Original Article

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Comparison of REMS, MEWS, and HOTEL Scores to Prognosticate Acute Medical Patients

Shabbir Shekhli

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Abstract

Aims: Emergency medicine is a new specialty that started in India in 2012 to treat severely ill patients as soon as possible. The main principle is triage which is useful for patient treatment and counseling of attenders regarding prognosis.

Material and Methods: A prospective study was conducted in the adult ED of a 1200-bed hospital. A totalof thousandpatients presented with acute medicalconditions were included in the study. Data collected at admission includedpulse rate, respiratory rate, mean arterial pressure, mental status, pulse oximetry, age, blood pressure, and Glasgow coma scale. Aim was to investigate relationship between the scoring systems to predict in-hospital mortality.

Results: In our study majority of the population was male and in the age group of 21 to 30 years. Cases admitted in ICU (62%) were higher thanin wards (38%).The HOTEL score showed a better prediction of mortality comparedwith REMS and MEWS.

Conclusion: A HOTEL score of more than 1, predicts ICU admission and in-hospital mortality compared to MEWS and REMS.

Keywords: *REMS, MEWS, HOTEL, RAPS, Emergency Department, Mortality, Scoring System.*

INTRODUCTION

The emergency department (ED) plays a pivotal role in managing complex and critically ill patients. Triage focuses on the effective flow of patient management, providing appropriate care, and preventing unnecessary interventions to improve the proper use of hospital resources in case of emergency. ER physicians often need to quickly assess patients' vital signs[1-5] for prioritization, and make appropriate decisions. Effective triage requires optimal scoring systems to accelerate treatment and positively influence treatment outcomes. During the past decades, a variety of scoring systems have been developed to assess

Author's Affiliation: Associate Professor, Department of Emergency Medicine, Rajarajeshhwari Medical College and Hospital, Bangalore, India.

Corresponding Author: Shabbir Shekhli, Associate Professor, Department of Emergency Medicine, Rajarajeshhwari Medical College and Hospital, Bangalore, India.

E-mail: drshabbir9880033401@gmail.com

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patients presenting to casualty. The core element in these systems is an assessment of disease severity based on deviations in various physiological variables[5-7]. HOTEL is a novel scoring system developed by Kellett *et al*[10] in 2008 for patients in the EDs, which includes the parameters of blood pressure, oxygen saturation, and body temperature, in addition to electrocardiography (ECG) findings and loss of independance.

More recently, researchers such as Nguyen and Hyzy have developed new scoring systems for critically ill trauma patients. However, none of these systems are dedicated to acute medical patients.A previous study stated that REMS is a better predictor of patient outcomes in the ED versus other scoring systems.The present study aimed to investigate the relationship between the scoring systems to predict in-hospital mortality.

OBJECTIVES

To compare Rapid Emergency Medicine (REMS), Hypotension, oxygenation, temperature, ECG abnormality, Loss of independence (HOTEL) score, and Modified Early Warning Score (MEWS) in predicting in-hospital mortality[10-12].

MATERIAL AND METHODS:

Study design: A prospective observational study.

Sample size: 1000

Study variables:

The data were prospectively collected in 1000 consecutive acute medicalpatientsadmitted in the ED, over 6 months.At the time of admission information regarding gender, age, the main symptom presented at entrance, i.e. the reason for attending the ED, and six physiological measurements: blood pressure, pulse rate, GCS, respiratory rate, peripheral oxygen saturation, and body temperature. The protocol was approved by the local ethics committee.

Inclusion criteria:

- Patients >18 years of age admitted with acute medical conditions
- Exclusion criteria:
- out of hospital cardiac arrest.
- Patient treated outside and on inotropic support
- Pregnancy
- Trauma and surgical patients.

Statistical analysis:

Descriptive analysis of all the explanatory and outcome parameters was done using frequency and proportions for categorical variables, whereas Mean and SD for continuous variables. The level of significance set at $p<0.05$.

RESULTS

1000 patients were included in a study who fulfilled the requirements. In our study majority of the population were male and in the age group of 21 to 30 years. Of these 62% were admitted in ICU and 38% in wards.The average hospital stay was 5 daysin 68% of patients, and 21% of patients required 6 to 10 days (Table 3).The mean score in the non-survival group was REMS 8.46, Hotel 2.98, and MEWS 3.65 (Table 4).

Table 1: Gender Distribution

Gender	No of Cases	Percent
Male	530	53
Female	470	47
Total	1000	100.0

Table 2: Age Distribution

Age	No of Cases	Percent
≤ 20	110	11.0
21-30	250	25.0
31-40	90	9.0
41-50	140	14.0
51-60	150	15.0
61-70	150	15.0
71-80	70	7.0
> 80	40	4.0
Total	1000	100.0
Mean & Sd	45.2 ± 20.22	

Table 3: Place of addmssion and length of stay [LOS] in Days

Admission	**No of Cases**	**Percent**
ICU	620	62
Ward	380	38
Hospital stay in Days	**No of Cases**	**Percent**
5	680	68.0
6-10	210	21.0
11-15	70	7.0
> 15	40	4.0
Total	1000	100.0
Mean & SD	5.3 ± 4.23	

Table 4: Outcome assessment

Assessment	**Outcome**				**Independent t Test**	
	Died		**Survived**			
	Mean	**Sd**	**Mean**	**Sd**	**t Value**	**P Value**
REMS Score	8.46	4.30	3.50	3.83	5.50	P<0.001
HOTEL Score	2.92	1.16	1.05	1.01	7.82	P<0.001
MEWS Score	3.65	2.58	2.03	2.15	3.14	P<0.001

DISCUSSION

Several studies have been done to compare the different types of scores to predict the prognosis of emergency patients. In the present study, we are comparing REMS, MEWS, and HOTEL scores, regarding the prognosis of acute medical patients.

T Olssan[15] *et al*l study in 2004 the mean age of the patients was what's 61.9 years femalesaccountedfor 51.6%, mean hospital days was 3.2 days.compared with our study, the mean age was 45.2 years and male population accounted for 53% and the mean hospital stay was 5.3 days. This difference is due to the geographical variation of disease and the level of hospital care, the socio-economic status of the population.

Agilan R[16] *et al*l did a study in 2023 in Tamil Nadu India found mean age group is 40 years, with males accounting for 60%. Their findings were similar to our study.

In our study mean REMS score in non-surviving patients is 8.46, the HOTEL score is 2.92 and the MEWS score is 3.69 compared to Agilan R *et al*l study REMS score is 4.8 and the HOTEL score of 1.07. this difference may be due to sample size.

The mean REMS score was 8.46 (sensitivity 85% and specificity 64%), HOTEL score 1.07 (sensitivity, 84% and specificity 66%), and MEWS score 3.65 (sensitivity, 65% and specificity 68%.) HOTEL score is mostly useful as it is, as it includes oxygen saturation and ECG abnormalities

Limitation: A single-centric study with a small .sample size. analytical statistics were not done

CONCLUSION

Patients admitted to the emergency department havea wide spectrum of disease severity, and predicting prognosis in terms of discharge or death at the time of admission will help counsel regarding the prognosis. A HOTEL score of more than 1, predicts ICU admission and in-hospital mortality compared to MEWS and REMS.

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