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Femoral Fracture Configuration and The Implant used for Trauma Cases in Haji Adam Malik General Hospital Medan Indonesia January 2015-December 2016

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Abstract: Background : Trauma is a neglected source of morbidity and mortality in which caused 65-91% femoral fracture. Femur fracture is the most common cases in orthopedic. The aim of the study was to know the most common configuration's fracture and implant, to be used as the guide for provisional implant. **Methods :** A descriptive study was conducted using 177 medical records of femur fracture patients in Department of Orthopaedic and Traumatology Haji Adam Malik General Hospital Medan from January 2015 to December 2016. The inclusion criterias were medical records containing patient aged more than 12 years old who diagnosed femur fracture due to trauma, sex, cause of fracture, type of fracture and treatment, femur X-ray to locate the site and configuration of fracture and the implant that were used. **Result :** Of 177 cases of femur fracture due to trauma, the most common caused of trauma is motor vehicle accident 127 cases, with the most common configuration of fracture is oblique 87 cases. Of 167 patient who underwent surgery, the largest implant that had been used is plate and screw in 128 cases. **Conclusion :** Femur fractures were mostly happened in middle aged group of man with the most common configuration of fracture is oblique. Plate and screw is still the main implant for fixation of femur fracture.

Keyword : Trauma, femur, implant, configuration.

Introduction

Trauma is a neglected source of morbidity and mortality in low and middle income countries (LMICs) that causes more than five million deaths each year which accounts for 40% of deaths among young people worldwide. Femur fracture secondary trauma has high incidence rate where road traffic coalition account for 65% to 91% of femoral fractures¹. It is also one of the most common orthopedic cases. In Dr. Hasan Sadikin General Hospital Bandung, there was about 20.84% femur fractures from total fracture cases (173 from 830 cases). There are many factors contributed to the incidence of femur fracture, such as: age, sex, body weight and height, previous history of any fracture, drug usage, trauma, weakness and bone malformation related to malnourished, chronic diseases, osteoporosis and others².

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In the previous study about characteristic femur fracture in Dr. HasanSadikin General Hospital Bandung they also found that Of 60 cases of motor vehicle accidents, there were more male (77.53%) than female who suffered from fracture. Closed fracture was more common with 52 cases of closed fracture compared to 29 cases of proximal fracture. Of 35 patients accepted treatment, 30 patients were treated by surgery and hospitalized for 21–30 days².

The objective in this study is to describe the configuration of the fracture and the implant that has been chosen for fixation femur fracture in Haji Adam Malik General Hospital Medan from January 2015 to December 2016.

Methods

A descriptive study was conducted using 200 medical records of femur fracture patients in the Department of Orthopaedics and Traumatology Adam Malik Hospital in collaboration with Radiologic Department Adam Malik Hospital Medan from January 2015 until December 2016. Of 200 medical records, 177 medical records were eligible and 23 medical records were excluded because was not provided with X-ray. The inclusion criteria of the study were medical records that contained data of the patient aged above 12 years old who were diagnosed with femur fracture, sex, cause of the fracture, type of the fracture, complete X-ray to determined the anatomical location of the fracture and configuration of the fracture, type of the treatment and type of the implant has been used.

Data were analyzed using frequency distribution. Ethical clearance was given by The Health Research Ethical Committee Medical Faculty of Universitas Sumatera Utara / Haji Adam Malik General Hospital Medan.

Result

The total number of femur fracture recorded in Haji Adam Malik General Hospital Medan was 200 patients. Twenty three records of 200 patients was excluded because was not provided with previous x-ray. Of 177 patients who had been diagnosed with femur fracture, fifteen patient was with bilateral femur fracture. Base on the year patient's visitation, 93 patients came on 2015 and 84 patients came on 2016. Close femur fracture has higher incidence rate 143 (80.8%) cases than open fracture 23 (12%) cases. Male 121 (68.4%) cases have higher incidence than female 56 (31.6%) cases. The highest incidence femur fracture was ranged of age between 19-30 years 51 (28.8%) cases. Commonly fractures were caused by motor vehicle accident 127 (71.8%) cases (Table 1).

Table 1. Characteristic patients with femur fracture

Femur Fracture	Number of cases	Percentage (%)
Type of Fracture		
Closed	143	80.8
Open	34	19.2
Sex		
Male	121	68.4
Female	56	31.6
Caused of Fracture		
Gun Shoot	2	1.1
Motor Vehicle Accident	127	71.8
Fall	48	27.1
Age		
12-18	13	7.3
19-30	51	28.8
31-40	32	18.1
41-50	21	11.9
51-60	19	10.7
>60	41	23.2

Configuration of the fracture		
Cominutive	56	29.2
Oblique	87	45.3
Segmental	21	10.9
Spiral	3	1.6
Transverse	25	13.0

According to the site of the fracture, mostly fracture happened at shaft of femur, with the most common configuration of the fracture was oblique (Table 2).

Table 2. Site of the Fracture and Configuration of the Fracture

Site of the fracture	Fracture Configuration				
	Comminutive	Segmental	Oblique	Spiral	Transverse
Head Femur	0 (0%)	0 (0%)	2 (100%)	0 (0%)	0 (0%)
Neck Femur	1 (4.3%)	0 (0%)	21 (91.3%)	0 (0%)	1 (4.3%)
Intertrokhanter	1 (4.3%)	7 (30.4%)	15 (65.2%)	0 (0%)	0 (0%)
Subtrokhanter	0 (0%)	2 (14.3%)	9 (64.3%)	2 (14.3%)	1 (7.1%)
Shaft Femur	35 (32.7%)	9 (8.4%)	39 (36.4%)	1 (0.9%)	23 (21.5%)
Distal Femur	19 (82.6%)	3 (13%)	1 (4.3%)	0 (0%)	0 (0%)

Of 192 femur fractures, 167 (87%) cases were treated with surgery and 25 (13%) cases were refused the treatment. The most common implant that had been chosen for fixation were plate and screw system 128 (66.7%) cases (Table 3).

Table 3. Implants used for fixation

Type of implant	Number of Cases	Percentage (%)
External fixation	12	6.3
Plat and screw	128	66.7
Screw	3	1.6
Intramedullary nailing	6	3.1
Arthroplasty	18	9.4

Discussion

Based on the data from January 2015 until December 2016, most of the patients who were diagnosed with femur fracture were male in the range of age were 19-30 years, with the caused of injury was motor vehicle accident, where closed fracture is higher than open fracture and mostly configuration of the fracture were oblique. The finding is in line with previous research by Mohamad Firdausin Dr. Hasan Sadikin General Hospital Bandung in 2015. From that studies, the most common femur fracture happened in male aged between 20-29 years which caused by motor vehicle accident where closed fracture had higher incidence rate in more than 50% cases². Different result were found according to the location of the fracture where in this study we got the shaft femur fracture is the most common site but from previous research they found proximal femur is the most common site. Other research who had same result were performed by Salminen in 2000, they got shaft femur fracture is the common femur fracture in male aged 15-24 year due to motor vehicle accident³. Shaft

femur fracture happened usually because of high force direct to the bone during accident. Shaft femur is circumferentially padded with large muscles which brings advantages and disadvantages: reduction can be difficult as muscle contraction but healing potential is improved by having well-vascularized sleeve containing a source of mesenchymal stem cell^{4,5,6,7,8}.

Of 192 femur fracture, 162 cases were proceeded to surgery with plate and screw were the most common implant that had been used. This method usually reduces chances of complication such as mal-union and non-union as the bone will be placed in a proper anatomical alignment and be held by plate and screws placed on the bone. There were some of factors becomes limitation to this research. Several medical records can not fulfill the inclusion criterias because were not provided with femur X-ray which is important to determine the site of the fracture and implant that had been chosen^{7,8,9,10}.

Conclusion

The most common femur fracture is closed fracture at the shaft of the femur with oblique configuration in the age of 19-30 years. Plate and screw is still the main implant for fixation of femur fracture.

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