

Clinical presentation and management of pulmonary embolism at a tertiary care hospital of Peshawar, KP, Pakistan

Mohammad Asim, Muhammad Khizar Hayat, Omer Nasim, Shaila Wazir Khan, Fatima Afaq Banoori, Mohammad Ahmed Arsalan Khan

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Author Information:*Dr. Mohammad Asim*Consultant Pulmonologist,
Northwest General
Hospital, Peshawar, KP.*Dr. Muhammad Khizar
Hayat*House Officer, Rehman
Medical Institute,
Peshawar, KP.*Dr. Omer Nasim*Lecturer, Department of
Anatomy, Rehman Medical
College, Peshawar, KP.*Dr. Shaila Wazir Khan*Registrar, Warrington &
Halton General Hospital,
UK.*Dr. Fatima Afaq Banoori*House Officer, Quaid-i-
Azam Hospital,
Rawalpindi, Punjab.*Dr. Mohammad Ahmed
Arsalan Khan*House Officer, Rehman
Medical Institute,
Peshawar, KP.**Citation:**

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ABSTRACT

Introduction: Pulmonary embolism (PE) is a thrombotic disorder, in which blockage occurs in the pulmonary artery preventing blood flow to the lungs.

Objective: To assess the presenting complaints, risk factors and clinical presentation of patients presenting to Rehman Medical Institute (RMI) and the management plan implied in treating these patients.

Materials & Methods: A cross-sectional descriptive study was conducted in Pulmonology Ward of Rehman Medical Institute (RMI) from January 2016 to December 2017. All patients diagnosed with Pulmonary Embolism were included in the study regardless of age or gender, while deceased patients were excluded. Patients were diagnosed using various investigations. Data were collected using a Performa by direct interview from the patients. Consent for data collection was taken from the patients verbally. Data collected were entered in Statistical Package for Social Science (SPSS) version 20.0 and analyzed for descriptive statistics.

Results: A total of 100 patients were assessed in the ward. The male to female ratio was 0.82:1. The mean age of patients was 59.84 ± 18.81 years. The most prevailing risk factor was immobilization or the patient being bedridden (66%). The least common risk factors were recent trauma / Road Traffic Accident (RTA) in the past 3 months (5%), and Warfarin Use (4%). Shortness of breath (96%) was the most significant clinical feature followed closely by Pain (93%). Clexane (37%) was the most common drug used for males while Rivaroxaban (45%) was commonly used in females.

Conclusion: The clinical presentation of PE is generally the same; however, a set of diagnostic investigations cannot be devised due to the variability of results seen in this study. Physicians are urged to keep a low index of suspicion when diagnosing a case of PE.

Keywords: Pulmonary Embolism; Anticoagulants; Warfarin; Rivaroxaban.

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INTRODUCTION

Pulmonary embolism (PE) is a thrombotic disorder. Blockage occurs in the pulmonary artery preventing blood flow to the lungs.¹ PE is an unrecognized, undiagnosed and undertreated clinical problem amongst hospitalized patients in Pakistan due to non-availability of objective tests or lack of awareness amongst physicians.² The natural history of PE is incompletely characterized, because most episodes of PE go undetected.³ In the United States, 500,000 to 600,000 people per year are affected with PE. It is the third most frequent cardiovascular disease after acute myocardial infarction and stroke with an incidence of 1 - 2 per 1,000 people.⁴ Ten percent (10%) are fatal in the first hour.⁵ Most people succumb to PE within the first few hours of the event.

Risk factors of PE include obesity, immobilization, cigarette use, cancer, surgery, trauma, pregnancy, oral contraception or hormone replacement therapies, and a prior history of PE or a known hyper-coagulable disorder.⁴

PE presents with a wide clinical spectrum, from asymptomatic disease to a massive life-threatening embolus that causes hypotension and cardiogenic shock. Clinically, PE can present with dyspnea, tachypnea, tachycardia, chest pain, syncope, cough, hemoptysis, respiratory distress, fever, etc.

The diagnostic accuracy of PE decreases with age and the presence of comorbidities, while it is readily detectable in patients with Deep Venous Thrombosis (DVT).⁵ The foundation to PE treatment is anticoagulation and it plays a major role in the survival of patients with PE.⁶ Treatment involves the predominant use of Low Molecular Weight Heparin (LMWH), unfractionated heparin, or fondaparinux in combination with vitamin K antagonists (VKAs).⁷

This study was carried out to assess the presenting complaints, risk factors and clinical presentation of patients presenting to Rehman Medical Institute (RMI) and the management plan in treating these patients.

MATERIALS & METHODS

This was a cross-sectional descriptive study conducted in the Pulmonology Ward of Rehman Medical Institute (RMI) from January 2016 to December 2017. All patients diagnosed as a case of Pulmonary Embolism and admitted in the ward were included in the study regardless of their age or gender, while deceased patients were excluded. Patients were diagnosed as a case of PE through ECG, Echocardiography and X-Ray Chest. Data were collected using a Performa by direct interview from patients. Consent for data collection was taken verbally from patients. Data were entered in Statistical Package for Social Science (SPSS) version 20.0 and analyzed for descriptive statistics.

RESULTS

A total of 100 patients were assessed in the ward. The male to female ratio was 0.82:1. The mean age of patients were 59.84 ± 18.81 years.

As shown in Table 1, the most prevailing risk factor was immobilization or the patient being bedridden (66%). Recent travel of more than 4 hours (36%) and Ex-smokers (32%) were next on the list. The least common risk factor was that of recent trauma/RTA in the past 3 months (5%), and Warfarin Use (4%).

Table 1: Demographics and risk factors of Pulmonary Embolism (n=100).

Demographics	Number = %
Gender	
Male	45
Female	55
Age	
Mean (Years)	59.84 ± 18.81
Risk Factors	
Bed Ridden/Immobilized	66
Recent Travel (more than 4 hours)	36
Ex-smoker (past history)	32
Smoker	18
Recent Surgery (past 3 months)	17
Pregnancy	09
Use of OCP/Injections	08
Varicose Vein	06
Recent Trauma/RTA (past 3 months)	05
Warfarin Use	04

RTA = Road Traffic Accident; OCP = Oral Contraceptive Pill

Table 2 depicts the clinical features and the diagnostic methods used for patients with Pulmonary Embolism. Shortness of breath (96%) was shown to be the most significant clinical feature followed closely by Chest Pain (93%). Other significant features of PE were Tachycardia (84%) and Tachypnea (81%). Shock (10%) was found to be the least common presentation of PE.

Table 2: Clinical Features in Patients with Pulmonary Embolism (n=100).

Clinical Features & Diagnostic Method	Number = %
Shortness of Breath	96
Chest Pain	93
Tachycardia	84
Fever	84
Tachypnea	81
Cough	50
Cyanosis	40
Hemoptysis	34
Decreased Level of Consciousness	34
Shock	10

ECG, Chest X-ray and Echocardiogram were used as the diagnostic methods for PE. As shown in Table 3, 45% patients showed a normal ECG. In the Chest X-ray, 35% of the results were not significant. Amongst the significant results, consolidations were the most common findings, unilaterally (11%) and bilaterally (10%). Pleural thickening (13%) was another notable finding in the Chest X-rays. Echocardiogram showed Pulmonary Hypertension (88%) and RV Dysfunction (75%) as the most commonly occurring finding. Dilation of right ventricle however was the least common finding (1%).

Table 3: Diagnostic Methods in Patients with Pulmonary Embolism (n=100).

Diagnostic Methods	Number = %
ECG	
Normal	45
RV Straining	18
RV Straining with Atrial Fibrillation	03
Sinus Tachycardia	01
Chest X-Ray	
Not Significant	35
Pleural Thickening	13
Unilateral Consolidation	11
Bilateral Consolidation	10
Bilateral Pleural Effusion	09
Unilateral Pleural Effusion	03
Bilateral Shadowing	02
Patchy	01
Echocardiogram	
Pulmonary Hypertension	88
RV Dysfunction	75
RV Failure	09
LV Impairment/Dysfunction	04
Dilation of RV	01

RV = Right Ventricle, LV = Left Ventricle

Table 4 represents the management of PE in accordance with demographics and past medical history. Clexane (37%) was the most common drug used for males while Rivaroxaban (45%) was commonly used in females. Thrombolysis (2%) was done equally in both genders. Warfarin was commonly given to the age group 25 – 35 Years so was thrombolysis; however, thrombolysis was also given once each in age group 45 – 55 and 76 – 85 years each. Clexane was least common in age group 36 – 45 years (3%) while the age group 76 – 85 years (17) saw it being used the most. Use of Rivaroxaban was more prevalent in the age group 56 – 65 years (17) while 86 – 95 years (2) had the least significance.

When comparing the past medical history with management method used, Warfarin was not used in patients with a history of Stroke, TIA, Paresis or Paralysis. It was used once in all the other cases. Clexane was used more commonly in patients with history of CAD/IHD (38), Hypertension (43), COPD (36), Stroke, TIA, Paresis or Paralysis (22) and any malignancy (18) while Rivaroxaban was used more commonly for Diabetic patients (26). Though it was closely followed by Clexane (23). Thrombolysis was only used once in patients with previous history of Hypertension, diabetes or any malignancy.

Variables	Therapy Given (Number = %)			
	Warfarin	Clexane	Rivaroxaban	Thrombolysis
Gender				
Male	01	37	30	02
Female	02	38	45	02
Age Group (Years)				
25 – 35	02	10	15	02
36 – 45	0	03	8	0
46 – 55	0	10	11	01
56 – 65	0	15	17	0
66 – 75	0	15	11	0
76 – 85	01	17	11	01
86 – 95	0	05	02	0
Past Medical History				
CAD/IHD	01	38	28	0
Hypertension	01	43	38	01
COPD	01	36	29	0
Stroke, TIA, Paresis or Paralysis	0	22	16	0
Diabetes Mellitus	01	23	26	01
Any Malignancy	01	18	03	01

CAD = Coronary Artery Disease, IHD = Ischemic Heart Disease, COPD = Chronic Obstructive Pulmonary Disease, TIA = Transient Ischemic Attack

DISCUSSION

Pulmonary embolism has remained a difficult condition to diagnose due to its wide range of predisposing risk factors and clinical presentations. According to our results the prevailing risk factors were the immobilization of the patient, followed by travelling for more than 4 hours, and smoking. In a study carried out in a tertiary care hospital of Pakistan, the risk factors identified for thromboembolism, immobilization and recent surgery were the commonest recognized factors. Other important risk factors included previous history of deep vein thrombosis, trauma and hypercoagulable state.² Another study also stated that the major risk factors for thromboembolic events include recent immobilization, Myocardial Infarction, surgery, and recent trauma.⁸

In our study, shortness of breath, chest pain, tachycardia and fever were the most common symptoms. Husain et al showed that

dyspnea and tachycardia were the most prevalent symptoms, followed by chest pain and hemoptysis.² In a Nepali study, the most common clinical presentation was also dyspnea, followed by chest pain.⁹ Dyspnea has generally been seen as the most common symptom, with others such as tachypnea, tachycardia, chest pain, and fever, being present in various percentages.⁴

In the study conducted, ECG, Chest X-ray and Echocardiogram were used as the diagnostic methods for PE, although nowadays, multidetector spiral CT pulmonary angiography is considered the standard option for confirming PE.⁶ Almost half our patients showed a normal ECG and a large percentage of the chest X-ray findings were also not significant. Amongst the significant chest X-ray results, consolidations were the most common findings, followed by pleural thickening. In another Pakistani study the

abnormal chest radiographs had cardiomegaly as the most recurrent finding, followed by pleural effusion and atelectasis.² A Korean review article showed that cardiac enlargement, effusion, and an elevated hemidiaphragm in that order were the most common chest radiograph findings.⁴ Stein et al found that the most frequent chest X-ray finding was atelectasis or parenchymal abnormality. It is obvious from all these different results that there is no specific sign that can uncover pulmonary embolism, and one cannot depend on chest X-ray alone for its diagnosis.¹⁰

Echocardiogram conducted showed pulmonary hypertension and RV dysfunction as the most occurring findings, while right ventricle dilation was a very infrequent result. Other studies also mirror this, with right ventricular dysfunction being present in most of the cases.^{9,11} Pulmonary hypertension has also been a typical finding.¹² Echocardiography is not recommended as a routine imaging test to diagnose suspected pulmonary embolism. However, it is useful for identifying patients with pulmonary embolism who may have a poor prognosis.¹³

In the ECG results, RV straining was the most common result, with only one case of sinus tachycardia. This is in contrast with the Nepali study, in which the most common ECG finding was sinus tachycardia.⁹

In regard to management of the patients, Clexane (enoxaparin, a LMWH) and Rivaroxaban were used widely as compared to

warfarin or thrombolysis. It has been found that in hemodynamically stable patients, who do not have any contraindications to systemic anticoagulation, parenteral anticoagulation with subsequent conversion to vitamin K antagonists is the mainstay of therapy.⁸ The traditional parenteral anticoagulants employed in the initial treatment of non-high-risk PE include LMWH, intravenous or subcutaneous unfractionated heparin or fondaparinux.⁶ Rivaroxaban has also proven to be a beneficial form of long-term therapy for PE.¹⁴ According to one meta-analysis, there is little evidence to support the effectiveness of thrombolytic therapy compared with heparin for the initial treatment of patients with acute pulmonary embolism.¹⁵ Most PE patients should continue to be treated conservatively, with aggressive treatment options reserved for those at high- or intermediate-high-risk without contraindications.¹⁶

CONCLUSION

The clinical presentation of Pulmonary Embolism is generally the same; however, a set diagnostic investigation cannot be devised due to the variability of results seen in this study in comparison to other studies conducted on similar topics. Accurate diagnosis and risk stratification of patients with PE, together with the simplified treatment that the direct oral anticoagulants can provide, are likely to improve patient outcomes and reduce mortality associated with this disease. Physicians are urged to keep a low index of suspicion when diagnosing a case of PE.

REFERENCES

1. What is Pulmonary Embolism? [Internet]/ Signs and Symptoms of Pulmonary Embolism/ [cited 2017 Dec 12]. Available from: https://www.thrombosisadviser.com/en/patient/pulmonary-embolism/?gclid=EAlaQobChMlwY2w3svc2wVjxgbCh03cwQyEAAAYASAAEgJq_vD_Bw_E.
2. Husain SJ, Zubairi ABS, Fatima K, Irfan M, Atif M, Saeed MA. Clinical characteristics, management and outcome of major pulmonary embolism: an experience from a tertiary care center in Pakistan. *JPMA*. 2009;59(6):372-75.
3. Olin JW. Pulmonary embolism. *Rev Cardiovasc Med*. 2002;3(2):S68-75.
4. Morrone D, Morrone V. Acute Pulmonary Embolism: Focus on the Clinical Picture. *Korean Circ J*. 2018;48(5):365-81.
5. Belohavek J, Dytrych V, Linhart A. Pulmonary Embolism, part I. Epidemiology, risk factors and risk stratification, pathophysiology, clinical presentation, diagnosis and nonthrombotic pulmonary embolism. *Exp Clin Cardiol*. 2013;18(2):129-38.
6. Meyer G. Effective diagnosis and treatment of pulmonary embolism: Improving patient outcomes. *Archives of Cardiovascular Disease*. 2014;107:406-14.
7. Torbicki A1, Perrier A, Konstantinides S, Agnelli G, Galie N, Pruszczyk P, et al. Guidelines on the diagnosis and management of acute pulmonary embolism: the task force for the diagnosis and management of acute pulmonary embolism of the European Society of Cardiology (ESC). *Eur heart J*;2008;29:2276-315.
8. Tarbox AK, Swaroop M. Pulmonary embolism. *Int J Crit Illn Inj Sci*. 2013 Jan-Mar;3(1):69-72.
9. Adhikari CM, Bishal KC, Khadka S. Clinical profile, management and outcome of pulmonary embolism in Shahid Gangalal National Heart Centre, Kathmandu, Nepal. *The Egyptian Heart Journal*. 2018 Mar 1;70(1):41-3.
10. Stein PD, Terrin ML, Hales CA, Palevsky HI, Saltzman HA, Thompson BT, Weg JG. Clinical, laboratory, roentgenographic, and electrocardiographic findings in patients with acute pulmonary embolism and no pre-existing cardiac or pulmonary disease. *Chest*. 1991 Sep 1;100(3):598-603.
11. Khan NU, Hafizullah M. Pulmonary embolisms are associated with echocardiography evidence of right ventricular strain. *JPML*.;15(2):161-4.
12. Samaranyake CB, Royle G, Jackson S, Yap E. Right ventricular dysfunction and pulmonary hypertension following sub-massive pulmonary embolism. *The clinical respiratory journal*. 2017 Nov;11(6):867-74
13. Goldhaber SZ. Echocardiography in the management of pulmonary embolism. *Annals of internal medicine*. 2002 May 7;136(9):691-700.
14. Einstein-PE Investigators. Oral rivaroxaban for the treatment of symptomatic pulmonary embolism. *New England Journal of Medicine*. 2012 Apr 5;366(14):1287-97
15. Wan S, Quinlan DJ, Agnelli G, Eikelboom JW. Thrombolysis compared with heparin for the initial treatment of pulmonary embolism: a meta-analysis of the randomized controlled trials. *Circulation*. 2004 Aug 10;110(6):744-9.
16. Jaber WA, Fong PP, Weisz G, Lattouf O, Jenkins J, Rosenfield K, et al. Acute pulmonary embolism: with an emphasis on an interventional approach. *Journal of the American College of Cardiology*. 2016 Mar 1;67(8):991-1002.