General Practitioner Antimicrobial Stewardship Programme Study

GAPS

C-Reactive Protein

How to use CRP testing in general practice within consultations for acute respiratory tract infections

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What is C-reactive protein?

- C-reactive protein is an acute phase protein that is produced in the liver and it is recognised as a marker of inflammation.
- In healthy individuals CRP is present in low concentrations in serum (<10 mg/l).
- Its production increases within a few hours of the onset of inflammation or acute tissue injury and peaks at about 48 hours (2 days).
- Its half-life of about 19 hours is constant, and therefore its level is determined by the rate of production and hence the severity of the precipitating cause.

Is it safe to use CRP to assist antibiotic prescribing?

- CRP testing has been used in Scandinavian countries for several years.
- The test result is available within a few minutes from one drop of blood.
- Training in the use of a CRP test at point of care is associated with notable reductions in antibiotic prescribing rates.
- Withholding antibiotics in patients with low CRP values has not been associated with compromising patients' recovery and satisfaction with care.

- If you would like to read more:

Effect of point of care testing for C reactive protein and training in communication skills on antibiotic use in lower respiratory tract infections: cluster randomised trial by Cals et al:
http://www.bmj.com/content/338/bmj.b1374.long

Effects of internet-based training on antibiotic prescribing rates for acute respiratory-tract infections: a multinational, cluster, randomised, factorial, controlled trial by Little et al:
http://www.sciencedirect.com/science/article/pii/S0140673613609940#

Lower respiratory tract infections and rhinosinusitis

- Evidence for CRP testing in general practice are mainly based on using CRP tests within consultations for lower respiratory tract infections and rhinosinusitis.

- We do not recommend using CRP testing within consultations for acute otitis media or acute pharyngitis/tonsillitis.

- If you would like to read more:

Point-of-care C-reactive protein testing and antibiotic prescribing for respiratory tract infections: a randomized controlled trial by Cals et al: http://www.annfammed.org/content/8/2/124.full.pdf+html

C-reactive protein testing in patients with acute rhinosinusitis leads to a reduction in antibiotic use by Llor et al:http://fampra.oxfordjournals.org/content/29/6/653.long

Association between C-Reactive Protein Rapid Test and Group A Streptococcus Infection in Acute Pharyngitis by Calvino et al:
http://www.jabfm.org/content/27/3/424.full.pdf+html

Differentiating serious from self-limiting ARIs

- CRP does not reliably differentiate bacterial from viral infections in general practice. It can differentiate bacterial from viral infections in the intensive care setting, but not in general practice.

- So how does CRP help us then in general practice?
  CRP can assist you in differentiating serious from self-limiting ARIs.

- Most patients with an ARIs have a self-limiting illness and will not benefit from antibiotics (regardless of bacterial or viral aetiology).
  However, a minority have a more serious infection, particularly pneumonia, where patients are much more likely to benefit from antibiotic treatment. CRP helps to differentiate between these two groups of patients.

ARI= Acute respiratory tract infection

CRP is not a stand-alone test

- CRP should not be used as a stand-alone test. Medical history and physical examination are the cornerstones of the consultation.
- CRP is an additional diagnostic test, which can assist in determining the illness severity.
- The test results should always be used in combination with findings from the consultation. So, although practice staff / nurses can perform the test, they should never give advice to patients solely based on the result, as the result always needs to be considered within the context of the patient's illness.

Cut-off values

- **CRP ≤ 20 mg/l**

Self-limiting acute respiratory tract infection

Withhold antibiotics

- **CRP 21 - 50 mg/l**

Majority of patients have a self-limiting acute respiratory tract infection

Withhold antibiotics in most cases

- **CRP 51 - 100 mg/l**

Group with both self-limiting and more severe infections

Withhold antibiotics in the majority of cases

Consider delayed or immediate antibiotics

- **CRP > 100 mg/l**

Severe infection

Prescribe antibiotics

Intermediate CRP levels?

- CRP values higher than 20 mg/l do not automatically indicate a need for antibiotic prescribing.

- Decisions to prescribe antibiotics in patients with CRP values between 21 and 100 mg/l should be based on the clinical presentation and the duration of illness. Treatment decisions need to be guided by your estimation of illness severity in conjunction with the CRP value.

- Antibiotics can be withheld in most cases.

- Consider a delayed antibiotic prescribing strategy.

Be aware of…

- If a patient consults within the first few days of the start of the illness and their clinical presentation is severe, please bear in mind that CRP may still be rising. In this case, the previously explained cut-off values must be considered cautiously.

- If, based on clinical presentation, uncertainty remains, either
  a) a consultation to re-assess the patient must be planned, and CRP can be re-measured on that occasion, or
  b) a delayed antibiotic prescription can be considered.

- A rise in the CRP level is non-specific and should not be interpreted without a complete clinical history.

- Evidence for CRP testing in children and patients with severe co-morbidity is scarce.

In summary

- The test result is available within a few minutes from one drop of blood.
- CRP can be used as an additional diagnostic tool in the consultation, and to inform and reassure patients on the self-limiting nature of their symptoms.
- CRP testing should only be used within ARI consultations for lower respiratory tract infections and rhinosinusitis.
- Antibiotics can be withheld in patients with CRP ≤ 20 mg/l. – and in most patients with CRP values of 21-50 mg/l.

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References and acknowledgement

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