



Delayed Admission Time and Its Reason in Patients with Geriatric Hip Fracture

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Purpose: Geriatric hip fractures are common. Surgical treatment is generally required to achieve a good quality of life. It was reported that a delayed time from injury to treatment leads to poor outcomes. We aimed to determine the time interval from injury to hospital admission in patients with geriatric hip fractures and explore the reasons for delay.

Methods: Information on geriatric hip fracture patients who received treatment at our hospital from November 2016 to October 2020 was extracted from medical records. The average delay time was analyzed and reported. The reasons for delay were collected from patients who were not referred from other hospitals and had a time interval from injury to admission of more than 24 h.

Results: The median time interval was 0.38 days, and 127 (32%) visited the hospital more than 24 h later. In patients not referred from other hospitals, the most common cause of delay was that patients overlooked the possibility of bone fractures (58%). Other reasons included unavailable transportation (20%), missed diagnosis from other hospitals (11%), inability to afford the transportation cost (7%), and inability to talk and/or caregivers did not notice the injury (4%).

Conclusions: Almost one-third of geriatric hip fracture patients had a time from injury to admission of more than 24 h. Knowing the reason for delay and determining a solution to minimize this time interval may improve treatment quality. This information demonstrates that public and healthcare providers should pay attention to elderly patients with a history of fall injury.

Keywords: geriatric hip fracture, delay time, admission time, morbidity

Geriatric hip fractures are a common injury in the aging era. Most elderly individuals have osteoporosis, which is usually asymptomatic and

left untreated. In these populations, even minor trauma, such as a fall from a standing height, can cause hip fracture. Surgery for bone fixation is the first line of treatment and is recommended for all patients with geriatric hip fractures unless the patients have a contraindication for surgery. Many studies have recommended early surgery, which may reduce the rate of complications, such as pressure sores, urinary tract infections, pneumonia, or even death⁽¹⁻⁴⁾.

The time from injury to surgery can be divided into two periods. The first period was the

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interval from injury to admission. The second period was defined as the interval between admission and surgery. Many studies have reported on the latter interval. In addition, in the interval from admission to surgery, some factors that impede early surgery have been studied, some of which are inevitable. However, few studies have reported the time interval from injury to admission and the reason for this delay. We hypothesized that some reasons for the delay in this time interval may be avoidable. These data may be of benefit for creating policies or advertising the importance of early treatment seeking after the injury when geriatric hip fracture is suspected, which may decrease the delay time and result in a better treatment outcome.

The objective of this study was to report the time interval from injury to admission and determine the reason for delays in geriatric hip fracture patients.

METHODS

This retrospective study was approved by Lerdsin General Hospital Institutional Review Board (no. LH651013, with the patients' informed consent). Patients who were diagnosed with geriatric hip fracture and admitted to our hospital between November 2016 and October 2020 were included in the study. The criteria for the diagnosis of geriatric hip fractures were as follows: 1) 55 years old or above, 2) hip fracture due to minor injury (e.g., falling from a standing height), and 3) no other pathological causes (e.g., tumor or infection) were observed. All included patients lived in Bangkok or the perimeter area. Data on age, sex, previous history of hip fracture, concomitant fracture (defined as another fracture elsewhere in the injury episode), type of hip fracture, whether the patients were referred from other hospitals or not, the time interval from injury to admission, and reason of delay in patients who had a time from injury to admission of more than 24 h were obtained. For the time from admission to surgery, according to our hospital policy, the "refracture prevention" protocol was used in all patients. All patients who were candidates for surgery received operative treatment within 72 h.

The patients' demographic data were reported as mean and percentage. The time interval from injury to admission were reported as mean with standard deviation (or median with interquartile range in case of non-normally distributed data). The reasons for delay in patients who were not referred from other hospitals and had a time from the injury to admission of more than 24 h are divided per reason and reported as percentages. We used a time frame of 24 h, determined by our health care provider, and recorded the reason for delay if patients had a time interval of more than 24 h from injury to admission. Patients' demographic data were further analyzed using Pearson's correlation or Spearman's correlation for non-normally distributed data and Student's T-test or Mann-Whitney test for non-normally distributed data to determine the relationship with the time interval. Subset analysis of patients who were not referred from other hospitals was performed in the same manner.

RESULTS

Three hundred and ninety-four patients were included in this study. The mean age of the patients was 77 years (range, 55-103). Two hundred ninety-eight patients (76%) were female. Sixty patients (15%) had a history of hip fracture. Ten (3%) patients had concomitant fractures. There were 198 (50%), 189 (48%), and seven (2%) patients with femoral neck, intertrochanteric, and subtrochanteric fractures, respectively. Seventy-nine (20%) patients were referred to other hospitals (Table 1).

Table 1 Patients' characteristics (n=394).

Characteristics	Result
Age (years): mean (SD)	77 (10)
Sex (Female): n (%)	298 (76%)
Previous hip fracture: n (%)	60 (15%)
Concomitant fracture: n (%)	10 (3%)
Type of fracture: n (%)	
Femoral neck	198 (50%)
Intertrochanteric	189 (48%)
Subtrochanteric	7 (2%)
Refer from other hospitals	79 (20%)

The median time interval from injury to admission was 0.38 days (IQR= 0.17–1.62, range 0 - 21). One hundred and twenty-seven patients (32%) had a time interval from injury to admission of > 24 h. The Spearman correlation test revealed no association between age and time interval from injury to admission. There was also no association between sex, previous hip fracture, or concomitant fracture and the time interval. The time interval was significantly increased in referred patients ($p < 0.01$) (Table 2).

Table 2 Factor in the time interval from injury to admission.

Factor	p-value
Age	0.78
Sex	0.51
Previous hip fracture	0.52
Concomitant fracture	0.65
Refer from other hospitals	<0.01*

*significant

Subset analysis of the patients who were not referred from other hospitals ($n=315$) revealed that the median time interval from injury to admission was 0.33 days (IQR= 0.15–1.21, range 0–16). Ninety-one patients (29%) had a time interval from injury to admission of > 24 h. (Figure 1) There was no significant association between age, sex, previous hip fracture, or concomitant fracture and the time interval (Table 3).

Table 3 Factor in the time interval from the injury to the admission in patients who were not referred from other hospitals.

Factor	p-value
Age	0.84
Sex	0.30
Previous hip fracture	0.91
Concomitant fracture	0.53

In 91 patients who were not referred from other hospitals and had a time interval from injury to admission of more than 24 h, reasons for delay were obtained in 74 patients. The most common reason was that the patients and/or caregivers did

not realize that the injury resulted in a hip fracture (43 patients, 58%). The second most common reason was that the patients and/or caregivers were unable to transport patients (15 patients, 20%). Other reasons were missed diagnosis from other hospitals (eight patients, 11%), inability to afford the cost of transportation (five patients, 7%), and inability to talk to the patients and/or inability of caregivers to notice the injury (three patients, 4%) (Figure 2).

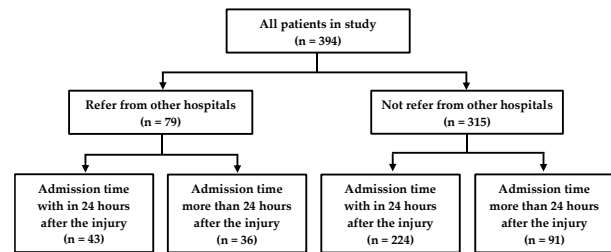


Fig. 1 Summary number of the patients.

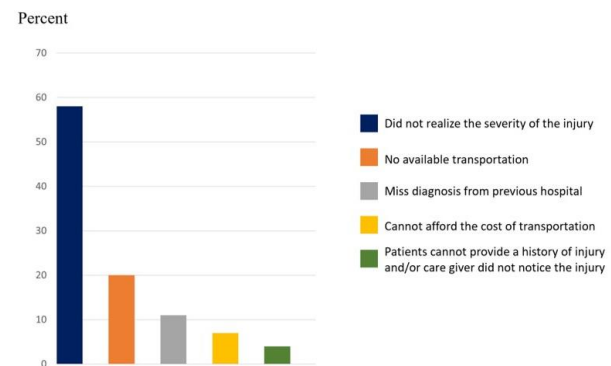


Fig. 2 Reasons for delay in the time interval from the injury to the admission of more than 24 hours (exclude referred patients).

DISCUSSION

Geriatric hip fracture is a common injury that needs to be a concern. Patients should undergo surgery in the absence of contraindications. Previous studies have reported the importance of early surgery, which may decrease morbidity and mortality⁽⁵⁻⁷⁾. Studying and revealing the factors affecting delay in admission and treatment may aid in planning and developing policies.

Previous studies have reported the factors affecting the time from admission to surgery. The leading causes of delayed surgery in geriatric hip

fractures are preoperative medical clearance and lack of an operative theater and/or surgeon⁽⁸⁾. At present, in Thailand, many hospitals, including our center, have implemented a protocol for geriatric hip fracture resulting in early surgery and could decrease the delay time from admission to surgery. However, considering the time to surgery, the interval from injury to admission is important. Because most geriatric hip fracture patients have medical conditions that need to be treated or prepared for operation, patients who had less time from injury to admission underwent early surgery due to early preoperative evaluation.

Few studies have reported the time interval from injury to admission. Vidal et al. reported an average interval of 3.1 days⁽⁹⁾. This finding is comparable to that of our study (mean delay, 2 days). This delay time may significantly increase the mortality rate⁽¹⁰⁾. Hefley et al. reported an increased incidence of deep venous thrombosis in osteoporotic patients with delayed admission⁽¹⁾. Even though most patients in our study had a time from injury to admission of less than 1 d after injury, some patients had a long delay time, which may have caused morbidities and mortality.

Regarding the reason for delay, Orosz et al. reported that the leading cause of delay in their study was that patients did not realize the severity of their injury, which is consistent with our finding. This reason, the leading cause of delay, could be prevented by conducting public advertising on the possibility of bone fracture and the importance of this time interval.

Our study had several limitations. First, the study was conducted in a single center, and may not be representative of other hospitals; for example, the convenience of transportation, location of the hospital, and differences in the socioeconomic status of patients. Second, according to the retrospective design, some data could not be obtained or were incomplete, such as the reason for the delay in patients who were referred from other hospitals. Finally, the small sample size in the study may have resulted in a lack of power to determine the effect factor for delay time. Further studies on this topic at a multicenter or national scale may be beneficial. Knowledge of this topic may help in planning

policies to decrease complications and improve outcomes in patients with geriatric hip fractures. Educating the public about the possibility of bone fracture, which should be considered after even a minor fall accident, the availability of transportation by nearby healthcare providers, and concern of abnormal movement or daily living with pain in a patient who cannot communicate is recommended. In addition, there would be a benefit in alerting healthcare providers regarding proper investigation (e.g., X-ray in the suspected case with proper position, such as internal rotation view to detect the occult fracture) to prevent misdiagnosis, provide transportation for suspected geriatric hip fracture patients, and quick response if referral is needed.

CONCLUSIONS

Early treatment in patients with geriatric hip fractures is important to improve outcomes and decrease complications. Many patients had delayed time intervals from injury to admission, resulting in delayed treatment. Our findings regarding the reason for the delay may be beneficial in solving this problem, and may increase the quality of life in these patients.

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