

Full Length Article

In-hospital direct costs for thromboembolism and bleeding in Chinese patients with atrial fibrillation

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Abstract

Objective: Limited data are available on the direct costs of hospitalization owing to thromboembolism and bleeding in patients with atrial fibrillation (AF) in China. Such data are essential for policy development, service planning, and cost-effectiveness analysis of new therapeutic strategies.

Methods: We collected data regarding in-hospital direct costs among patients with AF who were hospitalized owing to ischemic stroke (IS), transient ischemic attack (TIA), intracranial hemorrhage (ICH), or major gastrointestinal bleeding. All data were collected from 7 representative tertiary referral hospitals and 3 secondary care hospitals from December 2009 to October 2014.

Results: In total, 312 eligible patients with thromboembolism and 143 patients with major bleeding were identified, and their hospital charts were reviewed. The median in-hospital direct costs were 17,857 Chinese Yuan (CNY) for IS and 16,589 CNY for TIA (equivalent to \$ 2907 US dollars and 2701 US dollars, respectively). For patients with major bleeding, the costs were 27,924 CNY for ICH and 18,196 CNY for major gastrointestinal bleeding (equivalent to 4546 US dollars and 2962 US dollars, respectively). The direct costs were mainly driven by medications, which accounted for approximately 33.4%–36.1% in different groups of patients. The direct costs were highly related to the hospital level and National Institutes of Health Stroke Scale scores in patients with thromboembolism; in patients with ICH, the factors included hospital level, warfarin treatment before admission, and prior hospitalization for stroke.

Conclusions: Given the high prevalence, AF-related thromboembolism and bleeding impose considerable economic burden on the Chinese society. Efforts to improve the management of AF may confer substantial economic benefits.

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Keywords: Atrial fibrillation; Ischemic stroke; Bleeding; In-hospital direct costs

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Introduction

Atrial fibrillation (AF) is one of the most common causes of stroke, conferring a five-times higher risk of stroke on patients compared to the risk in the general

¹ The first two authors contributed equally to this work.

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population.¹ AF-related stroke is nearly twice as likely to be fatal than non-AF stroke, and functional deficits are likely to be more severe among survivors.² Several prior studies have reported that the mean costs of ischemic stroke (IS) were significantly higher for patients with AF than for those without AF.^{3–6} Two national database studies in the Europe^{7,8} estimated the mean costs for intracranial hemorrhage, gastrointestinal bleeding, and other major bleeding events in patients with AF. The acute care costs were 7331, 3601, 3941 EUR, and the average 3-year societal costs were 27,627, 17,868, and 12,384 EUR, respectively, suggesting that bleeding events also conferred a substantial economic burden on patients with AF.

With the wide adoption of new treatments among patients with AF for stroke prevention, such as non-vitamin K antagonist oral anticoagulants (NOACs) and left atrial appendage occlusion procedures, it is important to evaluate the costs of these new treatments on the healthcare system and the money they will save by providing more effective stroke prevention and reducing the adverse events of bleeding.^{9,10} Hence, accurate data on hospitalization costs related to AF-associated stroke and bleeding are essential for informed policies and decision making.

However, the available data on the health economics of patients with AF-related stroke and bleeding are scarce, especially for the healthcare system in Asian countries such as China. This study aimed to provide detailed data regarding in-hospital direct costs for patients with AF who are hospitalized owing to acute thromboembolism and bleeding events, compare the costs at different scenarios, and identify independent factors that may predict the costs.

Methods

Data source

This cost-of-illness study was conducted in 7 representative tertiary hospitals and 3 secondary care hospitals in Beijing. Tertiary hospitals were referral hospitals providing high-level medical services to several geographic regions. Secondary care hospitals usually provide general medical care in the regions where they are located. In all the participating hospitals, electronic medical records and detailed medical costs during hospitalization were available, and data were abstracted through chart review.

Data of all patients with a diagnosis of AF and of those hospitalized owing to new-onset stroke or transient ischemic attack (TIA) from January 2012 to March

2014 were collected. As major bleeding-induced hospitalization was less common, we expanded the data collection window to December 2009 to October 2014, to increase our sample size.

Study population

Eligible patients were ≥ 18 years of age, and the diagnoses were identified by the International Classification of Diseases, 10th Revision (ICD-10), coded by the discharging hospital.

For patients with thromboembolism, the inclusion criteria were as follows: (1) hospitalization owing to IS or TIA; and (2) a history of AF or newly diagnosed AF during the index hospitalization.

For patients with major bleeding, the inclusion criteria were as follows: (1) hospitalization owing to intracranial hemorrhage (ICH) or major gastrointestinal bleeding (major gastrointestinal bleeding was defined as bleeding leading to transfusion of at least two units of whole blood or erythrocytes, requiring hospitalization or surgery, resulting in permanent disability); and (2) a history of AF or newly diagnosed AF during the index hospitalization.

Patients were excluded if they satisfied the following criteria: (1) transient or reversible AF; (2) diagnosis of rheumatic mitral stenosis or mitral valve prostheses; (3) hospital discharge against physician advice or transfer to another hospital; (4) Bleeding related to tumors, trauma, immunodeficiency, and pregnancy.

Patient consent forms were exempted as this study was a retrospective study using data from medical records. In addition, no individualized patient data were published or revealed. The Ethics Committee of Beijing Anzhen Hospital, the Capital Medical University approved the study protocol.

Data collection

The data abstracted from medical records included sociodemographic characteristics, medical history, information on smoking and alcohol consumption, and variables related to hospitalization. Medication usage information, including that on preadmission warfarin, antiplatelet agents, non-steroidal anti-inflammatory drugs, and steroids, was also obtained. Stroke severity, evaluated by the National Institutes of Health Stroke Scale (NIHSS), was also abstracted.

In-hospital direct costs

Data on costs were collected from medical records. All costs during hospitalization were classified into 8

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