

# Is patients' care compromised, when mortality risks and sites of care in Community Acquired Pneumonia (CAP) management are decided, utilising just the clinical features and or other factors instead of recommended prognostic tools? - A questionnaire study from a district hospital in Ireland.

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## Citation

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## Abstract

**Background:**The Republic of Ireland has the highest mortality rate from respiratory diseases in Western Europe. In 2004, respiratory diseases caused over 6000 deaths in Ireland, and community acquired pneumonia accounted for 33% of deaths. Current community acquired pneumonia (CAP) guidelines recommend the use of the British Thoracic Society's (BTS) CURB-65 Pneumonia Guideline or the Pneumonia Severity Index (PSI) to assess the severity and mortality risks in patients with CAP. **Objectives:** Our aim was to assess the knowledge and compliance with the BTS-CURB 65 guideline rule among physicians in our district hospital and to identify other CAP prognostic methods or criteria used in assessing mortality risks and deciding sites of care for CAP patients. **Methods:** A prospective questionnaire study of 25 physicians (middle and lower grades) from the emergency and general medicine departments was undertaken. **Results:** 88% (22) physicians used clinical features and or other factors in deciding sites of care. Among those criteria, social factors, co-morbidities and pre-existing respiratory diseases, were considered for admission by 56% (14), 20% (5), and 20% (5) physicians respectively, while respiratory distress, hypoxia, sepsis, respiratory failure, hypotension and confusion were considered for admission by 12% (3), 12% (3), 12% (3), 8% (2), 4% (1) and 0% (0) physicians respectively. 32% (8) physicians correctly identified all parameters included in the BTS CURB-65 CAP guideline, while 28% (7) used it as a decision tool. Only 1 (4%) physician used the PSI as CAP decision tool. **Conclusions:**Our study confirms that, when our physicians' used clinical features and other factors for sites of care decisions, without utilising any CAP guidelines' prognostic tools, there was poor co-relation between their mortality risk assessments and decisions on sites of care. We also identified deficiencies in our physicians' knowledge of BTS CURB-65 rule and its prognostic predictive value of mortality risk. Above findings, contribute to the suboptimal management, as the patients' with increased and high mortality risks, may be inappropriately discharged. Hence, suggestions to use BTS CURB-65 rule effectively, in emergency departments were recommended.

## BACKGROUND

Prognostic scoring systems for community acquired pneumonia (CAP) were developed to assess the severity of the illness and classify patients on the basis of mortality risk, as appropriate management requires prompt recognition of seriously ill patients to avoid mistakes, such as failure to use a hospital or intensive care unit for patients who could benefit from care and observation in such settings. The two

prominent tools for this purpose are, the Pneumonia Severity Index (PSI) derived from Pneumonia Patients Outcome Research Team (PORT) cohort study [1] and the British Thoracic Society's CURB-65 rule [2,3]. Current CAP guidelines recommend the use of these scoring systems so that, mortality among the CAP patients' is reduced.

The Republic of Ireland has the highest mortality rate from respiratory diseases in Western Europe. In 2004 respiratory

diseases caused over 6000 deaths in Ireland and community acquired pneumonia accounted for 33% (1968) of deaths [4].

Emergency department of the district (county) general hospital of Mullingar receives 34,000 patients annually. Our study was performed to assess the knowledge and compliance with the BTS CURB-65 CAP rule among our physicians and also to identify other CAP prognostic methods or admission criteria used, in deciding the sites of care for CAP patients.

## **METHODS**

We studied physicians (middle and lower grades), involved in admitting and managing patients with CAP, from the emergency and general medicine departments at the Mullingar Regional Hospital. A prospective questionnaire was used to obtain the relevant data.

A questionnaire to assess the awareness and compliance of current CAP mortality scoring methods and other admission criteria.

{image:1}

{image:2}

The questionnaires were distributed to the relevant physicians at one of our hospital grand rounds session in May 2007. Physicians were requested to answer the questionnaires within 15 minutes, thus avoiding prompting and any reference. Out of 31 physicians, six were excluded from the study (one was on leave, two refused to participate in the study, and three returned their questionnaires 2-3 hours after receiving them).

As BTS-CURB 65 rule is the simplest CAP prognostic tool to practise in emergency department, we designed questions to evaluate its awareness (questions 1, 2), knowledge and compliance (questions 3-7) for mortality risk assessment and sites of care decisions.

Questions 8, 9 and 10 were designed to determine the number of physicians using PSI/PORT scoring method for sites of care decisions. However, the questionnaire was not designed to assess the physicians' knowledge of PSI /PORT mortality scoring, as this involved multiple factors and hence would be difficult to be compliant in a busy emergency department.

We suspected that our physicians were using clinical

features or other factors, at their discretion (e.g. hypoxia, fever, increased WCC count or patient living alone), to decide on the sites of care. Hence, question 12 was designed to identify these criteria, and to co-relate between their mortality risk assessments and sites of care decisions. Physicians were requested to assess the mortality risk of individual criteria they considered as, high risk, increased risk, low risk or indecisive for risk assessment and decide on the appropriate sites of care as, ICU/ HDU care, short term inpatient care, outpatient care or indecisive for site of care. The co-relation between the CAP risk assessments and sites of care decisions was assessed by the appropriateness of our physicians' decisions (e.g. High risk assessment of CAP meant that physicians' should decide on managing the patient in ICU/HDU, similarly increased risk and low risk assessment of CAP meant physicians' should chose short stay in-patient and out-patient as sites of care respectively).

## **RESULTS**

Out of 31 middle and lower grade physicians, 6 were excluded for reasons mentioned earlier, while 25 were included in the study ( n = 25).

{image:3}

Figure 1 demonstrates that among the 25 physicians surveyed, 19 (76%) were aware of the BTS CURB-65 guideline. 8 (32%) physicians correctly identified all parameters included in CURB-65 and among them, 5 (25%) always used it, while 2 (8%) used it frequently. 10 (40%) physicians used CURB-65 occasionally, and 8 (32%) never used it. 7 (28%) physicians were aware of the PSI, while only 1 (4%) used it frequently, 6 (24%) used it occasionally and 18 (72%) were not aware of it. 22 (88%) physicians were aware of other CAP admission criteria (clinical features and other factors) and all of them used those criteria at their discretion to decide on the sites of care, while 3 (12%) physicians were not aware of any criteria to use, in deciding the sites of care.

{image:4}

22 different criteria (clinical features and other factors) were identified by our physicians and figure 2 demonstrates the selection of these criteria for deciding the sites of care in CAP management.

{image:5}

Appropriate clinical decisions: High risk = ICU/ HDU care, Increased risk = Short term in-patient care, Low risk = Out-patient care.

In-appropriate clinical decisions: Highlighted texts.

Table 1 demonstrates the co-relation between our physicians' CAP risk assessments and sites of care decisions, when they used these criteria.

Among the 19 physicians who were aware of the CURB 65 rule, 9 (47%) were aware through their exam preparations, 6 (32%) through emergency department's clinical guidance booklet, 4 (21%) by attending the CPD/ CME meetings, 1 (5%) through Internet and 1(5%) through interaction with colleagues.

## DISCUSSION

The Infectious Diseases Society of America along with the American Thoracic Society (IDSA/ATS), and the European Respiratory Society, recommends the validation of decision to hospitalise in CAP, against at least one objective tool of risk assessment, i.e. CURB or PSI [56]. According to the British thoracic society's up-dated guideline, patients' with a CURB-65 score of 3 or more are at high risk of death (17-57%), and should be managed as having severe pneumonia and need ICU/HDU admission. Patients with a CURB-65 score of 2 are at increased risk of death (13%) and they should be considered for short stay inpatient treatment, while patients' with a CURB-65 score of 0 or 1 are at low risk of death (0.7-3.2%), and hence considered as having a non-severe pneumonia and can be treated as outpatient [23]. The PSI stratifies patients into 5 mortality risk classes. It suggests that patients' with risk class 1 (0.1-0.4% mortality) and 2 (0.6-0.7% mortality) should be treated in out-patient. Patients' with risk class 3 (0.9-2.8% mortality) should be treated in out-patient or with a short hospitalisation while patients' with risk class 4 (8.2- 9.3% mortality) and 5 (27-31.1% mortality) should be treated as inpatients preferably in ICU [1].

Our survey confirmed that few of our physicians were using and compliant with the CURB 65 rule 28% (7). This was due to lack of knowledge 68% (17) and non-compliance 4% (1) of BTS-CURB 65 rule, even though most of the physicians 76% (19) were aware of its existence. Very few physicians were using PSI/PORT scoring 4% (1), and most of them 88% (22) were comfortable in deciding the sites of care of CAP patients' utilising just the clinical features and

or other factors (figure 1).

We do not know the knowledge of PSI/PORT mortality scoring, among our very few physicians who used it frequently 4% (1) and occasionally 24% (6) for site of care decisions, as our questionnaire was not designed for it. However, most of the physicians 72% (18) were not aware of its existence. In a study conducted by Lee RW and Lindstrom ST [7], only 33% (45 out of 137 patients) of the admitted community acquired pneumonia patients were categorised using PSI scoring for further management and the accuracy of the PSI scoring was low too (58% - 26 out of 45 patients). They opined that this was due to lack of knowledge of PSI and its relative complexity in application. However this study did not include the compliance and knowledge of CURB 65 scoring.

When clinical features and other factors were used by our physicians, without utilising any CAP guidelines' mortality scoring, the top three admission criteria were - social factors 56% (14 ) (e.g. old age, living alone and living away from the hospital), co-morbidities 20% ( 5) and pre-existing respiratory diseases 20% ( 5), while important clinical features like respiratory distress 12% ( 3), hypoxia 12% ( 3 ), sepsis 12% ( 3 ), respiratory failure 8% ( 2 ), hypotension 4% ( 1 ) and confusion 0% ( 0 ) received very little or no support as admission criteria (Table 1). There was inconsistency in mortality risk assessments and sites of care decisions, as different physicians' assessed the same criteria differently, and decided on sites of care differently (e.g. hypoxia was considered by 2 physicians as high risk, while 1 considered it as increased risk and 2 were not sure of the risk and while 2 physicians decided to treat their CAP patients' with hypoxia in short stay in-patient care, 1 decided on ICU/HDU care and the other was not sure where to treat his patient). Hence among the 78 clinical decisions taken by our physicians, 61.5% (48) decisions were in-appropriate (Table 1). We confirm that when clinical features and other factors were used by our physicians' in deciding the sites of care without utilising any current CAP guidelines' mortality scoring, there was poor co-relation between their mortality risk assessments and decisions on sites of care.

Although the PSI and CURB-65 criteria are valuable aids in avoiding inappropriate admissions of low-mortality-risk patients [8910], another important role of these criteria is to help identify patients' at high risk who would benefit from hospitalisation. When compared in the same population, the

PSI identified a slightly larger percentage of patients with CAP in the low-risk categories, compared with the CURB-65 criteria, with similar low mortality rate among patients categorized as low risk [9]. The PSI includes 20 different variables and, therefore, limits its practicality in a busy emergency department, whereas CURB 65 criteria are easily remembered and applicable.

The IDSA/ATS committee prefers CURB-65 scoring because of ease of use as they were designed to measure illness severity and mortality. Patients with a CURB-65 score  $\geq 2$  are not only at increased risk of death but also are likely to have clinically important physiologic derangements requiring active intervention. These patients should be considered for hospitalisation. Because the PSI score is not based as directly on severity of illness as the CURB-65 criteria, a threshold for patients who would require hospital admission or intensive outpatient treatment is harder to define. The higher the score the greater is the need for hospitalisation. However, even a patient who meets PSI class 5 on the basis of very old age and multiple stable chronic illnesses may be successfully managed as an outpatient [3].

Nadarajan P, Wilson L, Mohammed B, et al, reported poor compliance in CURB-65 scoring, only 2 (7%) out of 28 CAP patients in their study, with 81% compliance (113/140 variables) in recording variables of CURB-65 [11]. They retrospectively reviewed the medical records of 45 patients admitted as CAP over a 5 months period (2006) and assessed the documentation of CURB 65 score or CURB 65 variables. They assumed that physicians lacked the knowledge as there was poor documentation of confusion as a CURB 65 variable. However this study does not confirm whether the 45 CAP admissions, were from different physicians, as there could be significant variation among their physician's knowledge of current CAP guidelines and prognostic tools. If a particular physician admits more than one CAP patient on the same on-call day or the next on-call day, his/hers compliance to the CURB-65 rule would still be the same irrespective of total number of CAP admissions (unless the particular physician's knowledge on CAP guidelines and prognostic tools has improved between the admissions) and this would contribute to the duplication of their results and introduce the bias.

Collini P, Beadsworth M, Anson J, et.al, reported poor compliance to BTS-CURB and CURB 65 pneumonia guidelines (48% in 2001/2 and 87% in 2005/6) among the 52

physicians, in spite of educational programmes during a two-year period [12]. This study was retrospective and there was poor documentation by the physicians, about their mortality risk assessment. Also their educational programmes did not document physicians' attendance and there was no feedback from them. Hence the authors could not assess the knowledge of these physicians about the BTS-CURB 65 guideline.

In comparison to the above studies [11,12], our study was prospective with questions designed to test the knowledge of the physicians' on CURB 65 scoring. Hence we were able to distinguish between the physician's who were aware about the existence of the guideline and those who had the knowledge and hence complied with the guideline. As our questionnaire study targeted individual physicians treating CAP rather than collective CAP admissions [11], there was no duplication of results.

We did not come across any publication co-relating the physicians' decisions on sites of care, to their mortality risk assessment of CAP, when just the clinical features and other factors were used in CAP management, without utilising the current CAP prognostic tools (CURB 65/ PSI). We realise that in our study the number of participants are small and the results can vary depending on the institution and knowledge of the participants.

## **CONCLUSIONS**

Our study confirms that, when our physicians' used clinical features and or other factors for sites of care decisions without utilising any current CAP guidelines' prognostic tools (CURB-65 and or PSI), there was poor co-relation between their mortality risk assessments and decisions on sites of care. We also identified deficiencies in our physicians' knowledge of BTS CURB-65 rule and its prognostic predictive value of mortality risk and this we believe led to the poor compliance of CURB-65 rule.

Above findings contribute to the suboptimal management, as the patients' with increased and high mortality risks, may be inappropriately discharged. Hence emergency departments need to have a policy in place for mortality risk assessment of CAP patients', prior to their admission or discharge, so that patients' care is not compromised.

We recommend the use of British Thoracic Society's CURB- 65 pneumonia scoring, as it is a much simpler mortality risk assessment and management tool in a busy

emergency department. Physicians' knowledge on current pneumonia guidelines should be updated through departmental and CPD/CME meetings, and assessed at regular intervals, with feedbacks from the physicians' involved in managing CAP. Further, audits/studies needs to be undertaken to confirm whether the above recommendations were effective.

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