

# Geriatric Hip Fracture Pathway in Private Hospital: Early results

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**Purpose:** A prospective study was performed according to the Geriatric Hip Fracture Pathway in patients who sustained a hip fracture and were admitted to Bangkok Hospital.

**Methods:** Eligibility criteria were defined as aged over 60 and a hip fracture caused by simple fall. From July 1<sup>st</sup>, 2013 to July 31<sup>st</sup>, 2014, the number of patients with hip fractures aged over 60 years was 57.

**Results:** The average age was 77 years, with 13 males (23%) and 44 females (77%). There were 27 cases of femoral neck fractures (47.5%), 27 cases of intertrochanteric fractures (47.5%), and 3 cases of subtrochanteric fractures (5%). The operations performed were 2 total hip arthroplasties, 23 bipolar hip hemiarthroplasties, and 32 internal fixations. The performance indicators according to the 2013 annual report of the Nation Hip Fracture Data of the United Kingdom (NHFD) were recorded and evaluated. The timing of operation within 36 hours could achieve 82% with 100% of complete geriatric pre-operative assessment and no infection at the surgical site. All patients had deep vein thrombosis prophylaxis, no development of bed sores, no mortality, no reoperation within 28 days, no readmission within 28 days, and no secondary hip fractures. The average length of stay was 15 days with the median at 10.5 days and 74% of osteoporosis assessment with proper treatment.

**Conclusion:** Most of the actual performances could hit the target in comparison with the NHFD. However, the patients might be followed up for a longer period to evaluate the balancing score and the prevention of second hip fractures. Although this pathway has only been in place for one year, we may conclude that the overall results are satisfactory and the geriatric hip fracture pathway should be continued with some modifications for a better result in our hospital.

**Keywords:** Geriatric hip fracture, Co-management pathway.

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## Introduction

In Thailand the prevalence of osteoporosis (by dual-energy X-ray absorptiometry) was 33% by femoral neck or lumbar spine bone mineral density (BMD) in Thai woman aged 60±10 years<sup>(1)</sup>. The total number of hip fractures every year is projected to reach more than 36,000 in 2020 and 65,000 in 2050. Almost all hip fractures require surgical correction, predominantly for preservation of function.

Patients with hip fracture have a high prevalence of co-morbidity and a high risk of complications from surgery, and for this reason, a multi-disciplinary approach may be well suited to improve outcomes of care<sup>(2,4)</sup>. Co-management of geriatric fracture patients by orthopedic surgeons and multidiscipline teams has led to better outcomes<sup>(3,4)</sup>. This guideline was described by the Geriatric Hip Fracture pathway that has resulted in

lower-than-predicted length of stay and readmission rates, with a short time to surgery, low complication rates, and low mortality. The pathway was based on the principles of early evaluation of patients, ongoing co-management, protocol-driven geriatric-focused care, and early discharge planning. Good hip fracture care depended on minimizing pre-operative delay<sup>(5)</sup>. There are six standards for hip fracture care which reflected good clinical practice. These standards were written in the book of the British Orthopaedic Association entitled 'The Care of Patients with Fragility Fracture'<sup>(2)</sup>. The implementation of these guidelines would improve the quality of care and provide better outcomes, as well as reduce costs. The objectives of this study were to ensure that patients should receive holistic care from a multidisciplinary team. The second objective was to reduce the risks that might occur during the care processes. The third objective was to improve the quality of life after treatment and to prevent recurrent hip fractures.

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## Materials and Methods

A prospective study was performed according to the Geriatric Hip Fracture Pathway in patients who sustained a hip fracture and were admitted to Bangkok Hospital. Bangkok hospital has implemented the Geriatric Hip Fracture Pathway since July 2013, as a private hospital in Thailand. We had set up a geriatric hip fracture pathway committee. The committee had studied and proposed the documents of 10 guideline categories (Fig. 1). The inclusion criteria were hip fracture patients who were over 60 years old and without previous hip surgery. The type of fractures were femoral neck fractures, intertrochanteric fractures, and subtrochanteric fractures. Exclusion criteria were acetabular fractures and a history of previous hip surgery. The performance indicators would be collected and compared with the National Hip Fracture Data 2013 (NHFD) of the United Kingdom<sup>(11)</sup>.

| <b>Guideline Category</b>                     |
|---|
| 1. Pre-hospital management for transportation |
| 2. Emergency department evaluation            |
| 3. Caring the patient in ward (nursing)       |
| 4. Preoperative assessment and care           |
| 5. Anesthetic management                      |
| 6. Surgical management                        |
| 7. Early postoperative management             |
| 8. Rehabilitation                             |
| 9. Discharge planning and management          |
| 10. Secondary prevention of future fracture   |

**Fig. 1** Guideline category

The Geriatric Hip Fracture Pathway, Bangkok Hospital, has been implemented since July 2013. The performance indicators were operating within 36 hours, complete geriatric pre-operative assessment, surgical site infection, deep vein thrombosis (DVT) prophylaxis, development of bed sores, mortality rate, reoperation rate within 28 days, readmission rate within 28 days, length of stay, and osteoporosis assessment with proper treatment.

The pathway should be started from the emergency room (ER). The ER physician assessed the patients within 15 minutes of arrival. If fracture was suspected, the patients would get an early imaging investigation to make a definite diagnosis of a hip fracture. The orthopedic surgeon should be notified within 30 minutes and the standing order with care protocols initiated. The geriatrician should be notified for a preoperative assessment in anticipation of surgery. Pain assessment and

analgesia might be administered before transferring the patients to the ward. SpO<sub>2</sub> was checked and supplementary oxygen would be administered as needed, as well as fluid and electrolyte correction. The patient might be transferred to the ward within 2 hours. The patients were placed on a bed rest without traction. A pain assessment with standardized pain regimen was started. Decubitus ulcer prevention was applied. Medical assessment for preoperative medical clearance was performed within 24 hours. The Anesthesiologist, physical medicine and rehabilitation, and orthopedic clinical nurse coordinator were notified. The hip surgery should be scheduled as soon as possible with 36 hours, if medical condition allowed. Either mechanical or pharmaceutical thromboembolic prophylaxis should be considered. Post-operative management by transferring patients to critical care was necessary. A standardized pain regimen and prophylactic antibiotics were given. Early rehabilitation should be started within 24 hours post-operatively. The dietician and pharmacist might be notified for nutritional and medication assessment. Discharge planning was started. Written information, mobility, and expected progress were given to the patients and relatives.

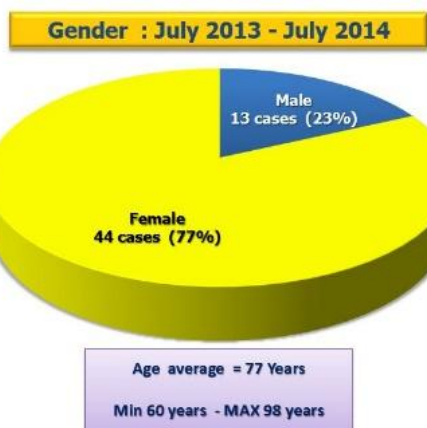
Secondary prevention of future fractures should be started including osteoporosis assessment with initial treatment, fall risk assessment, and fall prevention.

## Results

From July 2013 to July 2014, there were a total of 57 patients who met the inclusion criteria. There were a total of 44 female and 13 male patients. The average age was 77 years, with the minimum of 60 years and maximum of 98 years (Fig. 2). From the classification by nationality, there were 36 Thais and 21 foreigners (Fig. 3). In terms of fracture types, there were 27 cases of femoral neck fractures (47.5%), 27 cases of intertrochanteric fractures (47.5%), and 3 cases of subtrochanteric fractures (5%). The operations performed were 2 total hip arthroplasties, 23 bipolar hip hemiarthroplasties, and 32 internal fixations. All of the cases were discharged to their homes.

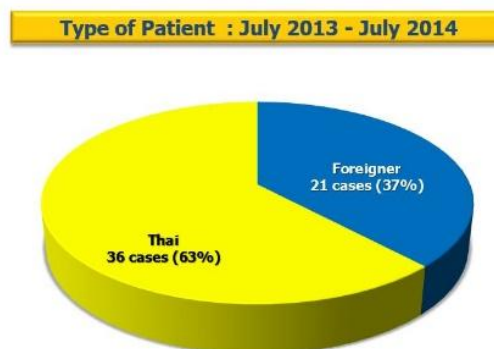
The performance indicators were recorded and evaluated. Of the total operations, 82% were within 36 hours of arrival, 100% of patients underwent complete geriatric pre-operative assessment (Table 1). Additionally, there were no patients suffered from surgical site infection, development of bed sores, mortality, reoperation within 28 days, or readmission within 28 days (Table 2), and all patients had DVT prophylaxis. The average length of stay was 15 days with the median at 11 days (Table 3). So far, there have been no secondary hip fractures.

### Patient's characteristics



**Fig. 2** Patient characteristics based on gender and age

### GHF Pathway Patient's characteristics



**Fig. 3** Patient characteristics based on nationality

**Table 1** Performance indicator (1)

| Performance Indicator (Process)  | Target | July 2013-<br>Dec 2013 | Jan 2014-<br>July 2014 | Annual Report<br>NHFD 2013 |
|--|--------|------------------------|------------------------|----------------------------|
| Admission time within 2 hour. (start from time arrival ER to ward)                   | 90%    | 52%                    | 31%                    | 50%<br>Within 4 hrs.       |
| Operation time within 36 hour (start from time arrival ER to operation time)         | 90%    | 75%                    | 82%                    | 86%<br>Within 48 hrs.      |
| Pre operation assessment by internist or geriatrician                                | 100%   | 100%                   | 100%                   | 49%<br>Orthogeriatrician   |
| Receiving a falls assessment prior to discharge                                      | 100%   | 72%                    | 85%                    | 94%                        |
| Home medication must include calcium & vitamin D                                     | 100%   | 100%                   | 100%                   | 69%                        |
| Osteoporosis assessment and treatment must be started within 30 days after admission | 100%   | 100%                   | 74%                    | N/A                        |

**Table 2** Performance indicator (2)

| Performance Indicator (Results)           | Target | July 2013-<br>Dec 2013 | Jan 2014-<br>July 2014 | Annual Report<br>NHFD 2013 |
|---|--------|------------------------|------------------------|----------------------------|
| Development of pressure ulcers            | < 3%   | 0%                     | 0%                     | 3.5%                       |
| Mortality rate within 28 days             | < 10%  | 0%                     | 0%                     | 8.2%<br>within 30 days     |
| Reoperation rate within 28 days           | 0%     | 0%                     | 0%                     | N/A                        |
| Readmission rate within 28 days           | < 11%  | 0%                     | 0%                     | N/A                        |
| Surgical site infection (deep infection)  | < 1%   | 0%                     | 0%                     | N/A                        |
| Hospital acquired urinary tract infection | < 20%  | 0%                     | 0%                     | N/A                        |

**Table 3** Performance indicator (3)

| Performance Indicator (Results)  | Target   | July 2013-<br>Dec 2013 | Jan 2014-<br>July 2014 | Annual Report<br>NHFD 2013 |
|--|----------|------------------------|------------------------|----------------------------|
| Hospital acquired lower respiratory tract infection                              | < 9%     | 0%                     | 0%                     | N/A                        |
| Deep vein thrombosis   | < 2%     | 0%                     | 0%                     | N/A                        |
| Percentage case fall after discharge in monthly (during 30 days after discharge) | 0%       | 25%                    | 0%                     | N/A                        |
| Barthel index score improvement more than 15 scores at 6 months                  | 50%      | 62.5%                  | -                      | N/A                        |
| Length of stay (time median)   | ≤ 7 days | 11 days                | 10.5 days              | 20                         |

## Discussion

Hip fracture is a major health problem in Thailand<sup>(6)</sup>. The estimated cumulative incidence was 181 per 100,000 people and hip fracture incidence had increased by an average of 2% per year. This mobility and mortality rate is high, 30 days mortality is around 10% and 30% in 1 year.<sup>(7)</sup> Geriatric hip fracture used to be considered as a low energy simple fracture and used to be treated as a less urgent condition. But more studies and more evidence has shown that these osteoporotic fractures should be managed with aggressive medical and surgical support, which have been shown to achieve excellent results with good clinical outcomes<sup>(2)</sup>.

Our pathway started from the emergency department when the patients were admitted and continued through medical evaluation, surgery and rehabilitation, and until the patients were discharged home. It also included pain management, osteoporosis detection, and treatment. The preoperative period was one of the most important factors that affected clinical outcomes. In many clinical studies, it has been stated that the shorter the preoperative waiting time, the fewer complications and a lower mortality rate can be achieved<sup>(7,8)</sup>. Therefore, the significant reduction in the preoperative waiting time was considered as one of the major accomplishments in our clinical pathway. 82% of our patients had a preoperative time within 36 hours which was comparable with 86% within 48 hours in the 2013 annual report of NHFD.

There were no short term (28 days after surgery) complications, pressure sores, infections, or mortality in our patients, which is better than the 2013 annual report of NHFD. Data from many reports have mentioned that the risk for a second hip fracture was 5-10% and that 78% occur in the 12 months after the first fracture<sup>(9,10)</sup>. Osteoporosis was the most important factor causing fractures in the elderly and in second fractures<sup>(10)</sup>, therefore, osteoporosis should be detected and treated during admission and treatment continue as an outpatient to prevent a second fracture of the other hip. The assessment of osteoporosis in our report achieved 74% according to the foreign patients from different countries had been transferred back to their own countries shortly after operation, as well as the un-coverage of the insurance policy.

This study was a very short term study lasting for only 1 year. It may require a longer period of time to ensure the results of our pathway. The results in our hospital may be satisfactory as a result of the characteristics of a private hospital with a low volume of patients, because most doctors and the operating room were always available for the patients. We were also concerned about, and took assessment of, the patient's cognitive status which was added as a regular record after the pathway was implemented. We did

not report the type of operation for individual patients. However, the fixation devices or the prosthesis should be selected under supervision of senior Ortho-trauma surgeons.

## Conclusion

From the early clinical data after the Geriatric Hip Fracture pathway implementation, we may conclude that the overall early results were satisfactory in our situation as a private hospital. However, we should analyze all data to improve the pathway with some modifications in the future.

## Acknowledgements

The authors would like to thank the multidisciplinary personnel for their tireless contribution in the geriatric hip fracture pathway process. Thanks to the doctors and nurses for working long days and nights in emergency rooms, all specialists and geriatricians for taking care of the elderly patients, and orthopedic surgeons, anesthesiologists, as well as all operative room personnel for assisting the operations towards success. Also, the authors would like to thank all the nurses and physiotherapists for helping in physical rejuvenation. In addition, thanks to the nutritionists and pharmacists in their helpful guidance on healthy foods and appropriate medication. Lastly, the authors would very much like to thank the nurse coordinator for efficiently managing all the cases, which finally lead to successful treatment.

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## แนวปฏิบัติในการดูแลผู้ป่วยสูงอายุที่กระดูกสะโพกหักในโรงพยาบาลเอกชน: รายงานผลเบื้องต้น

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โรงพยาบาลกรุงเทพ ได้นำแนวทางการดูแลผู้ป่วยสูงอายุที่มีกระดูกสะโพกหักที่เข้ารับรักษาในโรงพยาบาลมาใช้และมีการเก็บข้อมูลเพื่อประเมินผล ประกอบด้วยวิธีการปฏิบัติที่เป็นระเบียบแบบแผน การประสานงานร่วมกันของแพทย์ผู้เชี่ยวชาญในสาขาต่างๆ และมีแผนการติดตามการรักษาต่อเนื่อง ตั้งแต่ วันที่ 1 กรกฎาคม พ.ศ. 2556 ถึงวันที่ 31 กรกฎาคม พ.ศ. 2557 มีผู้ป่วยที่มีอายุตั้งแต่ 60 ปี ที่ได้รับการวินิจฉัยว่ากระดูกสะโพกหักและรับรักษาตัวไว้ในโรงพยาบาลจำนวน 57 ราย มีอายุเฉลี่ย 77 ปี เพศชาย 13 คน (ร้อยละ 23) และเพศหญิง 44 คน (ร้อยละ 77) เป็นกระดูกหักบริเวณส่วนคอ 27 ราย (ร้อยละ 47.5) กระดูกหักบริเวณฐานระหว่างโหนกกระดูก 27 ราย (ร้อยละ 47.5) และกระดูกหักบริเวณใต้ฐานระหว่างโหนกกระดูก 3 ราย (ร้อยละ 5) ได้รับการผ่าตัดด้วยการเปลี่ยนข้อสะโพกทั้งข้อ 2 ราย ผ่าตัดเปลี่ยนข้อสะโพกบางส่วน 23 ราย และการผ่าตัดใส่โลหะยึดตรึงไว้ภายใน 32 ราย

ตัวชี้วัดด้านคุณภาพ ได้ใช้รายงานประจำปีเกี่ยวกับข้อมูลของกระดูกสะโพกหักของประเทศอังกฤษ ซึ่งเป็นรายงานสถิติแห่งชาติประจำปี พ.ศ. 2556 เป็นตัวเปรียบเทียบ ได้แก่ การที่ผู้ป่วยได้รับการผ่าตัดในวันที่รับเข้าไว้เป็นผู้ป่วยในหรือไม่เกินวันถัดไป (ภายใน 36 ชั่วโมง) ได้ร้อยละ 82 การป้องกันการเกิดหลอดเลือดดำอุดตัน ได้ร้อยละ 100 การได้รับการตรวจร่างกายก่อนการผ่าตัด จากแพทย์อายุรกรรม หรือ แพทย์เฉพาะทางผู้สูงวัย ได้ร้อยละ 100 การไม่เกิดแผลกดทับ ได้ร้อยละ 100 การได้รับการประเมินความเสี่ยงต่อการลื่นตกหกล้ม ได้ร้อยละ 85 การได้รับแคลเซียมและวิตามินดี เป็นยากลับบ้าน ได้ร้อยละ 100 ตลอดจนกระทั่งการได้รับการรักษาโรคกระดูกพรุนและ/หรือการประเมินภาวะกระดูกพรุน จากแพทย์ผู้เชี่ยวชาญโรคกระดูกพรุนภายใน 30 วัน ได้ร้อยละ 74 อัตราการติดเชื้อร้อยละ 0 อัตราตายและอัตราการกลับมาเข้าโรงพยาบาลใหม่ภายใน 28 วันร้อยละ 0 และจำนวนวันที่อยู่โรงพยาบาลค่ามัธยฐาน 10.5 วัน ซึ่งผู้ป่วยได้รับการดูแลตามมาตรฐานต่างๆครบร้อยละ 100 และจากผลการดำเนินงานมา 1 ปี มีผลเปรียบเทียบเป็นที่น่าพอใจ แม้ว่าจะได้เริ่มใช้แนวทางนี้มาระยะสั้น แต่ก็สามารถสรุปได้ว่า มีแนวโน้มในทางที่ดีที่จะเกิดประโยชน์กับผู้ป่วยและจะต้องปรับปรุงให้ได้ประสิทธิภาพที่ดียิ่งขึ้นต่อไป