The Impacts of Early Hip Surgery in High-Risk Elderly Taking Antithrombotic Agents and Afflicted with Intertrochanteric Fracture

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Objective: *To compare the outcome of early hip surgery in intertrochanteric fracture between high surgical risk patients receiving antiplatelet and anticoagulant drugs and those who did not.*
Design: *Retrospective study.*
Material and Method: *One hundred and four elderly patients with intertrochanteric fracture and having American Society of Anesthesiologist grade III-IV, who underwent early hip surgery (within 72 hours after admission) with proximal femoral nail anti-rotation (PFNA), were recruited and allocated into two group: antiplatelet and anticoagulant (AA-AC) group (n = 65), and no drug group (n = 39). Perioperative and postoperative outcomes were recorded and analyzed.*
Results: *The mean age was 81±8 years. The overall 1-year mortality was 6.7% (7 patients: 5 AA-AC group, and 2 no drug group, p = 0.7). Intra-operative blood loss in AA-AC group and No drug group were 87±70 and 91±65 ml, respectively (p = 0.74). There was no significant difference in blood transfusion, postoperative complications, and 1-year ambulatory status between both groups (p>0.05 all). However, AA-AC group showed significant longer in duration of hospital stay compared with no drug group (p = 0.02).*
Conclusion: *Early hip fracture surgery with PFNA in patients who received antiplatelet and anticoagulant medications is safe and does not significantly increase perioperative blood loss, blood transfusion, and postoperative mortality and morbidity.*

Keywords: *Trochanteric fracture, Antithrombolic agent, Proximal femoral nail antirotation (PFNA)*

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Osteoporotic intertrochanteric fractures in elderly are difficult to manage and are associated with high rates of mortality and morbidity[1,2]. It is because these patients are mostly frail and afflicted with multiple co-morbidities leading to poor functional recovery and subsequent complications; most of the surgical treatment options result in significant blood loss requiring blood transfusion, especially in patients who received thrombotic agents[3]. Recently several studies have shown that early surgical intervention within 48 hours had significantly lower mortality, morbidity, and shorter lengths of stay[4,5]. Moreover, many newly surgical techniques and surgical instruments, such as minimally invasive osteosynthesis and proximal femoral nail, were successfully developed and have proven to produce significantly better outcomes with less blood loss compared to traditional procedure, such as dynamic hip screw fixation. Regarding the risk of significant bleeding in geriatric patients receiving antiplatelet or anticoagulant drugs, there still was no definitive consensus on treatment guidelines for these specific patients in several aspects including timing of surgery, drug discontinuation, and surgical option[6-8]. Therefore, this study aimed to evaluate the postoperative outcome of high surgical risk geriatric patients who sustained intertrochanteric fracture and underwent early surgical intervention with proximal femoral nail fixation, followed by comparison of those who received antiplatelet or anticoagulant therapy to those who did not.

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Material and Method

This was a single-centered, retrospective

study and prior approval was obtained from our Institutional Board Review. Eligible patients were those having been newly diagnosed with intertrochanteric fracture and had undergone fracture repair with PFNA within 72 hours after admission to our hospital from June 2012 to January 2014. The inclusion criteria were 1) age over 60 years, 2) having low-energy trauma, and 3) classified as high surgical risk defined as having American Society of Anesthesiologist (ASA) status grade III or IV. The exclusion criteria were 1) other pathological fracture such as metastatic fracture, and 2) having previous fracture on the injured hip.

Surgical intervention

After diagnosis as intertrochanteric fracture, the patients were then admitted to orthopedic trauma ward within 2 hours. Pre-operative medical consultation, surgical planning, and postoperative care were applied following early hip surgery protocol in our hospital[9]. All operations, as closed reduction with PFNA using minimally invasive technique, were performed by orthopedic trauma surgeons (NK, PS, and NS). Blood transfusion was considered when hematocrit was less than 28% or the patients had anemic symptoms. The patients were encouraged to start ambulation as soon as possible post operation. The initial rehabilitation goal was partial-weight bearing ambulation on injured hip with gait aids, and then progressed to full-weight bearing ambulation with gait aids within 8 weeks postoperatively.

Data collection

Demographic data such as age, gender, comorbid diseases and concomitant medication, American Society of Anesthesiologist (ASA) physical status, functional status[10], and pre-operative ambulatory level were recorded. Comorbid disease data were then calculated on the Charlson co-morbidity index. Regards the patients' ongoing antiplatelet and anticoagulant medications, they were allocated into two groups; Antiplatelet and anticoagulant (AA-AC) group, and no drug group.

Perioperative data, such as, duration time from admission to surgery, pre-operative and postoperative hematocrit (Hct), operative time, intra-operative blood loss, blood transfusion, and length of hospital stay, were recorded. Postoperative data, such as fracture healing time, death and its cause, complications related to hip fracture, and postoperative ambulatory level at 1-year period were followed by first author (NK), by medical records or telephone interview.

Statistical analysis

Stata software version 11.0 (Stata Corp, College Station, Texas, USA) was employed to analyze the data. Unpaired t-test was used for continuous data, and Chi-square test or Fisher exact test were used for categorical data. Significant difference was considered if *p*-value <0.05.

Results

One hundred and four patients were enrolled in this study. General characteristic data were shown in Table 1. Seventy-three patients (70%) are female and 31 (30%) are male. The average age was 81$\pm$8 years (range 60-95 year). In terms of ASA type classification, Seventy-three patients are ASA type III and 31 patients are ASA type IV. The average waiting time from admission to surgery was 29 hours (range 2-72 hours, standard deviation = 18 hours). All fractures healed and the overall 1-year mortality was 6.7% (7 patients). Sixty-five patients, who received antiplatelet and anticoagulant drugs (49 aspirin, 12 clopidogrel and 4 warfarin), were allocated to AA-AC group. Thirty-one patients, who took none of these drugs, were allocated as No drug group. There was no significant difference in age, gender, ASA physical status, functional status, and preoperative ambulatory status between both groups (p>0.05 all). However, AA-AC group showed a significantly greater in Charlson co-morbidity index than the No drug group (6.2$\pm$1.8 versus 5.5$\pm$1.5, p = 0.04).

Perioperative data were shown in Table 2. There was no significant difference in time from admission to surgery, pre-operative Hct, operative time, intra-operative blood loss, blood transfusion requirement, and Hct on the fourth postoperative day between both groups (p<0.05 all). The overall length of hospital stay and duration of hospital stay after operation in AA-AC group were significantly longer than those in No drug group (9$\pm$8 versus 6$\pm$2 days and 7$\pm$8 versus 4$\pm$2 days, p = 0.02 both).

Postoperative outcomes were shown in Table 3. The 1-year mortality rate was a non-significant difference between groups; 7.7% (5 patients) in AA-AC group versus 5.1% (2 patients) in No drug group (p = 0.70). Two patients died during hospital admission (One patient in AA-AC group from cardiac arrest, and 1 patient in No drug group from septicemia). Five patients (four patients in AA-AC group, and 1 patient in No drug group) died, after hospital discharge, within 3 months after hip fracture. The average time to fracture union and 1-year postoperative ambulatory status were not significantly different in either group (p>0.05).

Table 1. General characteristics of study population

General characteristics	AA-AC group (n = 65)	No drug group (n = 39	*p*-value
Age, year[a]	80±8	82±7	0.33
Female gender[b]	46 (71)	27 (69)	0.77
ASA classification[b]			
III	42 (65)	31 (79)	0.13
IV	23 (35)	8 (21)	
Functional status[b]			
I	12 (18)	6 (15)	0.82
II	41 (63)	27 (69)	
III	12 (18)	6 (15)	
Charlson comorbidity index[a]	6.2±1.8	5.5±1.5	0.04*
Preoperative ambulatory status[b]			
I	27 (42)	24 (62)	0.20
II	30 (46)	13 (33)	
III	6 (9)	2 (5)	
IV	2 (3)	0 (0)	

[a] = value presented as mean ± standard deviation; [b] = value presented as No. of patients having that condition (percentage); ASA = American society of Anesthesiologist

* Significant difference between AA-AC and no drug group with *p*-value <0.05

Table 2. Perioperative data

	AA-AC group (n = 65)	No drug group (n = 39)	*p*-value
Duration before surgery, hours[a]	24 (2-72)	24 (2-72)	0.39
Preoperative Hct, %[b]	33.1±4.7	31.7±5.2	0.18
Operative time, minute[b]	57±20	62±24	0.28
Intraoperative blood loss, ml[b]	87±70	91±65	0.74
Blood transfusion, unit[a]	1 (0-6)	1 (0-3)	0.93
Postoperative Hct on day 4, %[b]	31.8 (3.1)	32.5 (4.0)	0.32
LOS after hip surgery, day[a]	5 (2-53)	4 (2-13)	0.02*
LOS total, day[a]	9 (3-55)	6 (2-14)	0.02*

[a] = value presented as median (range); [b] = value presented as mean ± standard deviation; Hct = hematocrit; LOS = length of stay

Postoperative complications were not significantly different between either group ($p = 0.40$). However, AA-AC group showed non-significant greater cardiac and gastrointestinal complications compared with No drug group (5 versus 1, and 4 versus 0).

Discussion

Intertrochanteric fracture is the most common hip fracture and accounts for half of hip fractures in the elderly[11]. Most of these geriatric patients possess high risk for surgery, due to their comorbid diseases and for some of those of high risk of excessive surgical bleeding due to concomitant antiplatelet and anticoagulant medications. Although early surgical intervention has demonstrated significant reduction in mortality and morbidity, this management may result in increased blood loss and perioperative bleeding complication in these high-risk geriatric patients[3,12]. Therefore, the aim of this study was to compare the postoperative outcome after early fracture fixation with PFNA between the elderly patients with ASA physical status grade III or IV and receiving antiplatelet or anticoagulant medications and those who did not received these drugs.

Our results in this study showed 1-year mortality was only 6.7% (7 patients) and there was no

Table 3. Postoperative outcomes

	AA-AC group (n = 65)	No drug group (n = 39)	*p*-value
Time to union, week[a]	12.3±1.5	12.2±1.9	0.92
1-year mortality[b]	5 (7.69)	2 (5.12)	0.70
Myocardial infarction	2	1	
Sepsis	2	1	
Respiratory failure	1	0	
Complications[b]			
Overall complication	28 (45)	14 (36)	0.40
Implant-related	1	1	
Thromboembollism	0	1	
Infection	5	5	
Pressure sore	1	0	
Electrolyte imbalance	3	0	
Cardiac	6	1	
Pulmonary	2	1	
Renal	1	1	
Gastrointestinal	4	0	
Delirium	5	4	
1-year postoperative ambulatory status[b]	(n = 50)	(n = 37)	
I	13 (26.0)	10 (27.0)	0.22
II	24 (48.0)	21 (56.8)	
III	15 (30.0)	4 (10.8)	
IV	6 (12.0)	1 (2.7)	
V	2 (4.0)	1 (2.7)	

[a] = value presented as mean ± standard deviation; [b] = value presented as No. of patients having that condition (percentage)

significant difference in 1-year between the groups (Table 3). All of the patients died within the first 120 days after surgery. This could have resulted from the poor physiological status, as shown in having multiple comorbid diseases and the high value in mean CCI in our study[13]. We also found that there was no significant difference in postoperative complications and postoperative ambulatory status at 1-year period (Table 3). This could be explained by the effect of early surgical intervention to allow early functional recovery in these high-risk patients.

The intra-operative blood loss and blood transfusion rate also were not significantly different between both groups (Table 2). These findings were consistent with previous studies[14,15] and this could be explained by the effect of minimally invasive surgery that prevents unnecessary intra-operative blood loss. However, we found that AA-AC group showed a non-significant increase in gastrointestinal bleeding complications compared to No drug group. However, AA-AC group demonstrated a significantly longer duration of admission after surgery and overall length of hospital stay compared with No drug group (Table 2). This would result from a significantly higher CCI , which required closed monitoring during hospitalization and the need for a multidisciplinary team approach.

The conclusion is that early hip fracture surgery with PFNA in patients who received antiplatelet and anticoagulant medication is considered safe and does not significantly increase perioperative blood loss, blood transfusion, and postoperative mortality and morbidity.

Potential conflicts of interest

None.

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การผ่าตัดกระดูกสะโพกหักแบบเร็วในผู้ป่วยสูงอายุที่มีความเสี่ยงสูงร่วมกับภาวะ intertrochanteric fracture และได้รับยาละลายลิ่มเลือดและยากันเลือดแข็งตัว

นรเทพ กุลโชติ, ปพน สง่าสูงส่ง, นรชาติ ศิริศรีตรีรักษ์, ศิวดล วงค์ศักดิ์, ชาญยุทธ ศุภชาติวงศ์, วิวัฒน์ วจนะวิศิษฐ, วิโรจน์ กวินวงศ์โกวิท

วัตถุประสงค์: *เพื่อเปรียบเทียบผลการรักษาในการผ่าตัดกระดูกสะโพกหักแบบเร็วระหว่างผู้ป่วยสูงอายุ ที่มีความเสี่ยงสูงในการผ่าตัดร่วมกับภาวะ intertrochanteric fracture ที่ได้รับยาละลายลิ่มเลือดและยากันเลือดแข็งตัวกับผู้ป่วยที่ไม่ได้รับยา*

วัสดุและวิธีการ: *การศึกษาเปรียบเทียบโดยการเก็บข้อมูลย้อนหลังในผู้ป่วย 104 รายที่มี American Society of Anesthesiologists ระดับ 3 หรือ 4 ที่เข้ารับการผ่าตัดกระดูกสะโพกแบบเร็วด้วย proximal femoral nail antirotation (PFNA) โดยแบ่งผู้ป่วยเป็น 2 กลุ่มคือ กลุ่ม AA-AC (65 ราย) และกลุ่ม No drug (39 ราย) ผลการรักษาระหว่างและหลังผ่าตัดถูกบันทึกและนำมาวิเคราะห์*

ผลการศึกษา: *อายุเฉลี่ยของผู้ป่วยเท่ากับ 81±8 ปี อัตราการเสียชีวิตที่ 1 ปีเท่ากับร้อยละ 6.7 (7 ราย: 5 รายในกลุ่ม AA-AC และ 2 รายในกลุ่ม No drug) ปริมาณการเสียเลือดเฉลี่ยระหว่างการผ่าตัดในกลุ่ม AA-AC และกลุ่ม No drug เท่ากับ 87±70 และ 91±65 มิลลิลิตร ตามลำดับ (p = 0.74) ไม่พบความแตกต่างอย่างมีนัยสำคัญทางสถิติในปริมาณการใช้เลือด ภาวะแทรกซ้อนหลังผ่าตัด และสมรรถภาพการเคลื่อนไหวที่ 1 ปีหลังผ่าตัด (p>0.05 ทั้งหมด) อย่างไรก็ตามกลุ่ม AA-AC มีระยะเวลานอนโรงพยาบาลมากกว่ากลุ่ม No drug อย่างมีนัยสำคัญทางสถิติ (p = 0.02)*

สรุป: *การผ่าตัดสะโพกแบบเร็วด้วย PFNA ในผู้ป่วยที่ได้รับยาละลายลิ่มเลือดและยากันเลือดแข็งตัวนั้นมีความปลอดภัย และไม่มีความแตกต่างในด้านปริมาณการเสียเลือด, การให้เลือดทดแทน, อัตราการเสียชีวิต, และการเกิดภาวะแทรกซ้อนอย่างมีนัยสำคัญ*