

Readmission Reasons of Senile Patients Hospitalized with Acute Decompensated Heart Failure in Different Department: A Retrospective Study

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Abstract

Background -The readmission reasons for senile patients hospitalized in different wards with acute decompensated heart failure are not well known. **Method** -We conducted a retrospective study of senile patients admitted to the People's Hospital of Sichuan Province in a one-year period. Patients suffered with heart failure were identified from the hospital administrative database. Chart reviews were carried out to explore 30-day readmission reasons. Descriptive statistics were utilized to compare the patients and hospital characteristics among different wards. Student's t-test was used for normally distributed continuous variables, chi-square for categorical variables. **Results** -Of all the hospitalization cases (3922), 1316 patients with heart failure were rehospitalized, among which 893 were admitted to geriatric department. The readmission rate was 33.55%. The top 10 reasons for rehospitalization in geriatric department were AECOPD (18.5%), hypertension (15.5%), hypertensive heart disease (13.3%), pneumonia (10.5%), coronary artery disease(7.0%), acute coronary syndrome(11.3%), dementia (6.8%), PAD (3.25%), stroke (2.2%), cancer/valvular heart disease (1.4%). The top 10 reasons in other departments were stroke (32.5%), AECOPD (10.7%), pneumonia (10.0%), coronary artery disease(6.8%),CKD (5.9%), cancer(5.7%), hypertensive heart disease (4.8%), dementia (4.6%), valvular heart disease (3.3%), DCM (2.6%). Geriatric department tended to receive more senile patients than other wards, and had longer days of hospitalization(24.38 ± 5.228 vs 15.65 ± 5.907), however, the cost among different wards was of no difference (31345.53 ± 1343.354 vs 30868.49 ± 2241.292). In terms of discharge disposition, 98.95% patients in geriatric department were discharged straight to home, 'which was statistically higher than that of other wards (86.68%). **Conclusion** -This study shows the prevailing reasons for readmission of senile patients hospitalized with acute decompensated heart failure. Long term or short term care is summoned in China.

1.introduction

Heart failure is a major health problem in the elderly, which is associated with significant hospital admission rates, mortality, and costly health care expenditures, despite progresses in the treatment and management of heart failure and heart failure-related risk factors [1].

Nearly 25% of the patients hospitalized with heart failure are readmitted within 30 days after being discharged [2]. Short term hospital readmissions not only lead to a significant portion of health care budget [3], but also are independently associated with increased risk of 180-day all-cause death [4,5]. Meanwhile, the senile patients can be triaged to geriatric and other departments, the differences among wards should be seen in order to better serve those senile patients. Therefore it is essential to figure out the characteristics and reasons for readmission after hospitalization of acute decompensated heart failure in senile patients.

2. Materials And Methods

In this study, totally 3921 senile—defined as equal or above 80 years old—patients were admitted into Sichuan Provincial People’s Hospital from January to December 2017. They were selected from the electronic case record database, among which 1316 heart failure cases were targeted for the current analysis.

We excluded admissions related to chemotherapy as these were largely planned admissions. The patients that were also excluded were those who were readmitted on the same day for what we considered as a continuation of index admission. The heart failure diagnoses were based on current or past clinical symptoms, signs or radiographic or echocardiography evidence of pulmonary congestion.

Definition of readmissions

The International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) was used to identify primary discharge diagnoses of acute decompensated heart failure. Other diagnoses were also grouped according to the ICD-10-CM codes. Readmission was defined as any admission within 30 days of a prior admission except those that were previously planned to be readmitted. We performed the analysis on the admission level while considering that multiple readmissions may be correlated. The top 10 diagnoses were evaluated to determine cause-specific readmissions.

Statistical analysis

Descriptive statistics were utilized to compare patients, admissions and hospital characteristics of readmissions in different wards. Student’s t-test was used for normally distributed continuous variables, chi-square for categorical variables. All statistical tests were completed with SPSS 11.1 for Windows, and two-tailed 95% confidence levels; a $p < 0.05$ was required to reject the null hypothesis.

Results

Of all the hospitalizations (3922), 1316 heart failure patients were rehospitalized, among them 893 were admitted to geriatric department. The readmission rate was 33.55%. Compared with other departments, geriatric department showed a larger number of males vs. females (72.96% versus 58.29%, $P < 0.0001$), a higher age group (89.10 versus 82.12, $P < 0.001$), and longer days of hospitalization (24.38 days versus 15.65 days, $P < 0.01$). However, the total cost between them were of no difference (CNY 31345.53 versus 30868.49, $P = 0.129$). The characteristic of the patients are presented in Table 1.

The top 10 reasons for rehospitalization in geriatric department were AECOPD (18.5%), hypertension (15.5%), hypertensive heart disease (13.3%), pneumonia (10.5%), coronary artery disease—7.0%—, acute coronary syndrome (11.3%), dementia (6.8%), PAD (3.25%), stroke (2.2%), cancer/valvular heart disease (1.4%)—Fig. 1—. The top 10 reasons in other departments were stroke (32.5%), AECOPD (10.7%), pneumonia (10.0%), coronary artery disease—6.8%—, CKD (5.9%), cancer (5.7%), hypertensive heart disease (4.8%), dementia (4.6%), valvular heart disease (3.3%), DCM (2.6%)—Fig 2—. Totally, the top 10 reasons were AECOPD (15.8%), stroke (12.8%), hypertensive heart disease/pneumonia (10.3%), acute coronary

syndrome(7.9%), coronary artery disease(6.9%), dementia (5.1%), cancer (2.9%), CKD(2.3%), and diabetes mellitus(1.7%)Fig 3.

Discussion

The readmission rate in our study for Chinese senile patients with acute decompensated heart failure was 33.55%, much higher than that as reported by other researchers which ranges from 16.8% [6] to 32.6% [7]. Since heart failure has an overwhelming prevalence among senile groups, meanwhile old age is also a risk factor for readmission. Furthermore, older patients have higher percentage of geriatric syndromes which are also associated with early readmission. These may be the reasons why our readmission rate result is much higher than in other published articles.

The mean length of hospital stay (LOS) for each group was 24.38 days and 15.65 days respectively. Both were much longer than the target “9 days” which is the average LOS in our hospital. The REDUCE-AHF [8] study showed that the Spanish heart failure patients have an average 9-day LOS. EPICA-UCe study, aimed to study the factors associated with prolonged hospitalization for acute heart failure cases in Spanish short-stay units, has showed that a mean age of 80.9 years has a median length stay was 3.0 days with an in-hospital mortality of 2.7% [9]. The United States reported a median 5.0 days LOS with an in-hospital mortality of 2.9% in 2014 [10]. Obviously, we must put significant efforts into reducing the LOS. In-hospital mortality information were absent in present study because those who died in 30 days after discharge or in the hospital were excluded.

LOS has been adopted to identify the severity of illnesses and healthcare resource utilization [11], and can be influenced by numerous factors [12]. It's not easy to specify the underlying exact reasons prolonged the LOS in our study. However, various factors may postpone the time to discharge, i.e., multiple chronic conditions, polypharmacy, frailty and geriatric syndromes, and premature discharge. The latter was also mentioned by Europe practitioners and they have started to develop approaches that focus on arranging swift and effective discharge from acute settings, reducing cases of delayed discharge [13].

Nowadays, with the trend of longevity, many hospitals in China have already established geriatric department, but the long term care or short term care or home care are insufficient in our country and specialized care cannot be extensively provided for elderly patients [14,15]. Therefore they or their relatives have a phobia of being discharged from hospital to home directly. Staying at hospitals seems a safer solution. However, this may be unnecessary, costly and not helpful to the old patients and the public health system. So, it is urgent to establish and improve the level of care system.

Surprisingly, the findings revealed that there was no statistical difference in total cost between different wards, even if the geriatric department has a longer LOS. This may be attributed to less drug use, fewer operations, and more palliative skills provided by the geriatricians. However, further research with more extensive and intensive data is needed for justification.

The most common causes for readmission in geriatric department were identified as AECOPD (18.5%), hypertension (15.5%), hypertensive heart disease (13.3%), acute coronary syndrome (11.3%), pneumonia (10.5%). In other departments the most common cause were stroke (32.5%), AECOPD (10.7%), pneumonia (10.0%), coronary artery disease 6.8%, CKD (5.9%), cancer (5.7%). Of note, acute stroke patients generally admitted to neurology ward, even if they are very old, that is why stroke ranked top 1 readmission reason in other wards. When in a whole perspective, the top 1 reason for readmission is AECOPD. COPD is one of the most common co-occurring chronic conditions among heart failure patients [16], and adversely affects cardiac disease. AECOPD inevitably increase the incidence of acute cardiovascular event [17]. Sympathetic overactivity is the same pathogenic mechanism shared by the two different diseases [18,19]. Meanwhile the prognosis of COPD with HF combined is poorer than that of either respectively [20]. Patients with COPD and heart failure may have the same symptoms which increase the difficulty to distinguish them. It's necessary for us to collect sufficient data for further exploration; and may be of interest for future research.

Limitations may exist in this study. First of all, as a retrospective study, the classification of diagnoses was conducted using diagnosis codes, and therefore we may have misclassified some admissions. Secondly, the data of patients who died at home within 30 days after discharge were not available in the hospital database or medical records, which could reduce the effect of variables reflecting higher illness severity. Furthermore, survey logistic regression was used to assess the relationship between potential predictors for readmissions, but no positive result was found.

In conclusion, this study identifies a high readmission rate in senile patients hospitalized with acute decompensated heart failure patients. It describes the top 10 reasons for readmissions, with AECOPD ranking the frontmost. Furthermore, total cost in geriatric department has no difference compared with other department, the length of hospital stay in geriatric department was longer than other department. Last but not least, it's necessary and important to figure out the underlying reasons which postpone the discharge and urgent to improve the long term care system for the elderly patients. Further studies are necessary to determine the efficacy of such interventions.

Abbreviations

AECOPD: acute exacerbations of chronic obstructive pulmonary disease; HTN: hypertension; PAD: peripheral artery disease, VHD: valvular heart disease; DCM: dilated cardiomyopathy; CKD: chronic kidney disease; ACS: acute coronary syndrome, HHD: hypertensive heart disease.

Declarations

Competing interests

The authors declare that they have no competing interests.

Author's contributions

Zhiying Zhao conceived the research idea and drew the study design. Jing Jin, Yong Sheng and Biao Cheng finalized the plan. Zhiying Zhao, Jing Jin, Yong Sheng, Rong Yu and Biao Cheng participated in writing of the manuscript, and revised it critically. All authors have given the final approval of the version to be published and have access to the final trial dataset.

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Conflict of Interest Statement

The results presented in this paper have not been published previously in whole or part, except in abstract format.

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Tables

Table 1. characteristics for senile patients

	geriatric department	other departments	P-value
	N=858	N=458	
Age in years	89.10±4.582	82.12±8.096	0.0001
Mean ± SD			
Gender			0.0001
Male [%]	626 [72.96]	267 [58.29]	
Female [%]	232 [27.04]	191 [41.74]	
LOS in days	24.38±5.228	15.65±5.907	0.01
Mean ± SD			
Discharge disposition			0.016
Routine (%)	(849)98.95	(397)13.32	
Other institution [%]	(9)1.05	(61)86.68	
Cost of hospitalization (¥) Mean ± SD	31345.53±1343.354	30868.49±2241.292	0.129

Figures

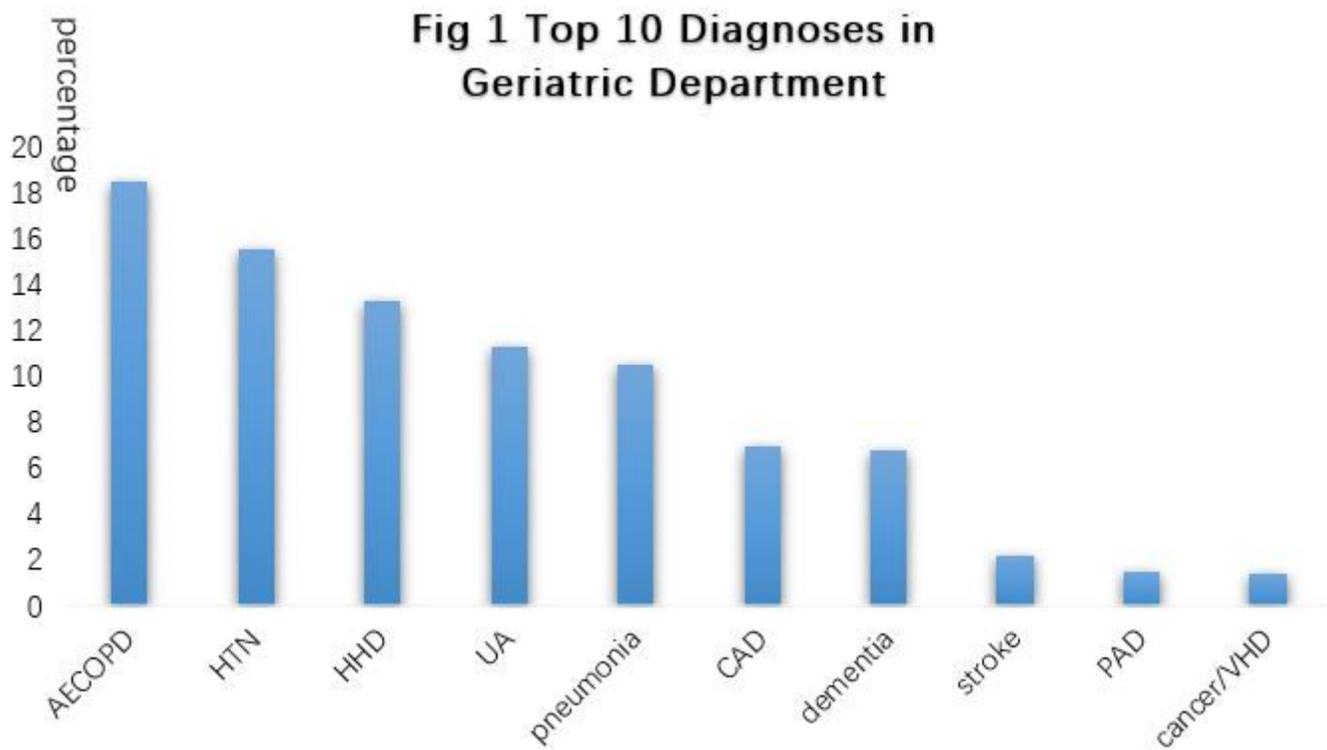


Figure 1

Top 10 Diagnoses in Geriatric Department

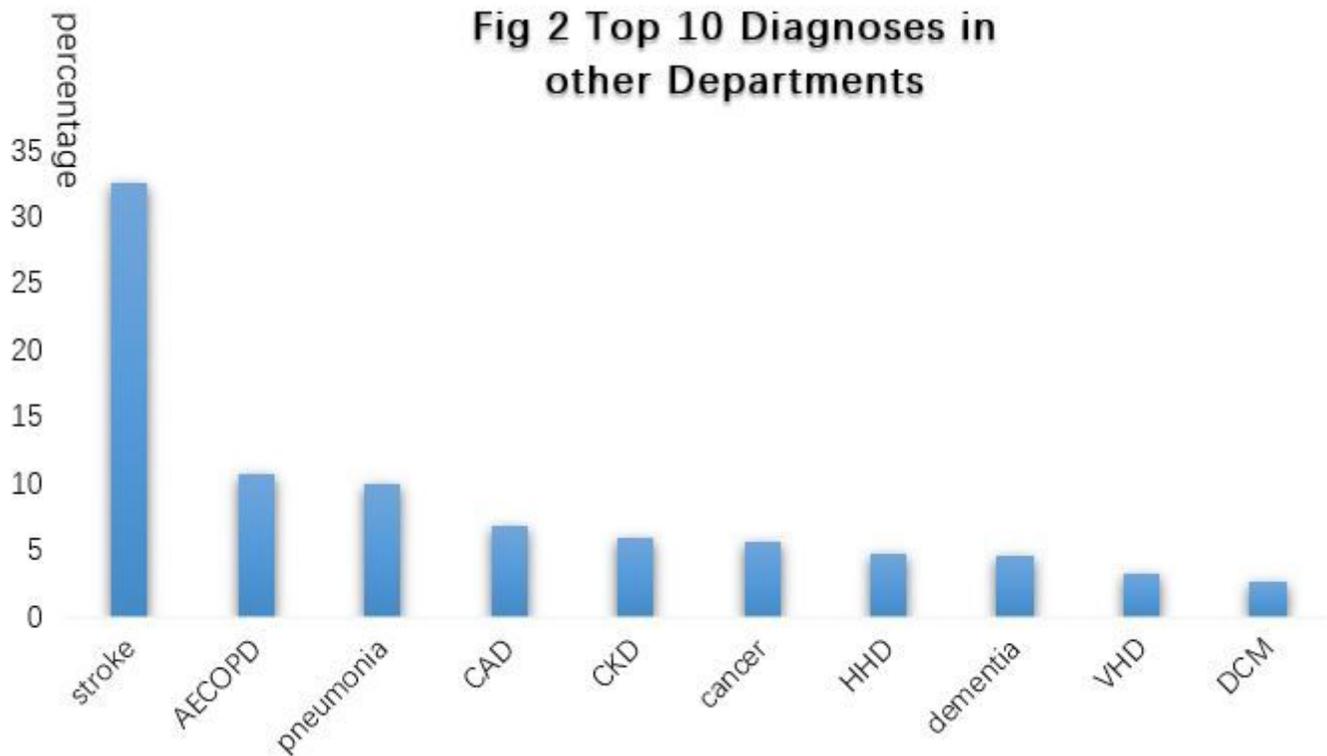


Figure 2

Top 10 Diagnoses in other Departments

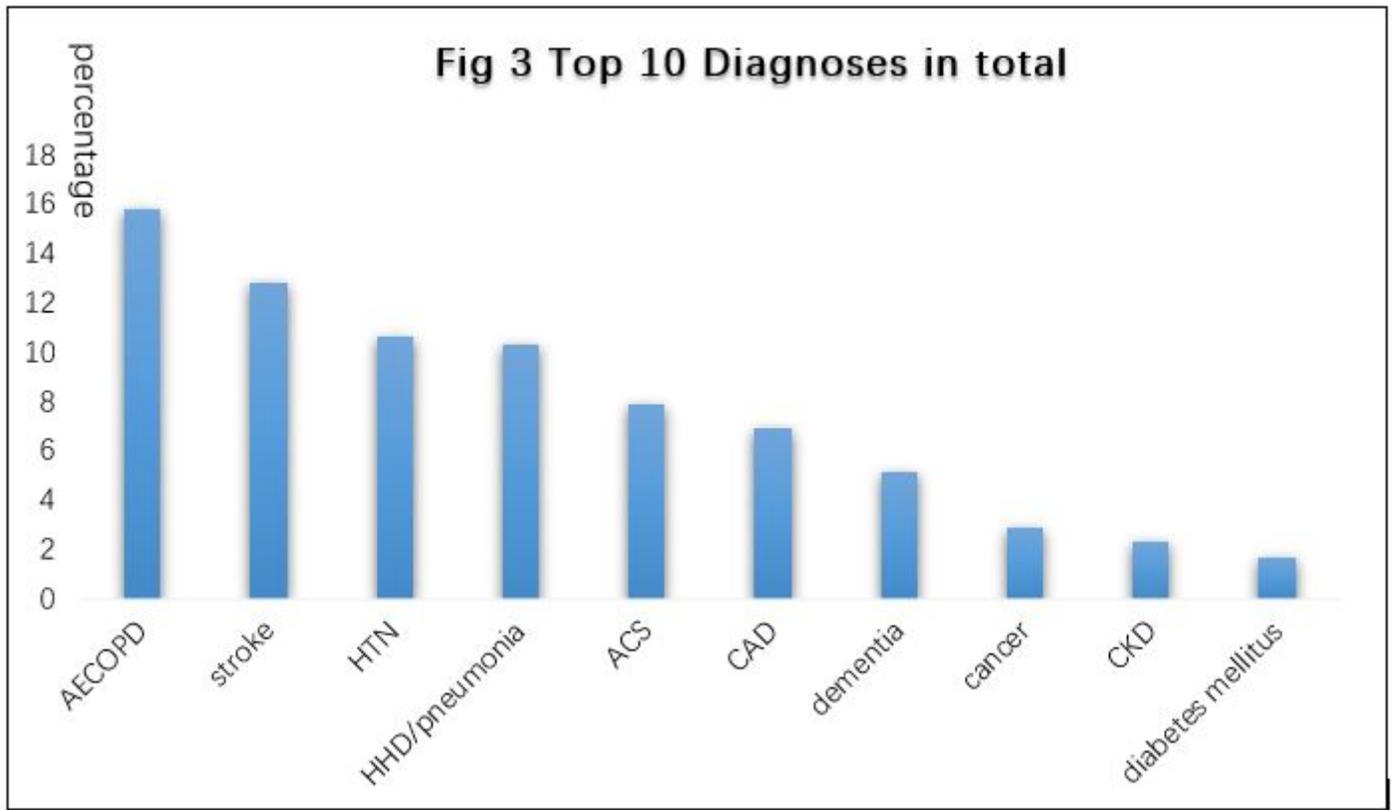


Figure 3

Top 10 Diagnoses in total