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DOES INCREASING NUMBER OF RISK FACTORS AFFECT PROGNOSIS IN PATIENTS WITH ACUTE CARDIOGENIC PULMONARY EDEMA

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ABSTRACT **Introduction:** Acute Cardiogenic Pulmonary Oedema(ACPE) is a typical cardiologic emergency with a relatively high in-hospital mortality rate. ACPE is secondary to left ventricular failure due to either systolic or diastolic dysfunction. The presence of risk factors predisposes to the development of disease. Acute myocardial infarction is the single most common cause of ACPE.
The aim of this study is to compare the outcome and number of risk factors in a patient with acute cardiogenic pulmonary edema. This is prospective,time bound, hospital based, longitudinalobservational study.
RESULTS:172 patients had risk factors the disease. Almost half the patients had 3 risk factors. 40% of patients with 4 factors, 25% with 5 risk factors expired. Mortality due to ACPE directly correlates with increasing number of risk factors.
CONCLUSION: As risk factors increases, mortality increases, hence frequent health checkups will be helpful for every six months in the age group of >45 years to diagnose the disease early and prevent the development of ACPE. Identification and appropriate management of risk factors can prevent or reduce the incidence of the disease.

KEYWORDS : acute Cardiogenic pulmonary edema, risk factors, mortality, prognosis

INTRODUCTION

Acute Cardiogenic Pulmonary Oedema(ACPE) is a typical cardiologic emergency with a relatively high in-hospital mortality rate. ACPE is secondary to left ventricular failure due to either systolic or diastolic dysfunction. It must be distinguished from causes of non–Cardiogenic pulmonary edema associated with the alveolar-capillary membrane's injury caused by various etiologies, i.e.,direct pulmonary injury such as sepsis, ARDS, negative pressure pulmonary edema, near-drowning.

Risk factors contributing to the development of ACPE are classified into modifiable and non-modifiable. Modifiable risk factors include hypertension, hypercholesterolemia, coronary artery disease, smoking, diabetes mellitus, obesity, physical activity. Non-modifiable risk factors include family history, age, and gender. However, ACPE can also occur in the absence of identifiable risk factors.

The extent of in-hospital mortality and morbidity in patients with risk factors and those without has both been quantified.

MATERIALS AND METHODS:

Study design: The study was a prospective, hospital-based, longitudinal study.

Study population: All patients presenting to the Emergency Medicine department with acute cardiogenic pulmonary edema from January 2019 to June 2020.

INCLUSION CRITERIA:

All consecutive patients attending to the Department of Emergency Medicine,PESIMSR with clinical features suggestive of ACPE.

EXCLUSION CRITERIA:

1. Age <18years
2. Those who are not willing for the study
3. Non-cardiac causes of pulmonary oedema

RESULTS:

177 patients satisfying inclusion and exclusion criteria were enrolled during the study period. Among them, five patients did not have any risk factors; the remaining 172 patients had risk factors.Only five patients presented with ACPE did not have any risk factors among recovered patients. Most patients had three risk factors(52.4%), followed by four risk factors(17.9%), followed by two risk factors (15.2%), and one risk factor(10.3%).

None of the patients having one or no risk factors died during the hospital stay.13(40.6%) patients who were having four risk factors died, followed by patients with five risk factors accounted for 25%, followed by three risk factors (15.6%), two risk factors(12.5%), and six risk factors 6.2%. Among 177 patients, 18.1% have died during the hospital stay, and 81.9% were discharged home.

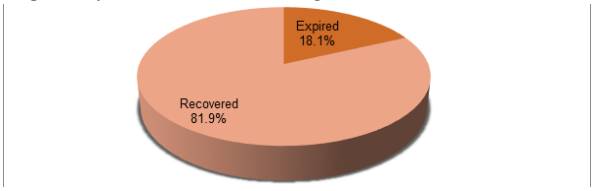


Figure 7: Pie chart descriptive analysis of outcome

The recovery rate increased as the number of risk factors decreased.

Distribution of risk factors in the study population:

Nearly 70% were smokers, and others never smoked in their lifetime. Less than one-fourth of the patients had a BMI consistent with obesity. A majority (72%) of these patients were hypertensive, while diabetes was found only in a quarter.A negligible fraction of patients had dyslipidemia, and another quarter of patients had pre-existing cardiac pathology.

Most of the patients diagnosed with ACPE were in the age group of 51-70 years(62.2%), followed by those between 31-50 years (31.1%) and less common in age groups below 30 years and above 70 years.

Table 03: Distribution of study subjects according to age

Age	No. of subjects	Percentage
<30years	1	0.5%
31-50years	55	31.1%
51-70years	110	62.2%
>70years	11	6.2%
Total	**177**	**100%**

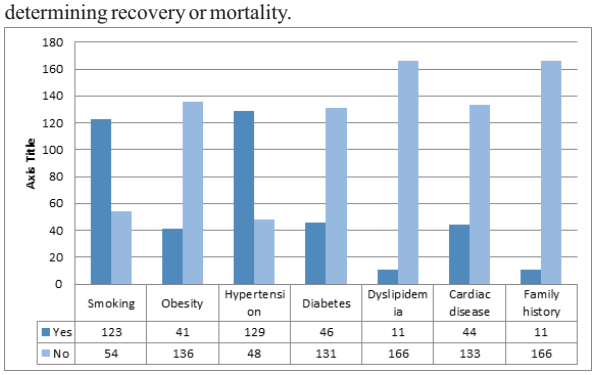
The outcome in patients presenting with ACPE in association with risk factors found to be statistically significant.

Out of 32 patients who expired, most were aged between 51 and 70 years.

Smoking was the most common risk factor leading to mortality. 90% of

smokers who developed ACPE died. Smoking is closely followed by hypertension (75%) and diabetes (50%). Obesity and dyslipidemia contributed to a lesser proportion of deaths.

Pre-existing cardiac disease was another significant risk factor contributing to mortality. Family history played a negligible role in determining recovery or mortality.



	Smoking	Obesity	Hypertension	Diabetes	Dyslipidemia	Cardiac disease	Family history
Yes	123	41	129	46	11	44	11
No	54	136	48	131	166	133	166

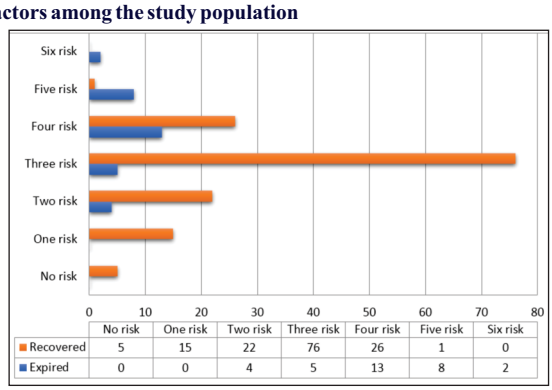
Figure 6: Bar chart descriptive analysis of the distribution of various Risk factors among the study population

DISCUSSION:

When compared risk factors with the outcome, among the expired population, none of the patients present without or with one risk factor, four patients (12.5%) had two risk factors, five patients (15.6%) had three risk factors, 13 patients(40.6%) had four risk factors, eight patients(25%) had five risk factors and 2(6.2%) had six risk factors.

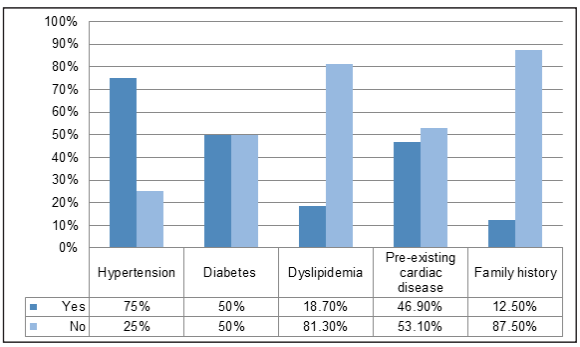
Among recovered, five patients(3.5%) had no risk factors, 15(10.3%) had one risk factor, 22 patients(15.2%) had two risk factors, 76patients(52.4%) had three risk factors, 26 patients(17.9%) had four risk factors, one patient (0.7%) had five risk factors, and none of the patients had six risk factors

Figure 20: Bar chart descriptive analysis of the number of risk factors among the study population



	No risk	One risk	Two risk	Three risk	Four risk	Five risk	Six risk
Recovered	5	15	22	76	26	1	0
Expired	0	0	4	5	13	8	2

One retrospective study by Cosentini et al. [29] highlighted advanced age as a predictor of in-hospital mortality and suggested that the high number of co-morbidities affecting elderly individuals was associated with a high risk of mortality.Hence with the above observations, in all studies, as the number of risk factors increases, mortality will be increased.



	Hypertension	Diabetes	Dyslipidemia	Pre-existing cardiac disease	Family history
Yes	75%	50%	18.70%	46.90%	12.50%
No	25%	50%	81.30%	53.10%	87.50%

Figure 19: Bar chart descriptive analysis of risk factors among the expired population

According to a study by A Roguin[31]., the most common precipitating factors for the development of ACPE include high blood pressure, rapid atrial fibrillation, unstable angina pectoris, infection, and acute myocardial infarction. In-hospital mortality was 12%, mostly contributing to cardiac pump failure. Left ventricular dysfunction was associated with a high risk of in-hospital mortality.

According to a study by J J Goldberger et al.[37] precipitating factors for ACPE include progressively worsening congestive heart failure, coronary insufficiency, subendocardial myocardial infarction, arrhythmia, medical noncompliance, and other causes. This study found that patients with progressively worsening congestive heart failure had a better prognosis than patients with other precipitant factors might be because of early presentation to the hospital and also found that patients with presentation systolic blood pressure of 160mmHg or higher had an improved survival over patients with less than 160mmHg. No other prognostic factors were found in this study.

In a study by John T Parissis[38], patients with diabetes, arterial hypertension, peripheral vascular disease, and chronic renal disease had a high incidence of ACPE, which further leads to in-hospital mortality.

According to a study by Ali A Sovari[3], myocardial infarction associated with hypotension at presentation and a history of frequent hospitalizations for ACPE generally increase the risk of in-hospital mortality.

Hence, according to most of the studies, risk factors that lead to higher in-hospital mortality include older age, hypertension, hyperlipidemia, and pre-existing heart diseases.

CONCLUSION:

Risk factors that lead to in-hospital mortality include smoking, hypertension, hyperlipidemia, pre-existing cardiac disease. As the patients are from rural areas, patients usually have poor education levels and access to the health care system, time of presentation to the hospital will be late, and reduced detection and late identification and management of risk factors lead to the development of acute myocardial infarction more frequently which further leads to high in-hospital mortality rate. Moreover, people in rural areas will tend to neglect their health issues in the early stages and present to tertiary care centers only in life threatening situations.

Hence, there is a need for medical education to the population in the rural areas regarding regular health checkups, frequently at least at an interval of 6 months in the age group of >45 years. So that disease can be diagnosed early, and development of ACPE can be prevented. And also, to be educated regarding the clinical features, so that patients can be reached to the health care systems early and thereby decreasing the in-hospital mortality in rural areas.

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