

4.0 CANCER OR INFLAMMATION

4.1.1 Faecal Calprotectin (FCP)

Due to a lack of formal standardisation of faecal calprotectin assays it is difficult to offer didactic guidance to be given on cut off values where inflammation is unlikely; hence clinicians should be familiar with the assay used within their institution⁽¹⁾. It is critical therefore that appropriate quality assurance protocols are in place.

The differing assays to measure FCP has resulted in variation in purported cut off levels making recommendations for values difficult for example in predicting post operative recurrence of Crohn's disease or predicting relapse in Crohn's disease on anti-TNF therapy.⁽²⁻⁴⁾

4.1.2 Faecal occult blood test (FOBT)/ Faecal Immunochemical technique (FIT)

NICE recently caused controversy by recommending the use of FOBT in the diagnosis of colorectal cancer in symptomatic patients without specifying, which test, NICE Guidance 12⁽⁵⁾ (June 2015). The use of faecal haemoglobin in symptomatic patients was updated again in 2017 (DG30). In the context of guideline NG12 NICE recommend the use of FOBT in people under the age 50 years with a change in bowel habit (symptom based). The purpose of this NICE recommendation was to enhance the diagnosis of cancer but these recommendations limit its use to a smaller sub group of patients and unlikely to impact on the current burden of increased number of colonoscopies undertaken at present. Moreover, the use of FIT within a defined population (as outlined in NG12) seems to lower its efficacy for the diagnosis of significant bowel disease (colorectal cancer and IBD).⁽⁶⁾

5.0 COMMON DISODERS

5.3 Maldigestion of fructose-based carbohydrates and lactose, and polyhydric alcohols

Although the clinical utility of fructose / fructan hydrogen breath tests in this context is unproven, the expense and relative difficulty of adhering to a diet low in fermentable carbohydrates such as the 'low FODMAP diet makes desirable the ability to direct dietary

management to those patients that are most likely to benefit. Recent studies have shown that the occurrence of symptoms after ingestion of a dietary challenge including 20g lactose (in IBS patients with lactase deficiency) or 25g lactulose (all IBS patients) identified a group of patients with visceral hypersensitivity; the sensitivity falls with lower doses. ^(7,8) Concurrent assessment of oro-caecal transit and fermentation has the potential to identify the causes of IBS symptoms in many patients. Studies are awaited that assess whether this approach identifies patients that will respond to a reduction in dietary FODMAPs or other specific interventions.⁽⁹⁾








6.0 TESTS FOR MALABSORPTION

6.1.1 Faecal Elastase

A sensitive commercial ELISA utilising 2 monoclonal antibodies to human E1 is available. Faecal elastase has also been compared with structural/imaging tests. Hardt et al. ⁽¹⁰⁾ measured FE in 213 patients undergoing ERCP finding that sensitivity for any ductal change was only 45% but this increased to 75% for more severe ductal abnormality. These results have been broadly confirmed by Keim et al. ⁽¹¹⁾ who found sensitivities of 69% and 78% for 2 FE assays with specificities of 76 and 77% for ductal changes seen at ERCP. An MRCP study of 81 patients with chronic pancreatitis showed 31/56 patients had MRI abnormalities despite normal FE emphasising the point that exocrine function is preserved long after structural change is present.⁽¹²⁾

The wider availability of FE testing has led to its use in assessment of a number of conditions. Thus FE has been found to be reduced in coeliac disease, ⁽¹³⁾ IBS, ⁽¹⁴⁾ senescence ⁽¹⁵⁾ and in diabetes. ⁽¹⁶⁾ Whether this reflects a true deficiency in pancreatic function or confounding factors due to the dilutional effects of diarrhoea remain unclear. However, care is needed in interpreting low FE results as this does not necessarily indicate pancreatic dysfunction. Nevertheless, given the ease of use and at least comparable performance compared with other non-invasive pancreatic function tests, Faecal elastase remains the most effective initial screening test for pancreatic insufficiency.

Bristol Stool Chart

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on its surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces. Entirely Liquid

References:

1. Dhaliwal A, Zeino Z, Tomkins C, Cheung M, Nwokolo C, Smith S, et al. Utility of faecal calprotectin in inflammatory bowel disease (IBD): what cut-offs should we apply? *Frontline Gastroenterol.* 2015;6(1):14-9.
2. Amcoff K, Stridsberg M, Lampinen M, Magnuson A, Carlson M, Halfvarson J. Clinical implications of assay specific differences in f-calprotectin when monitoring inflammatory bowel disease activity over time. *Scand J Gastroenterol.* 2017;52(3):344-50.
3. Ferreiro-Iglesias R, Barreiro-de Acosta M, Lorenzo-Gonzalez A, Dominguez-Munoz JE. Usefulness of a rapid faecal calprotectin test to predict relapse in Crohn's disease patients on maintenance treatment with adalimumab. *Scand J Gastroenterol.* 2016;51(4):442-7.
4. Herranz Bachiller MT, Barrio Andres J, Fernandez Salazar L, Ruiz-Zorrilla R, Sancho Del Val L, Atienza Sanchez R. The utility of faecal calprotectin to predict post-operative recurrence in Crohns disease. *Scand J Gastroenterol.* 2016;51(6):720-6.
5. Benton S, Steele R, Logan R, Djedovic N, Smith S, Addison C. NICE referral guidelines for suspected cancer: colorectal cancer and faecal occult blood testing. *Ann Clin Biochem.* 2016;53(Pt 1):7-9.
6. Quyn AJ, Steele RJ, Digby J, Strachan JA, Mowat C, McDonald PJ, et al. Application of NICE guideline NG12 to the initial assessment of patients with lower gastrointestinal symptoms: not FIT for purpose? *Ann Clin Biochem.* 2017:4563217707981.
7. Zhu Y, Zheng X, Cong Y, Chu H, Fried M, Dai N, et al. Bloating and distention in irritable bowel syndrome: the role of gas production and visceral sensation after lactose ingestion in a population with lactase deficiency. *Am J Gastroenterol.* 2013;108(9):1516-25.
8. Le Neve B, Brazeilles R, Derrien M, Tap J, Guyonnet D, Ohman L, et al. Lactulose Challenge Determines Visceral Sensitivity and Severity of Symptoms in Patients With Irritable Bowel Syndrome. *Clin Gastroenterol Hepatol.* 2016;14(2):226-33 e3.
9. Deng Y, Zhu Y, Dai N, Fox M. Dietary challenge tests: identifying food intolerance as a cause of symptoms in irritable bowel syndrome patients. *Clin Gastroenterol Hepatol.* 2016.
10. Hardt PD, Marzeion AM, Schnell-Kretschmer H, Wusten O, Nalop J, Zekorn T, et al. Fecal elastase 1 measurement compared with endoscopic retrograde cholangiopancreatography for the diagnosis of chronic pancreatitis. *Pancreas.* 2002;25(1):e6-9.
11. Keim V, Teich N, Moessner J. Clinical value of a new fecal elastase test for detection of chronic pancreatitis. *Clin Lab.* 2003;49(5-6):209-15.
12. Bilgin M, Bilgin S, Balci NC, Momtahan AJ, Bilgin Y, Klor HU, et al. Magnetic resonance imaging and magnetic resonance cholangiopancreatography findings compared with fecal elastase 1 measurement for the diagnosis of chronic pancreatitis. *Pancreas.* 2008;36(1):e33-9.
13. Evans KE, Leeds JS, Morley S, Sanders DS. Pancreatic insufficiency in adult celiac disease: do patients require long-term enzyme supplementation? *Dig Dis Sci.* 2010;55(10):2999-3004.
14. Leeds JS, Hopper AD, Sidhu R, Simmonette A, Azadbakht N, Hoggard N, et al. Some patients with irritable bowel syndrome may have exocrine pancreatic insufficiency. *Clin Gastroenterol Hepatol.* 2010;8(5):433-8.

15. Herzig KH, Purhonen AK, Rasanen KM, Idziak J, Juvonen P, Phillips R, et al. Fecal pancreatic elastase-1 levels in older individuals without known gastrointestinal diseases or diabetes mellitus. *BMC Geriatr.* 2011;11:4.
16. Hardt PD, Hauenschild A, Nalop J, Marzeion AM, Jaeger C, Teichmann J, et al. High prevalence of exocrine pancreatic insufficiency in diabetes mellitus. A multicenter study screening fecal elastase 1 concentrations in 1,021 diabetic patients. *Pancreatology.* 2003;3(5):395-402.