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Trends of thromboprophylaxis and complications after major lower limb orthopaedic surgeries in Korea: National Health Insurance Claim Data



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ABSTRACT

Background: In Western countries, prophylaxis for venous thromboembolism (VTE) following major lower limb orthopaedic surgeries is recommended. However, that has not been the case in Asian countries, where the reported incidence of postoperative VTE has been low. The present study examined trends in VTE prophylaxis prescriptions and related complications following major lower limb orthopaedic surgeries in South Korea. Design/Participants: Using claim data from the National Health Insurance Corporation, 263,664 patients aged

65 years or older who underwent major orthopaedic surgeries (total hip arthroplasty [THA], total knee arthroplasty [TKA], or hip fracture surgery [HFS]) between 2008 and 2012 were included.

Result: The prescription rate for VTE prophylaxis has increased from 62.4% in 2008 to 75.4% in 2012 (P < 0.001). The prescription rate for new oral anticoagulants following THA and TKA has increased drastically since 2010, while that following HFS has not. Instead, prophylactic use of aspirin or low molecular weight heparin has increased in HFS cases. The rate of postoperative complications has significantly increased annually only in HFS: VTE (P = 0.018) and brain haemorrhage or gastrointestinal bleeding (P = 0.019).

Conclusion: This result could suggest the need for more studies about the use of VTE prophylactic medicines following HFS.

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1. Introduction

Venous thromboembolism (VTE), which clinically manifests as deep vein thrombosis (DVT) or pulmonary embolism (PE), is a relatively common complication after major orthopaedic surgery [1,2]. In Western countries, the incidence of DVT following total hip arthroplasty (THA), total knee arthroplasty (TKA), or hip fracture surgery (HFS) is 45-57%, 40-84%, and 36-60%, respectively, when no pharmacological prophylaxis is prescribed [2,3]. Therefore, routine administration of prophylaxis is recommended following this type of surgery, especially in Western countries [2,4,5]. On the other hand, in Asian countries, including South Korea, prescription of pharmacological prophylaxis has not been routinely recommended because the reported incidence of postoperative VTE has been low [6,7]. However, the incidence of VTE has been increasing in Asia because of Westernized dietary habits and lifestyle [8,9]. According to recent studies in Asian countries, including South Korea, the prevalence of VTE following major orthopaedic surgery among Asians has increased to a level not significantly different from that for Westerners [8,9]. In response, South Korea and other Asian countries announced recommendations for preventing VTE after major surgeries in 2011 and 2012 [10-12]. Therefore, we investigated changes in thromboprophylactic prescriptions and their clinical effects before and after implementation of the recommendations.

In South Korea, 98.7% of the total population is enrolled in the government-run national health insurance program, and the remaining low-income citizens are enrolled in a government-run medical aid program. Thus, most medical services and prescriptions are claimed and reimbursed through the National Health Insurance Corporation (NHIC) [13]. Health insurance claims data contain detailed information about diagnoses, examinations, medical procedures, and prescribed medicines. Additionally, the general characteristics of medical service users, such as age, sex, date of medical service, and type and location of medical institutions, as well as information about the medical service providers, are also included. Furthermore, since the computerised claim rate for national health insurance and medical aid (excluding dental, oriental medicine, and maternity clinics) reaches 99.9%, the electronic claims data makes it possible to easily assess the current state of nationwide medical service utilization [14]. Therefore, in the present study, we used NHIC data to identify annual changes in the prescription rate for VTE prophylaxis following major lower limb orthopaedic surgeries in

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the elderly and to examine changes in the incidence of postoperative VTE and bleeding.

2. Methods

2.1. Study population

The study population consisted of patients aged 65 years or older who underwent major orthopaedic surgery (THA, TKA, or HFS) between January 2008 and December 2012, according to computerised claims data submitted to the NHIC. TKA and THA cases were enrolled using reimbursement claim data with medical fee codes N2072, N2077, or N0712 (corresponding to TKA) and N0711 or N2070 (corresponding to THA). HFS cases had either International Classification of Disease (ICD)-10-based disease code S720 (fracture of neck of femur) or S721 (pertrochanteric fracture) [15,16] and at least one of the insurance claims code for HFS: N0601 (open reduction of fractured extremityfemur), N0641 (closed reduction of fractured extremity-pelvis, femur), N0715 (hemiarthroplasty-hip), N0981 (external fixation-pelvis, femur), or N0991 (closed pinning-femur). Each classification was defined through a consensus among an orthopaedic surgeon, a data analyst from NHIC, and 2 geriatricians. In the study population, any individual who was prescribed anti-platelets or anti-coagulants, including new oral anticoagulants (NOACs), at least one week prior to surgery was excluded.

2.2. Definitions of medical prophylaxis for venous thromboembolism and postoperative VTE and bleeding incidence

Thromboprophylaxis was defined as an anti-platelet agent or anticoagulant (including NOACs) newly prescribed within one day prior to or one day after major lower limb orthopaedic surgery [5,17]. VTE incidence was noted using claims data with ICD-10-based diagnosis codes, in addition to codes I802 (DVT, not otherwise specified [NOS]) or I80.3 (embolism or thrombosis of the lower extremity, NOS) for DVT and codes I26 (pulmonary thromboembolism), I260 (pulmonary embolism with mention of acute cor pulmonale), and I269 (pulmonary embolism, NOS) for PE as the main disease or sub-disease code between postoperative day 1 and 5 weeks [18]. We also used the VTE codes I828 (embolism and thrombosis of other specified veins) and I829 (embolism of vein, NOS and thrombosis [vein], NOS). The major complication of thromboprophylaxis, bleeding, was defined as cases claimed for brain haemorrhage (I608–611,613–616, 618–621, and 629) or GI bleeding (K920, 921, and 922) [19–21].

2.3. Ethical approval

The present study protocol was reviewed and approved by the Institutional Review Board of Kyung Hee University Medical Center (KMC IRB 1522-09). Informed consent was submitted by all subjects when they were enrolled.

2.4. Statistical analysis

The numbers of each major orthopaedic operation (TKA, THA, and HFS) and associated complications (VTE, DVT, and PE) from 2008 to 2012 are presented here, and comparisons of demographic and lifestyle variables were evaluated by ANOVA and chi-square tests. For each operation, we analysed the annual incidence of complications and evaluated annual changes in incidence using the chi-square test. Significance was defined as P < 0.05 for all analyses. Statistical analyses were conducted using SAS 9.3 (SAS Institute Inc., Cary, NC, USA).

3. Results

3.1. Characteristics of elderly Korean patients who underwent major orthopaedic surgery from 2008 to 2012

The total number of major lower limb orthopaedic surgeries performed between 2008 and 2012 was 236,334. The mean age of all subjects who underwent major lower limb orthopaedic surgery was 74.5 years: 72.3 years, 72.8 years, and 79.3 years for TKA, THA, and HFS, respectively. There were 3976 incidents (1.7%) of VTE associated with all major lower limb orthopaedic surgeries, of which 2909 cases occurred post-TKA (1.9%), 170 cases occurred post-THA (1.6%), and 897 cases occurred post-HFS (1.2%). There were 626 incidents of postoperative brain haemorrhage or GI bleeding, with 415 cases occurring post-HFS (0.6%), 189 cases occurring post-TKA (0.1%), and 22 cases occurring post-THA (0.2%) (Table 1).

3.2. Annual prescriptions for VTE prophylaxis

Prescription rates for VTE prophylaxis among patients who underwent major lower limb orthopaedic surgery increased significantly each year, from 62.4% in 2008 and to 64.4%, 67.5%, 73.4%, and 75.4% in 2009, 2010, 2011, and 2012, respectively (P < 0.001 by chi-square test for trend). However, prescription rates for prophylaxis after HFS did not differ between 2008 and 2012, at 61.3% and 61.4%, respectively (Fig.S1).

Prescriptions of warfarin, an anticoagulant, noticeably decreased for all three types of surgery, and the rate has drastically decreased since 2010. Since 2010, the prescription rate for NOACs following THA and TKA has significantly increased, but there has been only a slight increase following HFS. On the contrary, prophylactic use of aspirin or low molecular weight heparin (LMWH) has increased in HFS cases (Fig. 1). Although there was very little change in the overall prescription rate for anti-platelet drugs, prescription rates for aspirin following HFS have increased every year (Table S1).

3.3. Annual complication incidence

Between 2008 and 2012, the overall incidence of post-TKA VTE and post-THA VTE did not increase, but post-HFS VTE did increase (P = 0.018 by ANOVA and chi-square test). Additionally, although there was no significant annual change in the incidence of postoperative brain haemorrhage, GI bleeding, or operation-related bleeding associated with TKA or THA, but the incidence of postoperative brain haemorrhage or GI bleeding or operation related bleeding associated with HFS increased significantly as years go by (P = 0.019), though the increase continued until 2011 and fell off in 2012 (Table 2).

4. Discussion

Between 2008 and 2012, overall prescriptions for medicines to prevent DVT following major lower limb orthopaedic surgeries tended to increase in South Korea. This finding coincided with announcements of worldwide consensus on the importance of pharmacological prophylaxis. Additionally, relevant guidelines from the American Academy of Orthopaedic Surgeons (AAOS) and the American College of Chest Physicians (ACCP) [5,17] and guidelines for Asian countries [12] and South Korea [10] have been published.

The prescription rate for warfarin decreased every year since 2008 in Korea. Warfarin was commonly prescribed in the past because of its low cost and oral administration. However, interactions with a variety of food and drugs and the requirement for continued monitoring are major disadvantages [22].

Along with recommendations from the ACCP and AAOS, the Korea Ministry of Health and Welfare Affairs announced in 2003 that prophylactic administration of fondaparinux to prevent VTE in patients Download English Version:

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