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COMMENTARY

Inflammatory markers are helpful when treating LRTI in primary care

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Antibiotic resistance is a growing problem, and unnecessary antibiotic use exposes people to the risk of adverse reactions, wastes money, and medicalises self-limiting conditions. Better targeting of antibiotics is therefore essential – especially in primary care, where most antibiotics are prescribed.

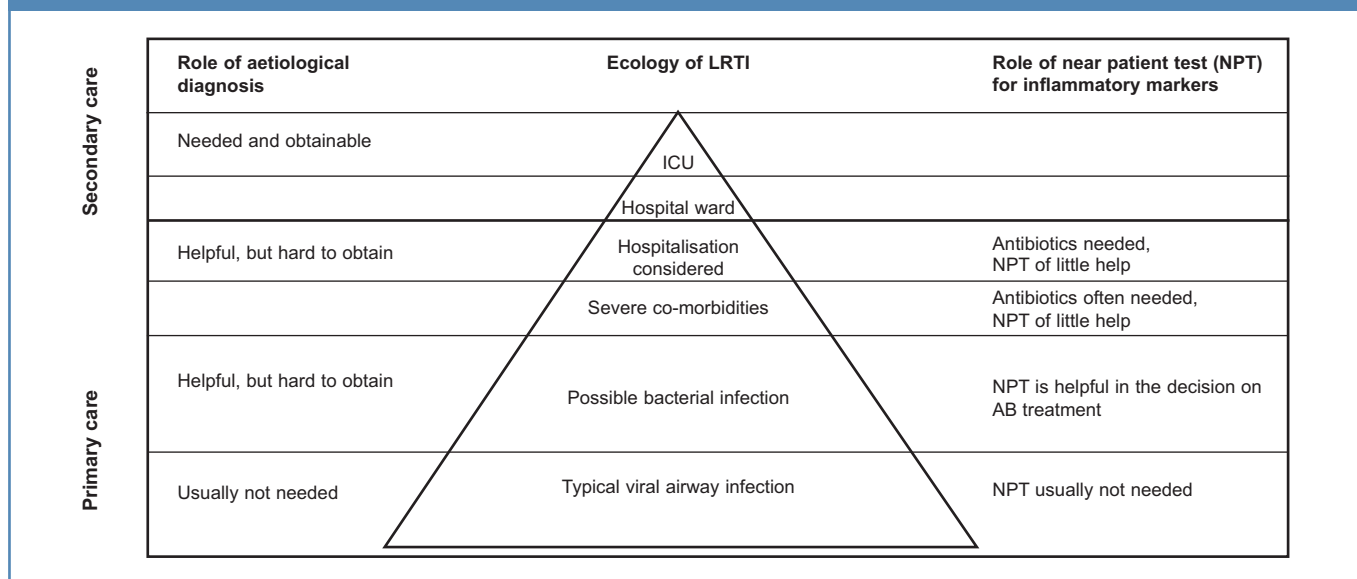
Inflammatory markers like C-reactive protein (CRP) and procalcitonin (PCT) do not adequately differentiate between bacterial and viral infection.¹ CRP is a better predictor of pneumonia than any symptom or sign.² The diagnostic value of PCT has been less studied in primary care, probably because a Near Patient Test (NPT) version is not yet available. However, it

seems to be a less sensitive marker of pneumonia than CRP.^{3,4} Nevertheless, as Aabenhus and Jensen point out in this comprehensive review,⁵ both the PCT and CRP tests have proved useful in guiding clinicians' prescribing decisions so as to achieve a reduction in unnecessary antibiotic use.^{5,6} A CRP NPT result can be obtained in under five minutes, and results are strongly weighted by GPs in Scandinavia when deciding on antibacterial treatment in patients with acute cough.⁷

Inflammatory markers are more useful as a guide when deciding on antibacterial treatment in primary care rather than in secondary care; in the former an aetiological diagnosis may be

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Figure 1. Incidence, severity, and the role of inflammatory markers and microbiological tests in decisions about antibacterial treatment for respiratory infections in primary and secondary care



less important than prediction of prognosis and treatment benefit. The pyramid in Figure 1 shows the different levels of incidence and severity of LRTI and the role of NPTs for inflammatory markers.

- The foundation layer at the bottom of the pyramid represents the great majority of patients with an acute cough. These have a high probability of respiratory viral infection. This broad syndromic diagnosis is usually obvious, due to the typical symptoms affecting both the upper (e.g. coryza) and lower respiratory tract (cough).
- The layer above represents patients who are moderately ill, but with a slightly increased risk of pneumonia and/or bacterial infection. As Aabenhus and Jensen point in this review,⁵ an inflammatory marker can be particularly helpful in ruling out a need for antibiotics in these patients – CRP probably more so than PCT as it is a better predictor of pneumonia.
- The next (third highest) layer represents patients with important co-morbidities, mainly those with severe COPD. The severity of their COPD and of the actual symptoms should probably overrule any information from tests for biomarker levels. However, a very high value of CRP or PCT will increase concern about pneumonia, and so clinicians will consider the need for hospital admission (and thus move up to the next layer in the diagram).
- Patients in the next layer up will receive little additional benefit if decisions about antibiotic treatment are made with the help of an inflammatory biomarker. These patients will almost certainly be treated with antibiotics, either at home or in hospital. Clinical and other laboratory findings such as blood pressure, respiratory rate, the mental alertness of the

patient, and age (all components of the CRB-65 score), will be more useful than biomarker test results in guiding antibiotic prescribing decisions.^{1,8} However, a decision to manage the patient in hospital rather than at home may be supported by high levels of CRP⁹ or PCT.¹

- Once in hospital, many more laboratory tests become available, and inflammatory markers can be used to monitor response to treatment. Regarding antibiotic choice, empirical treatment is usual, but with thorough and urgent efforts to obtain good specimens for detection of the aetiological agent. This is particularly important in intensive care units, where tracheal aspirates are often collected. In primary care, microbiological tests will usually be based on specimens from sputum or from the throat. Microbiological testing in primary care will be less useful because of the problems of getting a representative sample, the length of time for obtaining the result, and because the relationship between commensal and disease-causing organisms is often unclear. Improved diagnostics that are rapid enough for primary care is an important goal. Ideally, such tests should identify sensitivities to the relevant antibiotics, allowing the narrowest spectrum antimicrobial agent to be prescribed

Managing LRTI in primary care with CRP can lead to reduced antibiotic prescribing, which can also be achieved by enhancing the communication skills of the GP.⁵ Improved consultation skills and CRP together have the greatest effect on safe reductions in antibiotic prescribing for LRTI without negatively impacting on recovery and satisfaction with care. Primary care clinicians and their patients point out that they would find a CRP NPT most useful in those cases where there is doubt in the minds of clinicians and/or patients about whether or not antibiotics

should be prescribed.^{10,11} Clinicians want the test to perform well, no doubt. The ability of NPTs to predict things like radiographic pneumonia is useful, but their ability to help reduce anxiety and gain an acceptance of non-antibiotic management may sometimes be even more important. Patients may sometimes be more willing to accept advice from a clinician that antibiotics are not necessary on this particular occasion if the advice is backed up by a test. If the test performs at least as well as clinical assessment alone, then the clinical decision should most often be confirmed, with the patient leaving the consulting room feeling they have been taken seriously, well managed and more accepting of non-antibiotic management.

Diagnostic performance should therefore not be the only consideration when evaluating biomarkers and other tests. Tests should not be parachuted into clinical care without careful consideration of their niche and of the complex surrounding clinical assessment and communication issues. And as the authors of this review point out,⁵ all-round excellence in consultation skills will ensure greatest added value from biomarkers and other tests in general practice.

Conflicts of interest

The authors declare that they have no conflicts of interest in relation to this article. All are doing research in related areas.

Contributorship

All authors contributed to the review of literature, formulation of content and drafting the manuscript.

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