

# QUESTIONNAIRE SURVEY ON VENOUS THROMBOEMBOLISM MANAGEMENT AT HOSPITALS WITH PSYCHIATRIC BEDS IN AKITA PREFECTURE: COMPARISON BETWEEN GENERAL HOSPITALS AND PSYCHIATRIC HOSPITALS

Keisuke Irinaka, Masahiro Takeshima and Kazuo Mishima

*Department of Neuropsychiatry, Akita University Graduate School of Medicine, Akita, Japan*

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## Abstract

**Aim:** This study aimed to investigate the current status of venous thromboembolism (VTE) management in psychiatric inpatients.

**Methods:** This study involved a questionnaire survey of hospitals with psychiatric beds in Akita Prefecture. In May 2019, a questionnaire was sent to hospitals to investigate the actual management of VTE.

**Results:** The response rate was 78.3% (18/23). Of the 18 hospitals, 4 were general hospitals and 14 were psychiatric hospitals. All general hospitals, but not all psychiatric hospitals, had intermittent pneumatic compression (IPC), the recommended prophylaxis for high-risk VTE. For patients at high risk of VTE, 75% of general hospitals had experience with IPC and anticoagulant prophylaxis, whereas none of the psychiatric hospitals had experience with IPC and 50% had experience with anticoagulant prophylaxis. Few hospitals with psychiatric beds reported that IPC or anticoagulants were the most commonly used VTE prophylaxis for patients at high risk of VTE. Most hospitals used VTE prophylaxis with compression stockings.

**Conclusion:** This study suggests that psychiatric hospitals lack the necessary equipment and staff for VTE management and that hospitals with psychiatric beds do not provide VTE prophylaxis, as recommended by guidelines in Akita Prefecture. Future studies involving hospitals throughout Japan are needed.

**Keywords:** anticoagulation, intermittent pneumatic compression, prophylaxis, psychiatry, venous thromboembolism

## Introduction

Venous thromboembolism (VTE) is a serious medical condition that can lead to sudden death<sup>1</sup>. The condition of patients admitted to psychiatric wards is often complicated by VTE, with previous studies reporting VTE in 11.6% of psychiatric patients who were physically restrained<sup>2</sup>, 10.5% of patients admitted for major depressive disorder<sup>3</sup>, and 35.7% of patients with catatonia<sup>4</sup>. Although there are few reports on the incidence of VTE in psychiatric beds that are not limited to specific conditions, 2.3% of patients admitted to the psychiatric unit of a general

hospital developed VTE<sup>5</sup>. The risk of VTE is also increased by the use of antipsychotics, antidepressants, and benzodiazepines in the treatment of psychiatric disorders<sup>6-8</sup>. Therefore, VTE risk assessment and appropriate prophylaxis in psychiatric inpatients are critical.

The guideline-recommended prophylaxis for VTE in patients at high risk for VTE is intermittent pneumatic compression (IPC) and anticoagulation<sup>9-11</sup>. Anticoagulants carry a risk of bleeding but do not interfere with patients' basic activities of daily living (walking, transferring, toileting, bathing, etc.)<sup>12,13</sup>. On the other hand, IPC does not increase the risk of bleeding, but it is relatively expensive and may discourage patients' basic activities of daily living. Thus, IPC is recommended by the American College of Cardiology guidelines for the prevention of VTE after surgery because of its safety<sup>9,10</sup>. In Japan, there are approximately 320,000 psychiatric beds, with 75% in psychiatric hospitals and 25% in general hospitals<sup>14</sup>. Despite this substantial capacity, psychiatric hospitals, by their nature,

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Corresponding Author: Masahiro Takeshima  
Department of Neuropsychiatry, Akita University Graduate School of Medicine  
1-1-1, Hondo, Akita 010-8543, Japan  
Phone: +81-18-884-6122  
Fax: +81-18-884-6445  
E-mail: m.takeshima@med.akita-u.ac.jp

have few IPCs, which are commonly used in the perioperative management of surgery, and may not provide adequate VTE prophylaxis for patients at high risk for VTE due to difficulties in managing anticoagulant-induced bleeding. However, the actual status of VTE management in psychiatric hospitals has not been studied, and it is unclear how VTE prevention is implemented and what problems exist in psychiatric hospitals. A survey of the equipment and personnel needed for prevention, screening, and definitive diagnosis of VTE in psychiatric hospitals will help identify current problems, and interventions to address these problems may reduce the number of sudden VTE-related deaths in psychiatric hospitals.

Therefore, we conducted a questionnaire survey to understand and clarify the actual status of VTE management in patients admitted to psychiatric wards.

## Methods

### Study design and participants

This study was an unpaid questionnaire survey of chiefs of psychiatry at hospitals with psychiatric beds in Akita Prefecture. The study was conducted to examine the actual situation regarding VTE management in patients admitted to psychiatric wards. In May 2019, we mailed questionnaires to psychiatry department directors of hospitals with psychiatric beds in Akita Prefecture.

### Survey items

The questionnaire used in this study consisted of the following items. The question about VTE prophylaxis in physically restrained patients was designed to determine what VTE prophylaxis is used in patients at high risk for VTE. According to clinical guidelines for VTE prophylaxis by the Japanese Society of General Hospital Psychiatry<sup>15)</sup>, patients who are on psychotropic medications and are restrained are considered to be at high risk for VTE.

#### *Details of each hospital*

1. Hospital type (general or psychiatric)
2. Number of psychiatric beds
3. Number of full-time psychiatrists
4. Number of full-time non-psychiatrists
5. If your institution is a psychiatric hospital, the number of part-time non-psychiatrists

#### *Equipment for physical prevention of VTE*

6. IPC (present or absent)
7. Compression stockings (present or absent)

#### *Experience with VTE prophylaxis in patients with physical restraints*

8. IPC (present or absent)
9. Anticoagulants (present or absent)

10. Compression stockings (present or absent)
11. No experience with any of the above-mentioned VTE prophylaxis (yes or no)

#### *Most frequent VTE prophylaxis performed on physically restrained patients*

12. IPC (yes or no)
13. Anticoagulants (yes or no)
14. Compression stockings (yes or no)
15. No experience with any of the above-mentioned VTE prophylaxis (yes or no)

#### *Equipment and personnel needed to screen for, diagnose, and treat VTE*

16. D-dimer analyzer (present or absent)
17. Ultrasound scanner (present or absent)
18. Ultrasound technician (present or absent)
19. Computerized Tomography (CT) (present or absent)
20. Full-time radiologist (present or absent)
21. Full-time cardiologist (present or absent)

### Statistical analysis

Non-normally distributed continuous and categorical variables are expressed as median and interquartile range (IQR) values or as numbers and percentages, respectively. To analyze differences between general and psychiatric hospitals, the Mann-Whitney U test was used for continuous variables and Fisher's exact test for categorical variables. Statistical significance was set at  $p < 0.05$  (two-sided). All statistical analyses were performed using SPSS Statistics 28.0 (IBM Corp. Armonk, NY, USA).

### Ethics

This study was approved by the Ethics Committee of the Akita University Graduate School of Medicine and the Faculty of Medicine Ethical Committee for Human Research and was conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from the participants in written form before answering the questionnaire.

## Results

Of the hospitals to which questionnaires were sent, 78.3% (18/23) responded. The response rate was 100% (4/4) for general hospitals and 73.7% (14/19) for psychiatric hospitals. Table 1. summarizes the results of the survey. Psychiatric hospitals had significantly more psychiatric beds than general hospitals (psychiatric hospitals: median 201 beds vs. general hospitals: median 60 beds,  $p=0.003$ ) and fewer full-time non-psychiatrists (psychiatric hospitals: median 1 vs. general hospitals: 73.5,  $p=0.002$ ), and the number of full-time psychiatrists was not significantly different between the two groups. The median number of part-time non-psychiatrists in psychiatric hospitals

Table 1. The results of the survey

	GH (N=4)	PH (N=14)	Total (N=18)	P-value
<b>Details of each hospital</b>				
Psychiatric beds †	60 (42–60)	201 (135.5–302)	150 (105–242.25)	0.003
Full-time psychiatrists †	4.5 (3.25–11.75)	4 (3–8)	4 (3–8)	0.705
Full-time non-psychiatrists †	73.5 (42.25–247.25)	1 (0.75–2.25)	1 (1–15.25)	0.002
Part-time non-psychiatrists	NE	1 (0–1)	NE	
<b>Equipment for physical prevention of VTE</b>				
IPC ‡	4 (100%)	0 (0%)	4 (22.2%)	<0.001
Compression stockings ‡	4 (100%)	12 (85.7%)	16 (88.9%)	1
<b>Experience with VTE prophylaxis in patients with physical restraints</b>				
IPC ‡	3 (75%)	0 (0%)	3 (16.7%)	0.005
Anticoagulants ‡	3 (75%)	7 (50%)	10 (55.6%)	0.588
Compression stockings ‡	4 (100%)	11 (78.6%)	15 (83.3%)	1
None ‡	0 (0%)	2 (14.3%)	2 (11.1%)	1
<b>Most frequent VTE prophylaxis performed on physically restrained patients</b>				
IPC	0 (0%)	0 (0%)	0 (0%)	NC
Anticoagulants ‡	0 (0%)	3 (21.4%)	3 (16.7%)	1
Compression stockings ‡	4 (100%)	12 (85.7%)	16 (88.9%)	1
None ‡	0 (0%)	2 (14.3%)	2 (11.1%)	1
<b>Equipment and personnel needed to screen for, diagnose, and treat VTE</b>				
D-dimer analyzer ‡	4 (100%)	4 (28.6%)	8 (44.4%)	0.023
Ultrasound scanner ‡	4 (100%)	2 (14.3%)	6 (33.3%)	0.005
Ultrasound technician ‡	4 (100%)	2 (14.3%)	6 (33.3%)	0.005
CT ‡	4 (100%)	2 (14.3%)	6 (33.3%)	0.005
Full-time radiologist ‡	4 (100%)	2 (14.3%)	4 (22.2%)	0.005
Full-time cardiologist ‡	4 (100%)	0 (0%)	4 (22.2%)	<0.001

**Note:** Values are presented as median (interquartile range) values or number (%).

† Mann-Whitney U test

‡ Fisher's Exact Test

**Abbreviations:** CT, computerized tomography; GH, general hospital; IPC, intermittent pneumatic compression; NC, not calculated; NE, not examined; PH, psychiatric hospital; VTE, venous thromboembolism

was 1.

Regarding physical prophylaxis for VTE, possession of IPC was significantly lower in psychiatric hospitals than in general hospitals, with none of the psychiatric hospitals having IPC, and all general hospitals having IPC (psychiatric hospitals: 0% vs. general hospitals: 100%;  $p < 0.001$ ). No significant differences were noted in possession of compression stockings between the two groups (Table 1).

In terms of experience in preventing VTE with IPC in physically restrained patients, the implementation rate was significantly higher in general hospitals than in psychiatric hospitals (psychiatric hospitals: 0% vs. general hospitals: 75%;  $p = 0.005$ ). Experience with VTE prophylaxis using compression stockings and anticoagulants did not differ between the groups. The most common VTE prophylaxis for physically restrained patients was compression stockings in both general and psychiatric hospitals, with no significant difference between the two groups. There were no hospitals in which IPC was the most commonly used VTE prophylaxis for physically restrained patients. The most common VTE prophylaxis for physically

restrained patients was anticoagulation in 0% of general hospitals and 14.3% of psychiatric hospitals. In addition, 14.3% of psychiatric hospitals did not provide VTE prophylaxis with IPC, anticoagulants, or compression stockings to physically restrained patients (Table 1).

General hospitals had all the staff and equipment needed to screen, diagnose, and treat of VTE and were significantly more likely to have each of these staff and equipment than psychiatric hospitals. Only 28.6% of psychiatric hospitals were able to screen for VTE with D-dimer, and only 14.3% had CT, echo, and ultrasound technicians and radiologists needed to make a definitive diagnosis of VTE (Table 1).

## Discussion

To the best of our knowledge, this is the first study to examine the current status of VTE management in Japanese hospitals with psychiatric beds. As we hypothesized, many psychiatric hospitals lacked the equipment and staff to manage VTE. The most commonly used prophylaxis for physically restrained

patients at high risk of VTE in psychiatric wards was compression stockings in both psychiatric and general hospitals, suggesting that the guideline-recommended VTE prophylaxis may be underutilized in psychiatric wards.

None of the psychiatric hospitals had IPC, a recommended method of prophylaxis for patients at high risk for VTE, and only 50% of the psychiatric hospitals had experience with anticoagulant prophylaxis for physically restrained patients at high risk for VTE. It is unclear why VTE prophylaxis with anticoagulants is not widely used in psychiatric hospitals where VTE prophylaxis with IPC is not available. Possible reasons include psychiatric hospitals having inadequate non-psychiatric physicians and laboratory equipment to manage bleeding and other side effects of anticoagulants and psychiatrists being unfamiliar with the use of anticoagulants. The decision to offer IPC or anticoagulation to patients at high risk for VTE should be based on various factors, including individual patients' physical condition, bleeding risk, and treatment preferences. However, in Akita Prefecture, most high-risk VTE patients admitted to psychiatric hospitals are limited to anticoagulation when VTE prophylaxis is provided according to guidelines. Although this study did not survey psychiatric hospitals outside Akita Prefecture, it is possible that psychiatric hospitals outside Akita Prefecture also have few IPCs, considering that medical fees in Japan are uniform throughout Japan. To address the disparities in VTE prophylaxis between general and psychiatric hospitals, policy interventions should be implemented in the future to make it easier for psychiatric hospitals to prevent VTE through IPC.

This study showed that VTE prophylaxis with compression stockings is commonly used in psychiatric beds for physically restrained patients at high risk for VTE. Compression stockings can prevent VTE in those with a low to moderate risk for VTE<sup>16)</sup>, but they are not effective in preventing VTE in those with a high risk for VTE, and instead worsen side effects such as skin problems<sup>17)</sup>. Therefore, it is necessary to educate psychiatrists about VTE prophylaxis to ensure that patients at high risk for VTE who are admitted to psychiatric beds receive VTE prophylaxis according to guidelines. However, caution should be exercised when interpreting the study results. Although this study examined which VTE prophylaxis was most commonly used in physically restrained patients, the frequency at which each VTE prophylaxis was used was not examined. In real-world clinical practice, compression stockings are often used in combination with IPC or anticoagulants. In this study, all high-risk patients in the general hospital may have received thromboprophylaxis with IPC plus elastic stockings or anticoagulants plus elastic stockings, making elastic stockings the most common method of VTE prophylaxis. Future studies are warranted to examine the risk of VTE in individual patients admitted to psychiatric beds and determine whether thromboprophylaxis is provided.

This study found that many psychiatric hospitals lacked the

equipment and staff to screen, diagnose, and treat of VTE. A previous study reported that despite VTE prophylaxis with subcutaneous heparin for all physically restrained patients, 11.6% of patients developed deep vein thrombosis after release from physical restraint<sup>2)</sup>. Because VTE can occur even with guideline-recommended prophylaxis, even patients receiving VTE risk-based prophylaxis may need to be screened for VTE and tested for a definitive diagnosis, depending on the individual patient's medical condition and VTE risk. Since it would be difficult for psychiatric hospitals to be fully equipped and staffed to diagnose VTE owing to cost constraints, psychiatric hospitals should work more closely with general hospitals to diagnose and treat VTE.

This study has several limitations. First, this survey was based on psychiatric beds in Akita Prefecture, which are not representative of all psychiatric beds in Japan. Second, because this study was a questionnaire survey of chiefs of psychiatry at each hospital, it may not have accurately reflected the actual state of VTE practices at each hospital. Third, this study lacks information on early weaning and active exercise, which are recommended by guidelines for patients at risk of VTE. Hospitals that cannot provide VTE prophylaxis with IPC may have provided VTE prophylaxis with voluntary or passive dynamic exercises for physically restrained patients.

In conclusion, although Japanese psychiatric hospitals have approximately 75% of psychiatric beds in Japan, they are not equipped with the personnel and equipment necessary for VTE management, including prevention, screening, diagnosis, and treatment of VTE. In addition, this study suggests that not only psychiatric hospitals but also general hospitals with the capacity to manage VTE do not provide guideline-recommended VTE prophylaxis to patients at high risk for VTE. Future policy interventions to promote IPC in psychiatric hospitals are desirable, and psychiatrists should be educated on VTE prevention, as recommended by guidelines.

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### Conflict of Interest

The authors have no conflicts of interest to declare.

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