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Clinical Findings of Patients with Acute Pulmonary Embolism in a Sample of Iraqi Patients

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ABSTRACT

Background: *Pulmonary embolism (PE) is one of the serious medical issues with higher prevalence and mortality rates, it is a significant cause of hospitalization frequently requiring critical care services.* ***Objectives:*** *To evaluate clinical findings of patients with PE.* ***Patients and Methods:*** *A cross sectional study done in multiple teaching hospitals in Baghdad, during a period of from 1st of March 2023 to 1st of January 2024, for patients who were diagnosed with PE by CT pulmonary angiography. The data are collected from 100 patients admitted to the cardiac care unit, general medical and surgical wards of Alyarmouk, ALImamein AL-Kadhimein and Baghdad medical city teaching hospitals according to different parameters such as age, sex, site of occurrence whether inpatient or outpatient and predisposing factors (hypertension, diabetes mellitus, smoking, bed ridden over a 72-hour period, long time trip more than 4 hours, recent surgery, pregnancy, the use of contraceptive pills, haematological diseases, solid malignancies and the personal or family history of venous thrombosis).Each patient underwent a carful clinical assessment, especially for vital signs, oxygen saturations, lower limb unilateral swelling, jugular venous pressure, cardiac finding, in addition to the following investigations: Complete Blood Count, Biochemistry, Electrocardiogram.* ***Results:*** *The average age of the participants were 53.9 years, with a standard deviation of 16.2 years, the female was 77.0% of the cases, PE incidents occurred more often outside the hospital setting (71.0%) than within (29.0%), 9.0% of participants had a previous history of VTE, the most prevalent risk factor was immobilization, observed in 88.0% of cases, the most common clinical presentation is shortness of breath (98.0%). The initial treatments included thrombolysis used in 36% of cases.* ***Conclusions:*** *The pulmonary embolism events were more prevalent among females in this study, the outpatients were more than inpatients, and shortness of breath is the most common clinical presentation. The immobilization was the most common risk factor.*

Keywords: Clinical Findings, Acute Pulmonary Embolism, Iraqi Patients.

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INTRODUCTION

Pulmonary embolism (PE) results when thrombus migrates from the venous circulation to the pulmonary vasculature and lodges in the pulmonary arterial system, is one of the life threatening diseases with higher incidence and mortality rates, is a significant cause of hospitalization and frequently requiring critical care services (1). The annual incidence of pulmonary embolism worldwide is approximately 1 in 1000 persons (2). The risk of PE increases with age, and mortality is high (9.4–32.2/100,000 persons/y).(3) One third of the non survivors die within hours of diagnosis, depending on the extent of PE ,presence and severity of right ventricular (RV) dysfunction, and concomitant cardiopulmonary disease.(4) Testing for PE is performed with increasing frequency in recent years. However, this diagnosis is confirmed only in a small proportion of patients tested (about 15–25%).(5 The disease can occur both inside and outside the hospital, and it still imposes a relevant medical and societal burden

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(6). The prevention and control of venous thromboembolism (VTE), including deep vein thrombosis (DVT) and PE, is an important regulatory task for hospitalised patients (7). Many studies have reported that the risk factors for PE include advanced age, prolonged bed rest, surgery, malignant tumors and trauma. Identifying risk factors will be conducive to the prevention and control of VTE (8,9).

Depending on the severity of the embolism, both symptomatic and asymptomatic embolism can occur (10,11). Acute SPE is a condition we must be on high alert for because it may be life-threatening (12). The most common symptoms of PE are dyspnoea, pleuritic chest pain and cough,in addition to pre-syncope or syncope, or haemoptysis. (13) Haemodynamic instability is a rare but important form of clinical presentation, as it indicates central or extensive PE with severely reduced haemodynamic reserve (13) The Wells Criteria, introduced by Wells et al. in 1998, is a PE risk stratification method, that has been widely validated for assisting clinicians in determining the need for a CTPA, or ruling out PE as a differential diagnosis (14). Typically, further diagnostic workup with D-dimer testing is recommended for low- to intermediate-risk groups, while the high-risk groups should proceed directly to imaging. (15).

PATIENTS AND METHOD

Study designs:

The current cross sectional multiple-centre study was conducted in the Coronary Care Unit, general medical& surgical wards at Alyarmok, AL-Imamein AL-Kadhimein & the Medical city hospitals in Baghdad, in the period between March 2023 and January 2024.

One hundred (100) patients were enrolled in the study, all of them were admitted to these hospitals with acute PE which was confirmed by clinical assessment, ECHO study and Computed Tomographic pulmonary angiography. Different parameters are taken for data collections, as age, gender, inpatient or outpatient & predisposing factors (hypertension, diabetes mellitus, smoking, bedridden, long-time trip, recent surgery, pregnancy, the use of contraceptive pills, haematological diseases, solid malignancies and the personal or family history of venous thrombosis). Clinical prediction rules for pulmonary embolism (PE) probability are by the most widely reported and clinically validated are the Wells Criteria (14).

Regarding the specific time that predispose to thromboembolism in long-time trip is more than 4 hours (16), and a 72-hour in bed ridden condition (17), while in case of recent surgery the risk of thromboembolism increase from 1 to 12 weeks regardless the type of operation (18). Each patient underwent a carful clinical assessment especially for vital signs, oxygen saturations, lower limb unilateral swelling, jugular venous pressure, cardiac finding, in addition to the following investigation CBC, Biochemistry, ECG and was put in special form. Vital signs that included blood pressure, pulse rate, respiratory rate & temperature. Cardiac finding, we focused on presence of any heave, loud P2 or specific murmur of the tricuspid regurgitation. CBC taken for every patient participate in this study to lock for Hb, WBC, platelet count, any haematological disorder may predispose to the development of PE such as sickle cell anaemia, polycythaemia, possible haematological malignancies.

The biochemical tests that sent for the participants, liver function test (S. GOT, GPT, ALK), Renal function test (B. urea, S. creatinine). Regarding the ECG finding we looked for the presence of sinus tachycardia, T wave inversion in chest leads (V1, V2, V3, V4), positive R wave in V1, right axis deviation and S1Q3T3.

CT Angiography done to confirm PE diagnosis and to look for the lung vessels

involvement whether central or peripheral depending on the report from the radiologist. In the central type of PE, the involvement may be to the trunk or to the main right or main left pulmonary artery, while the peripheral type of PE, the involvement is divided to the segmental or subsegmental branch.

Inclusion Criteria:

1) Age of the patients usually >17 years old.
2)Full data about the disease.
3)Confirmed diagnosis obtained by the clinical & radiological features and by application of Wells criteria (14).

Exclusion Criteria:

1)Those patients with incomplete data.
2)Those patients refused to participate in study.

Statistical analysis:

Continuous variables were expressed as means and standard deviations. Duration of symptoms was not normally distributed and thus were described by median and interquartile range (IQR). Categorical variables were expressed as frequency and percentages. The Welch's t-test (for normally distributed variables) and Wilcoxon rank-sum test (Mann-Whitney test) (for non-normally distributed variables) were performed to test the difference in means and medians, respectively. The difference between categorical variables was investigated using either the $\chi 2$ test with yates' correction or Fisher's exact test, depending on the context. A P value less than 0.05 was considered statistically significant. R software packages (dplyr, gt_summery and gg plot) were used for data processing, visualization, and statistical analysis ("R version 4.2.2, R Foundation for Statistical Computing, Vienna, Austria").

RESULTS

In this study, 100 participants were involved, the average age of =the participants was 53.9 years with a standard deviation of 16.2 years, the sex distribution was predominantly female, accounting for 77.0% of the cases versus 23 (23.0%) in male. Pulmonary embolism incidents occurred more often outside the hospital setting (71.0%) than within (29.0%), additionally, common co-morbidities included hypertension (46.0%), diabetes mellitus (35.0%), and ischemic heart disease (17.0%). A smaller percentage of participants had a history of stroke, COPD and 9.0% had a previous history of venous thromboembolism, as in **table 1.**

Table 1: Description of demographics, and past-medical history.

Characteristics	N = 100[1]
Age (years)	53.9 ± 16.2
Gender	
Female	77 (77.0%)
Male	23 (23.0%)
Place of occurrence	
Outside	71 (71.0%)
Hospital	29 (29.0%)
History of co-morbidities	
Hypertension	46 (46.0%)
Diabetes mellitus	35 (35.0%)
Ischemic heart disease	17 (17.0%)
Stroke	9 (9.0%)

Characteristics	N = 100[1]
Asthma	6 (6.0%)
Chronic obstructive pulmonary disease (COPD)	5 (5.0%)
Interstitial lung disease (ILD)	3 (3.0%)
Previous history of VTE	9 (9.0%)

The most prevalent risk factor was immobilization, observed in 88.0% of cases, followed by a history of recent surgery (35.0%), a history of active cancer (24.0%), and the presence of a fracture (24.0%). Pregnancy and the use of oral contraceptives (OCP) accounted for 6.0% each. Additionally, a history of sickle cell anaemia was noted in 3.0% of cases, while recent long trips and family history of thrombosis were less common (2.0% and 0.0%, respectively). A 24% had exposure to smoking in their life either as current or ex-smokers, as in **table 2**.

Table 2: Description of risk factors for the entire cohort.

Risk factors for PE	N = 100[1]
Immobilization >72 hours	88 (88.0%)
History of recent surgery 1-12 Weeks	35 (35.0%)
History of active cancer	24 (24.0%)
Presence of fracture	24 (24.0%)
Pregnancy	6 (6.0%)
Use of OCP	6 (6.0%)
History of Sickle cell anemia	3 (3.0%)
Recent long trip >4 hours	2 (2.0%)
Family history of thrombosis	0 (0.0%)
Exposure to smoking	24 (24.0%)
[1]n (%)	

The clinical features of pulmonary embolism were examined. Patients commonly presented with shortness of breath (98.0%), palpitations (65.0%), cough (63.0%), chest pain (59.0%), dizziness (48.0%), syncope (18.0%), and haemoptysis (10.0%). The duration of symptoms ranged from 11 to 72 hours, with a median of 48 hours. Common signs at presentation included tachypnoea (78.0%), tachycardia (61.0%), unilateral leg swelling (37.0%), JVP distension (32.0%), and gallop rhythm (28.0%). Vital signs at presentation showed an average pulse rate of 105.5 bpm, average respiratory rate of 27.2 cycle/m, systolic blood pressure of 111.4 mmHg, diastolic blood pressure of 71.1 mmHg, temperature of 37.0 degrees Celsius, and SpO2 at 90%, as in **table 3**.

Table 3: Signs and symptoms of pulmonary embolism in addition to vital signs.

Characteristics	N = 100[1]
Clinical presentation	
Shortness of breath	98 (98.0%)
Palpitation	65 (65.0%)
Cough	63 (63.0%)
Chest pain	59 (59.0%)
Dizziness	48 (48.0%)
Syncope	18 (18.0%)
Hemoptysis	10 (10.0%)
Duration of symptoms (hours)	48.0 (11.0 - 72.0)
Signs at presentation	
Tachypnoea	78 (78.0%)
Tachycardia	61 (61.0%)
Unilateral leg swelling	37 (37.0%)
JVP distension	32 (32.0%)
Gallop rhythm	28 (28.0%)
Vital signs at presentation	
Pulse rate (bpm)	105.5 ± 20.3
Respiratory rate (Cycle/m)	27.2 ± 7.6
Systolic blood pressure (mmHg)	111.4 ± 21.6
Diastolic blood pressure (mmHg)	71.1 ± 15.2
Temperature (degree Celsius)	37.0 ± 0.7
SpO_2 (%)	90 ± 10
[1]n (%); Median (IQR); Mean ± SD	

Initial blood tests included in this study were as follows: haemoglobin (mean 11.3 g/dL, median 11.0 g/dL), white blood cell count (mean 11.9 × 10^9/L, median 11.0 × 10^9/L), platelet count (mean 247.2 × 10^9/L, median 230.0 × 10^9/L), blood urea (mean 46.7 mg/dL, median 40.0 mg/dL), serum creatinine (mean 1.0 mg/dL, median 0.9 mg/dL), serum GOT (mean 46.0 U/L, median 30.0 U/L), and serum GPT (mean 53.4 U/L, median 32.0 U/L), as in **table 4**.

Table 4: Description of blood tests including: CBC, RFT, and LFT.

Characteristics	Mean (SD)	Median (IQR)	Range
Hemoglobin (g/dL)	11.3 ± 2.2	11.0 (10.0, 12.6)	6.1, 17.7
WBC ($\times 10^9$/L)	11.9 ± 4.0	11.0 (9.6, 14.8)	2.6, 23.4
Platelets ($\times 10^9$/L)	247.2 ± 116.5	230.0 (172.0, 300.0)	40.0, 701.0
Blood urea (mg/dL)	46.7 ± 25.0	40.0 (30.0, 53.5)	3.7, 143.0
Serum creatinine (mg/dL)	1.0 ± 0.5	0.9 (0.6, 1.3)	0.3, 3.4
Serum GOT (U/L)	46.0 ± 101.9	30.0 (20.0, 37.3)	6.0, 940.0
Serum GPT (U/L)	53.4 ± 115.8	32.0 (25.0, 40.0)	7.0, 913.0

In terms of ECG abnormalities, sinus tachycardia was highly prevalent at 89.0%, with T-wave inversion in V1-V4 present in 74.0% of cases. Other ECG abnormalities included S1Q3T3 (50.0%), right axis deviation (26.0%), prominent R wave in V1 (21.0%), and ST-segment depression in V1-V4 (17.0%), while 2.0% exhibited a normal ECG. as in **table 5**.

Table 5: Description of ECG findings.

Characteristics	N = 100[1]
ECG abnormalities	
Sinus tachycardia	89 (89.0%)
T inversion in V_1-V_4	74 (74.0%)
$S_1Q_3T_3$	50 (50.0%)
Right axis deviation	26 (26.0%)
Prominent R wave in V_1	21 (21.0%)
ST-segment depression in V_1-V_4	17 (17.0%)
Normal	2 (2.0%)
[1]n (%); Mean ± SD	

The Well's score was found to have a mean of 6.8 ± 1.9 and a median of 7.0 (IQR: 5.3-8.6), with a range from 4.0 to 11.0, severity classification revealed that 4% had low severity, 55% were intermediate, and 41% were classified as high severity. Initial treatments included thrombolysis for 36% of cases, unfractionated heparin for 77%, low-molecular-weight heparin (LMWH) for 23%, as in **table 6**.

Table 6 : Severity classification of PE, and initial treatment given.

Characteristics	N = 100[1]
Well's score	
Mean (SD)	6.8 ± 1.9
Median (IQR)	7.0 (5.3, 8.6)
Range	4.0, 11.0
Severity classification	
Low	4 (4.0%)
Intermediate	55 (55.0%)
High	41 (41.0%)
Initial treatment	
Thrombolysis	36 (36.0%)
Unfractionated Heparin	77 (77.0%)
Low-molecular-weight heparin (LMWH)	23 (23.0%)
[1]n (%)	

In terms of emboli location on CTPA, 62.0% were central, and 38.0% were peripheral, as in **table 7**.

Table 7: Location of pulmonary emboli on CTPA.

Location of emboli on CTPA	N = 100[1]
Central	62 (62.0%)
peripheral	38 (38.0%)
[1]n (%)	

Regarding the relation between central & peripheral PE, the investigation unveiled key disparities between these groups, Notably, patients in the Central group had a higher mean age of 57.3 years compared to 48.3 years in the Peripheral group, with a statistically significant p-value of 0.007. Gender distribution also varied, with more females in the Central group (83.9%) and more males in the Peripheral group (34.2%), with statistically significant difference. Various comorbidities and risk factors were assessed, and their implications on PE were examined, HT & DM were more in central group with statistically significant difference, while for risk factors there is no significant statistical difference between central & peripheral groups. Regarding symptoms and signs and severity classification of lung involvement by CTPA, were no statistically significant difference between two groups, while for vital signs only diastolic blood pressure was lower in central group with statistically significant P Value 0.023, as in **table 8**

Table 8: Relationship between central and peripheral pulmonary embolism in regard to study parameters.

Characteristics	Central, N = 62[1]	Peripheral, N = 38[1]	P-value[2]
Age (years)	57.3 ± 15.5	48.3 ± 16.0	**0.007**
Gender			**0.037**
Female	52 (83.9%)	25 (65.8%)	
Male	10 (16.1%)	13 (34.2%)	
Co-morbidities			
Hypertension	34 (54.8%)	12 (31.6%)	**0.023**
Diabetes mellitus	26 (41.9%)	9 (23.7%)	**0.063**
Ischemic heart disease	12 (19.4%)	5 (13.2%)	0.4
Stroke	6 (9.7%)	3 (7.9%)	>0.9
Asthma	4 (6.5%)	2 (5.3%)	>0.9
COPD	4 (6.5%)	1 (2.6%)	0.6
ILD	1 (1.6%)	2 (5.3%)	0.6
Previous history of VTE	7 (11.3%)	2 (5.3%)	0.5
Risk factors			
Immobilization	55 (88.7%)	33 (86.8%)	0.8
Hx of recent surgery	23 (37.1%)	12 (31.6%)	0.6
Hx of active cancer	13 (21.0%)	11 (28.9%)	0.4
Presence of fracture	16 (25.8%)	8 (21.1%)	0.6
Pregnancy	3 (4.8%)	3 (7.9%)	0.7
Use of OCP	3 (4.8%)	3 (7.9%)	0.7
Hx of Sickle cell anaemia	3 (4.8%)	0 (0.0%)	0.3
Recent long trip	1 (1.6%)	1 (2.6%)	>0.9
Exposure to smoking	14 (22.6%)	10 (26.3%)	0.7
Duration of symptoms (hours)	48.0 (5.5 - 72.0)	36.0 (15.0 - 90.0)	0.7
Symptoms at presentation			
Shortness of breath	61 (98.4%)	37 (97.4%)	>0.9
Palpitation	36 (58.1%)	29 (76.3%)	0.063
Cough	40 (64.5%)	23 (60.5%)	0.7
Chest pain	35 (56.5%)	24 (63.2%)	0.5

Characteristics	Central, N = 62[1]	Peripheral, N = 38[1]	P-value[2]
Dizziness	27 (43.5%)	21 (55.3%)	0.3
Syncope	12 (19.4%)	6 (15.8%)	0.7
Hemoptysis	6 (9.7%)	4 (10.5%)	>0.9
Signs at presentation			
Tachypnoea	47 (75.8%)	31 (81.6%)	0.5
Tachycardia	38 (61.3%)	23 (60.5%)	>0.9
Unilateral leg swelling	25 (40.3%)	12 (31.6%)	0.4
JVP distension	20 (32.3%)	12 (31.6%)	>0.9
S_3 gallop	20 (32.3%)	8 (21.1%)	0.2
Vital signs at presentation			
Pulse rate (bpm)	105.0 ± 19.1	106.3 ± 22.4	0.8
Respiratory rate (cycle/m)	26.7 ± 8.2	28.0 ± 6.5	0.4
Systolic blood pressure (mmHg)	110.2 ± 22.1	113.2 ± 20.8	0.5
Diastolic blood pressure (mmHg)	68.3 ± 14.8	75.5 ± 14.9	**0.023**
Temperature (degree Celsius)	37.0 ± 0.7	37.0 ± 0.8	0.6
SpO_2 (%)	0.9 ± 0.1	0.9 ± 0.1	>0.9
Severity classification			0.5
Low	2 (3.2%)	2 (5.3%)	
Intermediate	32 (51.6%)	23 (60.5%)	
High	28 (45.2%)	13 (34.2%)	

[1]Mean ± SD; n (%); Median (IQR)
[2]Welch Two Sample t-test; Pearson's Chi-squared test; Fisher's exact test; Wilcoxon rank sum test.

DISCUSSION

In current study, 100 patients with confirmed pulmonary embolism were enrolled, revealed that the average age of the participants was 53.9 years, with a standard deviation of 16.2 years, in agreement with WEST et al study was tested in UK 2007, the mean age ranged from 44 to 69 years (median 57) (19). this age related increase in incidence in VTE is largely attributed to multiple causes; the increase in PE burden, the risk of cancer more among elderly patients, the risk of DVT more among elderly patients, the orthopaedic surgery associated more with PE in elderly patients and the vascular wall changes and hypercoagulability in elderly patients, together increase the incidence
of thrombotic events (20).

The sex distribution was predominantly female, accounting for 77.0% of the cases in this study, in agreement with Lindsey Norton study was done in Taiwan (2021) female patients were (52%) (21), and in Vincent et al study (22) (57%) of patients with isolated PE were women. The difference in gender distribution might be due to, females showed

higher prevalence for multiple risk factors of thromboembolism than male such as hypertensive heart disease, (41.1% vs 32.9%), arrhythmia (16.3% vs 13.9%), diabetes mellitus (14.8% vs 11.7%) and obesity (6.6% vs 3.5%) (23). Pulmonary embolism incidents occurred more often outside the hospital setting (71.0%) than within (29.0%), these findings were near similar to previous study results in Doha, Qatar 2022, by Wanis Ibrahim et al, which revealed the majority (68.6%) of PE events were occurred outside the hospital (23).

One of the co-morbidities that related to the development of PE and increase the relative risk of high severity of PE, we find that (46.0%) were hypertension and the value of systolic and diastolic blood pressure highly affect the risk of high severity PE with statistically significant value, in agreement with Keller et al trial in Mainz Germany 2015, where the systolic and diastolic blood pressures ar excellent prognosis predictors of patient with PE (24). Other co- morbidities in this study were Diabetes mellitus (35.0%), Ischemic heart disease (17.0%), in Thoddi et al study (25) diabetes mellitus 40% coronary artery disease 10.3%. The most prevalent risk factor was immobilization, observed in 88.0% of the participants in the current study followed by history of recent surgery (35.0%), history of active cancer (24.0%), in AT-AGE study by Engbers et al, (26) 2014 Netherlands, the overall contribution of immobility to thrombotic risk was 40%, in Thoddi et al study (25) history of recent surgery (25.0%), history of active cancer (24.0%), the cause of difference between two studies regarding immobilization is that our patients are older than the other study, and immobility explains part of the age gradient in the incidence of VTE. Patients commonly presented with shortness of breath (98.0%), palpitations (65.0%), chest pain (59.0%), these results nearly similar to previous multiple studies as with Massimo Miniati et al, trial was tested in Piza Italy 2012 which revealed the most prevalent symptoms was shortness of breath 78%, chest pain 39% (27), and with Qiao- Ying Ji et al, study in Wenzhou Medical University-China 2017 th most common symptoms of PE were dyspnoea in more than 60% ofpatients (28).

The duration of symptoms ranged from 11 to 72 hours, with a median of 48 hours, in agreement with Massimo Miniati et al (27), a large trial involves 800 cases was tested in Piza Italy 2012, which revealed the median interval between onset of symptoms and the diagnosis of PE was 2 days, but in 25% of the patients the time to diagnosis exceeded 7 days, the reason for this delay might be due to patients usually neglected occult PE, which might lead to an underestimation of the incidence of PE and most patients in whom the diagnosis of PE was delayed had sudden unexplained dyspnea as the initial clinical symptoms. Regarding the results of blood tests in this study, there is no significant changes in RFTs, LFTs and CBC in those patients with PE, in agreement with a previous large study was done in United Kingdom 2011, by Adeel Ashraf et al, a various biochemical tests have been studied but revealed no diagnostic significance except for raised blood urea, this result explained by some patients having other significant pathologies and not all patients had all the blood tests done (2).

In terms of ECG abnormalities, sinus tachycardia was highly prevalent at 89.0%, S1Q3T3 (50.0%), right axis deviation (26.0%), highly similar to Bertrand et al study (30) in Sub-Saharan Africa 2019,sinus tachycardia 63.4%, S1Q3T3 aspect 37.6%, right axis deviation 28.7%. The Well's score was found to have a mean of 6.8 ± 1.9, with a range from 4.0 to 11.0, and did not significantly impact high-severity PE based on odds ratios (OR) and (95%) CI, However, Angriman et al trial in Buenos Aires, Argentina 2015 (31), have

shown a high Wells score at time of VTE diagnosis is associated with a 4-fold increase in the incidence of death or new VTE during follow-up. Notably, the present study revealed that, central pulmonary embolism was higher than peripheral one, this was in agreement with that of Antonio et al study (32) in both per COVID and COVID periods. The patients in the central group pulmonary embolism, had a higher mean age of 57.3 years compared to 48.3 years in the Peripheral group, these findings compare with those obtained in a previous study by Jose Martinez et al (33), was tested in Navarra Spain 2016, the patients with central pulmonary embolisms were mostly the elderly and the age was higher than the age of patients with peripheral pulmonary embolisms.

In this study, the prevalence of DM was more among patients with central group PE with statistically significant difference, in comparison with multiple previous studies, the relationship between the history of DM and the severity of the disease in patient with PE was well established, as in Gulru Polat study in Research Hospital, Izmir, Turkey 2022 (34), which reveals that, the patient with DM more vulnerable to develop a massive PE, but no clear evidence in these studies about the type of PE whether central or peripheral, the highly suggested explanations are the hypercoagulable state with many coagulations and metabolic abnormalities.

CONCLUSIONS

In conclusion this study revealed that the pulmonary embolism more in middle to old age groups, female was more common. Central PE group was more than peripheral, and had a higher mean age. The most obvious clinical symptoms in PE was shortness of breath.There is no significant statistical difference for the laboratory biochemistry investigations (real and liver function tests) and for complete blood count in the development of PE. The diabetic patient more vulnerable to develop a massive central PE.

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