Assessment of severity of Community Acquired Pneumonia by CURB-65

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Background

Pneumonia is caused by microbial infection in the lung parenchyma. It is a condition characterized pathologically by inflammation within and around the alveolar spaces of the lung.

community-acquired pneumonia (CAP).is a disease in which individuals who have not recently been hospitalized develop an infection of the lungs.CAP occurs throughout the world and is a leading cause of illness and death, which can affect people at all ages.It is associated with significant morbidity, mortality and utilization of health service resources affecting about 1/1000 of the adult population per year.

Diagnoses of CAP

CAP can be diagnosed by symptoms and physical examination alone, though x-rays, examination of the sputum, and other tests are often used. The reference standard to diagnose CAP is a new infiltrate on chest radiograph in the presence of recently acquired respiratory signs and symptoms.

Assessment of severity of CAP.

Severity assessment is recognized as an important step in the management of community-acquired pneumonia guiding therapeutic options such as the need for hospital or intensive care unit (ICU) admission, suitability for discharge home, the extent of investigation, and choice and route of antimicrobial agent[14,15].

The CURB65 score.

CURB-65 prediction tool was introduced in 2003 appears to be an advanced severity assessment toolCURB-65 is a clinical prediction rule that has been validated for predicting mortality in community-acquired pneumonia. The CURB-65 is based on the earlier CURB score proposed by the British Thoracic Society (BTS) and modified by Neill et al (mBTS) which relies on four easily measurable clinical features was developed mainly as a means of identifying Patients with severe CAP at high risk of mortality[21].

The score is an acronym for each of the risk factors measured. Each risk factor scores one point, for a maximum score of 5:

1. Confusion (defined as an MTS of 8 or less).
2. Urea greater than 7 mmol/l (Blood Urea Nitrogen > 20).
3. Respiratory rate of 30 breaths per minute or greater.
4. Blood pressure less than 90 systolic or diastolic blood pressure 60 or less.
5. Age 65 or older.

Based on information available at the initial hospital assessment. Patients could be stratified into three groups according to increasing risk of mortality. Patients with a CURB-65 score of 3 or more are at

high risk of death and should be managed as having severe pneumonia, those with a score of 2 are at some increased ofrisk of death and should be considered for short stay inpatient treatment or hospital supervised outpatient treatment, and those with a score of 0 or 1 are at low risk of death and may be suitable for home treatment [22].

Aim of the study

We conduct this study to evaluate the efficacy of CRURB65 score in the assessment of the severity of community-acquired pneumonia, guiding therapeutic options and predict mortality.

Patients and Methods

200 consecutive patients attending Baquba Teaching Hospital (108 female and 92 male) at a median age of 68 year range from(15-90) year , male(46%) and female(54%)were enrolled to this prospective study between March 2017 and November 2018, diagnosed as CAP .

Patients were excluded from the study if they had one or more of the following criteria:

1. A non-pneumonia diagnosis of respiratory tract infection.
2. Aspiration, hypostatic or hospital-acquired pneumonia.

3. Patients whom initially diagnosed as CAP but there diagnosis was changed after admission to the hospital.
4. Patients whom lacked new infiltrate on the chest radiograph (atypical pneumonia).
5. Immunocompromised patients.
6. Malignancy.
7. Tuberculosis.
8. Patients had chronic respiratory disease.
9. Age<12 years.
10. Patients whom their radiological features did not improved during the 30 days period of follow up (slowly resolving pneumonia).

CURB65 scoring system was applied and the patients were divided into three groups (low, intermediate and high risk groups). The low risk group was managed at home with oral antibiotics, the intermediate and high risk groups were managed at hospital with intravenous antibiotics. The patients were reviewed daily until discharge from the hospital or death. The patients in low risk group were followed up in outpatient clinic. The 30-day mortalities were established. Deaths after discharge but within 30 days of admission to hospital were established by follow up in outpatient clinic and contact with patients by cell phone.

Results

1. (Figure 1) **show Distribution of patients according to their gender.** 92 male patients (46%) and 108 female patients(54%).
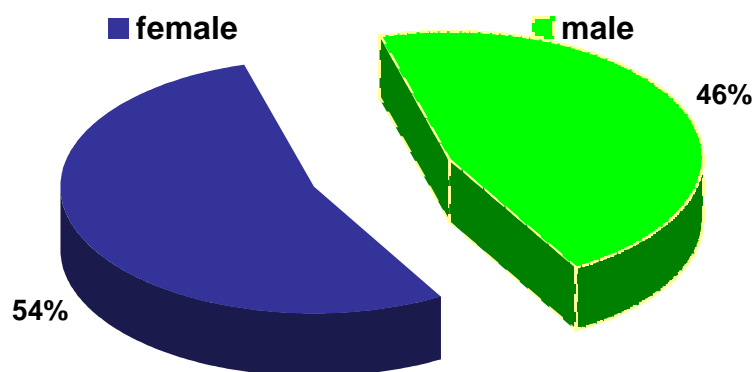

Figure 1: Distribution of patients according to thei0r gender.

2. Regarding CURB65 score, (Table1) show the number of patients who have each CURB65 criteria. 56 patients (28%) were having confusion, 104 patients (52%) were have B.U>7mmol/l, 44 patients (22%) were have R.R>30/minute, 12 patients (6%) were have systolic B.P<90 mm Hg,44 patients (22%) were have diastolic B.P<60 mm Hg and 132 patients (66%) were their age>65 years, .

Table-1. Distribution of studied sample regarding their CURB65criteria.

CURB65 criteria	Number of patients (%) n =50
Confusion	56(28%)
B.U >7mmol/l	104 (52%)
R.R ≥ 30/minute	44 (22%)
Systolic B.P<90 mmHg	12 (6%)
Diastolic B.P<60 mmHg	44 (22%)
Age >65	132 (66%)

3. Regarding CURB 65 score, (Table 2 and Figure 2) show distribution of patients according to CURB65 scores, 36 patients (18%) have score (0),   44 patients (22%) have score (1), 48patients (24%) have score (2), 44 patients (22%) have score (3), 20 patients (10%) have score (4) and 8 patients (4%) have score (5).

Table - 2. Distribution of patients according to CURB65 score

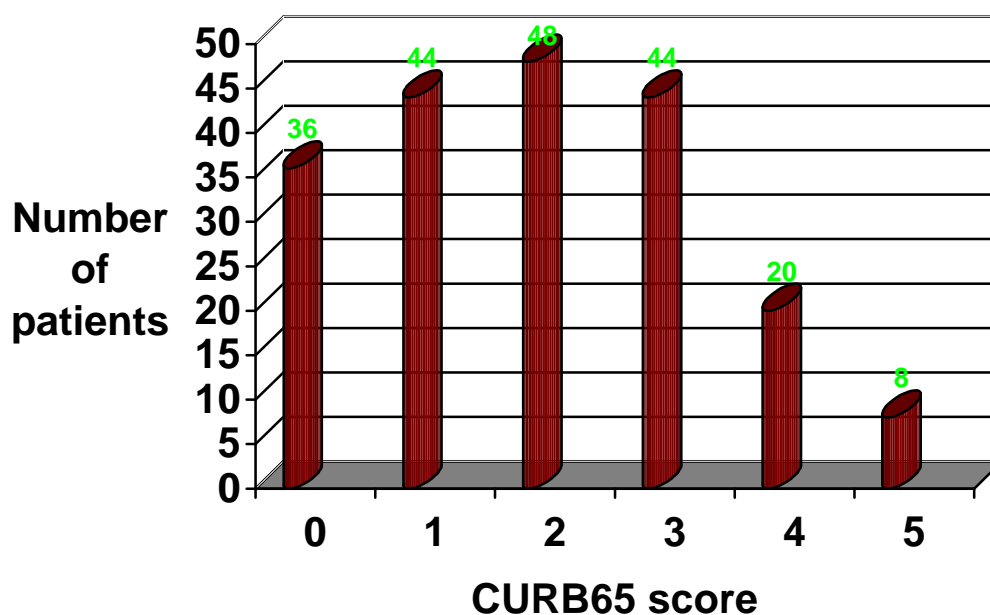| CURB65 score	Number of patients (%)
0	36(18%)
1	44(22%)
2	48(24%)
3	44(22%)
4	20(10%)
5	8(4%)
Total	200(100%)

Figure 2: Distribution of patients according to CURB65 score.

4. (Table 3 and table 4). Of the 200 patients included in the study 80 patients (40%) in the low risk group (CURB65=0-1)treated at home with oral antibiotics and followed up at outpatient clinic , 48 patients (24%) in the intermediate risk group (CURB65=2) treated at hospital with short course I.V then oral antibiotics and 72 patients (36%) in the high risk group (CURB65=3-5) Treated at hospital with I.V antibiotics with close monitoring and 12 patients admitted to the RCU .

Table -3. Distributions of patients in to the three CURB65 risk groups.

CURB65 score	Risk group	Number of patients(%)
(0 - 1)	Low risk	80 (40%)
(2)	Intermediate risk	48 (24%)
(3 - 5)	High risk	72 (36%)

Table-4 The management guidelines according to severity.

CURB65 score	Number of patients	Management guideline
(0 - 1)	80	Treated at home with oral antibiotics.
(2)	48	Treated at hospital with short course I.V then oral antibiotics.
(3 – 5)	72	Treated at hospital with I.V antibiotics with close monitoring .

5. (Table 5): The 30 day mortalities were (0%) in the low risk group, (16.5%) in the intermediate risk group and (30%) in the high risk. The p value <0, 05.

Table-5 The 30 day mortality according to risk group.

CURB65 score	Number of patients	30-day mortality.(%)
(0 - 1)	80	0 (0%)
(2)	48	8 (16.5%)
(3 – 5)	72'	24 (30%)

$p=<0,05$

6. (Table 6): The 30 day mortality regarding each CURB65 score. No patient died (0%) who have scores(0 and 1), 8 patients died (16.6%) who have score(2), 12 patients died (27%) who have score(3), 8 patients died (40%) who have score(4)   and 4 patient (50%) who have score(5). The p value <0,05.

The overall mortality is (16%).

Table-6 The 30 day mortality regarding each CURB65 score.

CURB65 score	Number of patients	30-day mortality*. (%)
0	36	0 (0 %)
1	44	0 (0%)
2	48	8 (16.6;%)
3	44	12(27%)
4	20	8 (40%)
5	8	4 (50%)

*The over mortality 32/200 (16%)$p=<0,05$

Discussion

In this study (figure 1), there was slight difference in female to male ratio (1.2:1) and 66% (table 1), were their age $\geq$ 65 this probably reflects the sex and age distribution in our population.

Barlow, et al[23] found (35%) of patients in the low risk group which is lower than this study(40%) and found (28%) of patients in the intermediate risk group which is higher than this study(24%) this is probably because many patients were partially treated at health care centers and outpatient clinics before they were presented to us.

In this (table 3 and 4), (36%) of patients were in the high risk group this is comparable to Lim et al.[24] who found it (35%).

Lim et al.[24] found (4%) mortality in the low risk group which is higher than this study(0%) this is probably because of limited number of patients in this study and difficulty of outpatient follow up for this group.

Lim et al.[24] found (33%) mortality in CURB65 score 5 (which is 50% in our study) (table 5), this is probably because of greater facilities in ICU in which many patients acquiring this score were admitted and probably because of late presentation of our patients.

Conclusion

1. CURB65 is a clinical prediction rule suitable for use in busy casualty departments or admission units, it include clinical features of prognostic importance, which were easily measurable at the time of initial assessment.

2. The ease of using each tool in clinical practice should be considered. CURB65 requires four bedside and one laboratory criteria that is available in most hospitals.

3. The low mortality in low risk group (CURB65 score 0-1) and the increasing mortality in the intermediate and then high risk groups indicate that CURB65 effectively stratified patients regarding the site of medical care , type and rout of administration of treatment and predicting mortality.

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