

4.08.A Fecal Calprotectin for Organic Intestinal Disease

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Fecal calprotectin is a stool biomarker used to distinguish inflammatory bowel disease (Crohn’s disease and ulcerative colitis) and other organic intestinal diseases from so-called functional gut disorder (irritable bowel syndrome). Other organic intestinal disease is everything else, including celiac disease (severe gluten intolerance), infectious colitis, and (rarely) colon cancer.

Walker et al reported on 789 consecutive adults aged 18-46 years who presented to primary care providers with diarrhea or abdominal pain and were considered for referral to a specialist. All of the patients had a fecal calprotectin level obtained. They reported the following results.

		Inflammatory Bowel Disease	Other Organic Intestinal Disease	Functional Gut Disorder	Total
Calprotectin µg/g	≥ 100	43	21	68	132
	< 100	7	29	621	657
	Total	50	50	689	789

Assume that the assignment to the 3 disease groups was accurate. According to the paper, the purpose of the calprotectin test is to identify patients with functional gut disorder and avoid referring them to a specialist. Patients with inflammatory bowel disease and other organic intestinal disease should be referred.

a) How should we define D+ and D- in this study?

***D+ should combine IBD and other organic disease. D- should consist of functional gut disorder.***

b) Fill in the 2x2 table below and calculate sensitivity, specificity, PPV, NPV, and prevalence.

		D+	D-	
Calprotectin µg/g	≥ 100			132
	< 100			657
				789

***Begin Answer:***

		D+	D-	
Calprotectin µg/g	≥ 100	64	68	132
				PPV 0.48

<b>&lt; 100</b>	36	621	<b>657</b>	NPV 0.95
	<b>100</b>	<b>689</b>	<b>789</b>	Prevalence 0.13
	Sens 0.64	Spec 0.90		

**End Answer**

The authors' calculations were as follows: Sensitivity 86%, Specificity 90%, Positive predictive value 38%, Negative predictive value 99%.

c) How do these numbers compare to what you calculated in (b)?

**Sensitivity is too high. Specificity is correct. PPV is too low. NPV is too high.**

d) If you did (b) correctly, your estimate of sensitivity was lower than 86%. Explain how this is due to spectrum bias.

**The 86% was calculated using an inappropriately homogeneous D+ group – just IBD. Since patients with other organic intestinal disease should be referred, they should also be included in the D+ group.**

e) You are a primary care provider like the ones in this study and your patient has a calprotectin < 100 ug/g. What is his probability of functional gut disease?

**621/657 = 95%. This is the NPV.**