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ORIGINAL ARTICLE

Epidemiological updates of venous thromboembolism in a Chinese population

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KEYWORDS

deep vein thrombosis;
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Summary *Background/Objective:* Deep vein thrombosis (DVT) was thought to be uncommon in Asians and routine thromboprophylaxis in the form of anticoagulation for surgical patients was considered to be unnecessary. The current study aims to provide a contemporary epidemiology of venous thromboembolism in a population-based scale.

Methods: Information from January 1, 2010 to December 31, 2011 was retrieved from a centralized computer public healthcare database serving mainly an ethnic Han Chinese population of 7.1 million. The incidence, demographics, and hospital mortality rates of DVT and pulmonary embolism (PE) were obtained, and analyzed for different surgical categories.

Results: The overall annual incidences of DVT, PE alone, and PE with DVT were 30.0 per 100,000 population, 8.7 per 100,000 population, and 3.0 per 100,000 population, respectively. Overall male to female ratio was 1:1.24. Venous thromboembolic disease was more common with increasing age in both sexes. Thirty days' mortality rates associated with DVT, PE alone, and PE with DVT were 9.0%, 17.4%, and 13.3% respectively. Among the patients who received 103,023 major and intermediate surgical procedures in the study period, the mean incidence of postoperative DVT, PE alone, and PE with DVT were only 0.20% (203.5 patients), 0.08% (85.5 patients), and 0.04% (40.5 patients) respectively.

Conclusion: Compared with a similar study 10 years ago, there seemed to be a general increase in incidence of DVT and PE. This study showed that postoperative thromboembolic events were not uncommon, with DVT occurring in up to 0.2% of patients and PE in 0.12% of patients in this longitudinal survey.

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1. Introduction

Venous thromboembolism is a major contributor to the global disease burden.¹ Deep vein thrombosis (DVT) and pulmonary embolism (PE) were thought to be rare in the Asian population when compared with the Caucasian population. In the Caucasian population, recent studies quoted the annual incidence rate of DVT was between 65 per 100,000 population and 152 per 100,000 population^{2–5} and that of PE was between 45 per 100,000 population and 189 per 100,000 population.^{2–7} By contrast, the annual incidence rates among Asians were between 5.3 per 100,000 population and 17.1 per 100,000 population for DVT^{8,9} and between 3.9 per 100,000 population and 7.0 per 100,000 population for PE.^{8,9} However, an autopsy study showed a 4.7% prevalence rate of pulmonary thromboembolism among 12,421 postmortem examinations in the Han Chinese population.¹⁰ The incidence of venous thromboembolism may be undetected or underestimated in Orientals.

We previously published a comprehensive epidemiology study of venous thromboembolism in a Chinese population for the years 2000–2001.⁸ The overall incidence of DVT and PE was 17.1 per 100,000 population and 3.9 per 100,000 population at the time. Hospital mortality rates associated with DVT and PE were 7.3% and 23.8%, respectively. Mean incidence of postoperative DVT and PE was 0.13% and 0.04%, respectively. We have in our territory a dedicated, reliable pan-territory electronic registration of patients' morbidity and mortality of venous thromboembolism over a long period of time. The Clinical Management System (CMS) and Electronic Patient Record (ePR), built in-house since 1991 in all the public hospitals, stores essential clinical database of > 7 million patients who had attended these hospitals. Since 1999, data could be extracted through the Clinical Data Analysis and Report System (CDARS), which allowed a direct evaluation of the prevalence of DVT and PE in a predominately Chinese community.

The aim of this current study is to provide an update on the epidemiology of deep venous thromboembolism in the Han Chinese population in Hong Kong.

2. Methods

Hong Kong had a population of 7,071,576 in 2011. The population continued to grow older compared with the preceding 10 years. The median age rose from 36.7 in 2001 to 39.6 in 2006 and further to 41.7 in 2011. Approximately 94% of the population were of Han Chinese ethnicity.¹¹ Our Hospital Authority is a public healthcare institution that manages 42 hospitals and provides over 90% of all in patient services in Hong Kong. Since 1999, patient data from all public hospital could be retrieved through the CDARS including the hospitalization rate, demographics, diagnosis, surgical procedures, and outcomes. A unique personal identifier allows retrieval of individual data for review.

Hospital admission and discharge statistics for the years 2010 and 2011 were included in the current analysis. All patients with discharge diagnosis of: (1) DVT; (2) PE alone; and (3) PE together with DVT were searched for their International Classification of Diseases codes 9th version (DVT: 451.1, 451.8, 453.8; PE: 415.1) through the CDARS.

Information on patients' age, sex, diagnosis, surgery (if any), 30 days mortality, and the cause of death were collected. The incidence of postoperative DVT and PE were determined by cross-reference to surgical codes and categorized as cardiothoracic surgery, dental, general surgery, neurosurgery, obstetrics and gynecology, ophthalmology, orthopedic surgery, and urology.

The annual overall and age-specific incidences of DVT and PE in Hong Kong were calculated from new hospital admission rates per 100,000 population, and stratified according to sex and age groups using population census data from 2011. Patients with PE were further categorized into those without or with evidence of DVT.

Comparisons between groups were made with Chi-square test and a *p* value < 0.05 was accepted as significant.

3. Results

3.1. Patient demographics

During the 24 months from January 2010 to December 2011, there were 2,898,107 admissions (of 1,348,097 patients) to all public hospitals in Hong Kong. An electronic medical record search yielded 4238 patients with diagnosis of DVT, and 1665 with PE, of which 430 (25.8%) were associated with DVT.

Figure 1 shows age distribution of DVT, PE alone, and PE with DVT for all patients. Venous thromboembolism increased over age with incidence peaked at age group of 75–84 years. The median age of patients with DVT at presentation was 73 years and that of PE was 70 years. Venous thromboembolism demonstrated a slight female predominant. Overall male to female ratio is 1:1.24 (1:1.27 for DVT and 1:1.15 for PE).

3.2. Incidence and mortality

The overall annual incidences of thromboembolic disease in Hong Kong were 30.0, 8.7, and 3.0 per 100,000 population for DVT, PE alone and PE with DVT respectively (Table 1). These figures were lower than those reported in Western countries (Table 3). However, significant growth in incidences were noted comparing to a similar study 10 years previously using the same hospital database and statistical methods.⁸ Annual incidence of DVT increased almost doubly from 17.1 per 100,000 in the years 2000–2001 to 30.0 per 100,000 in years 2010–2011. Incidence of PE increased triply from 3.9 per 100,000 in years 2000–2001 to 11.7 per 100,000 in years 2010–2011.

Table 2 showed the age-specific incidence and mortality rates from DVT, PE alone, and PE with DVT. The annual age-specific incidences of DVT, PE alone, and PE with DVT were 0.4 per 100,000 population, 0.2 per 100,000 population, and 0.1 per 100,000 for those aged 0–14 years; 1.6 per 100,000 population, 0.7 per 100,000 population, and 0.3 per 100,000 for ages 15–24 years; 6.6 per 100,000 population, 1.5 per 100,000 population; 0.6 per 100,000 for ages 25–34 years, 12.7 years, 2.9 years; 1.6 per 100,000 for ages 35–44 years, 21.5 years, 6.2 years; 2.4 per 100,000 for ages 45–54 years, 31.5 years, 12.4 years, 3.9 per 100,000 for ages 55–64 years, 72.2 years, 22.6 years; 8.9 per 100,000 for ages 65–74 years, 159.7 years, 53.0 years; 14.5 per 100,000 for ages 75–84

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