Survey of Pulmonary Embolism Characteristics, A Hospital Based Study

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ABSTRACT:

BACKGROUND:

Pulmonary embolism is a common complication of hospitalization and contributes to 5 to 10 percent of deaths in hospitalized patients, making it one of the leading causes of preventable hospital deaths.

OBJECTIVE:

Is to evaluate patients with pulmonary embolism admitted to Ibn Alnafees Hospital, Baghdad, Iraq.

PATIENTS AND METHOD:

Cross-sectional study in one year(2016) , We treated 52 cases of Pulmonary embolism in Ibn Alnafees Hospital in the CCU and we collected their data on admission to the hospital on different age group, gender, sign and symptoms, investigation, predisposing factors, treatments with thrombolytic therapy and the outcome of the patient. Seven patients died after admission, two of them same of day of admission.

RESULT:

In this study, the surgery was the most common risk factor for pulmonary embolism followed by deep Venus thrombosis. However, there was no obvious risk factor present in 11.5% of cases, and 28.7% of cases had have more than one risk factor.

CONCLUSION:

The surgery was the most common risk factor for pulmonary embolism followed by deep vein thrombosis. The CT pulmonary angiography is positive in vast majority of cases, so it's useful and effective diagnostic tool for pulmonary embolism.

KEY WORDS: pulmonary embolism, deep vein thrombosis , dyspnea.

INTRODUCTION :

Pulmonary embolism is a common complication of hospitalization and contributes to 5 to 10 percent of deaths in hospitalized patients, making it one of the leading causes of preventable hospital deaths [1,2,3]. Despite it being an enormous health problem, the true incidence of pulmonary embolism is uncertain. The diagnosis of venous thrombi and pulmonary emboli can be difficult and requires specialized imaging techniques that are not available in all hospitals or healthcare settings[4].

Aim of this study is to evaluate patients with pulmonary embolism admitted to Ibn Alnafees Hospital, Baghdad , Iraq

PATIENTS AND METHODS:

Design: Cross section descriptive study

Setting: Conducted in CCU at Ibn Alnafees Hospital

Duration: In 1 year (2016) informed consent was obtain from all participants

Inclusion criterion:

Patients admitted to CCU had a history of dyspnea, Chest pain, orthopnea. In examination the patients had tachycardia, tachypnea. Investigation which done at that time to confirm the diagnosis like ECG, ECHO, CT pulmonary angiography.

Exclusion criterion:

1.Children below 12 years

2.Patients with congenital heart disease

RESULTS:

A total of 52 patients were included in this study. 32 patients (68.5%) were female and 20 (31.5%) were male. Their age consider between (14 -75) year old with mean ± SD of 41± 14.7 year old.

Table 1 shows distribution of studied group according to their representing symptoms.

Ibn-Anafees Hospital.

Dyspnea was the major symptoms of presentation in which 23 (44.2%) followed by dyspnea and chest in 6 (11.5%). while other symptoms presented between 1.9% and 5.8% as shown below:

Table 1: Symptoms of presentation of studied group.

Symptoms	No.	Percent
Dyspnea	23	44.2
Tachycardia	2	3.8
Chest pain	3	5.8
Leg pain	1	1.9
Dyspnea tachycardia tachypnea	3	5.8
Dyspnea orthopnea	2	3.8
Dyspnea chest pain	6	11.5
Dyspnea chest pain orthopnea	2	3.8
Dyspnea chest pain collapse	2	3.8
Dyspnea hemoptysis chest pain	2	3.8
Dyspnea syncope	2	3.8
Dyspnea chest pain sweating	3	5.8
Dyspnea leg pain Leg	1	1.9
Total	52	100.0

Table (2) Study of the past surgical history prior to the attack of pulmonary embolism. From this table no history of surgery presented in 28 (53.8%) while operative surgery found in 24 (46.2%). Surgical operation distributed to Cesarean Section C/S in 9 (17.3%) of patients followed by Abdominal surgery by 7 (13.5%) then Limb surgery or fractures in 4 (7.7%). Spinal surgery reported in 2 (3.8%) and finally chest surgery and other surgeries reported in 1 (1.9%) of studied samples. As shown below

Table 2: Distribution of patient's according to history and type of Surgery.

History of surgery	No.	Percent
No Surgery	28	53.8
Chest Surgery	1	1.9
C/S) cesarean section Surgery	9	17.3
Limb Surgery	4	7.7
Abdominal Surgery	7	13.5
Spinal Surgery	2	3.8
Multiple Surgeries	1	1.9
Total	52	100.0

Studying of predisposing factors shown in table (3). In this table we found that deep venous thrombosis (DVT) in 15 (28.8%) while surgical complication as a direct cause of pulmonary embolism found in 12 (23.1%) of patients. No obvious predisposing reported in 6 (11.5%)

Table 3: Distribution of patients according to predisposing factor.

Predisposing factors	No.	Percent
no Predisposing factor	6	11.5
Deep vein thrombosis	7	13.5
Hypertension	6	11.5
Diabetic	2	3.8
Heavy Smoker	3	5.8
Surgery	12	23.1
Varicose Veins	1	1.9
Diabetic + Smoking	2	3.8
Deep vein thrombosis + Smoking	2	3.8
Deep venous thrombosis + Hypertension + Diabetic	4	7.7
Deep venous thrombosis + Bed Ridden	2	3.8
Hypertension + Diabetic + Ischemic heart disease	3	5.8
Hypertension + Oral contraceptive pills	1	1.9
Hypertension + Atrial fibrillation	1	1.9
Total	52	100.0

Table (4) shows ECG finding in studied patients. Tachycardia and S1Q3T3 were the major ECG finding 21 (40.4%) and 20 (38.5%) respectively, while normal ECG found in 7 (13.5%). Ischemic heart disease by ECG reported in 2 (3.8%) patients.

Table 3: Distribution of studied group according to ECG finding.

ECG			
No.			Percent
	Normal	7	13.5
	Tachycardia	21	40.4
	S1Q3T3	20	38.5
	Ischemia	2	3.8
	Tachycardia + S1Q3T3	2	3.8
	Total	52	100.0

Table (5) Echocardiographic finding of patients with pulmonary embolism. The table shows that 12 (23.07%) of patients had Right Ventricular dilatation, sometime associated with other finding like: presence of thrombus, Pulmonary Hypertension, Right side abnormal contractility and right side failure. In our study had normal echocardiographic study in 29 (55.8%). intracardiac thrombus found in 4 (7.6%) of patients. Nine cases diagnosed as pulmonary hypertension (17.5%) reported by echocardiographic study.

Table 5: Distribution of studied group according to Echocardiographic Findingز

No.			Percent
	Normal	29	55.8
	Dilated RV	4	7.7
	Dilated RV + Thrombus	2	3.8
	Dilated RV + Pulmonary hypertension	4	7.7
	Dilated RV + Pulmonary hypertension + Hypokinesia	1	1.9
	RV dysfunction	2	3.8
	Pulmonary Hypertension	3	5.8
	Thrombus	1	1.9
	Left ventricular hypertrophy	1	1.9
	Hypokinesia	3	5.8
	Dilated RV + RV Dysfunction	1	1.9
	Pulmonary hypertension + Thrombus	1	1.9
	Total	52	100.0

Table (6) Shows Distribution of studied group according to CT pulmonary angiography. Pulmonary embolism found in 37 patients distributed to: Bilateral pulmonary embolism in 27 (51.9%), massive pulmonary embolism 8 (15.4%) and single pulmonary embolism and small pulmonary embolisms in 1 (1.9%) for both of them.

Table 6:Distribution of studied group according to CT pulmonary angiography.

No.	Percent	
Not done	13	25.0
Bilateral Pulmonary embolism	27	51.9
Massive Pulmonary embolism	8	15.4
Small Pulmonary embolism	1	1.9
Dilated main pulmonary artery	2	3.8
Single Pulmonary embolism	1	1.9
Total	52	100.0

DISCUSSION:

Fifty two patients were admitted to the hospital for one year (2016), with definite diagnosis of having pulmonary embolism.

Because of invasive and nonspecific diagnostic symptoms and signs, PE is one of the most common causes of unexpected death. Hence, prompt diagnosis is essential [5,6]. Therefore, it is important to now the statistics of PE for early action to be taken in suspected cases.

In this study, there was obvious difference regarding gender, the females were much more than males (68.5% female), because sampling which taken in this study females are more than males. Although use of oral contraceptives and postmenopausal hormone replacement have been associated with VTE in women, published data suggests no consistent differences in the incidence of VTE among men and women [7]. Anderson et al [8 found a similar incidence in both sexes. Silverstein et al [9] noted a slightly higher incidence rate among younger women, and modest prediction among older men. Cushman et al [10 reported similar incidences among men and women except for a 2-fold higher rate in men over age 75.

In our study, dyspnea was the most frequent presenting symptom (44.2%), followed by dyspnea and chest pain (11.5%), while leg pain was the least presenting symptom. This disagree with other study by Paul et al (PIOPED II) [11] which found that hemoptysis and/or pleuritic pain occurred in 44% of all cases of pulmonary embolism, while dyspnea occurs in 36%. This difference may be related to the size of sample and the type of pulmonary embolism. However, our finding agrees with other studies by Massimo et al [12] and Jan et al [13] which noted sudden onset dyspnea was the most frequent symptom.

In this study, the cesarean section surgery and abdominal surgery were the most frequent surgical procedures associated with pulmonary embolism (17.3% & 13.5% respectively), while the majority of cases (53.8%) did not have recent surgery. This in contrast to data study by Richard et al [14] which found that hip arthroplasty surgery and invasive neurosurgical procedures were associated with highest incidence of venous thromboembolism. Major vascular procedures on aorta, iliac, and femoral or popliteal arteries were also associated with a high incidence of venous thromboembolism; approximated 56% of all venous thromboembolism events were diagnosed after hospital discharge. The size of our study cohort and the type of surgical procedures that commonly performed in our country which depend on facilities that are available in addition to other settings may lead to significant reduction in number of vascular and neurosurgical procedures, and increase in the number of cesarean section procedures. This may explain the difference.

In this study, the surgery was the most common risk factor for pulmonary followed by deep vein thrombosis. However, there was no obvious risk factor present in 11.5% of cases, and 28.7% of cases had have more than one risk factor. According to British Thoracic Society the postoperative state (surgery) is number one of major risk factors for venous thromboembolism and pulmonary embolism ([15]. Immobilization (bed rest within past month for the most of day for three or more consecutive days) deep vein thrombosis was the most frequent risk factor assessed in patients with PE, and surgery was the usual cause of immobilization (Paul D et al; PIOPED II) [11]. One or more of risk factors were reported in 94%of patients with PE [11]. A study by Richard H noted 25-50% of patients with first time venous thromboembolism have an idiopathic condition without a readily identifiable risk factor [7].

Regarding ECG findings, sinus tachycardia is the most frequent finding in this study (40.4%), while S1 Q3 T3 pattern is the next frequent one (38.5%), the ischemia or combination of sinus tachycardia and S1 Q3 T3 pattern were rare findings, only 13.5% of cases with normal ECG. This disagree with other study by Paul D et al (electrocardiogram in acute pulmonary embolism) which revealed that with sub massive PE 23% of patients had a normal ECG and in massive PE 6% had normal ECG. The most common ECG abnormalities were nonspecific T wave changes which occurred in 42% of patients and nonspecific abnormalities (elevation or depression) of ST segment which occurred in 41% of patients [16].

About half of patients in our study had normal echocardiographic study (55.8%), and about quarter of patients (23.07%) had dilated right ventricle with or without other abnormalities like: presence of thrombus, pulmonary hypertension, and right ventricular abnormal contractility. Right ventricular hypokinesia was uncommon finding. The data from published articles mentioned that most common echocardiographic findings in acute pulmonary embolism are: Right ventricular dilatation, right ventricular dysfunction, in some cases with preservation of the apical contractility (McConnell's sign) [17]. When the pulmonary embolism is large, more than 90% of patients have right ventricular hypokinesia [14]. Signs of pulmonary hypertension: flattening of the interventricular septum during systole, tricuspid regurgitant flow velocity higher than 2.7 m/sec [19,20]. The echocardiographic findings are most probably related for the size and extent of thrombus in the pulmonary arteries.

Regarding CT pulmonary angiography, it was positive for pulmonary embolism (detecting thrombus) in 94.87% of cases and negative in 5.12% of cases, all cases documented diagnosis as pulmonary embolism by CT pulmonary angiography . This disagree with other two studies; one by Ranji SR et al which noted that CT pulmonary angiography was positive in 17.8% of patients [21], and another by Arnaud P et al which noted that multidetector-row CT was positive in 26% of patients [22,23,24], but both studies performed on clinically suspected pulmonary embolism patients from emergency department and this may be the cause of difference from our study result.

CONCLUSION:

1. The incidence of pulmonary embolism is slightly higher in female than male gender.
2. The surgery was the most common risk factor for pulmonary embolism followed by deep vein thrombosis.
3. Sinus tachycardia is the most frequent electrocardiographic finding.
4. The most frequent echocardiographic finding is dilated right ventricle with or without other abnormalities like: presence of thrombus, pulmonary hypertension, and right ventricular abnormal contractility.
5. The CT pulmonary angiography is positive in vast majority of cases, so it's useful and effective diagnostic tool for pulmonary embolism.

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