Prognostic impact of comorbidities on mortality and re-hospitalization in acute decompensated heart failure in real world clinical settings: Interim results from a multi-center longitudinal registry

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BACKGROUND

- High burden of heart failure (HF) remains a major public health issue in India.[1]
- Incidence of HF in India vary widely from 1.3 – 2.3 million.[2]
- Acute decompensated heart failure (ADHF), in particular, is the leading cause of mortality and morbidity; hence, identifying clinical and treatment related factors that predict them, can guide optimal management and resource utilization.[3]
- The Indian College of Cardiology National Heart Failure Registry (ICCNHFR) started in August 2018 with the aim to assess prognostic factors, and overall management of ADHF patients in real world setting in India.

METHODS

Study

- A prospective longituditional registry of patients with ADHF in India.

Methodology

- The interim analysis of this prospective registry was performed to evaluate data from 1230 patients enrolled, out of which 1005 patients completed follow-up at 30 days at 19 centres across India.
- The primary objective was to study the impact of comorbidities on all-cause mortality and re-hospitalization.

Statistical analysis

- A logistic regression analysis was performed to identify predictors of in-hospital, 30 days post-discharge mortality, and re-hospitalization.
- The prognostic factors included in this model were age, gender, comorbid diabetes, hypertension, ischemic heart disease, pulse rate, blood pressure, Echocardiogram, left ventricular ejection fraction (LVEF) medications.

RESULTS

Patients' demography

Table 1: Baseline characteristics of patients (n=1005)

Age, years	61.2±14.4
Male, n(%)	649(64.58)
Risk/etiologic factors and associated comorbidities	
Diabetes, n(%)	527(52.44)
Hypertension, n(%)	497(49.45)
SBP, mm Hg	126.7±29.4
DBP, mm Hg	78.1±15.4
Ischemic heart disease, n(%)	586(58.31)
Abnormal ECG, n(%)	801(79.70)
Pulse rate, bpm	93.6±23.2
LVEF<40%, n(%)	709(70.55)

Data presented as Mean±SD or n(%); DBP: diastolic blood pressure; SBP: systolic blood pressure; LVEF: left ventricular ejection fraction; ECG: echocardiogram

- The mean age was 61.2±14.4 years, and 64.5% were male.
- About 70.55 % patients had LV dysfunction, 52.44% had diabetes and 49.45% presented with hypertension with relatively low admission BP of 126.7±29.4 mmHg.

Therapeutic approaches

Table 2: Medications in-hospital and at 30 days of follow-up

Medications	In-hospital, n(%)	At 30 day follow-up, n(%)
Diuretics	831(82.68)	791(78.70)
ACEI/ARB	313(31.14)	323(32.14)
Beta-blockers	539(53.63)	506(50.35)
MRA/Aldactone	357(35.52)	309(30.74)
Nitrates	209(20.79)	199(19.80)
Digoxin	172(17.11)	168(16.71)
Hydralazine	72(7.16)	50(4.98)
Aspirin	635(63.18)	586(58.31)
Clopidogrel	556(55.32)	529(52.64)
Anti-arrhythmic agents	66(6.56)	43(4.28)
Angiotensin Receptor-Neprilysin Inhibitors	34(3.38)	24(2.39)
Oral anticoagulants	94(9.35)	76(7.56)
Novel oral anticoagulants	12(1.19)	6(0.59)
Ivabradine	117(11.64)	95(9.45)

ACEI: angiotensin converting enzyme inhibitor; ARB: angiotensin receptor II blockers; MRA: Mineralocorticoid receptor antagonists

- Diuretics (82.68%) followed by antiplatelet agents, aspirin (63.18%), clopidogrel (55.32%) and beta-blockers (53.63) were the most common medications received by patients.

In-hospital and follow-up mortality and re-hospitalizations

Table 3: Mortality and rehospitalizations in-hospital and at 30 days of follow-up

In hospital mortality, n(%)	88(8.76)
Follow-up mortality, n(%)	49(5.3)
Re-hospitalization, n(%)	73(7.26)

- Of 1005 patients, 88 died during index hospitalization leading to mortality rate of 8.8%.
- During post-discharge follow-up at 30 days, 49 patients died (5.3%) leading to a cumulative mortality rate of 13.6%.

RESULTS

Predictors of in-hospital mortality using logistic regression analysis

Table 4: Predictors of in-hospital mortality

Predictors	Estimate	Standard Error	Wald Chi-Square	OR (95% CI)	P value
Age	0.075	0.030	5.924	1.078(1.015, 1.145)	0.0149
Gender	1.706	0.821	4.321	5.512(1.102, 27.56)	0.0376
Abnormal ECG	2.239	1.064	4.425	9.39(1.165, 75.67)	0.0354
LVEF <40%	-1.188	0.550	4.661	0.305(0.104,0.896)	0.0308
Diuretics	-4.911	1.055	21.642	0.007(<0.001, 0.058)	<.0001
Beta blockers	-2.895	1.378	4.412	0.055(0.004, 0.824)	0.0357
Aspirin	-3.993	1.310	9.288	0.018(0.001,0.240)	0.0023

ECG: echocardiogram; LVEF: left ventricular ejection fraction; OR: odds ratio; CI: confidence interval

- Increasing age, gender, abnormal ECG and LVEF <40% were independent predictors of in-hospital mortality.
- Treatment with diuretics, beta-blockers and aspirin were found to reduce in-hospital mortality.

Predictors of mortality at 30 days of follow-up using logistic regression analysis

Table 5: Predictors of mortality at 30 days of follow-up

Predictors	Estimate	Standard Error	Wald Chi-Square	OR (95% CI)	P value
LVEF <40%	-1.728	0.621	7.744	0.178(0.053, 0.600)	0.0054
Diuretics	-6.343	1.509	17.673	0.002(<0.001, 0.034)	<.0001

LVEF: left ventricular ejection fraction; OR: odds ratio; CI: confidence interval

- During post-discharge follow-up at 30 days, LVEF <40% independently predicted post-discharge mortality at 30 days.
- Treatment with diuretics was found to reduce the post-discharge mortality risk.

No prognostic factor was found to correlate with re-hospitalization.

DISCUSSION

Patient profile in India

- Admission SBP in our registry was 126.7±29.4, which is relatively lower than that reported in other global registries: 147 mmHg in ATTEND[4], 144 mmHg in ADHERE[5] and 143 mmHg in OPTIMIZE-HF[6].
- More than half of patients had diabetes and hypertension which is similar to the previous reports.[7,8]

Medical therapy and guideline adherence

- In our study, diuretics were prescribed to >70% patients at discharge and follow-up medications.
- Analysis of the ADHERE registry database found that delayed administration of intravenous diuretic was independently associated with a modest increased risk of in-hospital mortality.[9]
- The results of 1-year registry in chinese cohort also suggest that administration of intravenous diuretic for HF patients should be promptly initiated during hospitalization.[10]
- Moreover in our study, 50.35% and 32.14% patients were receiving beta-blockers and ACEI/ARB at follow-up despite the fact that they had proven to decrease mortality and re-hospitalization in HF patients and are recommended by the clinical practice guidelines.[11]

Predictors

- LVEF <40% was a common risk factor predicting both, in-hospital and post-discharge mortality.
- Treatment with diuretics, beta-blockers and aspirin were found to reduce in-hospital mortality

CONCLUSION

- Several comorbidities are associated with mortality risk of hospitalized patients with ADHF.
- LVEF <40% was a common risk factor predicting both, in-hospital and post-discharge mortality.
- Efforts to increase the prescription rate of evidence-based medications is needed to achieve optimal management.
- Results of this interim analysis suggest that continued follow-up will further inform and enhance our understanding of management practices in the real-world setting in India.

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ABBREVIATIONS

ACEI: angiotensin converting enzyme inhibitor; ADHF: acute decompensated heart failure; ARB: angiotensin receptor II blockers; CI: confidence interval; DBP: diastolic blood pressure; ECG: echocardiogram; HF: heart failure; LVEF: left ventricular ejection fraction; LV: left ventricular; MRA: mineralocorticoid receptor antagonists; OR: odds ratio; SBP: systolic blood pressure

DECLARATION OF INTEREST

The authors declares that there is no conflict of interest.

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