Comparison of CURB 65 and SCAP score in predicting outcome of CAP: A single center study

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ABSTRACT

Introduction: Community acquired pneumonia is one of the leading cause of death. CURB-65 and SCAP score are tools to measure the severity of disease. CURB-65 uses relatively less variables than SCAP in scoring, this study is designed to measure the usefulness of both score in predicting outcome in our context.

Method: This is descriptive, cross sectional quasi experimental study conducted in Kathmandu Medical College teaching hospital from July 2012 December 2012. Patient more than 18 years were scored and with CURB-65 and SCAP score and followed to see the outcome. Sensitivity and specificity was calculated. Both scores were compared for outcome using McNemer's test.

Result: Total 127 patient with mean age of 57 years were included. Total number of patient included in the study was 127 Mean age of patient was 57.66 years with two standard deviation of 19.46 years. Mortality rate was 5.5%. Male were 48(37.8%) and female were 79(62.2%). There was positive correlation with both CURB-65 (0.19, p=0.02) and SCAP (0.18, p=0.04) score on level of care required at hospital. There was no difference between CURB 65 and SCAP score in predicting outcome (p>0.05).

Conclusion: There was no significant difference between predicting outcome with CURB-65 and SCAP score. Though CURB-65 uses less variables than SCAP score, it is equally effective in predicting the outcome or severity of disease.

Keywords: CAP, CURB-65, SCAP, pneumonia

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INTRODUCTION

Assessment of severity of community acquired pneumonia (CAP) is important to help in clinical decision like need for hospital admission, requirement of parental therapy and level of monitoring needed for admitted patient.[1] Clinicians tends to overestimate and underestimate severity of CAP. Different severity assessment tools have been developed incorporating various comorbidities, clinical and laboratory variables that are important in determining the clinical course of CAP. So, this is a study to compare the outcome of two commonly used severity assessment tool CURB-65 and SCAP.[2]

METHOD

This is a descriptive, cross sectional quasi experimental study conducted at Kathmandu Medical College Teaching Hospital on December 2012. Hundred consecutives admitted to hospital with the diagnosis of pneumonia was taken for the study. Pneumonia was defined on the basis of clinical and radiological findings.[3] Patient more than 18 years were included in the study while severe immune suppressants and not giving consent were excluded.

Clinical and demographic characteristics of each patient were recorded. CURB-65 scores with one point each for confusion, increase urea, respiratory rate more than 30, systolic blood pressure less than 60 mmHg and age more than 65 years was recorded on admission. Score of zero to one was classified as low risk, two as intermediate risk and three to five as high risk.[4] Similarly SCAP score was also recorded on same patient on admission. Arterial blood gas, confusion, urea, respiratory rate and chest X ray were used to calculate the score. Zero to nine was taken as low risk 10 to 19 as intermediate risk and more than 20 as high risk.[5]

Primary outcomes were evaluated under four headings, intensive care unit admission (mechanical ventilator not required), need for mechanical ventilator, progress to severe sepsis, treatment failure and death. Severe sepsis defined as per surviving sepsis guidelines.[6] Patient was classified as treatment failure if during the hospital stay clinical worsening develops (understood as persistence of clinical symptoms with pneumonia e.g. fever, shortness of breath, hemodynamic instability defined as BP less than 90/60 mmHg, respiratory failure defined as decrease PaO2 or increased PaCO2 or radiographic worsening).[7] Secondary outcome was measured as length of hospital stay, discharge and mortality. Level of care was classified from lowest to highest as hospital admission, severe sepsis, ICU care, need for mechanical ventilator.

The admitting physicians were blinded to the scoring system so patients were admitted to ward or ICU on the clinical ground. Both scores were taken immediately after admission. Patients were observed till they are admitted and highest level of care was recorded as primary end point. Secondary outcome was recorded on the day patient left hospital. Though admitting doctor was blinded to scoring system, verbal consent was taken for arterial blood gas by admitting doctor. Written consent was taken from patient for enrollment in the study after being admitted to hospital. Consent from very sick patient was taken from the closest relative. Ethical clearance was taken to conduct the study. Demographic variables were analyzed with descriptive statistics. Sensitivity and specificity of CURB 65 and SCAP was calculated for primary outcome. T test was used to analyze secondary outcome.

RESULT

Total number of patient included in the study was 127 Mean age of patient was 57.66 years with two standard deviation of 19.46 years. Mortality rate was 5.5%. Male were 48(37.8%) and female were 79(62.2%). Primary outcome of patients was as follows: 64(50.3%) were admitted to ward, 44(34.6%) required ICU care, 10(7.8%) had severe sepsis, 6(4.7%) were admitted to ward signing high risk consent, 2(1.5%) required mechanical ventilator and 1(0.7%) had treatment failure. Secondary outcome of patients was as follows: 105 (82.6%) of patients were discharged, 13(10.2%) left against medical advice, mortality was 7(5.5%) and 2(1.5%) were discharged on request.

Table 1: Sensitivity and Specificity of CURB-65 and SCAP

Outcomes	CURB-65 (CI 95%)		SCAP (CI 95%)	
	SN	SP	SN	SP
Hospital Admission#	32.8 % (22.6-45)	65.1% (52.6-75.7)	14.06 % (7.5-24.6)	66.6% (54.3-77.1)
ICU Admission*	52.3% (39.9-66.2)	89.1% (72.3-88.7)	43.9% (29.6-57.7)	78.3% (68.3-85.8)
Mechanical Ventilator*	0% (0-67.7)	92.8% (86.8-96.7)	100% (34.2-100)	72.0% (63.5-79.1)
Severe Sepsis*	30% (10.7-60.32)	70.1% (61.2-77.6)	70% (39.6-89.22)	74.4% (65.7-81.4)
Treatment Failure*	0% (0-79.3%)	69.8% (61.3-77.1)	0% (0-79.3%)	70.6% (62.1-77.8)

Intermediate score as a predictor *High Score as predictor; (MC Nemar P > 0.05); SN=Sensitivity; SP= Specificity

There was positive correlation with both CURB-65 (0.19, p=0.02) and SCAP (0.18, p=0.04) score on level of care required at hospital, lowest being care at ward and highest being care in mechanical ventilator.

Table 2. Analysis of secondary outcome

	CURB-65	SCAP			Total	P *
		L (%)	I (%)	H (%)		
Discharge	L	88.6	6.8%	4.5%	100	0.009
	I	44.1	41.2%	14.7	100	
	H	0	37.0%	63.0	100	
Death	L	0	0	0	100	> 0.05
	I	33.3	0	66.7	100	
	H	14.3	0	85.7	100	

L= Low; I=Intermediate, H= High; * MC Nemar P

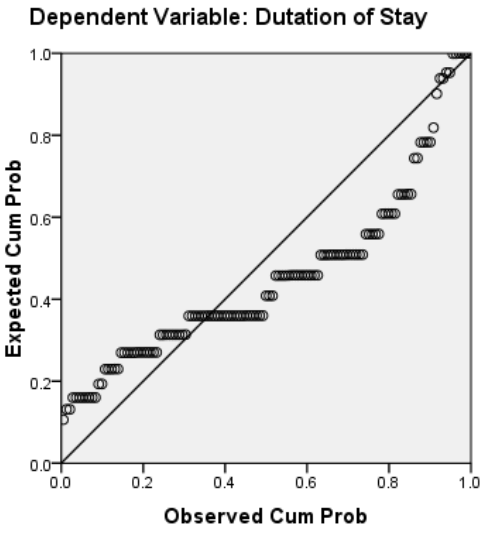

Figure 1a. Linear regression of length of hospital stay with CURB-65 score (p=0.5)

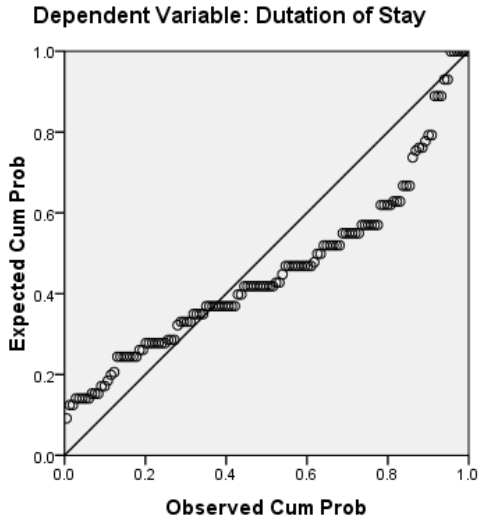

Figure 1b. Linear regression of length of hospital stay with SCAP score (p=0.58)

DISCUSSION

This study showed that CURB-65 and SCAP scores were non-inferior to each other in predicting primary outcome. Intermediate scores of both scores were taken as a predictor of hospital admission. Both scores had higher specificity than sensitivity (Sensitivity: CURB 65 65.1%, SCAP 66.6%). Similarly, higher scores were taken as a predictor of ICU admission, need for ventilator, severe sepsis and treatment failure. ICU admission, severe sepsis and treatment failure had more specificity than sensitivity (Sensitivity: CURB 65 89.1%, SCAP 78.3%; CURB 65 70.1%, SCAP 74.4%; CURB 65 69.8%, SCAP 70.6%). High CURB 65 and SCAP score as predictor for need of mechanical ventilator was more specific for CURB 65 (92.8%) and sensitive for SCAP score (100%). There was however no significant difference between sensitivity and specificity of CURB 65 and SCAP score. This shows that both scores can be used to predict primary outcome. In a study, conducted in two large cohorts of patients hospitalized with CAP, the SCAP score was slightly more accurate than the widely used CURB-65 in predicting adverse outcomes.[8] A systemic review and meta analysis published in 2012 evaluation eight scores: PSI, CURB-65, CRB-65, CURB, ATS 2001, ATS/IDSA 2007, SCAP score, and SMART-COP. The study showed ATS/IDSA 2007, SCAP score, and SMART-COP, have better discriminative performances compared with PSI and CURB-65.[9] As different study has different findings, the findings in our study can still be valid for our population.

Both score was also compared with level of care that the patient got. There was positive correlation (CURB 65 = 0.19, SCAP = 0.18) between scores and level of care. This shows that both scores can be used interchangeable to predict the outcome. A study published in 2009 seeing the rate of all adverse outcomes and hospital LOS increased directly with increasing SCAP, PSI, or CURB-65 scores ($p < 0.001$) in both cohorts. Patients classified as high risk by the SCAP score showed higher rates of adverse outcomes (ICU admission, mechanical ventilation, severe sepsis, treatment failure) than PSI and CURB-65 high-risk classes.[9]

Among the patient who were discharged and had low CURB 65 or SCAP scores, 88.6% had both scores low. There was no difference in the scores in terms of mortality. This again shows both scores are non-inferior to each other. CURB-65 requires less resources while SCAP requires more resources like chest X ray, arterial blood gas analysis. So, SCAP score is in fact costlier than CURB 65 score. As this this study shows CURB 65 is non-inferior to SCAP score, so in a resource limited country like ours, CURB 65 can be used reliably as accurately as SCAP score. The findings however need to be verified with the adequately powered study.

CONCLUSION

There is no difference between CURB 65 and SCAP score in predicting outcome of the patient. As SCAP score requires more resources, CURB 65 can be used effectively. CURB 65 required limited resources so is a better tool in resources limited countries.

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