Rapid diagnosis strategy of community-acquired pneumonia for clinicians

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VERDICT Based on the best available evidence, a restricted strategy may be suitable for diagnosing pneumonia in the community. Such a strategy may be particularly suitable during the current Covid-19 pandemic where resources may be stretched.

RECOMMENDED APPROACH IN EMERGENCY SITUATION

- Key equipment includes pulse oximeter,1 a thermometer, and stethoscope (along with immediate therapy pack of amoxicillin/doxcycline AND clarithromycin).**
- Auscultation not essential if overall clinical judgement ('gestalt' - gut feeling) of CAP (partly based on **temperature >=38, respiratory rate > 20*** and heart rate >100 and new confusion)** is already met
- *Red Flag: Auscultation should be reserved for those where it is crucial to decision making.***
- Assessing blood pressure significantly increases contact time and should be considered only in those in whom it contributes to essential decision making to admit or not.
- We recommend documenting that on examination a 'limited examination' was performed (**abbreviated to O/E LE**).

    Remember: **STERILIZE** all equipment used between patients.

*see rapid pneumonia Rapidly managing pneumonia in older people during a pandemic for the antibiotic strategy

**pulse oximeter provides a simple way to measure heart rate and can aid the assessment of the deteriorating patient. Hypoxemia may influence the prognosis of patients with CAP independently of severity scores.

***Red Flag:** Independent predictors of pleural effusion are dullness to percussion and asymmetric chest expansion

EVIDENCE FOR THE RAPID DIAGNOSIS STRATEGY

A 2019 systematic review of 13 studies including 11,144 adult patients from outpatient clinics, emergency clinics, and primary care practices, presenting with cough, symptoms of respiratory tract infection and clinically suspected

pneumonia, assessed the diagnostic accuracy of clinical features for the diagnosis of pneumonia

Clinical features with the best pooled positive likelihood ratios were:

- Respiratory rate ≥20 per min +ve LR 3.47 (95% CI, 1.46–7.23),

- Temperature ≥38 °C +ve LR 3.21 (2.36–4.23),
- Pulse rate > per 100 min +ve LR 2.79 (1.71–4.33),
- Crackles +ve LR 2.42 (1.19–4.69).

A 2019 systematic review of 12 studies including 10 254 adult patients, assessing the signs and symptoms that rule out community-acquired pneumonia in outpatients showed:

- Adults with an acute respiratory infection who had normal vital signs (**temperature, respiratory rate and heart rate**) were at low risk for CAP -ve LR, 0.24 (0.17 to 0.34).
- Normal vital signs, as well as a normal pulmonary examination, had a -ve LR of 0.10 (0.07 to 0.13)== **factor of TEN, rules it out in emergency**

Access pdf: https://www.jabfm.org/content/jabfp/32/2/234.full.pdf

A 2019 systematic review determined the diagnostic accuracy of overall clinical impression ("clinical gestalt") in the diagnosis of infection, including community-acquired pneumonia, in primary care. The review included 9 studies of pneumonia with chest X-ray as the reference standard and a median prevalence of 15%.

- Diagnostic accuracy of an overall clinical impression had a +ve LR 7.7 (4.8-11.5) and -ve LR 0.54 (0.42-0.65) for the diagnosis of CAP in adults.

= close to ruling in, in emergency

In a review of the evidence for the diagnostic accuracy of the physical examination in diagnosing pneumonia, pleural effusion, chronic obstructive pulmonary disease independent predictors of pleural effusion were dullness to percussion (+ve LR 8.7; -ve LR 0.3) and asymmetric chest expansion (+ve LR 8.1; -ve LR 0.29).

.In a study of 278 patients (196 men), aged >12 admitted with respiratory symptoms the clinical signs that independently predict pleural effusion were asymmetric chest expansion, OR 5.22 (95% CI 2.06-13.23), and dull percussion note, OR 12.80 (95% CI 4.23-38.70). For the final multivariate model, physical signs may be helpful to rule out but not rule in pleural effusion.

ASSESSMENT OF SEVERITY OF COMMUNITY-ACQUIRED PNEUMONIA

NICE recommends using the CRB65 score to assess patients at low, intermediate or high risk

(https://www.nice.org.uk/guidance/cg191/chapter/1-Recommendations#community-acquired-pneumonia-3):

CRB65 SCORE FOR MORTALITY RISK ASSESSMENT IN PRIMARY CARE

The CRB65 score is used to assess the severity and mortality risk in patients with CAP.

Calculate by giving 1 point for each of the following prognostic features:

- confusion (abbreviated Mental Test score 8 or less, or new disorientation in person, place or time)
- raised respiratory rate (30 breaths per minute or more)
- low blood pressure (diastolic 60 mmHg or less, or systolic less than 90 mmHg) **reverse - systolic then diastolic 90 // 60**
- **age 65 years or more**.

Patients are stratified for risk of death as follows:

- 0: low risk (less than 1% mortality risk) (likely suitable for home treatment)
- 1 or 2: intermediate risk (1-10% mortality risk) (consider hospital referral)
- 3 or 4: high risk (more than 10% mortality risk) (urgent hospital admission)

A [2010 systematic review of 14](#) validation studies assessed the validity of CRB-65 to grade the severity of CAP in terms of 30-day mortality and included 397,875 patients.

The study found that CRB-65 accurately predicts 30-day in hospitalised patients, particularly in those classified as intermediate (RR 0.91, 95% CI, 0.71 to 1.17) or high risk (RR 1.01, 0.87 to 1.16).

In community settings, CRB-65 appears to over-predict the probability of 30-day mortality across all strata of predicted risk. The low event rate, particularly in the community-based studies, however, makes the precise estimates about CRB-65 performance less certain.

Hypoxemia:

[Hypoxemia may influence](#) the prognosis of patients with CAP independently of the CRB.

In a study of 585 hospitalized patients with mild pneumonia (CRB-65 group 0 and 1) 50% of the patients had hypoxemia on admission. Hypoxemic patients

had longer hospital stays, higher intensive care unit admissions and higher rates of severe sepsis, and mortality than non-hypoxemic patients.