

Prehospital Emergency Care

ISSN: 1090-3127 (Print) 1545-0066 (Online) Journal homepage: www.tandfonline.com/journals/ipec20

Prehospital fibrinolysis in high-risk pulmonary embolism - observational data on clinical picture and outcome

Johanna Harjola, Peter Holmström, Markus Sane, Juha Hartikainen & Veli-Pekka Harjola

To cite this article: Johanna Harjola, Peter Holmström, Markus Sane, Juha Hartikainen & Veli-Pekka Harjola (05 Nov 2025): Prehospital fibrinolysis in high-risk pulmonary embolism - observational data on clinical picture and outcome, Prehospital Emergency Care, DOI: 10.1080/10903127.2025.2582671

To link to this article: https://doi.org/10.1080/10903127.2025.2582671

View supplementary material

Accepted author version posted online: 05 Nov 2025.

Submit your article to this journal

Article views: 31

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=ipec20

Check for updates

Prehospital fibrinolysis in high-risk pulmonary embolism - observational data on clinical picture and outcome

Johanna Harjola[1] 0000-0003-2195-4703**, Peter Holmström**[1]**, Markus Sane**[2] 0000-0003-1366-9902**, Juha Hartikainen**[3] 0000-0003-0847-107X**, Veli-Pekka Harjola**[1,*] 000-0001-5351-0811

[1]University of Helsinki and Department of Emergency Medicine and Services, Helsinki University Hospital, Haartmaninkatu 4, 00029 Helsinki, Finland
[2]University of Helsinki and Department of Cardiology, Heart and Lung Center, Helsinki University Hospital, Haartmaninkatu 4, 00029 Helsinki, Finland
[3]Heart Centre, University of Eastern Finland, Kuopio University Hospital, Puijonlaaksontie 2, 70210 Kuopio, Finland

***Corresponding Author:** Veli-Pekka Harjola, University of Helsinki and Department of Emergency Medicine and Services, Helsinki University Hospital, Haartmaninkatu 4, 00029 Helsinki, Finland, veli-pekka.harjola@hus.fi.

Accepted Manuscript

ABSTRACT

OBJECTIVES: High-risk pulmonary embolism (PE) manifests as obstructive shock or cardiac arrest and requires immediate treatment. Our aim was to explore survival and bleeding complications of prehospital fibrinolysis in the treatment of suspected high-risk PE.

METHODS: We collected patient data from the emergency medical services (EMS) registry of the Helsinki metropolitan area and the hospital database of Helsinki University Hospital between 2007 and 2019. The inclusion criteria were clinically suspected, high-risk PE treated with intravenous fibrinolysis by EMS. Diagnosis of PE was confirmed in all patients with imaging or by autopsy. Patients who did not receive prehospital fibrinolysis served as comparators.

RESULTS: The study included sixty patients. Twenty-three patients, 44% female, with a mean age of 57 years received prehospital fibrinolysis. Seventeen of those patients (74%) had suffered cardiac arrest and six patients (26%) had obstructive shock as the leading manifestation. Prehospital mortality was 35% (n=8/23) and in-hospital mortality 27% (n=4/15), for a total (prehospital + in-hospital) mortality rate of 52% (n=12/23). All deaths were among patients presenting with cardiac arrest. Two patients had major bleeding complications, but none were fatal. All eleven fibrinolysis patients who were discharged alive from the hospital were still alive at a twelve-month follow-up. In comparison, there were 37 high-risk PE patients who did not receive fibrinolysis. They were older (mean, 72 years) and more likely to present with cardiac arrest (51%), and their 12-month mortality tended to be higher (76%) (p=0.06).

CONCLUSIONS: Out-of-hospital high-risk PE is associated with high mortality. In this case-series, fibrinolysis appears to be safe. The possible survival benefit needs to be confirmed in further trials.

Keywords: high-risk pulmonary embolism, out-of-hospital cardiac arrest, shock, fibrinolysis, mortality

Accepted Manuscript

INTRODUCTION

High-risk pulmonary embolism (PE) is the most fatal complication of venous thromboembolism (VTE). The expression indicates high risk of in-hospital or 30-day mortality (1). Studies in several countries have demonstrated that high-risk pulmonary embolism is a significant cause of mortality and is responsible for approximately 2% of out-of-hospital cardiac arrests (OHCA) (2, 3). Patients with high-risk pulmonary embolism manifesting with shock or cardiac arrest can suffer mortality rates between 25-70% (4-6).

Pulmonary embolism should be suspected in a patient with dyspnea, chest pain, presyncope or syncope, or hemoptysis (7). High-risk PE is manifested by persistent hypotension, obstructive shock, or cardiac arrest, especially with pulseless electrical activity (PEA). As such, high-risk PE requires emergency diagnostic work-up and treatment without any unnecessary delay. The primary treatment of choice is reperfusion with systemic fibrinolysis. It has been reported that the mortality of PE patients suffering cardiac arrest who receive fibrinolysis is lower than in those from whom it is withheld (8). The evidence for prehospital management of suspected high-risk PE is limited (3,6,8-12).

The aim of our study was to explore the survival and bleeding complications associated with prehospital fibrinolysis in the treatment of suspected high-risk PE. Our second aim was to compare these patients to those who did not receive prehospital fibrinolysis.

Accepted Manuscript

METHODS

This was a retrospective single center cohort study. The study was approved by the Institutional Review Board of Helsinki University Hospital. We collected data from the emergency medical services (EMS) registry of the Helsinki metropolitan area (Merlot Medi, CGI, Finland) and the hospital database of Helsinki University Hospital (Uranus, CGI, Finland) between June 2007 and August 2019. Our study was based on the pre-specified EMS registry of acute myocardial infarction and pulmonary embolism patients receiving fibrinolysis. The Helsinki EMS system is a tiered response system including basic life support first response, paramedic ambulances, and "medical supervisor" (i.e., advanced senior paramedics) or physician-staffed response units. More details are provided in Supplemental file. Only physicians and medical supervisors are allowed to provide fibrinolytic therapy, and supervisors are required to consult the emergency physician on call before initiating the therapy. Fibrinolysis is given at the discretion of the treating clinician and is not protocolized.

We analyzed all the patients in the EMS registry having suspected high-risk PE, after which only those with confirmed PE were included. We included the patients if they met all the following criteria: 1) clinically suspected high-risk PE (i.e., suspected PE presenting either with cardiac arrest or obstructive shock); 2) treatment with intravenous fibrinolysis by EMS; and 3) PE diagnosis confirmed with imaging in the emergency department or by an autopsy. We defined cardiac arrest as the need for chest compressions or defibrillation. We used the European Society of Cardiology (ESC) definition for obstructive shock, namely: a systolic blood pressure < 90 mmHg or vasopressors required to achieve a BP > 90 mmHg despite adequate filling status and accompanied by end-organ hypoperfusion (altered mental status; cold, clammy skin; oliguria/anuria; increased serum lactate) (1). The data included relevant symptoms recorded by EMS at the scene (dyspnea, chest pain or syncope), vital signs (initial rhythm, heart rate, blood

Accepted Manuscript

pressure, and respiratory rate) as well as examinations and treatments (point of care ultrasound, advanced life support, vasoactive medication or fibrinolysis). We collected the time from the dispatch alert to EMS arrival and the time from EMS arrival to fibrinolysis administration; for cardiac arrest patients we also collected the time to return of spontaneous circulation (ROSC). The starting point for time to ROSC was the time the emergency call was received. ROSC was required before patients were transported to hospital. In addition, we determined prehospital, in-hospital and 12-month mortality. The 12-month mortality data was collected from National Population Registry data.

The data are presented as mean with standard deviation or median with interquartile range (IQR) for continuous data, as frequency with percentage for categorical variables. Between-group comparisons were performed using the $\chi 2$ test and Fisher's exact test for categorical variables and Student's *t*-test for continuous variables. Statistical analysis was performed using SPPS Version 29 (IBM Corp., Armonk, NY, USA).

Accepted Manuscript

RESULTS

Sixty patients with autopsy or imaging-confirmed high-risk PE were identified in our registry, with 23 receiving prehospital fibrinolysis and 37 not receiving fibrinolysis. Table 1 shows the characteristics of the patients who did and did not receive prehospital fibrinolysis, and Table 2 shows the same characteristics for the prehospital fibrinolysis patients who did and did not survive, separately.

Among patients receiving fibrinolysis, the mean age was 57 (±15) years (range 19 to 80 years) and 10 (44%) were female (Table 2). The most common symptom at the scene was a sudden onset of dyspnea (40%). Upon EMS arrival, six patients (26%) were in obstructive shock. Three patients (13%) were in cardiac arrest prior to EMS arrival, and another fourteen patients (61%) suffered cardiac arrest after EMS arrival. The initial rhythm was PEA in 16 (94%) patients with cardiac arrest and ventricular fibrillation (VF) in one (6%).

The mean time from the dispatch alert to EMS arrival was 8 (± 3.5) min, and the time from EMS arrival to fibrinolysis was 33 (±15.3) min. The median time (IQR) to ROSC, when achieved, was 30 (7.0-70.0) min. Point-of-care transthoracic ultrasound examination was performed at the scene by the prehospital physician for 17 (74%) of fibrinolysis patients, and right ventricular dilatation was observed in all of them. In comparison 12 (32%) of non-fibrinolysis patients had point-of-care transthoracic ultrasound performed by the on-scene physician, with right ventricular dilatation observed in four of them.

Figure 1 shows the outcomes of the patients who received fibrinolysis. Eight out of seventeen (47%) patients with OHCA died on scene; nine (53%) survived to hospital admission and five (29%) survived to hospital discharge. The prehospital and in-hospital outcomes were similar in patients with cardiac arrest upon EMS arrival and in those who suffered cardiac arrest after EMS arrival (data not shown). All patients with obstructive shock were transported to hospital and discharged alive. Moreover, all patients who survived until hospital discharge were alive at twelve months.

Accepted Manuscript

Twenty-two patients (95%) were given intravenous tenecteplase and one (5%) reteplase with the same fibrinolytic dosage as for ST elevation myocardial infarction. The mean dosage of tenecteplase was 45 (±14) mg. One patient received 1120 mg reteplase.

An autopsy was performed on all eight fibrinolysis patients who died at the scene and one patient who died in the hospital. Two patients who died had bleeding complications observed either clinically or during autopsy, but neither case of bleeding was believed to be the cause of death. In one case, retroperitoneal bleeding was observed during autopsy. The cause of death determined during autopsy was PE caused by deep vein thrombosis. Another patient had diffuse bleeding from cannulation sites during extracorporeal membrane oxygenation (ECMO) treatment. In this case the cause of death was anoxic brain injury.

None of the patients had mechanical embolectomy. Two patients were managed with ECMO but neither survived. One of the ECMO patients also received catheter-directed fibrinolysis with 2mg of alteplase.

The data from the patients who did not receive prehospital fibrinolysis are also shown in Table 1 and Figure 2. The mean age of 72 years was significantly higher compared to those who received fibrinolysis ($p<0.001$). Patients who did not receive prehospital fibrinolysis presented in cardiac arrest more often than patients who did receive it (51% vs 13%, $p=0.018$). The difference in 12-month mortality between the fibrinolysis and no-fibrinolysis groups was not statistically significant (52% vs 76%, $p=0.06$).

Accepted Manuscript

DISCUSSION

Our study provides three main findings. First**,** we show that fibrinolysis was successful in 29% of high-risk PE patients suffering cardiac arrest even though the prevailing initial rhythm was PEA. Second, all the high-risk PE patients with obstructive shock who received fibrinolysis survived to hospital discharge. Third, no fatal bleeding complications were observed.

Seventy-four percent of patients receiving fibrinolysis in our study had OHCA, and almost invariably PEA as initial rhythm. This is in line with a finding from a French resuscitation registry from 2011 to 2018. It included 58 patients with OHCA caused by PE who were treated with fibrinolysis during resuscitation and in whom the initial rhythm was non-shockable in 99% of cases (3). Importantly, PEA is associated with high mortality (9,13). In a previous analysis of fatal PEs in Helsinki and Uusimaa, Finland, out-of-hospital resuscitation was attempted in 41% of patients with out-of-hospital cardiac arrest, but only seven (6.5%) received fibrinolysis during resuscitation (10).

It is proposed that after fibrinolysis during cardiac arrest, resuscitation should be continued at least 60-90 min before terminating the attempts (11,14). In our study, the time to ROSC in survivors who received fibrinolysis (median 18 min) was relatively short compared with non-survivors (median 62 min). However, the time to ROSC was even shorter (median 11 min) in patients who did not receive fibrinolysis. Although we cannot know for certain, it is possible that fibrinolysis was withheld (or not deemed indicated) when OHCA patients rapidly achieved ROSC. An earlier study showed that ROSC was much more frequent in PE patients with cardiac

Accepted Manuscript

arrest who received fibrinolysis (81%) compared to patients from whom fibrinolysis was withheld (43%) (8). This is also in line with a retrospective cohort study from a French registry reporting that prehospital fibrinolysis in OHCA caused by PE was associated with a marked survival benefit, with a thirty-day survival rate of 16% in the fibrinolysis group and 6% in the no-fibrinolysis group (3).

Our study showed that the hemodynamic measures improved in all patients with obstructive shock treated with fibrinolysis, and all the patients with obstructive shock were still alive 12 months after the index event. Our results are in line with German hospital registry data showing that systemic fibrinolysis improved survival both in patients with signs of shock as well as in those with cardiac arrest necessitating CPR (15).

In our study the overall 12-month mortality was 52%, and 35% of patients died at the scene. Notably, the in-hospital mortality rate was only 17% in our study. In a previous study, the in-hospital mortality rate was as high as 67% in patients with OHCA (8). Importantly, in our study 100% of patients who survived until discharge were still alive twelve months after discharge from the hospital, markedly better when compared with Austrian and French studies reporting a 30-day survival rate of 10% and 16%, respectively (3,8). In a previous study, 22% of non-shockable OHCA patients were discharged alive from hospital, whereas in our study 29% (n=5/17) were discharged alive from hospital (12).

Accepted Manuscript

The clinical suspicion of high-risk PE as a cause of cardiac arrest is the key to timely diagnosis and treatment, and it should be suspected in a patient with dyspnea, chest pain, presyncope or syncope (7). The leading symptom in our study was the sudden onset of dyspnea. Importantly, point-of-care ultrasound is a valuable and increasingly available tool to aid in the differential diagnosis of patients with hemodynamic collapse and cardiac arrest. The 2019 ESC guidelines recommend that focused ultrasound should be performed on all patients who are hemodynamically instable (1). Although focused on in-hospital management of PE, the concept underlines that typical ultrasound findings justify reperfusion therapy in patients with a high-suspicion of PE. In our study, point-of-care transthoracic ultrasound examination was performed at the scene by the prehospital physician for 17 (74%) of fibrinolysis patients, and right ventricular dilatation was observed in all of them. In comparison, 12 (32%) of non-fibrinolysis patients had point-of-care transthoracic ultrasound, and only four of them had right ventricular dilatation.

Bleeding, particularly cerebral bleeding, is the main fear and hazard of fibrinolytic therapy (8). In our study, bleeding complications occurred in only two cases and it was not the proximal cause for mortality for either. None of the patients had intracranial hemorrhage. Importantly, there seems to be no evidence that severe bleeding is more common when fibrinolysis is combined with CPR, and thus, CPR is not an absolute contraindication for fibrinolysis, especially if a high-risk PE is the possible cause of cardiac arrest (16).

Accepted Manuscript

LIMITATIONS

Although this analysis is based on a large EMS registry, few patients received fibrinolysis for high-risk PE. We must underline as an important limitation that the decision to administer fibrinolysis was at the discretion of the attending clinician, and the exact reasons for not providing prehospital fibrinolysis (e.g., contraindications, do not resuscitate order, comorbid conditions) were not available for all the patients. We did not explore whether patient characteristics or outcomes differed for patients attended by physicians vs. medical supervisors. Indeed, resuscitation was not attempted in some cardiac arrest patients with PE. Thus, the comparison between patients receiving and not receiving fibrinolysis must be interpreted with caution. Due to the small sample size, the comparison of mortality between fibrinolyzed and non-fibrinolyzed patients must also be interpreted with caution. Since the registry only included patients with confirmed PE, we were unable to assess possible adverse effects of fibrinolysis in patients without confirmed PE. Three (13%) of the fibrinolysis patients died in-hospital without a subsequent autopsy. Although they did not exhibit clinical signs of bleeding, it is possible there was occult bleeding that went undetected. The differences between our findings and those of previous studies may be attributable to differences in inclusion criteria, system policies about whether or when to transport patients who do not achieve ROSC, or other factors not explored in our analysis

Accepted Manuscript

CONCLUSIONS

Out-of-hospital high-risk PE is associated with high mortality. Our study suggests that prehospital fibrinolysis may be applicable in suspected high-risk PE. These findings, however, need to be confirmed in a proper randomized controlled trial. In this study, fibrinolysis appears to be safe but conclusions about any survival benefit need to be confirmed in further trials.

ACKNOWLEDGEMENTS: None.

FUNDING SOURCES: JH has received a research grant from the Department of Emergency Medicine and Services, Helsinki University Hospital for the analysis of the data and the writing of the manuscript. For the remaining authors none were declared.

DECLARATION OF INTEREST STATEMENT: The authors report there are no competing interests to declare.

DECLARATION OF GENERATIVE AI IN SCIENTIFIC WRITING: The authors did not use a generative artificial intelligence (AI) tool or service to assist with preparation or editing of this work. The authors take full responsibility for the content of this publication.

DATA SHARING STATEMENT: The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

AUTHORSHIP STATEMENT: JH and PH collected the available data. The data were analyzed by JH, and JH was the major contributor in writing the manuscript. All authors read and approved the final manuscript.

Accepted Manuscript

REFERENCES

1. Konstantinides SV, Meyer G, Becattini C, Bueno H, Geersing GJ, Harjola VP, Huisman MV, Humbert M, Jennings CS, Jimenez D, et al. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS). Eur Heart J. 2020;41(4):543-603. DOI:10.1093/eurheartj/ehz405.

2. Wendelboe AM, Raskob GE. Global burden of thrombosis: epidemiologic aspects. Circ Res. 2016;118(9):1340-1347. DOI: 10.1161/CIRCRESAHA.115.306841.

3. J Javaudin F, Lascarrou JB, Le Bastard Q, Bourry Q, Latour C, De Carvalho H, Le Conte P, Escutnaire J, Hubert H, Montassier E, et al. Thrombolysis during resuscitation for out-of-hospital cardiac arrest caused by pulmonary embolism increases 30-day survival: findings from the French national cardiac arrest registry. Chest. 2019;156(6):1167-1175. DOI: 10.1016/j.chest.2019.07.015.

4. Stein PD, Henry JW. Prevalence of acute pulmonary embolism among patients in a general hospital and at autopsy. Chest. 1995;108(4):978-981. DOI: 10.1378/chest.108.4.978.

5. Kasper W, Konstantinides S, Geibel A, Olschewski M, Heinrich F, Grosser KD, Rauber K, Iversen S, Redecker M, Kienast J. Management strategies and determinants of outcome in acute major pulmonary embolism: results of a multicenter registry. J Am Coll Cardiol. 1997;30(5):1165-71. DOI: 10.1016/s0735-1097(97)00319-7.

6. Sakuma M, Nakamura M, Nakanishi N, Miyahara Y, Tanabe N, Yamada N, Kuriyama T, Kunieda T, Sugimoto T, Nakano T, et al. Inferior vena cava filter is a new additional therapeutic option to reduce mortality from acute pulmonary embolism. Circ J. 2004;68(9):816-821. DOI: 10.1253/circj.68.816.

Accepted Manuscript

7. Miniati M, Prediletto R, Formichi B, Marini C, Di Ricco G, Tonelli L, Allescia G, Pistolesi M. Accuracy of clinical assessment in the diagnosis of pulmonary embolism. Am J Respir Crit Care Med. 1999;159(3):864-871. DOI: 10.1164/ajrccm.159.3.9806130.

8. Kürkciyan I, Meron G, Sterz F, Janata K, Domanovits H, Holzer M, Berzlanovich A, Bankl HC, Laggner AN. Pulmonary embolism as a cause of cardiac arrest: presentation and outcome. Arch Intern Med. 2000;160(10):1529-1535. DOI: 10.1001/archinte.160.10.1529.

9. Engdahl J, Bång A, Lindqvist J, Herlitz J. Factors affecting short- and long-term prognosis among 1069 patients with out-of-hospital cardiac arrest and pulseless electrical activity. Resuscitation. 2001;51(1):17-25. DOI: 10.1016/s0300-9572(01)00377-x.

10. Antero SM. Background of fatal pulmonary embolism: an analysis of all diagnosed fatal pulmonary embolism in 2015-2018 from Hospital District of Helsinki and Uusimaa. J Thromb Thrombolysis. 2022;53(2):550-556. DOI: 10.1007/s11239-021-02550-z.

11. Böttiger BW, Martin E. Thrombolytic therapy during cardiopulmonary resuscitation and the role of coagulation activation after cardiac arrest. Curr Opin Crit Care. 2001;7(3):176-183. DOI: 10.1097/00075198-200106000-00006.

12. Bougouin W, Marijon E, Planquette B, Karam N, Dumas F, Celermajer DS, Jost D, Lamhaut L, Beganton F, Cariou A, et al. Pulmonary embolism related sudden cardiac arrest admitted alive at hospital: Management and outcomes. Resuscitation. 2017;115:135-140. DOI: 10.1016/j.resuscitation.2017.04.019.

13. Niemann JT, Stratton SJ, Cruz B, Lewis RJ. Outcome of out-of-hospital postcountershock asystole and pulseless electrical activity versus primary asystole and pulseless electrical activity. Crit Care Med. 2001;29(12):2366-2370. DOI: 10.1097/00003246-200112000-00020.

Accepted Manuscript

14. Truhlar A, Deakin CD, Soar J, Khalifa G, Alfonzo A, Bierens JLM, Brattebo G, Brugger H, Dunning J, Hunyadi-Anticevic S, et.al. European Resuscitation Council Guidelines for Resuscitation 2015 Section 4. Cardiac arrest in special circumstances. Resuscitation 95(2015):148-201. DOI:10.106/j.resuscitation.2015.07.017.

15. Keller K, Hobohm L, Ebner M, Kresoja KP, Münzel T, Konstantinides SV, Lankeit M. Trends in thrombolytic treatment and outcomes of acute pulmonary embolism in Germany. Eur Heart J. 2020;41(4):522-529. DOI: 10.1093/eurheartj/ehz236.

16. Spöhr F, Böttiger BW. Safety of thrombolysis during cardiopulmonary resuscitation. Drug Saf. 2003;26(6):367-379. DOI: 10.2165/00002018-200326060-00001.

Accepted Manuscript

Table 1. Characteristics of high-risk pulmonary embolism patients receiving and not-receiving prehospital fibrinolysis.

	Prehospital fibrinolysis	No prehospital fibrinolysis
Patients, n	23	37
Age, mean (SD) years	57 (15)	72 (14)***
Female, n (%)	10 (44)	23 (62)
Clinical history, n (%)		
Immobilization	4 (17)	3 (8)
Previous VTE	5 (22)	7 (19)
Pneumonia	2 (9)	0 (0)
Clinical signs & symptoms, n (%)		
Dyspnea	9 (39)	15 (41)
Chest pain	4 (17)	5 (14)
Syncope	5 (22)	8 (22)
Obstructive shock	6 (26)	4 (11)
Cardiac arrest, n (%)	17 (74)	33 (89)*
Initially	3 (13)	19 (51)**
After arrival of EMS	14 (61)	14 (38)
ROSC, median (IQR) min.	30 (7.0-70.0)	10.7 (2.0-21.0)*
In-hospital fibrinolysis, n (%)	0 (0)	3 (8)
12-month survival, n (%)	11 (48)	9 (24)

Accepted Manuscript

Table 1 footnotes: VTE = venous thromboembolism; ROSC = return of spontaneous circulation; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Accepted Manuscript

Table 2. Characteristics of all, surviving and non-surviving high-risk pulmonary embolism patients who received prehospital fibrinolysis.

	Patients receiving prehospital fibrinolysis		
	All	Survivors	Non-survivors
Patients, n	23	11	12
Age, mean (SD) years	57 (15)	55 (16)	57 (14)
Female, n (%)	10 (44)	5 (46)	5 (42)
Clinical history, n (%)			
Immobilization	4 (17)	3 (27)	1 (8)
Previous VTE	5 (22)	1 (9)	4 (33)
Pneumonia	2 (9)	1 (9)	1 (8)
Clinical signs & symptoms, n (%)			
Dyspnea	9 (39)	3 (27)	6 (50)
Chest pain	4 (17)	2 (18)	2 (17)
Syncope	5 (22)	4 (36)	1 (8)
Obstructive shock	6 (26)	6 (55)	0 (0)
Cardiac arrest, n (%)	17 (74)	5 (46)	12 (100)
Initially	3 (13)	2 (18)	1 (8)
After arrival of EMS	14 (61)	3 (27)	11 (92)
ROSC, median (IQR) min.	30 (7-70)	18 (7-53)	62 (26-70)
In-hospital fibrinolysis, n (%)	0 (0.0)	0 (0)	0 (0)
12-month survival, n (%)	11 (48)	11 (100)	0 (0)

Table 2 footnotes: VTE = venous thromboembolism; ROSC = return of spontaneous circulation.

Accepted Manuscript

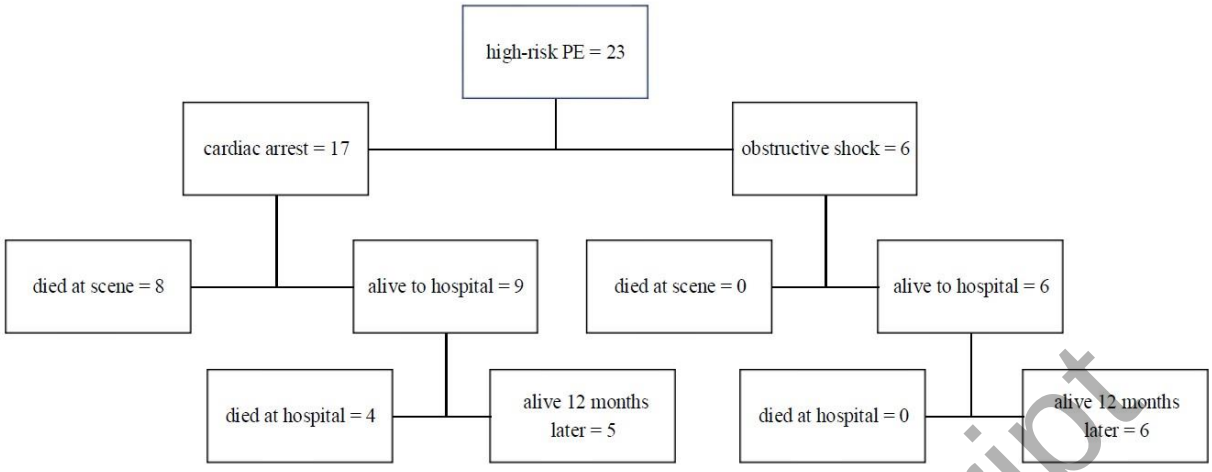


Figure 1: Clinical manifestations and outcomes of high-risk PE patients who received prehospital fibrinolysis therapy.

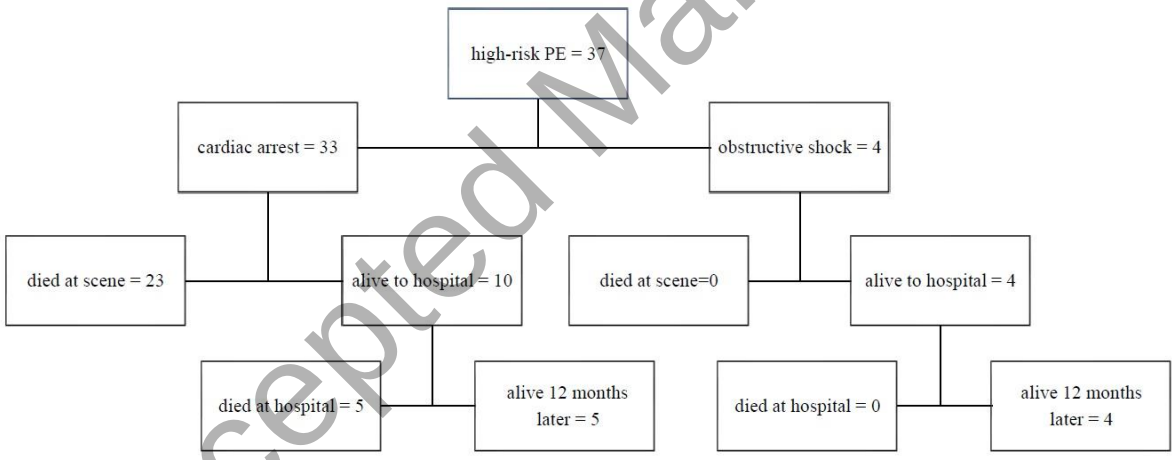


Figure 2: Clinical manifestations and outcomes of high-risk PE patients who did not receive prehospital fibrinolysis therapy.

Accepted Manuscript