

Prevention of venous thromboembolism in major lower limb orthopaedic surgery using aspirin: A retrospective cohort study

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Abstract

We did a retrospective cohort study using prospectively collected data of consecutive 993 patients undergoing major orthopaedic lower limb surgery including all hip and knee primary and revision arthroplasties, acetabulum and pelvic fracture fixations, hip fracture surgeries including neck femur and intertrochanteric fractures, interlocking nailing femur and tibia and external fixations femur and tibia from April 2008 to March 2016 at our institution. All cases excluding cancer and previous VTE or patients already on any kind of antithrombotic prophylaxis were started on aspirin 75 mg (low dose) on 3rd postoperative day. An early ambulation, ≤ 3 postoperative day protocol was followed. We preoperatively assessed the risks of pulmonary embolism and bleeding complications in all patients using medical history and laboratory results. Then all patients were stratified into 2 groups, based on the thorough preoperative risks assessments: 1) standard risks for both PE and bleeding, 2) increased risk for PE and standard risk for bleeding. Risk assessment criteria were based on the 1st AAOS guideline and National Institute for Health and Clinical Excellence (NICE) guideline issued in 2007. Also a preoperative Well's score was calculated for all the enrolled patients and a measurement of calf circumference was taken ten centimetres from the tibial tuberosity of both the limbs on admission and at every two days postoperative till the patient was discharge from hospital. Duration of treatment with aspirin (75mg) was three months with continued active physiotherapy. All patients with morbid obesity were treated with LMW heparin and were excluded from the study. Outcome evaluation: All patients were evaluated until 3 months after surgery, concerning the efficacy of the treatment i.e. overall incidence of symptomatic DVT or PE. All patients were routinely required to visit outpatient clinic at 2 weeks, 6 weeks and 3 months after surgery, and educated to visit emergency unit if any suspicious symptoms of PE developed. If a patient has symptoms which can make suspicion of DVT or PE, or a difference in calf circumference > 3 cm from opposite limb in case of unilateral surgery and from preoperative calf circumference from same limb in case of bilateral limb surgeries, a venous Doppler ultrasonographic examination and D-dimer levels were checked. Suspicious symptoms or signs of DVT are pain, edema, warmth or erythema of the leg or thigh and Homan's sign, and those of PE are chest pain or discomfort and dyspnea.

Key Words: Thromboembolism.

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INTRODUCTION

Pulmonary embolism is a life threatening event after major orthopaedic hip and knee surgeries such as THA, osteotomy, TKA and trauma surgeries. Most pulmonary embolism are thought to develop from deep venous thrombosis (DVT)¹ and continues to be a challenge in orthopaedic surgery. The risk of venous thromboembolism following major orthopaedics procedure, such as joint arthroplasty and fracture surgery, are well recognised.² Routine thromboprophylaxis has been a routine for VTE prevention since past 15 years.³

The incidence of venographic deep venous thrombosis through randomised clinical trials when no prophylaxis is administered is 42–57 % with total hip arthroplasty and 41–85 % with total knee arthroplasty. Fatal PE occurs in 0.1–2 % of patients after hip THA and in 0.1–1.7 % of the patients with TKA³. Asymptomatic DVT is common and, in the absence of prophylaxis, affects at least half of all patients. Most of these thrombi are clinically silent, and resolve spontaneously without any long-term sequelae.⁴ Though a preventable cause of postoperative morbidity and fatality, there is still no consensus on the best therapy for its prevention. Because of its antiplatelet activity aspirin was introduced as a possible thromboprophylaxis in 1968⁵. The 2012 edition of the American College of Chest Physicians recommendations on antithrombotic treatment includes aspirin as one of the possible medications for prophylaxis⁶. It requires no monitoring and is generally well tolerated⁷. But a few studies reported higher incidence of bleeding complications with aspirin⁸. A study investigating the efficacy of aspirin vs placebo in prevention of pulmonary embolism found significant reduction in incidence of venous thromboembolic complications in patients undergoing major hip fracture surgery ($n = 13,356$) and total hip arthroplasty ($n = 4,088$). There is considerable literature in support of aspirin being not inferior to low molecular weight heparin in venous thromboembolism prevention; however, the current AAOS and ACCP guidelines do not advise its use in isolation without combined mechanical prophylaxis^{9,10,11}. Some authors suggest the use of aspirin in patients undergoing knee and hip arthroplasty in combination with other mechanical modalities, early mobilisation and pneumatic compression devices may reduce the risk of VTE, particularly in low preoperative risk assessment¹². The American Academy of Orthopaedic Surgeons (AAOS) recommends acetylsalicylic acid (aspirin) as a suitable thromboprophylactic agent¹³, but the United Kingdom's National Institute of Health and Care Excellence (NICE), and Nicolaides *et al* international consensus statement¹⁴ both do not recommend its use. A study by Jameson *et al* recommends a revision in NICE guidelines as it has relied mostly on historical data and industry sponsored trials¹⁵.

RESULTS

A total of 1115 patient's records, receiving aspirin for VTE prophylaxis post lower limb orthopaedic surgery were screened, out of which 22 were excluded because of incomplete data and a total of 993 patients were included in the study. 436 patients were included in group 1 (standard risk of VTE and bleeding) and 557 in Group 2 (increased risk of VTE and standard risk of bleeding). The mean age in group 1 was 56.04 years and 63.10 years

in group 2. The mean preoperative Well's score in group 1 and 2 was 3.4 and 4.2 respectively. Only 46 patients in group one and 52 in group 2, there was a difference of more than 3 cm in the calf circumference. Only one patient reported symptoms of symptomatic DVT in group 2 in the third post-operative week and none developed symptomatic DVT in group 1. All the patients with increased calf circumference were investigated for presence of DVT and came out to be negative. The overall incidence of DVT in our study was 0.01%. Three patients in group 2 (table 2) developed wound hematoma and were managed with hematoma drainage and serial dressings.

Table 1:

Variables	Group 1	Group 2	Total
Age	56.04 ± 7.04 SD	63.10 ± 6.85 SD	
BMI	26.12 ± 4.35 SD	27.64 ± 4.72 SD	
Surgery type			
Hip arthroplasties	62	186	248
Hip trauma	194	223	417
TKA B/L	68	54	122
TKA U/L	33	41	74
Trauma	79	53	132
Well's score	3.4 ± 2.2 SD	4.2 ± 2.5 SD	
Calf circumference difference > 3cm	46	52	98

Table 2:

Complications	Group 1	Group 2	Total
Symptomatic DVT	0	1	0
Symptomatic PE	0	0	0
Major Bleeding	0	0	0
Minor Bleeding	0	3	3

DISCUSSION

At our institute, we have been using aspirin for VTE prevention in patients undergoing major orthopaedics surgery of lower limbs. Various scientific bodies have produced guidelines for VTE prevention in orthopaedic patients, low molecule weight heparin and pneumatic compression devices are still the first line for VTE prevention. Aspirin has been proposed as a possible agent for DVT prophylaxis in the 2012 ACCP guidelines. In this relatively large study on major orthopaedic surgeries of lower limb only one clinically relevant VTE occurred and no deaths were recorded, also the bleeding complications associated with aspirin use were relatively absent with only three cases with wound hematoma formation. The study confirms that aspirin can be used as a safe and effective agent for VTE prophylaxis in orthopaedic patients. Also aspirin use is cost effective as compared to LMW heparin¹⁸ and pneumatic compression

devices. We believe that aspirin along with early mobilization reduces venous thromboembolic events and its benefits outweigh the adverse events. Though a large series, there are certain shortcomings as only symptomatic VTE were recorded and subclinical cases of DVT were not investigated, also there is a lack of a control group in our study which can be better addressed by a randomised control study. Although the risk of contracting DVT is higher in the first few weeks of surgery, our follow-up of three months is long enough to report its incidence.

CONCLUSION

The evidence in favour of aspirin as a VTE prophylaxis in major orthopaedic surgery is limited. But there are reasons to consider it as one of the chemoprophylaxis agent. Its effects may be enhanced by early mobilisation and physiotherapy. A well-structured RCT is needed to increase the body of evidence in favour of aspirin.

REFERENCES

- Lieberman JR, Geerts WH. Prevention of venous thromboembolism after total hip and knee arthroplasty. *J Bone Joint Surg Am.* 1994; 76:1239–1250.
- Markovic-Denic L, Zivkovic K, Lesic A et al (2012) Risk factors and distribution of symptomatic venous thromboembolism in total hip and knee replacements: prospective study. *Int Orthop* 36(6):1299–1305
- Geerts WH, Pineo GF, Heit JA, Bergqvist D, Lassen MR, et al. Prevention of venous thromboembolism: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. *Chest.* 2004 Sep; 126(3 Suppl):338S–400S.
- Ginsberg, JS, Gent, M, Turkstra, F et al. Postthrombotic syndrome after hip or knee arthroplasty: a cross-sectional study. *Arch Intern Med.* 2000; 160:669–72.
- O'Brien JR (1968) Effects of salicylates on human platelets. *Lancet* 2:779–783.
- Guyatt GH, Akl EA, Crowther M, Gutterman DD, Schünemann HJ (2012) Executive summary: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest* 141(Suppl 2): 7S–47S
- Lieberman JR, Pensak MJ. Prevention of venous thromboembolic disease after total hip and knee arthroplasty. *J Bone Joint Surg Am.* 2013;95(19):1801–1811
- Geerts WH, Heit JA, Clagett GP et al (2001) Prevention of venous thromboembolism. *Chest* 119(1):132S–175S
- Stewart DW, Freshour JE. Aspirin for the prophylaxis of venous thromboembolic events in orthopedic surgery patients: a comparison of the AAOS and ACCP guidelines with review of the evidence. *Ann Pharmacother.* 2013; 47(1):63–74.
- Westrich GH, Bottner F, Windsor RE, Laskin RS, Haas SB, Sculco TP. VenaFlow plus Lovenox vs VenaFlow plus aspirin for thromboembolic disease prophylaxis in total knee arthroplasty. *J Arthroplasty.* 2006;21(6 Suppl 2):139–143.
- Anderson DR, Dunbar MJ, Bohm ER, Belzile E, Kahn SR, Zukor D, et al. Aspirin versus low-molecular-weight heparin for extended venous thromboembolism prophylaxis after total hip arthroplasty: a randomized trial. *Ann Intern Med.* 2013;158(11):800–806
- Vulcano E, GesellM, Esposito A et al (2012) Aspirin for elective hip and knee arthroplasty: a multimodal thromboprophylaxis protocol. *Int Orthop* 36(10):208–210
- Jacobs JJ, Mont MA, Bozic KJ, et al. American Academy of Orthopaedic Surgeons clinical practice guideline on: preventing venous thromboembolic disease in patients undergoing elective hip and knee arthroplasty. *J Bone Joint Surg [Am]* 2012;94-A:746–747
- Nicolaidis AN, Fareed J, Kakkar AK, et al. Prevention and treatment of venous thromboembolism--International Consensus Statement. *Int Angiol* 2013; 32:111–260.
- Jameson SS, Baker PN, Deehan DJ, Port A, Reed MR. Evidence-base for aspirin as venous thromboembolic prophylaxis following joint replacement. *Bone Joint Res* 2014; 3:146–149.
- Johanson NA, Lachiewicz PF, Lieberman JR, Lotke PA, Parvizi J, Pellegrini V, Stringer TA, Tornetta P 3rd, Haralson RH 3rd, Watters WC 3rd. Prevention of symptomatic pulmonary embolism in patients undergoing total hip or knee arthroplasty. *J Am Acad Orthop Surg* 2009; 17: 183-96.
- NICE. NICE clinical guideline 46: venous thromboembolism-Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in inpatients undergoing surgery. National Institute for Health and Clinical Excellence (United Kingdom) 2007.
- Schousboe JT, Brown GA. Cost-effectiveness of low-molecular-weight heparin compared with aspirin for prophylaxis against venous thromboembolism after total joint arthroplasty. *J Bone Joint Surg Am.* 2013 Jul 17; 95(14):1256-64.

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