

Do Pulmonary Thromboemboli Have any Relation with Seasonal Variation? (Cross Sectional Study in North- West Iran)

Pulmoner Tromboembolizmin Mevsimsel Değişikliklerle Bir İlişkisi Var mıdır? (Kuzeybatı İran'dan Kesitsel bir Çalışma)

Hasan Amiri, Samad Shams Vahdati, Mona Alikhani, Armin Nehzati, Mojan Ahmadi, Sahar Salek Zamani, Negin Nejad Ettehad, Leila Rasi Marzabadi
Department of Emergency, Imam Reza Hospital, Tabriz University of Medical Science, Tabriz, Iran

Abstract

Objective: In some studies, the effect of seasonal variations on the incidence of disease is proven. Seasonal variation is discussed in the development of pulmonary thromboembolism (PTE) because the effect of these variations on the incidence of PTE disease was different according to different studies, The results of the studies which have been done so far have not shown any relation. The purpose of this study is to determine whether seasonal variations have any effect on the incidence of pulmonary thromboembolism.

Materials and Methods: This research is a cross sectional study carried out on 158 hospitalized patients who were diagnosed as PTE between 2007 and 2008 in the Imam Reza educational and remedial center in Tabriz. Descriptive analysis is run on all variables and Chi-square method is used in evaluation of the difference among the groups.

Results: In this research 158 patients, who were diagnosed as suffering from PTE, were examined. The highest rate of incidence was in Spring and the rates of incidence in seasons in order are as follows: Spring 46 (29.1%) patients, Winter 42 (26.6%), Autumn 35 (22.2%), and Summer 35 (22.2%). In this study no sign of any meaningful difference in the number of patients in the different seasons was observed (P=0.32).

Conclusions: In this study on 158 patients suffering from PTE, no meaningful relation between the seasons and the incidence of PTE was found. Studies with more samples are needed to support the finding and effects of seasonal variations on PTE. (*JAEM 2010; 9: 113-6*)

Key words: Pulmonary thromboembolism, seasonal variations, incidence

Received: 05.05.2010

Accepted: 05.07.2010

Özet

Amaç: Bazı çalışmalarda, Hastalıkların mevsimsel değişikliği kanıtlanmıştır. Farklı çalışmalarda Pulmoner Tromboembolizmin insidansının mevsimsel değişiklik gösterdiği ve bazı mevsimlerde arttığından bahsedilmiştir. Ancak bugüne kadar yapılan çalışmalarda bir ilişki gösterilememiştir. Bu çalışmanın amacı, Pulmoner Tromboembolizmin mevsimsel değişikliklerle herhangi bir bağlantısı olup olmadığını araştırmaktır.

Gereç ve Yöntemler: Bu kesitsel çalışma 2007-2008 yıllarında Tebriz İmam Rıza Eğitim ve Araştırma Hastanesi'ne Pulmoner Tromboemboli nedeni ile başvuran ve hastaneye yatırılan 158 hastada yapıldı. Tüm değişkenler üzerinde betimsel analiz yapıldı ve sonuçlar ki-kare yöntemi ile karşılaştırıldı.

Bulgular: Bu çalışma Pulmoner Tromboemboli tanısı alan 158 hastada yapıldı. Görülme sıklığı en sık olan mevsim ilkbahardı. Sırayla oranlar: İlkbahar; 46 (%29.1) hasta, Kış; 42 (%26.6), Sonbahar 35 (%22.2) ve Yaz; 35 (%22.2) idi. Bu çalışmada hastalar arasında istatistiki olarak mevsimsel bir fark bulunamadı (P=0.32).

Sonuçlar: Bu çalışmada 158 hasta pulmoner tromboemboli tanısı almıştır. Bu hastalarda mevsimsel herhangi bir farklılık bulunamamıştır. Mevsimsel farklılıkları tespit edebilmek için daha fazla çalışmaya ihtiyaç vardır. (*JAEM 2010; 9: 113-6*)

Anahtar kelimeler: Pulmoner tromboembolizm, mevsimsel bağlantı, insidans

Alındığı Tarih: 05.05.2010

Kabul Tarihi: 05.07.2010

Introduction

Thromboembolism in the respiratory system is one of the main causes of sudden death and is an incident reason for death in hospitalized patients who presented with different and non-exclusive symptoms. Because of this, clinically diagnosing the disease is both difficult and significant. Less than half the cases in whom the physicians suspected PTE were proved correct at autopsy (1).

Almost half of the patients with pelvic vein thrombosis or lower organ deep proximal vein thrombosis suffer from PTE with no symptoms. Among these, leg vein thrombosis alone has less risk of PTE. Noting the incidence of PTE and specially the acute form, it seems essential to identify the risk factors and take preventative measures before the operation. According to epidemiologic studies so far, several risk factors for PTE are distinguished. These factors are: surgery, age, gender, heart failure, past record of thromboembolism, direct trauma to the lower organs, oral contraceptives, and hospitalization (2).

While emphasizing the importance of identifying the PTE risk factors, researchers are still attempting to find other risk factors. According to one existing hypothesis, seasonal variations affect events related to vessels, such as heart attack, cerebral apoplexy and PTE. As some epidemiologic studies have shown, the incidence of the disease is higher during the cold seasons of the year (3, 4).

Seasonal variations are discussed in the progression of PTE, since these variations affected the incidence of PTE differently in different studies. This relation has not been clarified in studies done so far. This study is devised based upon the effect of seasonal variations on the incidence of PTE.

Materials and Methods

This study is a cross sectional descriptive-analytic project in which the sampling procedure is enumeration.

158 patients who were hospitalized in the Imam Reza educational and remedial center from April 2007 to March 2008 and whose PTE was confirmed and treated, entered this study.

In this study the warm season is from May to November and the cold season is from November to May. The study tool was a check list filled by the researcher. When the PTE was confirmed and the patient entered the study, the researcher answered the questions of the check list based upon the information gained from relatives or the patient’s file.

This check list consists of questions about the demographic features such as age, gender, habitation locality, month and season of being affected by the disease (Table1).

PTE was confirmed by CT angiography.

The acquired data were analyzed in the SPSS 15.0 statistical system with descriptive statistical procedure analectic chi-square.

In this study P is considered significant when less than 0.05.

Results

In this study 158 patients, of whom 83 (52.2%) were males and 75 (47.5%) females, suffering from PTE were examined. The average age of the patients was 56.99±18.29 years, the mean was 60, the youngest was 17 and the oldest 70.

Table 1. Check list

Age:			
Gender:	Male <input type="checkbox"/>	Female <input type="checkbox"/>	
Address:	City resident <input type="checkbox"/>	Rural resident <input type="checkbox"/>	
Residency:			
Tabriz <input type="checkbox"/>	East Azarbaijan <input type="checkbox"/>	Neighbouring province <input type="checkbox"/>	
Month:	April <input type="checkbox"/>	May <input type="checkbox"/>	June <input type="checkbox"/>
	July <input type="checkbox"/>	August <input type="checkbox"/>	September <input type="checkbox"/>
	October <input type="checkbox"/>	November <input type="checkbox"/>	December <input type="checkbox"/>
	January <input type="checkbox"/>	February <input type="checkbox"/>	March <input type="checkbox"/>
Season:			
Spring <input type="checkbox"/>	Summer <input type="checkbox"/>	Fall <input type="checkbox"/>	winter <input type="checkbox"/>

132 (83.5%) patients lived in cities and 26 (16.5%) lived in villages. No meaningful relation was found between living in a city or a village and the incidence of the disease between the two genders (P=0.177). Regarding the place of inhabitation, 86 (54.4%) were from Tabriz, 65 (41.1%) from Eastern Azarbayjan, and the remainder from the nearby provinces.

Among the months of the year, the most cases were seen in January with 21 (13.3%) patients.

The next highest incidence was in May and July, with 19 (12%) patients each.

Comparing the incidence of PTE in the four seasons, rates in order are: Spring, Winter and then Autumn and Summer, with 46 (29.1%) patients in Spring, 42 (26.2%) in Winter, 35 (22.2%) in Autumn and 35 (22.2%) in Summer.

Inspection of the proportion comparison test showed that the number of patients in the different seasons of the year is not meaningful from the statistical aspect (P=0.32). Despite this fact, from the total number of 46 cases, the lowest number of patients was 12 in April and the highest number was in May, and in Summer the lowest number was 4 patients in September and the highest was 19 patients in July. In Autumn, the lowest and highest numbers were 6 patients in October and 16 patients in December. Finally, in Winter there were 9 patients in March and 21 patients in January.

The incidence of PTE during the 12 months of the year is illustrated in Figure 1.

The highest incidence in the female group was in Winter (28%) and in the male group this was in Spring (32.5%).

On examining the incidence of the disease between the two genders during the four seasons in chi-square statistic test, no meaningful difference was found (P=0.681).

Figures 2 and 3 illustrate the seasonal incidence of the PTE in Tabriz, Eastern Azarbayjan, and the nearby provinces.

The majority of the cases living in cities were seen in spring (27.3%) and then in winter (26.5%).

Among those from villages, the most cases were seen in Spring (38.5%) and then in Winter (26.9%).

Figure 3 illustrates the incidence of PTE in different seasons of the year among patients living in cities and villages. The results of analytic chi-square test showed no meaningful difference between patients living in cities and those living in villages regarding the incidence of the disease in the 4 seasons of the year.

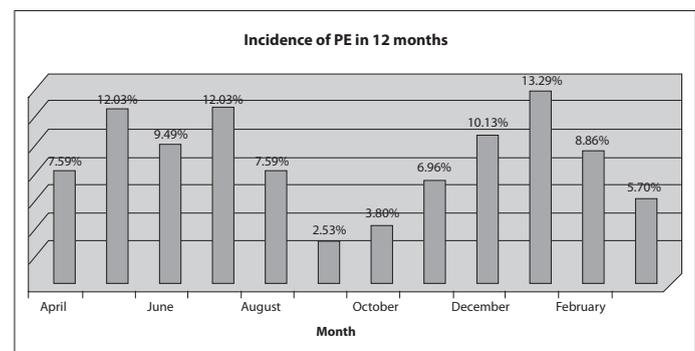


Figure 1. Incidence of PE in the 12 months of the year

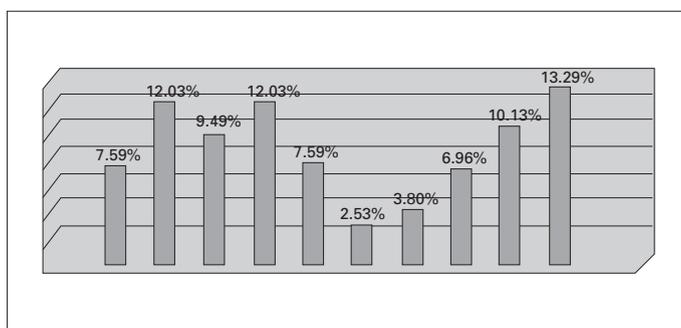


Figure 2. Incidence of PE in East Azarbaijan and neighbouring province

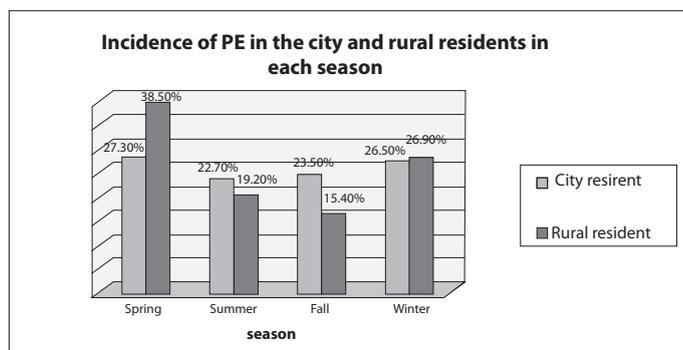


Figure 3. Incidence of PE in the city and rural residents in each season

Discussion

Different studies evaluating the difference between seasonal variations and the occurrence of vein thrombosis have been carried out so far. In this study the incidence and relationship between seasonal variations and incidence of thromboembolism in the pulmonary artery are evaluated.

Although the results of some studies prove that the incidence of thromboembolism increases evidently in some seasons, others reject this and believe that there is no meaningful relationship between the incidences of diseases in different seasons.

On this basis, along with a review of the results of some studies, we also analyzed the result of this study.

Bilora and his colleagues in their studies found an effective relationship between seasonal variations and non fatal pulmonary thromboembolism. In his other examination of deep veins thrombosis, the relationship with seasonal variation was proved as well (3, 4).

Funda Öztuna in her studies states that in recent years the high incidence of vein thrombosis in cold seasons is emphasized, but in some studies she considered these seasonal variations ineffective in the incidence of PTEs. Besides, in her study she reported the highest rate of PTE in May. In comparing different seasons, the highest incidence was in Spring and Fall. In this study, the meaningful relationship between the incidence of the disease and the pressure of the atmosphere and humidity was also found (5).

Allan T.M. and his colleagues in their studies mentioned that seasonal variations are effective in the occurrence of PTE (6).

This relationship, however, was rejected by Bounameaux and his colleagues in one large study which was carried out in 1996 (7).

Fabrice Boulay and his colleagues examined files of the deep vein thrombosis (DVT) patients during 4 years (1995-1998) in France. In this study the rate of hospitalization due to DVT and PTE in Winter was higher than in Summer (8). In his studies he mentioned that cold weather and the decrease in mobility by reason of coldness lead to reduced blood flow which would increase the possibility of thrombosis.

Fin AM and his colleagues carried out their study on 905 DVT patients from 1996 to 2000, and analyzed the relationship between different seasons of the year and the location of the thrombus, as well as the seasonal incidence of DVT. In this study the rate of DVT during the cold half of the year was meaningfully higher than the hot half of the year. Besides, in the cold seasons, the DVT of the distal regions was meaningfully higher than the proximal regions (9).

In contrast to Fin's findings and other scientists' about the relationship between seasonal variations and occurrence of the thromboembolism, Buanameaux believes that there is no relationship between the seasons of the year and the occurrence of DVT and he rejects this hypothesis basically (9).

The aim of this study was to determine the period of time in which the emergency departments should be ready for the patients with PTE. In our study, although the highest incidence was in Spring and Winter, no meaningful difference between the incidences of the disease in different seasons was found. Therefore, the emergency system should be ready for PTE patients at all seasons of the year.

Also, in comparing the incidence of the disease in different seasons of the year, the highest incidence of the disease was in January and then with a small difference in May and July. Thus, there is no meaningful difference between the incidences of the disease in different seasons of the year. In order to have meaningful results of the incidence in different months of the year a met analysis is required. By comparing the numbers of cases of the disease in hot and cold months of the year in this study, the result is reached that, although some studies supported the high incidence of disease in cold seasons, this study's findings state that the existence of other risk factors in hot seasons influences the rate of the incidence of the disease. While cold weather causes a decrease in mobility and increase in the risk of the occurrence of the disease, heat, dehydration and consequently increase in blood viscosity in hot seasons will also increase the occurrence of thromboembolism.

Conclusion

The results of different studies concerned with evaluation of the relationship between seasonal variations and PTE are different. It seems that the existence of some factors which are effective in the occurrence of PTE in hot and cold seasons influence this disease to a large extent, and eventually these factors prevent a large difference in incidence of this disease during different months and seasons of the year.

Conflict of Interest

No conflict of interest is declared by the authors.

References

1. Zierler BK. Ultrasonography and diagnosis of venous thromboembolism, circulation. 2004; 109: 19-14.
2. Wheatley T, Veitch PS. Recent advances in prophylaxis against deep vein thrombosis. *Br J Anaesth* 1997; 78: 118-20.
3. Bilora F, Manfredini R, Petrobelli F, Vettore G, Boccioletti V, Pomerri F. Chronobiology of non fatal pulmonary thromboembolism. 2001; 43: 7-10.
4. Gallerani M, Boari B, Toma D, Salmi R, Manfredini R. Seasonal variation in the occurrence of deep vein thrombosis, *Med Sci Monit* 2004; 10: 191-6.
5. Öztuna F, Özsu S, Topbaş M, Bülbül Y, Koşucu P, Özlü T. Meteorological parameters and seasonal variations in pulmonary thromboembolism. *The American Journal of emergency medicine* 2008; 26: 1035-41.
6. Allan TM, Douglas AS. Seasonal variation in deep vein thrombosis. *BMJ* 1996; 312: 1227.
7. Bounameaux H, Hicklin L, Desmarais S. Seasonal variation in deep vein thrombosis. *BMJ* 1996; 312: 284-5.
8. Boulay F, Berthier F, Schoukroun G, Raybaut C, Gendreike Y, Blaive B. Seasonal variations in hospital admission for deep vein thrombosis and pulmonary embolism: analysis of discharge data. *BMJ* 2001; 323: 601-2.
9. Fin AM, Mayer W, Steiner A. Seasonal variations of deep vein thrombosis and its influence on the location of the thrombus. *Thrombosis Research* 2001; 106: 97-100.