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Comparison of Clinical Outcome in Massive Pulmonary Embolism's Patients, between Two Groups of Thrombolytic Therapy and Non- Thrombolytic Therapy, from 2006-2011 Years in Shahid Rajaee Heart Center

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Abstract

In patients with acute pulmonary embolism, thrombolytic results in a more rapid resolution of pulmonary emboli than Heparin treatment and improved hemodynamic are clear. Whether this advantage results in an improved clinical outcome is unclear. We performed a 5-year retrospective clinical study and compared thrombolytic and non-thrombolytic treatment in patients with massive pulmonary thromboembolism (PTE). .Also in this investigation, we studied PTE incidence in Shahid Rajaee heart center, mortality rate in two groups, relationship between massive PTE with sex and age. From 80431 patients that admitted in Shahid Rajaee Heart Center in 5 years, the incidence of PTE was 41cases in 10000 patients and massive PTE was 15 in 10000 patients .There were no relationship between age and sex with massive PTE. (P Value= 0.737 and 0.408). In comparison of hemodynamic changes in before, 24 and 48 hr after treatment in thrombolytic group, there were normal reduction in PR (P Value <0.001), SPAP (P Value = 0.034) and in TRG (P Value = 0.030) and in non-thrombolytic group, we found no special changes in hemodynamic factors. Also we performed comparison between before and 24hr and before and 48hr after treatment in each groups and we observed reduction in SPAP (P Value = 0.022), TRG (P Value = 0.044) and RVD (P Value = 0.042) in before and 24hr after treatment with thrombolytic. And in before and 48hr after treatment in this group, there were reduction in DBP (P Value = 0.027), PR (P Value <0.001), TRG (P Value = 0.005) and RVD (P Value = 0.006). Also, in before and 24hr after in non-thrombolytic group, there were reduction in SBP (P Value = 0.032), DBP (P Value = 0.003), PR (P Value = 0.004) and in before and 48hr comparison in this group, we observed changes in SBP (P Value 0.005), DBP (P Value = 0.002), PR (P Value <0.001) and RVE (P Value = 0.043). In this study, we had 14 case deaths in thrombolytic group and 14 deaths in other group. In the base of this study, we found that there are no relationship between age and sex and massive PTE incidence. There is more effect in thrombolytic treatment vs. non-thrombolytic treatment in more rapid improvement hemo-dynamically but it isn't effective in decrease of mortality in massive PTE patients.

Keywords: Massive Pulmonary Embolism, Non-Thrombolytic Treatment, Thrombolytic Treatment

Introduction

Pulmonary embolism is one of the medical hurdles in the world and its destructive effects on public health interest to all communities in the world. Annual statistics of deaths in the United States and European countries with high numbers and proceed to a public information and education regarding risk factors, warning signs of pulmonary embolism, all indicate the need for special attention to this disease, predisposing factors, factors risk diagnostic procedures and therapeutic implications of it. Pulmonary embolism as a cause of mortality in communities and its health-threatening adv Intl. J. Basic. Sci. Appl. Res. Vol., 5 (1), 27-30, 2016.

Erse effects is of interest to different communities (Kucher & Goldhaber, 2005). Over the past decade, pulmonary embolism joined cardiology programs and special and advanced vocational education policy has been approved to treat pulmonary embolism (Torbicki et al., 2008). General Association of the United States of America calls for the prevention of deep vein thrombosis and pulmonary embolism have been introduced as the most preventable disease from death during hospitalization (Galson 2008). The most recently formed organizations that have offered public education and awareness of pulmonary embolism as targeted and innovative research for the prevention and treatment of pulmonary embolism (Segal et al., 2009), and because the mortality from pulmonary embolism is increasing, prevention and treatment are being pursued with seriousness and intensity (Park et al., 2009). Pulmonary embolism wide range of people, from children to people over 90 years plunges on your palate. Although adults and children who are prone to the incidence of pulmonary embolism increases with age (Naess et al., 2007). More than half of the cases of pulmonary thromboembolism are age 65 or older (Spencer et al., 2008). Women and men affected equal. About half of the cases, has been diagnosed with no known underlying cause, such as trauma, surgery, inactivity or cancer (Cushman et al., 2004). The total annual incidence of pulmonary embolism is approximately 23 to 69 cases per 100,000 populations (Konstantinides 2008). Estimates the incidence of mortality is 0.5 per 1,000. Surgical Public Association estimates that at least 100,000 deaths per year occurred due to pulmonary embolism (Janata et al., 2002). Pulmonary embolism increased pulmonary vascular resistance, increase airway resistance and decrease lung capacity and reduce systemic blood pressure, a progressive right heart failure, that these problems causes cardiogenic shock which the leading cause of mortality from this disease. Treatment and prevention of pulmonary embolism is much more difficult because the signs and symptoms of pulmonary embolism are nonspecific. Proper treatment can prevent recurrent pulmonary emboli with anticoagulant alone in low-risk patients, to inject thrombolytic with special protection from cardiovascular and respiratory systems in high-risk patients. Heparin is foundation treatment in patients with massive pulmonary embolism. The main advantage of heparin not crushed is short half-life. The anticoagulant effect fades after a few hours. This feature is especially useful for patients who underwent an invasive procedure such as embolectomy in surgical method.

The results of the study show that thrombolytic quickly solved blockages caused by pulmonary thrombosis and have positive impact on hemodynamic status and greater benefits for up to 48 hours of the onset of signs and symptoms when treatment starts with thrombolytic therapy. Also, these kinds of therapies have useful effects until 14 days (Almoosa 2002). According to the research, massive pulmonary embolism has mortality in a high percentage (50%), and although thrombolytic therapy as a treatment, option favored by many experts, but also the benefits and treatment outcomes and mortality in patients receiving treatment with thrombolytic, embolectomy and treatment with anticoagulants is not specified (Barrett et al., 2010). Many studies such prospective investigation of pulmonary embolism diagnosis, urokinase pulmonary embolism trial, urokinase-streptokinase pulmonary embolism trial plasminogen activator Italian Multicenter study were done to evaluate and the therapeutic effects of thrombolytic particularly heparin been conducted by researchers and improve right heart function, lung pressure, the rate of recurrence embolism and mortality in both groups were studied (Richard, 1970; Sasahra et al., 1974; Dalla-Volta et al., 1992; Worsley & Alavi, 1995). But in our country, Iran, according to searches conducted by researchers in the literature, including articles published in Farsi and English journals, also, Farsi and English thesis seems to be that specific and accurate statistics such as the incidence of pulmonary embolism, death rates the resulting mortality (mortality and morbidity), complications of hypertension pulmonary embolism, recurrence rates after treatment is not excited or related to specific treatment or intervention for a particular patient. As well as a no special study observed on the effectiveness of interventions and compare them to treat this important disease, hemodynamic status, check side effect of treatment with thrombolytic agents , time and cost imposed on society and length of stay in the hospital. Because the pulmonary embolism is potentially fatal disease and global health communities have specific attention to education and awareness, causes, treatment, prophylaxis and treatment strategy as well as there is has not been done research on the prevalence of pulmonary embolism, treatment strategies used in health centers country, their success rate and mortality rate in Iran, therefore For the first time this research was done. The results of this experiment can measure the efficacy of treatments and the results of this study can use in professional therapeutic decisions. The purpose of this study was Comparison of clinical outcome in massive pulmonary

embolism's patients, between two groups of thrombolytic therapy and non- thrombolytic therapy, from 2006- 2011 years in Shahid Rajaee Heart Center .

Methodology

This study was a historical cohort, and patients with pulmonary Trumbo emboli diagnosis which referred to Shahid Rejaee heart center, and under treatment with thrombolytic (Streptokinase, Urokinase, Plasminogen Activator) and non- thrombolytic treatment (uncrushed heparin, embolectomy surgery, embedded filter in the inferior vena) selected via census strategies from 2006-2011 years.

Inclusion criteria in this study were: pulmonary embolism confirmed in CT angiography of the pulmonary artery, or perfusion scan based on PIOPED be in high probability, or observed directly clot in echo cardiograph, or confirmed emboli in angiography or MRI, One of the items listed as massive embolism (dilation and severe failure in right ventricular function) is in ECO, and systolic blood pressure be equal or under 90 mmHg.

Exclusion criteria in this study were embolism patients who have died for other reasons, Patients that left the hospital without more diagnostic procedures, and Patients who do not complete their profile information.

Instruments for data collection were design by researcher. This check list included: patient demographic data, primary patient diagnosis, the final diagnosis based on records (angiography pulmonary CT scan, pulmonary angiography, eco cardiograph, perfusion scan and MRI), history and examination data (such as cough, dyspnea, tachycardia, hypertension), Results of Doppler ultra-sonography of the lower limbs (such as Thrombosis in deep veins above the knee), The results of CT angiography of the pulmonary artery (such as A clot in an artery in the right and left main branch), Echocardiography findings(such as the pulmonary artery systolic pressure), Laboratory findings (such as PT and PTT tests), treatment (such as treatment with uncrushed heparin), hemodynamic findings before the start of treatment, 24 and 48 hours later, Risk factors include unknown, heart failure, deep vein thrombosis, thromboembolism chronic orthopedic problems, surgery, cancer, use of oral contraceptives, long-distance travel, immobility, brain and central nervous system problems and obesity, death and disgorge from hospital, check the length hospital stay (the entire length of stay, a special department and the public sector).

Base on the patients list, 524 cases with primary diagnosis or pulmonary embolism were studied

during 5 years. Among these patients 332 with a final diagnosis of isolated thromboembolism and 119 patients with massive pulmonary thromboembolism, were enrolled. Data analysis through SPSS version 15 by use chi-square test,و Mann Whitney and independent T-test, Logistic and General liner regression tests, Pearson Correlation, Repeated major ANOVA, and Friedman Test .

Ethical considerations in this study were deputy permission of the research from Shahid Rajaee heart center ethics committee, and Commitment to confidentiality of the information contained in the records. Incomplete registration information of patients in medical records was one of the most important Limitations of this study.

Results

Following table descript number and percentage of patients with pulmonary embolism (massive & non-massive)

Table 1. Number and percentage of patients with pulmonary embolism.

Patient with non-massive pulmonary emboli		Patient with massive pulmonary emboli		Total patient with pulmonary emboli	
percentage	number	percentage	number	percentage	number
64.2	213	35.8	119	100	332

According to above table 35.8 % of patient had massive pulmonary emboli also, 64.2 % had with non-massive pulmonary emboli.

Following table compares changes in hemodynamic parameters in patients with venous thromboembolism in two groups of received massive pulmonary emboli and received non-massive pulmonary emboli before treatment.

Table 2. Compares changes in hemodynamic parameters in patients with venous thromboembolism in two groups of received massive pulmonary emboli and received non-massive pulmonary emboli before treatment.

variable		Total patients Mean& std. deviation	Received thrombolytic Mean& std. deviation	Received non-thrombolytic Mean& std. deviation	P- Value
		n =119	n =54	n =65	
Systolic blood pressure		119.13±24.97	115.46±22.51	121.86±25.86	0.169
Diastolic blood pressure		77.28±18.04	75.98±17.55	78.42±18.50	0.477
Pulse number		96.65±16.77	98.57±15.31	94.85±17.91	0. 244
Systolic pressure of pulmonary artery		77.88±22.13	71.35±18.62	76.60±24.69	0.346
Gradient pulmonary regurgitation		56.65±21.61	56.70±17.11	58.26±25.33	0.729
Dilated right ventricle	mild	1.8	2	1.6	0.814
	Mild to moderate	0.9	0	1.6	
	moderate	7.1	3.9	9.8	
	Moderate to sever	17.9	25.5	11.5	
	sever	71.4	68.6	68.6	
Failure right ventricular function	mild	2.7	0	4.8	0.146
	Mild to moderate	5.3	4	6.3	
	moderate	24.8	26	23.8	
	Moderate to sever	27.4	28	27	
	sever	37.2	42	33.3	

According to above table changes in hemodynamic parameters in patients with venous thromboembolism in two groups of received massive pulmonary emboli and received non-massive pulmonary emboli before treatment did not show significant difference (P- Value>.05).

Following table compares changes in hemodynamic parameters in patients with venous thromboembolism in two groups of received massive pulmonary emboli and received non-massive pulmonary emboli 24 hour after treatment.

Table 3. Compares changes in hemodynamic parameters in patients with venous thromboembolism in two groups of received massive pulmonary emboli and received non-massive pulmonary emboli 24 hour after treatment.

variable		Total patients Mean& std. deviation	Received thrombolytic Mean& std. deviation	Received non-thrombolytic Mean& std. deviation	P- Value
		n =119	n =54	n =65	
Systolic blood pressure		118.07±17.66	120.75±14.97	115.66±18.88	0.140
Diastolic blood pressure		73.76±12.15	76±10.20	71.77±12.89	0.073
Pulse number		91.11±16.96	93.80±17.12	89.16±16.86	0.169
Systolic pressure of pulmonary artery		64.60±22.40	58±21.76	80±32.16	0.040*
Gradient pulmonary regurgitation		51.53±19.67	47.93±19.92	61.60±16.74	0.190
Dilated right ventricle	mild	9.5	7.16	0	0.477
	Mild to moderate	0	0	0	
	moderate	0	16.7	22.2	
	Moderate to sever	0	0	0	
	sever	71.4	88.7	77.8	
Failure right ventricular function	mild	20.28	20	22.2	0.233
	Mild to moderate	4.2	6.7	0	
	moderate	20.8	26.7	11.1	
	Moderate to sever	20.8	20	44.4	
	sever	29.2	20	44.4	

According to above table changes in hemodynamic parameters in patients with venous thromboembolism in two groups of received massive pulmonary emboli and received non-massive pulmonary emboli 24 hour after treatment (except Systolic pressure of pulmonary artery) did not show significant difference (P- Value>.05).

Following table compares changes in hemodynamic parameters in patients with venous thromboembolism in two groups of received massive pulmonary emboli and received non-massive pulmonary emboli 48 hour after treatment.

Table 4. Compares changes in hemodynamic parameters in patients with venous thromboembolism in two groups of received massive pulmonary emboli and received non-massive pulmonary emboli 48 hour after treatment.

variable		Total patients Mean& std. deviation	Received thrombolytic Mean& std. deviation	Received non-thrombolytic Mean& std. deviation	P- Value
		n =119	n =54	n =65	
Systolic blood pressure		115.38±20.84	117.36±14.52	112.67±22.86	0.237
Diastolic blood pressure		72.18±13.50	72.84±11.50	71.17±14.48	0.531
Pulse number		83.73±17.81	83.73±19.58	48±16.32	0.939
Systolic pressure of pulmonary artery		55.28±22.04	49.29±21.73	62.91±20.39	0.128
Gradient pulmonary regurgitation		42.42±22.36	40.25±22.25	44.48±.23	0.645
Dilated right ventricle	mild	10.3	0	21.4	0.299
	Mild to moderate	10.3	0	21.4	
	moderate	17.2	26.7	7.1	
	Moderate to sever	6.9	13.3	0	
	sever	37.9	26.7	50	
Failure right ventricular function	mild	12.9	17.6	7.1	0.109
	Mild to moderate	16.4	11.8	28.6	
	moderate	25.8	23.5	28.6	
	Moderate to sever	9.7	11.8	7.1	
	sever	19.4	11.8	28.6	

According to above table changes in hemodynamic parameters in patients with venous thromboembolism in two groups of received massive pulmonary emboli and received non-massive pulmonary emboli 48 hour after treatment did not show significant difference (P- Value>.05).

Following table comparison clinical outcome of patient with massive thromboembolism in two groups of received thrombolytic and non- received thrombolytic.

Table 5. Comparison clinical outcome of patient with massive thromboembolism in two groups of received thrombolytic and non- received thrombolytic.

variable		Total patients Mean& std. deviation	Received thrombolytic Mean& std. deviation	Received non-thrombolytic Mean& std. deviation	P- Value
		n =119	n =54	n =65	
death	yes	23.6	25	20.6	0.578
	no	66.4	75	79.4	

According to above table Deaths in the two groups are equal and there is no significant difference (P-Value>05).

Discussion and conclusion

In this study, researchers compared the clinical outcomes of patients with massive pulmonary thromboembolism recipient thrombolytic and non-thrombolytic in Shahid Rajaee heart center from April 2006 to end March 2011.

Changes in hemodynamic status of patients, the mean systolic and diastolic blood pressure, pulse rate, systolic pulmonary artery pressure, pulmonary artery regurgitation gradient, and right ventricular failure is the widening to three times before treatment and 24 and 48 hours after treatment and then were compared to determine the mortality in the two groups were studied.

According to first hypothesis in this study, thrombolytic therapy results in a faster stable hemodynamic status of patients.

To prove this hypothesis, the researchers compared the hemodynamic parameters studied two groups in the desired time based on data from Table 2, 3 and 4 came to the conclusion that only the pulmonary artery systolic blood pressure of 18.62 ± 35.71 before treatment to 58 ± 21.12 hours after treatment with thrombolytic decreased and difference with non-thrombolytic group (P-Value>.05), and this difference was not statistically significant even at 48 hours after treatment. The results of this study congruent with result of other researchers (Richard, 1970; Sasahra et al., 1974; Levine et al., 1990; Dalla-Volta et al., 1992). The results of the comparison between hemodynamic factors before treatment and at 24 and 48 hours after treatment in this study shows that thrombolytics faster hemodynamic stability echocardiography (pulmonary arterial systolic pressure gradient tricuspid regurgitation, failure and dilated right ventricle) and non-thrombolytics the faster recovery of vital signs (systolic blood pressure, diastolic blood pressure and pulse) after the treatment of patients with massive pulmonary embolism.

According to second hypothesis in this study, the incidence of death due to massive embolism in people who treat with thrombolytic is lower.

To answer this question, according to data tables (2,3,4,5) It should be noted that although thrombolytic leads to faster settlement of clots and resolution of occluded, But this study, like other studies showed no reduction in mortality rate in patients that recived thrombolytics. The results of this study congruent with result of other researchers (Richard, 1970; Levine et al., 1990; Dalla-Volta et al., 1992; Hamel & Pacourel, 1992; Goldhaber et al., 1993; Paul & Stein, 2012).

According to this study, it was concluded that treatment with thrombolytic faster than non-thrombolytic improves hemodynamic status of patients, but does not reduce mortality. Nurses, based on the evidence available, should be providing the highest standard of care for the prevention of venous thromboembolism in patients. The nurse's role is to ensure that patients in the hospital received the best treatment based on risk assessment.

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Conflict of interest

The authors declare no conflict of interest

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