Incidence of Deep Vein Thrombosis in Postoperative Hip Fracture Patients in Phramongkutklao Hospital

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Background: *There are many reports about deep vein thrombosis from Western regions but few reports are from Asian countries especially Thailand.*
Objectives: *The purpose of the present study was to reveal the incidence of deep vein thrombosis in postoperative hip fracture patients.*
Material and Method: *Ninety six patients who had intertrochanteric fracture or femoral neck fracture were included. They had fixation or hemiarthroplasty performed according to their indications. Bilateral Venography was performed on the sixth to tenth day after surgery.*
Results: *The positive venography result was 47.9%. Only nine patients with positive results had signs and symptoms of deep veins thrombosis. Distal DVT was found in 43.5% of the positive group. Proximal DVT was 56.5%. No patients had symptoms of pulmonary embolism.*
Conclusion: *The incidence of deep vein thrombosis in Thailand is the same as in Western countries. The prophylaxis regimen may become a part of the line of management in elderly patients with hip fracture. Further studies about the natural history or complications of deep vein thrombosis should be of concern.*

Keywords: *Hip fracture, Elderly, Asia, Deep vein thrombosis, Venography*

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Venous thromboembolism (VTE) is one of the most common complications in orthopedic surgery. Deep vein thrombosis (DVT) can occur in up to 50% of patients undergoing surgical treatment for hip fracture[1]. This can potentially increase the risk of pulmonary embolism (PE) since DVT is usually present in more than 90% of PE cases[2]. Among surgical patients, patients with hip fracture are at the highest risk of venous thrombosis[3]. The important contributing factors to the development of venous thrombosis include venous stasis, hypercoagulability and injury to the venous endothelium[1,2,4]. For orthopedic patients, venous stasis is usually a result of prolonged immobilization. The immobilization period may range from the time of trauma to pre-operative preparation and limitation of movement or movement range after surgery. Endothelial injury to deep veins may be caused directly from trauma itself or from surgical procedure. Studies revealed that venous function was significantly reduced after surgical procedure involving proximal femur which correlated with the occurrence of deep vein thrombosis[5]. In addition, this reduced function may result from hematoma formation, thermal injury or during cement polymerization in hip replacement surgery. Other factors such as aging, obesity and comorbidities such as heart failure, varicose vein, and hypercoagulable state may be present and contribute to the occurrence of venous thrombosis in this population.

In 1989, Haake and Berkman reported that VTE and fatal pulmonary embolism occurred in 39-74% when the patients did not get prophylaxis and 3.6-12.9% of patients with hip fracture with prophylaxis[1]. In an earlier study by Salzman and Harris, DVT was found in 34-83% of patients with hip fracture[6]. Among these patients, two thirds of the patients were asymptomatic and went undiagnosed. On the contrary, only 50% of patients who had symptoms consistent with DVT were proved to have DVT[7]. Fatalities were

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usually a result of misdiagnosis or lack of prophylaxis[4].

From 2001 to 2002, there were 8 fatality cases among patients with hip fracture at Phramongkutklao Hospital. Autopsies were performed in 4 cases. PE was the cause of death in 1 case while myocardial infarction were the cause of death in the other cases. Therefore, the authors believed that the development of DVT leading to fatal PE may be an important complication in this population. As a result, the authors aimed to assess the incidence of deep vein thrombosis in patients with hip fracture. The availability of this information may enable us to justify the use of DVT prophylaxis in this patient population.

Material and Method

Ninety six patients with femoral neck fracture and intertrochanteric fracture receiving surgical treatment (either hemiarthroplasty or any types of fixation) at Phramongkutklao Hospital from June 2002 to May 2003 gave their consents to participate in the present study. The study protocol was approved by the Institutional Review Board, Royal Thai Army Medical Department.

Inclusion criteria included age $\geq$ 60 years old, without a history of dye allergy, no prior history of DVT, never received anticoagulant therapy and having serum creatinine of no more than 180 mmol/L. Patients who met the inclusion criteria and gave their informed consent were enrolled. Sequential bilateral venography was performed from post-operation day 6 to 10 since this was generally the time when thrombus occurred[8]. All the patients received hydration with 5% D/NSS/2 at the rate of 1 ml/kg/hr for 12 hours prior to and after venography to prevent contrast media-induced renal failure[9]. Non-ionic, low osmolality contrast media was used in all patients to reduce the risk of renal complications[10-12]. The results of venography were evaluated by two vascular radiologists.

Diagnostic criteria for venography used in the present study were as follow[13].

1. Constant filling defect showing thrombus attached to vein either in the central or eccentric location.

2. Abrupt termination of the dye column which is characterized by obstruction of contrast media by thrombus.

3. Non-filling of the entire deep venous system or portion, thereof when the proper technique is used.

4. Diversion of flow which occurs when contrast media flows into the collateral branch as a result of deep vein occlusion.

Descriptive analysis was used to describe the incidence of DVT. The incidence of DVT was presented by means of percentage.

Results

Of 96 patients, there were 15 (15.6%) males and 81 (84.4%) females with the average age of 75.8 years old (range 60-92). Fifty two patients were diagnosed as femoral neck fracture and 44 patients were diagnosed as intertrochanteric fracture, respectively. (Table 1) DVT was found in 46 patients (47.9%). These included 20 distal (43.5%), 20 (43.5%) proximal and 6 (6.2%) bilateral DVT. The incidence of combined proximal and bilateral DVT were therefore 56.5%. Of 46 patients with DVT, only 9 (19.5%) patients had signs or symptoms suggestive of DVT.

Table 1. Baseline demographic of study population

	Type of Fractures		Total
	Femoral Neck Fracture	Intertrochanteric Fracture	
Age mean (range)	73 (61-91)	78 (60-92)	
Sex			
Male	3	12	15
Female	48	33	81
Type of surgery			
Hemiarthroplasty	50	2	52
Fixation	1	43	44

Table 2. Location of DVT by types of fracture

Location of DVT	Femoral Neck Fracture	Intertrochanteric Fracture	Total
No DVT	24	26	50
Positive DVT	27	19	46
Calf veins	15	5	20
Popliteal vein	1	4	5
Popliteal and calf veins	2	2	4
Femoral vein	2	2	4
Femoral and calf veins	1	2	3
Femoral, popliteal and calf veins	2	2	4
Bilateral DVT	4	2	6
Total	51	45	96

None of the patients experienced fatal pulmonary embolism. No serious complications from venography (i.e., acute renal failure) were found. Flushing at the injection site was the only adverse reactions experienced by only a limited number of patients.

Discussion

The authors found that the incidence of DVT in the studied population was similar to those reported from Western populations. Haake and Berkman (1989) evaluated studies conducted from 1968 to 1980 and reported that the incidence of VTE (DVT and PE) after hip surgery ranged from 39 to 74% (mean of 50%; 281 of 567 patients). Forty five percent (226/497) and 29% (91/318) of DVTs occurred on the ipsilateral and contralateral legs, respectively. For PE, there was 11.2% of total PE while 7.5% were fatal[1].

Demer et al (1991) found that DVT occurred in 46 % (29/63) of patients undergoing surgery for hip fracture who received no DVT prophylaxis[14]. Montrey et al (1985) and Snook et al reported a DVT incidence of 25 (55/217) and 60 (15/25) %, respectively. These studies all employed venography as the standard diagnostic tool[15-16]. In addition, Sevitt and Gallagher (1959) conducted serial autopsies on 35 patients who died after hip fracture and found that DVT was present in 29 cases (83%)[17].

For an Asian population, there were only a few studies evaluating the incidence of DVT in hip fracture patients. Mok et al from Hong Kong (1979) reported a 53.1% and 14.3% incidence of DVT in the ipsilateral and contralateral legs, respectively[18]. Mitra et al from Singapore conducted a prospective study in 72 patients with fractures on the proximal femur and found that the incidence of DVT in their population was 9.7%[19]. Dhillon et al from Malaysia performed bilateral ascending venography in 88 patients with either fracture of the proximal femur or for total hip or knee replacement and reported a 50% incidence of DVT in patients with fractured femur[20]. As for studies conducted in a Thai population, only a few published reports are available. The first report was from Siriraj Hospital in 1976. This study was a serial autopsy from 1960 to 1969. Among approximately 7,500 cases, VTE were found in 200 cases which corresponded to an incidence of 2.6%[21]. In 1989, a result of autopsy accumulated over18 years at Ramathibodhi Hospital revealed the incidence of PE at 0.24% (12/4,896)[22]. There was only one published study specifically evaluating the incidence of DVT in patients with hip fracture or patients undergoing total hip replacement using venography as a diagnostic tool. This pilot study was conducted in 48 patients at Ramathibodhi Hospital which reported an incidence of DVT at 4% (2/48)[23]. However, small sample size was the major limitation of the study. In addition, since the two patients experiencing DVT had hip fractures, the incidence of DVT would actually be 6.9% if only patients with hip fracture were used as the denominator.

The authors found that the incidence of DVT is much higher than previously reported and similar to the incidence found in Western populations.The authors found 47.9% of deep vein thrombosis in postoperative hip fracture patients and nearly half as proximal deep vein thrombosis. This may be a result of the high sensitivity of venography in detecting the presence of DVT. Venography is currently considered the gold standard diagnostic tool for this indication and is commonly used in this area of research. In addition, the authors also found a significant number of DVT on the contralateral leg. Several factors may

contribute to the differences of DVT incidence in the present study compared to previous reports. Although DVT may develop without clinical symptoms, thrombus originating from DVT may lodge into the circulation and lead to fatal PE or cause significant damage to the venous valve leading to post-thrombotic syndrome. Preventive measures aiming to reduce VTE complications in orthopedic surgery is a common practice in the Western countries, however it is highly controversial in Thailand. The authors do recommend giving thromboprophylaxis to all elderly with hip fracture.

References

1. Haake DA, Berkman SA. Venous thromboembolic disease after hip surgery: Risk factors, prophylaxis, and diagnosis. Clin Orthop Relat Res 1989; 242: 212-31.
2. Pelvesky HI, Kelley MA. Fishman AP. Pulmonary thromboembolic disease, Fishman s Pulmonary Diseases and Disorders, 3rd ed. New York: McGraw-Hill, 1998: 1327-9.
3. Bass JW. Prevention of venous thrombosis and pulmonary embolism. NIH Consensus Development. JAMA 1986; 256: 744-9.
4. Fedullo PF. Pulmonary Thromboembolism. In: Murray JF, Nadel JA, Mason RJ, Boushey HA Jr, editors. Taxtbook of Respiratory Medicine. 3rd ed. PA: W B Saunders, 2002: 1503-31.
5. Wilson D, Cooke EA, McNally MA, Wilson HK, Yeates A, Mollan RA. Altered venous function and deep venous thrombosis following proximal femoral fracture. Injury 2002; 33: 33-9.
6. Salzman EW, Harris WH. Prevention of venous thromboembolism in orthopaedic patient. J Bone Joint Surg Am 1976; 58: 903-3.
7. Weinmann EE, Salzman EW. Deep-vein thrombosis. New Engl J Med 1994; 331: 1630-41.
8. Sikorski JM. Hampson WG, Staddon GE. The natural history and aetiology of deep vein thrombosis after total hip replacement. J Bone Joint Surg Br 1981; 63: 171-7.
9. Solomon R, Werner C, Mann D. Effects of saline, manitol and furosemide on acute decreases in renal function induced by radiocontrast agent. New Engl J Med 1994; 331: 1416-20.
10. Rudnick MR, Goldfarb S, Wexler L, Ludbrook PA, Murphy MJ, Halpern EF, et al. Nephrotoxicity of ionic and nonionic contrast media in 1196 patients: A randomized trial. Kidney Int 1995; 47: 254-61.
11. Barrett BJ, Parfrey PS, Vavasour HM . Contrast nephropathy in patients with impaired renal function: High versus low osmolar media. Kidney Int 1992; 41: 1274.
12. Lautin EM, Freeman NJ, Schoenfeld AH, Bakal CW, Haramati N, Friedman AC, et al. Radiocontrast-associated renal dysfunction: A comparison of lower - osmolality and conventional high - osmalality contrast media. Am J Roentgenol 1991; 157: 59-65.
13. Rabinov K, Paulin S. Roentgen diagnosis of venous thrombosis in the leg. Arch Surg 1972; 104: 134-44.
14. Demers C, Ginsberg JS, Brill-Edwards P, Panju A, McGinnis J. Heparin and graduated compression stockings in patients undergoing factured hip surgery. J Orthop Trauma 1991; 5: 387-91.
15. Montrey JS, Kistner RL, Kong AY, Linberg RF, Mayfield GW, Jones DA, et al. Thromboembolism following hip fracture. J Trauma 1985; 25: 534-7.
16. Snook GA, Chrisman OD, Wilson TC. Thromboembolism after surgical treatment of hip fractures. Clin Orthop Relat Res 1981; 155: 21-4.
17. Sevitt S, Gallagher NG. Prevention of venous thrombosis and pulmonary embolism in injured patients: Trial of anticoagulant prophylaxis with phenindione in middle- aged and elderly patients with fractured neck of femur. Lancet 1959; 2: 981-9.
18. Mok CK, Hoaglund FT, Rogoff SM, Chow SP, Ma A, Yau AC. The incidence of deep vein thrombosis in Hong Kong Chinese after hip surgery for fracture of the proximal femur. Br J Surg 1979; 66: 640-2.
19. Mitra AK, Khoo TK, Ngan CC. Deep-vein thrombosis following hip surgery for fracture of the proximal femur. Singapore Med J 1989; 30: 503-34.
20. Dhillon KS, Askander A, Doraismay S. Postoperative deep vein thrombosis in Asian patients is not a rarity: a prospective study of 88 patients with no prophylaxis. J Bone Joint Surg Br 1996; 78: 427-30.
21. Talalak P. Thromboembolism in Thailand: Incidence, coagulogram and its significance in therapeutic implication and prognosis. J Med Assoc Thai 1976; 59: 6-11.
22. Vathesatogkit P, Saenghirunvattana S, Nitiyanant P.Autopsy proven cases of pulmonary Thromboembolism: 18 year study at Ramathibodi Hospital. J Med Assoc Thai 1986; 72: 271-4.
23. Atichartakarn V, Pathepchotiwong K, Keorochana S, Eurvilaichit C. Deep vein thrombosis after hip surgery among Thai. Arch Intern Med 1988; 148: 1349-53.

อุบัติการณ์การเกิดลิ่มเลือดในหลอดเลือดดำส่วนลึกของขาในผู้ป่วยกระดูกข้อสะโพกหักและได้รับการผ่าตัดในโรงพยาบาลพระมงกุฎเกล้า

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ที่มา: *มีรายงานการศึกษามากมายที่เกี่ยวข้องกับ deep vein thrombosis (DVT) จากกลุ่มประเทศตะวันตก แต่มีการศึกษาเพียง 2 - 3 รายงาน ในประเทศแถบเอเชีย โดยเฉพาะในประเทศไทย*

วัตถุประสงค์: *เป็นการศึกษาเพื่อทราบอุบัติการณ์ของ deep vein thrombosis ในผู้ป่วยสูงอายุที่มีสะโพกหัก และได้รับการผ่าตัดในโรงพยาบาลพระมงกุฎเกล้า*

วัสดุและวิธีการ: *ผู้ป่วยจำนวน 95 คน ที่เข้าร่วมงานวิจัยมีทั้ง Intertrochanteric และ femoral neck Fracture ได้รับการผ่าตัด ด้วยการจัดกระดูกให้เข้าที่ หรือเปลี่ยนข้อสะโพกตามข้อบ่งชี้ทางการแพทย์ Bilateral Venography จะทำหลังการผ่าตัด 6 - 10 วัน ผลบวกจาก venography พบ 47.9 % มีเพียงผู้ป่วย 9 คน ที่มีผลบวก มีอาการและอาการแสดงของ deep vein thrombosis. Distal DVT พบ 43.5 % ในกลุ่มที่มีผลบวกใน Venography Proximal DVT พบ 56.5 % ไม่มีผู้ป่วยที่มีปัญหา pulmonary embolism และภาวะแทรกซ้อนจากการทำ venography*

ผลการศึกษา: *อุบัติการณ์ของ DVT ในประเทศไทยคล้ายกับในกลุ่มประเทศตะวันตก มาตรการการป้องกันเป็นส่วนหนึ่งในการดูแลผู้ป่วยสูงอายุที่มีกระดูกสะโพกหัก*

สรุป: *การศึกษาต่อไปควรศึกษาถึงธรรมชาติการเกิดโรคและภาวะแทรกซ้อนของ DVT*