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Corticosteroids in community-acquired pneumonia: a reflection on current guidelines and practice

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Community-acquired pneumonia (CAP) is the leading cause of hospitalisation in the UK,[1] with an incidence of 5-10 per 1000 population and 29 000 deaths per year.[2] It places a substantial burden on emergency services, with 85% of hospitalised CAP admitted via the emergency department (ED).[3] CAP is clinically heterogeneous; patients mount a variable inflammatory response despite similar clinical presentations, influenced by the pathogen, co-morbidities and age.[4 5] Several severity scores exist, including the Pneumonia Severity Index (PSI), American Thoracic Society (ATS) score[6] and CURB-65.[7] CURB-65 is the most widely used in the UK; although it now informs admission and antibiotic decisions, it was derived to predict mortality and has never been validated for guiding treatment.[7] Here, we examine the recent NICE recommendation to use CURB-65 scoring in selecting patients for corticosteroids.

DEFINING 'SEVERE' CAP: PROGNOSTIC VERSUS PHYSIOLOGICAL RISK

Since 2025, updated NICE guidelines recommend adjunctive corticosteroids in 'severe' CAP, defined by CURB-65 mortality risk scoring (≥3) in combination with clinician judgement.[2] This raises the key question: should severe CAP be defined by one's *prognostic* risk (eg, mortality scores) or markers of *physiological* risk (eg, hypoxaemia, requirement for ventilation). Although these correlate across the whole CAP population (ie, hospitalised patients are likely more clinically severe and have a higher risk of death compared with outpatients), within hospital this is not necessarily true: younger patients are much less likely to die, but more often have quite clinically severe CAP.

Although the guidance acknowledges that clinical severity and mortality risk scoring may be discordant, it offers only a non-exhaustive set of examples each with limited explanation ('having an unusually low oxygen saturation level, pleural complications or multiple comorbidities'). Furthermore, recommendation 1.2.2 states that 'the disease severity will usually correspond to the risk of death',[2] placing clear emphasis on mortality scoring and thereby introducing genuine uncertainty for clinicians. It is therefore reasonable to anticipate that mortality scoring will significantly influence which patients are classified as having severe CAP and, consequently, be eligible for corticosteroids.

When evaluating the utility of mortality scores for guiding treatment selection, a key distinction is easily lost: prognosis and treatment benefit are not the same. A mortality risk score estimates who is likely to die, not who will respond to corticosteroids. Because a constant relative treatment effect produces a larger absolute risk reduction wherever baseline risk is higher, sicker patients always appear to benefit more in absolute terms, irrespective of whether severity modifies the effect. By contrast, relative effects tend to be broadly stable across baseline risk, with a statistical re-analysis of 32 large, randomised trials across a variety of clinical specialities finding little consistent relationship between the two.[8] The larger absolute benefits in severe cohorts are therefore in substantial part an arithmetic consequence of higher baseline risk, rather than evidence that mortality risk identifies responders. This is not how treatment is targeted elsewhere; oncological therapy is directed by the mechanistic target (ie, the receptor or driver mutation). While this may correlate with mortality, patients are not given chemotherapy because they are more likely to die.

EMERGING EVIDENCE: HTE

The NICE recommendation for corticosteroids in severe CAP rests on a 2023 meta-analysis suggesting benefit is greatest in more severe disease,[9] with trials ongoing in mild/moderate CAP.[10] This meta-analysis by Pitre and colleagues found that corticosteroids reduced mortality in more severe CAP by 38% (relative risk (RR) 0.62, 95% CI 0.45 to 0.85), with no effect in less severe CAP (RR 1.08, 95%CI 0.83 to 1.42).[9] However, the definition of severe CAP varied; cohorts were deemed severe if >50% were in intensive care (ICU) at randomisation or >50% scored severe on a mortality risk score. The heterogeneous results of this meta-analysis emphasise that steroids are not a panacea and that optimal patient selection is key. While we agree that severe CAP patients should receive corticosteroids, selecting those with the highest prognostic risk through mortality scoring is inappropriate. As such, the current recommendations by NICE may not fully capture emerging evidence on heterogeneity of treatment effect (HTE), risking poor patient selection and harm.

Since the NICE recommendation, further evidence has been published and continued to develop our ongoing understanding in this area. In 2025, Smit and colleagues published a rigorous individual patient data meta-analysis using risk and effect modelling.[11] Although post hoc, its externally validated modelling robustly assessed HTE. On risk analysis, PSI-derived severity showed no HTE for 30-day mortality. Among those with CURB-65≥3, corticosteroids were associated with numerically higher 30-day mortality than placebo (OR 1.32, 95%CI 0.60 to 2.89; 17.1% vs 13.3%).[12] On effect modelling however, significant HTE was driven entirely by CRP and externally validated; patients with CRP >204 mg/L demonstrated a

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significant reduction in 30-day mortality with corticosteroids (OR 0.43, 95% CI 0.25 to 0.76), unlike those with CRP ≤204 mg/L (OR 0.98, 95% CI 0.63 to 1.50).[11] Subsequent to both meta-analyses, results from the REMAP-CAP trial have been published, in which patients admitted to the ICU with CAP were randomised to receive 7 days of intravenous hydrocortisone.[13] While no significant difference in mortality was observed overall, interpretation is complicated by the complex adaptive design and that almost a quarter of control-group patients received corticosteroids. Furthermore, the trial did not report HTE according to CRP or mortality scores, and its inclusion criteria captured only the most unwell patients (those requiring respiratory or cardiovascular organ support within 48 hours of hospital admission).[13] Consequently, these findings offer limited additional insights into more nuanced patient selection for corticosteroids relevant to the ED. While NICE made no specific research recommendation to refine severity assessment further, more recent evidence suggests that doing so should remain an important priority.

CLINICAL IMPLICATIONS: FROM MORTALITY SCORES TO CRP

While useful for prognostication, mortality scoring correlates poorly with the inflammatory response, the more plausible effect modifier and mechanistic target of corticosteroids in acute infection.[14] CURB-65 is heavily weighted towards baseline frailty markers (confusion, renal impairment, older age), and corticosteroids are known to exacerbate delirium in this at-risk group.[15] In older patients more burdened by polypharmacy, steroids increase adverse drug reactions such as gastrointestinal bleeding and hyperglycaemia.[16] Such risks might be justified by clear evidence of benefit, but Smit and colleagues suggest corticosteroid responsiveness tracks inflammatory burden more closely than conventional mortality scores.

As NICE offers no criteria for integrating other clinical correlates of severity, CURB-65 is likely to be used in isolation. This risks overlooking younger patients with other severity markers such as marked hypoxaemia or high inflammatory burden. With a better physiological and cognitive baseline, they are more resilient to changes measured by CURB-65 and thus may be denied beneficial treatment. Conversely, this may encourage over-prescription to less unwell patients, for example those re-presenting with persistent symptoms after complete treatment,[17] exposing them to additional harms such as recurrent pneumonia, secondary infections and new insulin dependence without additional benefit.[18]

The current NICE definition of severe CAP therefore has important limitations for corticosteroid administration, and since their initial recommendations, our understanding of corticosteroids in CAP has developed significantly. With 24.9% of CAP patients presenting to hospital with a severe CURB-65 score,[3] this is a frequently encountered ED problem. Since diagnosis and initial management usually occur in the ED, objective initiation criteria are essential for safe, consistent practice. Given the serious complications of unnecessary corticosteroids, we advocate using CRP with a threshold of 200 mg/L as the primary criteria, which recent evidence suggests may be more optimal than CURB-65. CRP is routinely measured acutely with rapid turnaround, making it a practical biomarker for stratification. In CAPE-COD, corticosteroids were required within 24 hours of meeting severity criteria; while improved outcomes were observed overall,[19] the benefit was confined on post hoc analysis to patients treated within 24 hours of admission, reflecting significant HTE by time to administration.[12] This suggests that benefit may depend on early treatment, and therefore timely, accurate identification of responders in ED is vital. With ongoing research to better optimise corticosteroid delivery in CAP,[10 20] more definitive evidence is hopefully on the horizon.

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