Commentary on small bowel imaging in Crohn's disease

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The article by Dr Bungay¹ succinctly describes the attributes of the various radiological techniques now available to examine the small bowel, and highlights the potential barriers to implementation of newer cross-sectional methodologies. It is suggested that MRI and CT techniques will replace conventional fluoroscopy as the mainstay of small bowel imaging over the next decade, with the emphasis very much on MRI given the current radiation burden of CT.

As Dr Bungay points out, many questions, however, remain unanswered—is this transition justified based on robust trial evidence considering comparative diagnostic performance? Can we identify specific clinical symptom complexes that indicate one particular test over the other, and where are the tests best placed in the diagnostic pathways? Will the translation be cost effective for healthcare providers and how will capacity and training issues be handled?

While the answers to some of these questions are slowly emerging, the lack of definitive trial evidence is undoubtedly hampering appropriate dissemination of the new technologies in clinical practice. The current literature mainly consists of relatively small single-site cohort studies performed in centres with an academic interest in one or other of the newer technologies.

Across the NHS, there is ad hoc provision and utilisation of MRI, ultrasound and CT in Crohn's disease, with little consistency between hospitals and no coherent implementation strategy. A recent survey clearly shows that despite the anticipated benefits of cross-sectional techniques, barium fluoroscopy remains the mainstay of radiological small bowel imaging in the UK, used by 90% of hospitals.² This is perhaps not surprising given the wide availability of fluoroscopic equipment, the relative simplicity of barium techniques and the familiarity

to both radiologists and gastroenterologists alike. Furthermore, the examination remains very much a part of the core curriculum training of UK radiologists, and the exquisite mucosal detail possible in a well-performed examination currently surpasses that achievable with cross-sectional techniques. Conversely, just 38% of UK departments routinely offer MRI and only 46% perform small bowel ultrasound. The survey revealed that, understandably, referring gastroenterologists are less likely to request new imaging techniques such as MRI than radiologists are to offer them, although both radiologists and gastroenterologists seem aware of the radiation burden associated with barium fluoroscopy, and particularly CT-tests not using ionising radiation were more commonly performed in younger patients. The accumulative radiation exposure associated with repeated CT in Crohn's disease patients has been highlighted by Dr Bungay, and this is a major concern, especially given that a safer alternative exists in the form of MRI, which based on current (albeit limited) evidence is at least as accurate. It should, however, be noted that new dose reduction techniques such as iterative reconstruction are being developed and it is likely that in the future radiation exposure from CT will be considerably reduced.

There is little doubt that in experienced hands and in selected patients, small bowel ultrasound is a simple, safe and highly effective test, yet less than half of UK hospitals offer it. The known reliance on expertise and the associated steep learning curve together with technical difficulties in obese or 'gassy' abdomens have always limited uptake, as has the general reluctance of clinicians to request the examination.

One of the undoubted advantages of cross-sectional techniques is their ability to quantify disease activity. Several features, particularly wall thickness, bowel

wall signal and contrast enhancement patterns, have been shown to correlate with clinical, biochemical and histological reference standards for acute inflammatory activity. The potential for imaging to non-invasively monitor disease response to immunomodulatory therapy is immense and indeed it is quite possible that imaging biomarkers will become accepted end points in clinical trials of therapy, replacing cumbersome Crohn's Disease Activity Index measurement or invasive endoscopy. The ability to differentiate between active or fibrotic disease also seems entirely feasible. However, until now a validated 'imaging disease activity index' is lacking, although research in this area is underway. The concept of a 'bowel damage score', whereby the accumulative effects of inflammation on the bowel structure over time is quantified (Crohn's Disease Digestive Damage Score), is also under development by an international consortium,³ and cross-sectional imaging findings, notably bowel wall thickness and detection of stenosis, will form part of this assessment.

So how are radiologists and clinicians to rationalise small bowel imaging now and in the near future? Current clinical guidelines, for example, by the European Crohn's and Colitis Organization (ECCO), already recommend MRI and CT over conventional fluoroscopy, despite the relative dearth of large-scale comparative trial data.⁴ Indeed, joint ECCO and European Society of Gastrointestinal and Abdominal Radiology consensus guidelines on imaging in inflammatory bowel disease are in preparation. It seems likely that new imaging technologies will feature even more highly in their recommendations. While the gradual replacement of conventional barium fluoroscopy with new cross-sectional techniques is undoubtedly underway, there is a need to plan the inevitable dissemination of the newer technologies in service provision, by scrutinising their clinical and cost effectiveness and defining an appropriate level of implementation. Most radiology departments simply cannot totally replace barium fluoroscopy services with MR enterography without compelling evidence to support this—there are major cost, capacity and training issues to be overcome. In this regard, strong parallels can be drawn with the impending replacement of barium enema with CT colonography (CTC). Like barium fluoroscopy, for

many years the barium enema has been ingrained in clinical practice as the standard luminal radiological investigation. The emergence of largely single-centre studies extolling the virtues of CTC led to its piecemeal adoption across the UK and Europe. Recognising this trend, the National Institute of Health Research's Health Technology Programme funded the 'SIGGAR 1 trial'⁵—a multicentre UK study that randomised over 5000 patients. The results of the trial will be published this year, but abstracted data have clearly shown the superiority of CTC over barium enema providing firm justification for the wholesale implementation of CTC as the radiological colonic investigation of choice.

Such trial data are required to guide the best use of small bowel imaging tests. The issue is undoubtedly complicated in Crohn's disease by the lack of a simple uniform standard of reference against which new technologies can be compared, but nevertheless the onus is on funding bodies to support such trials and for the radiological and gastrointestinal communities to respond appropriately. With this trial evidence, the inevitable dissemination of cross-sectional technologies in Crohn's disease will be appropriately planned and managed.

Competing interest None.

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