

# Outcome of Patients with Lower Limbs Deep Vein Thrombosis at the University Hospital of Brazzaville (The Republic of the Congo)

Stéphane Méo Ikama<sup>1,2\*</sup>, Eric Gibrel Kimbally Kaky<sup>1,2</sup>, Jospin Makani<sup>1</sup>,  
Fresnel Ngoma Mabondzo<sup>3</sup>, Thibaut Naïbe Gankama<sup>1</sup>, Bijou Moualengue<sup>1</sup>,  
Suzy Gisèle Kimbally Kaky<sup>1,2</sup>

<sup>1</sup>Department of Cardiology, University Hospital Center of Brazzaville, Brazzaville, Congo

<sup>2</sup>Faculty of Health Sciences, Marien NGOUABI University of Brazzaville, Brazzaville, Congo

<sup>3</sup>Department of Radiology, University Hospital Center of Brazzaville, Brazzaville, Congo

Email: \*stephane.mikama@gmail.com

**How to cite this paper:** Ikama, S.M., Kaky, E.G.K., Makani, J., Mabondzo, F.N., Gankama, T.N., Moualengue, B. and Kaky S.G.K. (2023) Outcome of Patients with Lower Limbs Deep Vein Thrombosis at the University Hospital of Brazzaville (The Republic of the Congo). *World Journal of Cardiovascular Diseases*, 13, 845-853.

<https://doi.org/10.4236/wjcd.2023.1312073>

**Received:** November 22, 2023

**Accepted:** December 19, 2023

**Published:** December 22, 2023

Copyright © 2023 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

The aim of this study was to describe the characteristics of patients with deep vein thrombosis (DVT) of the pelvic limbs at the time of diagnosis, and their course after hospitalization, in order to improve the management of DVT in our context. This was a descriptive longitudinal study, based on cases of deep vein thrombosis recorded between 1 January 2015 and 30 September 2018, in the cardiology and internal medicine department of the Brazzaville University Hospital Centre. During the study period, 4678 patients were hospitalized, including 52 with DVT. Thirty-three were reassessed. The frequency of DVT was 1.1% and the average hospitalization rate was 13.9 cases/year. The 33 patients were divided into 20 women and 13 men (sex ratio: 0.65). The mean age of the patients was  $51.4 \pm 17.8$  years (extremes: 16 and 85 years). The main aetiological factors were cancer (19.1%), sickle cell disease (3%) and HIV immunosuppression (3%). The predominant risk factors were: prolonged immobilization (42.9%), pregnancy, long travel and obesity in the same number of cases ( $n = 3$ , *i.e.* 14.2%). The DVT involved the left pelvic limb in 75.8% of cases. Anticoagulants were administered in all patients, and compression stockings were worn in 97% of cases. The mean time to re-evaluation was  $10.9 \pm 9.4$  months (extremes: three and 35 months). The mean measurements of the limb where the thrombosis had occurred at diagnosis and reassessment showed a significant difference. Venous Doppler showed compressible veins (60.6%), varicosities (36.3%), incompressible veins (30.3%) and thrombus (21.2%). Complications were: post-phlebotic disease (42.4%), death (21.2%), pulmonary embolism (18.2%), recurrence

(18.2%). The DVT remains relatively rare, and its conventional therapeutic management is satisfactory. Systematic venous Doppler ultrasound reassessment should enable patients at risk of recurrence to be identified.

## Keywords

Deep Vein Thrombosis, Reassessment, Complications, Congo

---

## 1. Introduction

Deep vein thrombosis (DVT) of the pelvic limbs and pulmonary embolism (PE) are two clinical manifestations of the same clinical entity: thromboembolic venous disease. Thromboembolic venous disease is a vascular emergency because of the immediate risk of life-threatening PE [1]. In addition to the acute episode, it can also lead to post-phlebotic disease resulting in venous insufficiency, varicose veins or trophic disorders [1]. DVT is common in Europe, where the annual incidence is estimated at 120 per 100,000 population [1]. In Africa, the rarity of the condition has been highlighted by several authors, with Boukinda *et al.* [2] referring to two cases of DVT of the lower limbs in Congo Brazzaville in 1996 as a “clinical curiosity in black Africa”. Six years later, Kingue *et al.* [3] reported 18 cases collected over two years in Yaoundé. For nearly fifteen years, the hospital incidence of DVT has been rising sharply in several sub-Saharan African countries, ranging from 1.1% to 4.9% [4]-[9]. This is due as much to the possibility of D-dimer testing as to the availability of Computed Tomography (Scanner) and vascular ultrasound skills [9]. Several authors in Europe have studied the outcome of patients with DVT, making it possible to identify those at higher risk of complications [10] [11] [12] [13]. In sub-Saharan Africa, few studies have focused on the same aspect [14]. We conducted this preliminary study with the order to improve the management of DVT in our context, by presenting the characteristics of patients at the time of diagnosis and their outcome after hospitalization.

## 2. Patients and Methods

A longitudinal and descriptive study was conducted in the cardiology and internal medicine department of the Centre Hospitalier Universitaire de Brazzaville, based on cases of deep vein thrombosis (DVT) recorded between 1 January 2015 and 30 September 2018, a period of three years and nine months.

Patients admitted for pelvic limb DVT who were reassessed after hospitalization were included. The diagnosis of pelvic limb DVT was based on a warm, painful, swollen limb with or without Homans’ sign (measurements were taken using a metric tape). Other signs included a fever of around 38°C and a tachycardia clearly dissociated from the temperature level (Malher’s climbing pulse). This diagnosis was confirmed on venous Doppler ultrasound, given the presence

of thrombus and/or venous incompressibility.

During the study period, 4678 patients were admitted to hospital, including 52 with deep vein thrombosis of the pelvic limbs, and only 33 of these were reassessed because of many difficulties in follow-up (patients lost to follow-up).

Reassessment was both clinical and paraclinical, using a Toshiba or Esaote venous Doppler ultrasound system with a 7.5 MHz probe. Ultrasound exploration focused on the venous territory where the thrombosis had occurred. A simple morphological analysis in two-dimensional mode was carried out and a haemodynamic study by Doppler (pulsed, colour). The aim of this investigation was to look for endoluminal material (thrombus), venous incompressibility (indicating incomplete repermeabilisation of the vein) and valvular incontinence. The measurements of the pelvic limbs (thigh, calf, and ankle) were made by using the measuring tape during physical examination.

For each patient, sociodemographic variables (frequency, age, sex, profession), clinical variables (risk factors for venous thromboembolism, associated comorbidities), paraclinical variables (vascular ultrasound data), and evolutionary variables (recurrence of DVT, pulmonary embolism or post-phlebotic disease) were studied.

Data were entered and analyzed using Epi Info software version 3.5.4. Quantitative variables were expressed as mean  $\pm$  standard deviation, and qualitative variables as headcount and percentage. The Kruskal-Wallis test was used to compare the data, and the difference was significant for  $p < 0.05$ .

### 3. Results

The incidence of deep vein thrombosis (DVT) of the pelvic limbs was 1.1%, with an average hospitalization rate of 13.9 cases per year. The thirty-three patients were divided into 20 women (60.6%) and 13 men (39.4%), giving a sex ratio of 0.6. The mean age of the patients was  $51.4 \pm 17.8$  years (extremes: 16 and 85 years). The main aetiological factors were cancer (19.1%), sickle cell disease (3%) and HIV immunosuppression (3%). The predominant risk factors were: prolonged immobilisation (42.9%), pregnancy, long travel and obesity in as many cases ( $n = 3$ , *i.e.* 14.2%). DVT involved the left pelvic limb in 75.8% of cases. Anticoagulants were administered to all patients, and compression stockings were worn in 97% of cases. The main characteristics of patients at the time of diagnosis are shown in **Table 1**.

The mean time to reassessment was  $10.9 \pm 9.4$  months (extremes: three and 35 months). The mean measurements of the limb where the thrombosis had occurred at diagnosis and at reassessment showed a significant difference (**Table 2**).

Venous Doppler showed compressible veins (60.6%), varicosities (36.3%), incompressible veins (30.3%) and thrombus (21.2%).

The course was marked by recovery without sequelae in 12 cases (36.4%). Post-phlebotic disease was the main complication in 14 cases (42.4%). **Table 3** shows the complications of DVT observed during follow-up.

**Table 1.** Main characteristics of the patients at the time of diagnosis.

<b>Age (years)</b>	51.4 ± 17.8
<b>Gender, n (%)</b>	
Female	20 (60.6)
Male	13 (39.4)
<b>Aetiological factors, n (%)</b>	
Cancer	3 (9.1)
HIV infection	1 (3.0)
Sickle Cell disease	1 (3.0)
<b>Risk factors, n (%)</b>	
Prolonged immobilization	9 (43.0)
Pregnancy	3 (14.2)
Obesity	3 (14.2)
Long trip	3 (14.2)
Interruption of VK A treatment	2 (9.7)
Compressive uterine myoma	1 (4.8)
<b>Previous DVT, n (%)</b>	4 (12.1)
<b>DVT location, n (%)</b>	
Left	25 (75.8)
Right	8 (24.2)

AVK: vitamin K antagonist; DVT: deep vein thrombosis; HIV: human immunodeficiency virus.

**Table 2.** Average pelvic limbs measurements.

	At the time of diagnosis	At reassessment	p
Thigh (cm)	49.3 ± 5	45.5 ± 4.1	0.02
Calf (cm)	38 ± 3.3	35.2 ± 4	0.02
Ankle (cm)	26.7 ± 5.8	23 ± 4.8	0.01

**Table 3.** Complications observed during follow-up.

	N	%
Post-phlebotic disease	14	42.4
Death	7	21.2
Pulmonary embolism	6	18.2
Recurrence of DVT	6	18.2

DVT: Deep vein thrombosis.

## 4. Discussion

### 4.1. Patient Characteristics at Diagnosis

The incidence of DVT was 1.1% in our study, as previously in the same department [4]. There was also little change in the annual incidence of the condition: 13.8 cases compared with 14.7 previously [4]. Adjenou *et al.* [9] in Togo reported a higher incidence of 41.2 cases per year. This may be explained by the emergence of risk and/or aetiological factors, also observed in sub-Saharan Africa, in addition to the increase in ultrasound diagnostic performance [4] [5] [6] [7] [8] [15] [16] [17].

As in our work, with 42.4% of 35 - 45 year olds, the condition is more common in young adults in sub-Saharan Africa [3] [5] [7] [8]. However, the predominance of gender varies. It was female in Brazzaville, as in our study and previous ones [4] [18], and male in Lomé [9] and Yaoundé [3]. We made the same observation as Ondze *et al.* [4] and Ikama *et al.* [18] in the Congo, regarding the existence of favourable factors that need to be combated to prevent recurrence. These include prolonged immobilization and obesity. With regard to aetiological factors, cancer and HIV infection have been observed in several African series [4] [6] [17], including our own. On the other hand, constitutional thrombophilia factors have rarely been investigated [3] [4] [5] [6] [7] due to under-equipped laboratories, a fact that we would also like to emphasize. The search for aetiological factors is fundamental in DVT cases, and their eventual management helps to prevent recurrences.

Venous Doppler provides diagnostic certainty by showing the direct image of the thrombus and its location. The frequently left-sided topography of the condition noted in our study is reported in the literature [1] [5] [7] [17] [19] [20]. In our study, DVT was proximal 54 times and distal 38 times. Proximal DVT is more likely to result in a potentially fatal PE. It is therefore recommended that anticoagulant therapy be optimized and that modifiable risk factors for DVT, such as obesity and a sedentary lifestyle, be addressed [1] [19] [20]. In addition, therapeutic education for carers on the prophylaxis of venous thromboembolism is essential [18] [21]. This concerns at-risk patients hospitalized on prolonged bed rest in medicine, orthopaedic surgery and gynaecology-obstetrics departments.

In terms of complications, PE was the most common in several series from sub-Saharan Africa [3] [4] [5]. In our work, no cases of death were noted in patients seen at the time of diagnosis. Case fatality in other African series ranged from 2.7% to 16%, most often due to PE [3]-[9]. It has been established that anticoagulant therapy and the use of compression stockings are fundamental elements in the treatment of DVT to prevent complications [1] [19] [20]. Direct oral anticoagulants are currently prescribed mainly for patients with active cancer (VKAs being less effective and poorly tolerated) or for any patient who does not wish to undergo restrictive biological monitoring. Because of their cost and the absence of health insurance, we did not prescribe them to our patients. In cases where thrombus has recently set in, thrombectomy may be performed to

reduce the incidence of post-phlebotic disease, as emphasized in Korea [22].

#### 4.2. Reassessment of Patients after Hospitalization

This involved 33 patients. The mean time to reassessment was  $10.9 \pm 9.4$  months (extremes: 3 and 35 months). Based on European and African longitudinal studies of the outcome of patients with DVT, it has been possible to identify patients at higher risk of complications [10] [11] [12] [13] [14].

Post-phlebotic disease (PVD) was the most frequent complication for Strandness *et al.* [11]: 67% of the 61 patients in their series. However, we observed this complication in 42.4% of cases, data comparable to those of Beyth *et al.* [10]. Post-phlebotic ulcers, the final stage of the condition, are more difficult to heal and have major repercussions on patients' quality of life, hence the need to prevent them [23]. Recurrence, another complication of DVT, is not uncommon [1] [24] [25]. It was observed in 18.2% of our cases, 16.2% of those of Kabore *et al.* in Ouagadougou [14] and 15% of the 124 cases of Beyth *et al.* [10]. Significantly higher rates were noted in Austria [24] and Brazil [26]: 30.7% and 40% respectively. The high risk of DVT recurrence is linked to the existence of risk factors in a patient [12] [25] [27]. These risk factors are: idiopathic nature, proximal location of the thrombosis, presence of cancer or antiphospholipid syndrome, short-term treatment with VKAs, or residual thrombus obstructing 40% of the lumen of the vein concerned at the end of anticoagulant treatment [24] [28] [29]. The role of venous Doppler ultrasound is therefore crucial in assessing patients at the end of treatment. In our 33 patients reviewed by Doppler ultrasound, we noted varicosities (36.3%), incompressible veins (one third of cases) and residual thrombus (18.2%). In contrast, Strandness *et al.* [11] observed residual thrombus in 40% of the 61 patients in their series, a finding which may be both operator-dependent and linked to the performance of the diagnostic tool.

The limitations of our work also lie in the laboratory tests which were not carried out for technical reasons, such as the search for constitutional thrombophilia or an increase in coagulation factors. In addition, the D-dimer assay was not performed in our study when VKAs were discontinued. According to the literature [1] [19] [20] [25], a negative D-dimer test is a decisive factor in ruling out a recurrence of DVT. Other etiological factors for DVT in our study were cancer (three cases), sickle cell disease (one case) and HIV infection (one case).

Pulmonary embolism (PE) is a major complication of DVT and is closely associated with death, especially in patients with severe DVT and proximal thrombosis [1] [19] [20]. In several of our cases, the thrombus was located in the iliac or femoral vein. In addition, all of our six cases (18.2%) of recurrence were complicated by fatal PE. It is therefore important to combat the risk factors for recurrent DVT [30]. Other authors have recently reported cases of DVT and PE as complications of Chinese acupuncture [31]. This is reminiscent of the parietal lesion described by Virchow in the development of DVT [1] [23]. According to Spencer *et al.* [13], patients who had suffered a PE had similar rates of recur-

rence of PE or isolated DVT. According to the same authors, mortality was higher at one month in cases of PE up to three years, hence the need to identify high-risk patients for appropriate anticoagulation strategies [1] [19] [20].

Death occurred in seven of our patients (21.2%), six of whom were associated with PE on the basis of clinical data, subject to autopsy. For Beyth *et al.* [10], the rate was 17% in the first year and 39% at five years. Death is strongly associated with PE [10] [11] [12] [19] [20].

36.3% of our patients recovered without any clinical sequelae. This figure was 8% in the series by Strandness [11], which included 61 cases of DVT.

## 5. Conclusion

The incidence of deep vein thrombosis of the pelvic limbs is low in our department. It is predominantly female and occurs preferentially on the left side of the body. Conventional treatment is satisfactory. However, it is difficult to follow up after treatment, partly because of the limitations of laboratories which do not allow research into constitutional thrombophilia factors. In addition, the fact that D-dimer tests and venous Doppler ultrasound are not systematically performed means that patients at high risk of recurrence cannot be identified. This explains the high frequency of complications, dominated by post-phlebotic disease, and secondarily by recurrence of DVT, pulmonary embolism, and death.

## 6. Study Limitations

The limitations of our study are in the laboratory test not carried out for technical reasons such as the search for constitutional thrombophilia, an increase in coagulation factors. Furthermore, the determination of D-dimers at a distance from the stopping of the vitamin K antagonists was not carried out in our study. According to the data in the literature, the negativity of D-dimers is a determining factor for excluding a recurrence of deep vein thrombosis.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- [1] Delsart, D., Girard, G., Moulin, N., Rivron-Guillot, K. and Décousus, H. (2008) Thrombose Veineuse: Diagnostic et Traitement. *EMC—Urgenze*, **12**, 1-14. [https://doi.org/10.1016/S1286-9341\(08\)70021-8](https://doi.org/10.1016/S1286-9341(08)70021-8)
- [2] Boukinda, F., Planchon, B. and Okondza, J. (1996) La thrombophlébite profonde des membres inférieurs: une curiosité clinique en Afrique noire, notre expérience à Brazzaville. *Médecine d'Afrique Noire*, **2**, 62-65.
- [3] Kingue, S., Binam, F., Teyang, A., Tagny-Zukam, D., Nouedoul, C. and Muna, W.F.T. (2002) La maladie thrombo-embolique veineuse au Cameroun. *Medecine Tropicale*, **62**, 47-50.
- [4] Ondze-Kafata, L.I., Kouala Landa, C.M., Traoré-Kissima, A., Loumouamou, M.,

- Bani, M., Amounya-Zobo, S., *et al.* (2013) La thrombose veineuse des membres inférieurs à Brazzaville: A propos de 44 cas. *Cardiologie Tropicale*, **135**, 1-13.
- [5] Sangare, I., Menta, I., Ba, H.O., Fofana, C.A., Sidib, N., Sogodogo, A., *et al.* (2015) Thrombophlébite des membres dans le service de cardiologie du CHU Gabriel Touré. *Mali Médical*, **30**, 3-6.
- [6] Coulibaly, S., Menta, I., Diall, I.B., Ba, H.O., Diakité, M., Sidibé, S., *et al.* (2018) Maladie thromboembolique veineuse dans le service de Cardiologie du CHU du Point G à Bamako. *Health Sciences and Diseases*, **19**, 27-30.
- [7] Mbaye, A., Dioum, M., Ngaide, A.A., Leye, M., *et al.* (2016) Venous Thromboembolic Disease: Prevalence, Etiological Factors and Management in Cardiology Department of Dakar in Senegal. *Angéiologie*, **68**, 47-53.
- [8] Konin, C., Adoh, M., Kramoh, E., Aevouelie-Kouassi, F., Anzouan-Kacou, J.B., Nguetta, R., *et al.* (2004) Les thromboses veineuses profondes des membres inférieurs en milieu tropical: Aspects épidémiologiques et facteurs étiologiques. *Médecine d'Afrique Noire*, **51**, 469-473.
- [9] Adjenou, K., Tchaou, M., Sonhayé, L., Djagnikpo, O., Agoda-Koussema, L.K., Damorou, F., *et al.* (2012) Echographie Doppler couleur dans la thrombose veineuse profonde des membres inférieurs à Lomé (Togo). *JAIM*, **3**, 1-2.
- [10] Beyth, R.J., Cohen, A.M. and Landefeld, C.S. (1995) Long Term Outcomes of Deep Vein Thrombosis. *Archives of Internal Medicine*, **155**, 1031-1037.  
<https://doi.org/10.1001/archinte.1995.00430100053006>
- [11] Strandness, D.E., Langlois, Y., Cramer, M., Randlett, A. and Thiele, B.L. (1983) Long Term Sequelae of Acute Venous Thrombosis. *JAMA*, **25**, 1289-1292.  
<https://doi.org/10.1001/jama.1983.03340100023022>
- [12] Prandoni, P., Lensing, A.W.A., Cogo, A., Cuppini, S., Villata, S., Carta, M., *et al.* (1996) The Long-Term Clinical Course of Acute Deep Venous Thrombosis. *Annals of Internal Medicine*, **125**, 1-7.  
<https://doi.org/10.7326/0003-4819-125-1-199607010-00001>
- [13] Spencer, F.A., Gore, J.M., Lessard, D., *et al.* (2008) Patient Outcomes after Deep Vein Thrombosis and Pulmonary Embolism. The Worcester Venous Thromboembolism Study. *Archives of Internal Medicine*, **168**, 425-430.  
<https://doi.org/10.1001/archinternmed.2007.69>
- [14] Kabore, H.W.P., Mandi, G.D., Yaméogo, A.R., Bamouni, J., Kologo, J.K., Yaméogo, V.N., *et al.* (2017) Incidence and Causes of Venous Thromboembolism Recurrence in Sub-Saharan Africa. *Sang Thrombose Vaisseaux*, **29**, 195-202.  
<https://doi.org/10.1684/stv.2017.0989>
- [15] Baragou, S., Djibril, M., Pio, M., Assouka, M., Pessinaba, S., Damourou, F., *et al.* (2012) Hyperhomocystéinémie et maladie thrombo-embolique veineuse chez l'adulte noir togolais. *Cardiac Troponins*, **33**, 13-17.
- [16] Diallo, B.A., Yéna, S., Diall, I.B., Diakité, S., Sanogo, K., Keita, L., *et al.* (2008) Les phlébites des membres inférieurs en milieu hospitalo-universitaire malien. *African Annals of Thoracic and Cardio-Vascular Surgery*, **3**, 66-69.
- [17] Pio, M., Baragou, S., Afassinou, Y., Pessinaba, S., Atta, B., Hachimou, A., *et al.* (2013) Actualité sur la maladie thromboembolique veineuse au CHU Sylvanus Olymp de Lomé. *Journal de la Recherche Scientifique de l'Université de Lomé*, **15**, 33-38.
- [18] Ikama, M.S., Nkoua, M.F., Gombet, T.R., Makani, J., Mongo-Ngamami, S., Ondze-Kafata, L.I., *et al.* (2016) Evaluation du risque de maladie thromboembolique



- veineuse et de sa prévention chez des patients hospitalisés à Brazzaville. *Journal des Maladies Vasculaires*, **41**, 182-187. <https://doi.org/10.1016/j.jmv.2016.02.001>
- [19] Léger, P., Barcat, D., Boccalon, C., Guilloux, J. and Boccalon, H. (2004) Thromboses veineuses profondes des membres inférieurs et de la veine cave inférieure. *EMC—Cardiologie-Angéiologie*, **1**, 80-96. <https://doi.org/10.1016/j.emcaa.2003.11.002>
- [20] Attias, D., Besse, B. and Lellouche, N. (2013) Maladie veineuse thromboembolique: Thrombose veineuse profonde et embolie pulmonaire. *Cardiologie vasculaire*, Éditions Vernazorbès-Gregoire, Paris, 159-194.
- [21] Naibe, D.T., Kabore, H., Samadoulougou, A., Yameogo, R.A., Millogo, G., Yaméogo, N.V., et al. (2014) Pratique de la prophylaxie de la maladie thromboembolique veineuse: Enquête réalisée auprès des professionnels de santé de la ville de Ouagadougou. *The Pan African Medical Journal*, **19**, Article No. 395. <https://doi.org/10.11604/pamj.2014.19.395.5474>
- [22] Seung-Kee, M., Young Hwan, K., Jin Hyun, J., Jin Mo, K., Ui Jun, P., Hyung-Kee, K., et al. (2016) Diagnosis and Treatment of Lower Extremity Deep Vein Thrombosis: Korean Practice Guidelines. *Vascular Specialist International*, **32**, 77-104. <https://doi.org/10.5758/vsi.2016.32.3.77>
- [23] Guanella, R. (2013) Syndrome post-thrombotique: La complication négligée de la maladie thromboembolique veineuse. *Revue Médicale Suisse*, **9**, 321-325.
- [24] Kyrle, P.A., Minar, E., Bialonczyk, C., Hirsche, M., Weltermann, A. and Eichinger, S. (2004) The Risk of Recurrent Venous Thromboembolism in Men and Women. *The New England Journal of Medicine*, **350**, 2558-2563. <https://doi.org/10.1056/NEJMoa032959>
- [25] Hansson, P.O., Sörbo, J. and Eriksson, H. (2000) Recurrent Venous Thromboembolism after Deep Vein Thrombosis. *Archives of Internal Medicine*, **160**, 769-774. <https://doi.org/10.1001/archinte.160.6.769>
- [26] Labropoulos, N., Spentzouris, G. and Sobreira, M.L. (2010) Clinical Significance of Recurrent Venous Thromboembolism. *Jornal Vascular Brasileiro*, **9**, 72-75. <https://doi.org/10.1590/S1677-54492010000200010>
- [27] Rosencher, J., Mirault, T., Martinez, I., Zhu, T., Messas, E. and Emmerich, J. (2011) Facteurs de risque de récurrence de la maladie thromboembolique veineuse. *Revue des Maladies Respiratoires*, **28**, 453-462. <https://doi.org/10.1016/j.rmr.2010.10.036>
- [28] Dargaud, Y. (2008) Quelle est la durée optimale du traitement anticoagulant après une thrombose veineuse profonde? *Blood*, **112**, 511-515.
- [29] Visweshwar, N., Jaglal, M. and Sokol, L. (2017) Recurrent Venous Thromboembolism—Its Causes, Prevention and Management. *Hematology & Transfusion International*, **5**, 180-183. <https://doi.org/10.15406/htij.2017.05.00109>
- [30] Anderson, F.A. and Spencer, F.A. (2003) Risk Factors for Venous Thromboembolism. *Circulation*, **107**, 9-16. <https://doi.org/10.1161/01.CIR.0000078469.07362.E6>
- [31] Dang, B.S.C. and Yeung, M.S.C. (2016) Deep Vein Thrombosis and Pulmonary Embolism as a Complication of Traditional Chinese Acupuncture and Cupping. *The Canadian Journal of General Internal Medicine*, **10**, 46-49. <https://doi.org/10.22374/cjgim.v10i4.83>