they are the people who are more involved in road traffic accidents or gunshot wounds [11].

According to study done by Dr Frank Gaillard *et al.* [12] it was studied that the total number of hip fractures will exceed 6 million people in 2014. In older patients, femoral neck and intertrochanteric fractures occur with almost the same frequency. This occurs in younger patients mainly due to trauma. In elderly patients, the mechanism of injury various from falls directly onto the hip to a twisting mechanism in which the patient's foot is planted and the body rotates.

According to study done by Nikolaou VS [6], One hundred forty-three of 203 patients met the inclusion criteria. All patients had unilateral diaphyseal fractures, 64 OTA 32.A (45%), 46 OTA 32.B (32%), and 33 OTA 32.C (23%). In addition, 134 associated injuries were identified in 52 patients [13].

CONCLUSION

In the case of a fractured femur that results in bone breaking the skin, there is an increased risk of infection. If the bones are not well aligned or there is irritation to the bone due to infection, the healing process may be delayed and require further surgery. Nerve damage in femoral fractures is relatively rare but can lead to persistent numbness or weakness in the lower leg. Fracture of femur may also lead to fat embolism resulting in death.

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