

Current Trends in the Management of Acute Deep Vein Thrombosis among Korean Vascular Surgeons

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Purpose: Venous thromboembolism (VTE) is a common life-threatening illness with significant morbidity and mortality rates. In recent years, the incidence of VTE has gradually increased in Korea. In this study, we evaluated the current trends in the management of acute deep vein thrombosis (DVT) in Korea.

Materials and Methods: A 20-item questionnaire was prepared and sent to 48 members of the Korean Society for Vascular Surgery. Each member worked in a different hospital. Twenty-two members participated in this study.

Results: The vascular surgery departments were primarily responsible for managing DVT. Ultrasound and computed tomography (CT) venography were chosen as the most common initial diagnostic tools. Eighty-two percent of participants routinely used the coagulation factor assay. Thrombolysis and inferior vena cava (IVC) filter insertion were performed mainly in the radiology departments. Seventy-seven percent of participants performed thrombolysis only if the thrombus age was less than 21 days. During thrombolysis, IVC filter was routinely inserted by 50% of respondents and removed within 14 days by 64% of respondents. Nearly all participants followed the 2012 American College of Chest Physicians guidelines for anticoagulation therapy.

Conclusion: The majority of Korean vascular surgeons followed the guidelines. However, CT was frequently used. Thrombolysis and IVC filter insertion were more frequently performed than recommended by the guidelines.

Key Words: Vein, Thrombosis, Korea

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INTRODUCTION

Venous thromboembolism (VTE), which includes deep vein thrombosis (DVT) and pulmonary embolism, is a common life-threatening illness with significant morbidity and mortality rates. VTE is a growing worldwide health concern with an annual incidence of 104 to 183 events per 100,000 individuals in the Caucasian population [1,2]. In Korea, a 2008 survey reported that the annual incidence of VTE per 100,000 individuals was 13.8, which represented an

increase from the results of a 2004 survey [3]. This study was designed to understand the current trends in the management of acute DVT in Korea.

MATERIALS AND METHODS

A 20-item questionnaire was prepared and sent to 48 members of the Korean Society for Vascular Surgery. The members worked in 48 different hospitals. Twenty-two members completed and returned the questionnaire.

RESULTS

The vascular surgery departments (91%) were primarily responsible for managing VTEs, followed by the cardiology departments (Fig. 1). Initial diagnostic tools for DVT were ultrasound (73%), computed tomography (CT) venography (77%), D-dimer tests (64%), and conventional venography (5%) (Fig. 2). The coagulation factor assay was routinely performed in 82% of hospitals.

1) Thrombolysis

The procedure of thrombolysis, including mechanical thrombectomy, was mainly performed in the radiology departments (59%), followed by the vascular surgery departments (23%). When queried about age limitations for thrombolysis, 45% of respondents stated that there was no limitation, 9% felt that thrombolysis should be

restricted to patients under 65 years of age, and 46% felt that thrombolysis should be restricted to patients under 70 years of age. When queried about limitations in time after onset of thrombi, answers of 7 days, 14 days, 21 days, and more than 28 days were made by 9%, 36%, 32%, and 23% of respondents, respectively. The durations of thrombolysis of up to 1 day and up to 2 days were preferred by 45% and 23% of respondents, respectively.

In addition, 45% of respondents did not have experience with open thrombectomy, 18% had experience with 1-5 cases of open thrombectomy, and 37% had experience with more than 5 cases of open thrombectomy. The reported indications of open thrombectomy included phlegmasia alba dolens, phlegmasia cerulea dolens, patients who were not indicated for anticoagulation therapy, and the presence of tumor thrombi.

2) Inferior vena cava filter insertion

Inferior vena cava (IVC) filter insertions were mainly performed in the radiology departments (55%), followed by the

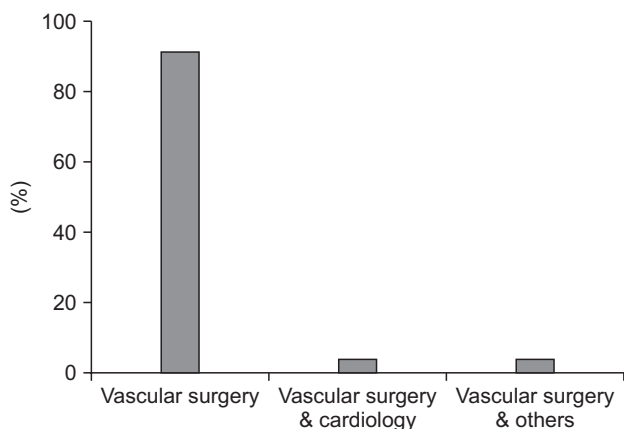


Fig. 1. Proportion of departments in charge of deep vein thrombosis treatment.

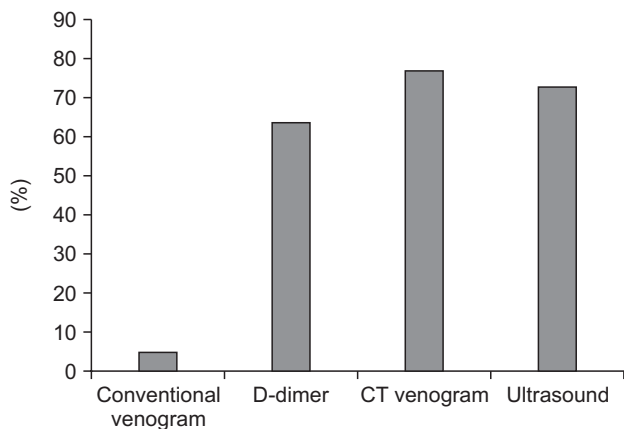


Fig. 2. Initial diagnostic tools in deep vein thrombosis. CT, computed tomography.

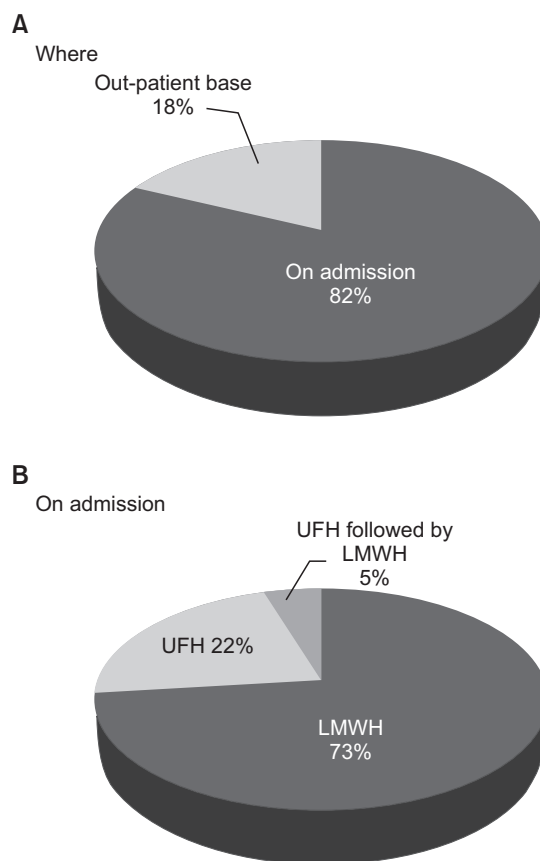


Fig. 3. Anticoagulation therapy (A) where treated, (B) on admission, what heparin used. UFH, unfractionated heparin; LMWH, low molecular weight heparin.

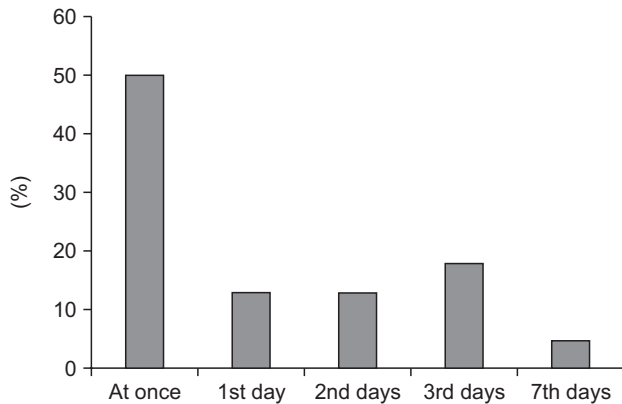


Fig. 4. Duration of overlap for heparin and warfarin.

vascular surgery departments. Fifty percent of respondents routinely inserted IVC filters, and 45% of respondents selectively inserted IVC filters. The indications for selective IVC filter insertion were the following: high risk for pulmonary embolism and floating IVC or iliac vein thrombi. Temporary IVC filters that were inserted after thrombolysis were removed after 2 weeks (41%), 1 week (18%), and 4 weeks (18%).

3) Anticoagulation therapy

Eighty-two percent of respondents treated acute DVT patients upon admission to the clinic, and 18% treated patients on an outpatient basis. On admission, 73% of respondents used low-molecular weight heparin, and 22% used unfractionated heparin (Fig. 3). Fifty percent of respondents used the newly developed oral anticoagulation agent rather than warfarin. With regard to oral anticoagulation, the majority of respondents (77%) used oral anticoagulation therapy over a >12-month period when the patient had abnormal anticoagulation factors. If there was no abnormality in the anticoagulation factor assay, the majority of respondents used oral anticoagulation therapy for 6 months (76%). Overlap of heparin and warfarin was carried out by 50% of respondents on day 1 (13%), day 2 (13%), day 3 (18%), and day 7 (5%) (Fig. 4). Sixty-eight percent of respondents maintained the optimal therapeutic international normalized range at 2-3, and 32% of respondents maintained it at 1.5-2. After the treatment of DVT, the follow-up diagnostic method was ultrasound (77%), followed by CT venography (55%) and the D-dimer test (23%). With regard to compression therapy, 23% of respondents applied compression until resolution of leg edema, 13% of respondents only applied compression in the presence of symptoms, and 64% of respondents applied compression for at least 2 years.

DISCUSSION

In 2012, the American College of Chest Physicians (ACCP) revised the eighth edition of evidence-based clinical practice guidelines for VTE. Specifically, they recommended using anticoagulants to treat proximal DVT. Thrombolytics or clot extraction interventions (thrombectomy) were not recommended for routine use. Patients who were most likely to benefit from catheter-directed thrombolysis (CDT) were those having iliofemoral DVT, symptoms within 14 days, good functional status, and a low risk of bleeding. The ACCP guidelines recommended outpatient treatment. In the acute setting (i.e., the first few days, according to the guidelines), the recommendation was to use dalteparin (Fragmin; Pfizer, New York, NY, USA), tinzaparin (Innohep; Leo Pharma Inc., Ballerup, Denmark), or fondaparinux (Arixtra; GlaxoSmithKline, London, England) once daily. Alternatively, enoxaparin (Lovenox; Sanofi-Aventis, Paris, France) may be used twice daily. Beyond the first few days, warfarin was preferred over rivaroxaban (Bayer, Leverkusen, Land Nordrhein-Westfalen, Germany). The length of treatment with anticoagulants was 3 months for surgery-triggered DVT, rather than 6 or 12 months. For DVTs that were caused by non-surgical risk factors, such as estrogen therapy, long-distance travel, and non-surgical hospitalizations, the length of treatment was 3 months, rather than 6 months, 12 months, or longer. Finally, for unprovoked (idiopathic) DVT, long-term treatment was recommended if the risk for bleeding was low [4].

The incidence of VTE in the Asian population has generally been lower than that among Caucasian populations, although it appears to be gradually increasing [5,6]. Regardless of the clinical significance of VTE, a nationwide epidemiologic study has never been performed in the Asian population. The 2012 ACCP guidelines were chiefly based on data from the Caucasian population and have provided useful information about VTE for physicians. However, the incidence and risk factors of VTE are clearly different between Caucasian and Asian populations. Genetic mutations have been suggested as an explanation for significant differences between Asians and Caucasians. Previous studies reported an incidence of hereditary thrombophilia of approximately 15%-30% in Caucasians. Genetic mutations, particularly those for clotting factor V (factor V Leiden) and factor II G20210A, are highly prevalent in Caucasians but are absent in Asians [7-9]. Individuals with one of these genetic mutations have a 3-4-fold higher risk of developing VTE [10,11]. Another possible cause of VTE is lifestyle. Little was known about the role of lifestyle in the development of VTE until recently, and dietary intake has been suggested as a changeable risk factor for the

development of VTE. A prospective cohort study suggested that the intake of more fish and plant-based foods with less red meat was associated with a lower incidence of VTE [12]. For this reason, an epidemiologic study may help us understand its incidence and pathophysiology. The present findings may allow one to properly apply the ACCP guidelines to DVT patients in Korea.

Although the majority of Korean vascular surgeons followed the ACCP guidelines, local availability and access to testing may preclude one's ability to follow these guidelines. For diagnosis, one of the following initial tests is recommended: a moderately sensitive D-dimer test, a highly sensitive D-dimer test, or a compression ultrasound of the proximal veins in patients with suspected first lower-extremity DVT. Our findings show that the ultrasound (73%), CT venography (77%), and the D-dimer (64%) test were all used in Korea. The ACCP guidelines recommend CT scans only if the other tests are not possible. However, CT scans for DVT were excessively used by the respondents in the study. This study has several limitations. First, the survey was only performed on vascular surgeons. Therefore, it was difficult to determine the general trend for DVT treatment in Korea. Second, the ACCP guidelines list specific points regarding anticoagulation therapy in patients during perioperative and postoperative periods. Intensive care unit patients, as well as those with cardiovascular disease or orthopedic issues, may tolerate anticoagulation therapy in different manners. Because communication was not properly carried out between the surveyor and respondents, DVT-related data on all types of patients were included in this survey.

CONCLUSION

This survey provided a greater understanding of both treatment procedures for DVT and compliance with ACCP guidelines. The majority of Korean vascular surgeons followed the ACCP guidelines. However, CT scans were performed more frequently than recommended. Also, thrombolysis and IVC filter insertions were used more often, due to insurance, accessibility, and lower fees. Although the admittance and treatment of DVT patients is generally considered to be convenient and safe, it is important to choose proper diagnostic procedures and treatment plans that will comply with the ACCP guidelines.

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