

CRP vs ESR

Case Study Feedback



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Acknowledgement

bpac^{nz} would like to thank the panel and Professor John Campbell for their support and contribution to this case study.

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September 2005

ESR/CRP Case Study

1. An 18 year-old woman has an exudative pharyngitis, fatigue and enlarged posterior cervical nodes. Your differential diagnosis is infectious mononucleosis, viral pharyngitis or bacterial pharyngitis.	CBC	
	ESR	
	CRP	
2. A 35 year-old male non-smoker with no previous history of significant cough or wheeze has had three days of productive cough following a URTI. Examination reveals scattered rhonchi. You suspect acute bronchitis.	CBC	
	ESR	
	CRP	
3. A 65 year-old woman has painful knees. They are particularly sore after she has been sitting for a prolonged period or on stairs. Her knees have boney swelling and a mild effusion. You suspect osteoarthritis.	CBC	
	ESR	
	CRP	
4. A 56 year-old woman with COPD has increased dyspnoea, cough, and purulent sputum. This is probably an exacerbation of her COPD but you are concerned about the possibility of pneumonia.	CBC	
	ESR	
	CRP	
5. A 67 year-old man has recent malaise. He also has a left sided headache and tenderness of his left scalp. His jaw aches when he chews his food. You suspect giant cell (temporal) arteritis.	CBC	
	ESR	
	CRP	
6. A 24 year-old woman presents with fatigue and heavy menstrual bleeding. She is clinically anaemic.	CBC	
	ESR	
	CRP	
7. A 54 year-old heavy smoker is noted to have finger clubbing on an occupational health check. Direct questioning reveals a persistent cough. Examination shows signs of a pleural effusion. You suspect lung cancer.	CBC	
	ESR	
	CRP	
8. A 78 year-old man is in good health apart from mild heart failure secondary to ischaemic heart disease. He is attending today for repeat of his thiazide diuretic, beta blocker and ACE inhibitor.	CBC	
	ESR	
	CRP	
9. A 46 year-old woman has had fatigue, anorexia and vague muscular aches and pains for two months. Now she had developed swelling, pain and tenderness of the PIP and MCP joints of both hands. You think it is most likely to be due to rheumatoid arthritis.	CBC	
	ESR	
	CRP	
10. A 34 year-old man has a first episode of acute inflammation of his 1 st MTP joint. You suspect gout but want to be sure that it is not infective.	CBC	
	ESR	
	CRP	

Feedback

We are sorry you did not return a case study to us. Please let us know if there is any way we can make our case studies more useful to you. We want our resources to be helpful to you in your day to day clinical practice. We would be pleased to receive any suggestions that you have.

These scenarios were designed to stimulate reflection on the use of inflammatory markers in general practice. We hoped you would consider:

- When is it appropriate to order both CRP and ESR simultaneously?
- Is it more appropriate to order the more useful CRP than to continue to use ESR?

As you can see from the responses of your peers, the panel discussion and specialist comment there is a wide range of approaches.

We hope these scenarios will give you an opportunity to reflect on your clinical practice and maybe identify some things you could change. If you have any questions please email these to us and we will answer via the 'Your Questions Answered' section of our web site.

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Case Study Feedback

For each scenario decide which (if any) of the provided blood tests would be part of your investigations of the scenario. The three blood tests are Complete Blood Count (CBC), Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP).

GP Panel Discussion

Initially the panel highlighted the difficulties these brief scenarios pose to responders. In real life consultations there is much more information available from patients including subtle clues which often form a pattern leading to a diagnosis. Laboratory tests can then be used to confirm this diagnosis. In written scenarios these clues are missing.

It is also apparent that the rates and choices of inflammatory marker use in these scenarios do not represent what happens in actual practice as represented by national laboratory figures.

1. An 18 year-old woman has an exudative pharyngitis, fatigue and enlarged posterior cervical nodes. Your differential diagnosis is infectious mononucleosis, viral pharyngitis or bacterial pharyngitis.

	CBC	CRP	ESR	CRP + ESR
You				
Your peers	93%	57%	1%	1%
GP Panel	+/-			

The panel agreed that neither of the inflammatory markers were likely to help with our differential diagnosis. A CBC can be justified to look for the atypical lymphocytes of infectious mononucleosis because of the enlargement of posterior cervical nodes. However our panel would not automatically jump into this and would base their decisions on the complete clinical picture and progress over the following week. Discussion highlighted the need for clarity around traditional testing methods for infectious mononucleosis and the place of Epstein Barr Virus immunology. This article in the American Family Physician is a good summary of the current state of play: *Am Fam Physician* 2004;70:1279-87

2. A 35 year-old male non-smoker with no previous history of significant cough or wheeze has had three days of productive cough following a URTI. Examination reveals scattered rhonchi. You suspect acute bronchitis.

	CBC	CRP	ESR	CRP + ESR
You				
Your Peers	33%	40%	0%	0%
GP Panel				

This young non-smoker almost certainly has a viral acute bronchitis, although recurrent episodes may lead you to consider asthma. Laboratory tests are unlikely to contribute to management for this consultation and the panel would not do any tests. A recent BMJ article evaluated the accuracy of CRP in discriminating between bacterial and viral infections of the lower respiratory tract and found insufficient evidence to support its use. Rapid responses to this article revealed that some clinicians are still likely to use it when there is stronger evidence of pneumonia. *BMJ* 2005;331;26

3. A 65 year-old woman has painful knees. They are particularly sore after she has been sitting for a prolonged period or on stairs. Her knees have bony swelling and a mild effusion. You suspect osteoarthritis.

	CBC	CRP	ESR	CRP + ESR
You				
Your peers	21%	26%	11%	3%
GP Panel				

The panel were unlikely to order any of these tests in this situation although some were very tempted to do CBC and/or ESR. The reasons were generally related to the age of the patient, the desire to assess any inflammatory or infective component and reassurance to the patient that they were taking the problem seriously.

4. A 56 year-old woman with COPD has increased dyspnoea, cough, and purulent sputum. This is probably an exacerbation of her COPD but you are concerned about the possibility of pneumonia.

	CBC	CRP	ESR	CRP + ESR
You				
Your peers	79%	79%	3%	1%
GP Panel				

The panel would not order any of these tests in this situation and they would treat promptly as a COPD exacerbation and assess response. They commented that a CBC might be useful to see if anaemia is contributing to the dyspnoea. Also see comments in question two about the use of CRP in the diagnosis of pneumonia.

5. A 67 year-old man has recent malaise. He also has a left sided headache and tenderness of his left scalp. His jaw aches when he chews his food. You suspect Giant Cell (Temporal) Arteritis.

	CBC	CRP	ESR	CRP + ESR
You				
Your peers	49%	90%	90%	81%
GP Panel	+	+	+	+

The panel all agreed that in the past they would have ordered CBC plus ESR in this situation but have now added CRP. 10% of people with GCA have a normal ESR and sensitivity of testing can be improved by adding CRP to the diagnostic tests. An initial CRP is also useful as this gives a baseline CRP which is the preferred option for monitoring response to therapy.

6. A 24 year-old woman presents with fatigue and heavy menstrual bleeding. She is clinically anaemic.

	CBC	CRP	ESR	CRP + ESR
You				
Your peers	99%	9%	1%	1%
GP Panel	+			

All of the panel would order a CBC but agreed that neither of the inflammatory markers would contribute to the management for this patient.

7. A 54 year-old heavy smoker is noted to have finger clubbing on an occupational health check. Direct questioning reveals a persistent cough. Examination shows signs of a pleural effusion. You suspect lung cancer.

	CBC	CRP	ESR	CRP + ESR
You				
Your peers	83%	45%	19%	7%
GP Panel				

This patient needs urgent X-ray and specialist advice. The panel did discuss the possibilities of doing a CBC and maybe a CRP. These may be useful at some stage.

8. A 78 year-old man is in good health apart from mild heart failure secondary to ischaemic heart disease. He is attending today for repeat of his thiazide diuretic, beta blocker and ACE inhibitor.

	CBC	CRP	ESR	CRP + ESR
You				
Your peers	16%	4%	0%	0%
GP Panel				

The panel, like the vast majority of respondents, would not order any of these tests routinely in this situation.

9. A 46 year-old woman has had fatigue, anorexia and vague muscular aches and pains for two months. Now she had developed swelling, pain and tenderness of the PIP and MCP joints of both hands. You think it is most likely to be due to rheumatoid arthritis.

	CBC	CRP	ESR	CRP + ESR
You				
Your peers	75%	76%	27%	21%
GP Panel	+	+		

All of the panel would order both CBC and CRP in this situation. They felt that although CRP may not contribute to the diagnosis a baseline was required to assess response to treatment.

10. A 34 year-old man has a first episode of acute inflammation of his 1st MTP joint. You suspect gout but want to be sure that it is not infective.

	CBC	CRP	ESR	CRP + ESR
You				
Your peers	79%	76%	4%	3%
GP Panel	+/-	+/-		

Most of the panel felt that infection was unlikely at this age unless there was a clear history of trauma with skin damage. Some however would look for signs of infection in CBC and/or CRP results. Many felt guilty that they would not aspirate the inflamed 1st MTP joint - a procedure commonly advised in textbooks but rarely done in practice.

The responses to these clinical situations indicate that although both the ESR and CRP can be useful in monitoring a patient's response to treatment they are of limited use diagnostically. In most of the clinical scenarios, more specific tests would be preferable to investigate the more serious diagnostic possibilities.

This is the case in scenario 10 when the patient appears to have gout. If the possibility of joint infection is a serious consideration because of the presence of other clinical indicators, not mentioned in the scenario, then aspiration of the joint is needed and an ESR or CRP will not help the decision. Similarly in scenario 7, although it is highly likely the man with a pleural effusion will have a CRP after referral, the diagnosis will depend on chest films and a diagnostic tap. The CRP is only likely to be of use if the underlying problem is an infection and the CRP can be used as a marker of response to treatment.

An elevated CRP may give an indication that an underlying inflammatory cause of a patient's symptoms needs to be pursued. If the 46 year old woman with generalised symptoms and tender hand joints (Scenario 9) has an elevated CRP then the likelihood of her having an inflammatory arthritis is increased and early diagnosis and treatment become more important.

The man with probable giant cell arteritis needs both an ESR and CRP. As the panel indicates, the ESR may be normal and our experience with CRP alone is limited. There is no information in the literature to indicate how often giant cell arteritis and polymyalgia rheumatica occur with a normal CRP. If both are elevated then the CRP is probably a better test to monitor response because it changes more rapidly. Although the clinical details are brief, the probability of giant cell arteritis looks sufficient to justify a temporal artery biopsy. I would start prednisone at a dose around 40 to 60mg after the CRP and ESR have been taken and refer for a biopsy to be done preferably in the next 48 hours.

As we swing more towards CRP rather than ESR there is one condition which may be missed. A normochromic normocytic anaemia with an elevated ESR has always been a trigger to think of multiple myeloma. If a patient presents with such an anaemia, especially if there are additional features such as musculoskeletal pain, impaired renal function, and a raised calcium, then a serum protein electrophoresis and, if really suspicious, quantitative immunoglobulins, should be requested.

Professor John Campbell
Physician