The significance of bowel wall thickening on abdominal computed tomography at australian hospital.

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Abstract

The aim of this retrospective study was to determine the causes and significance of bowel wall thickening on abdominal computed tomography. Of 175 consecutive CT abdomens identified, diverticulitis (28%) and infection (24.6%) were the most common causes. Flare of known inflammatory bowl disease (7.4%) and new cancer (5.7%) were relatively uncommon causes. Overall, 50/175 (28.6%) patients underwent subsequent colonoscopy, and of these, 41/50 (82%) were either normal or showed uncomplicated

Keywords: Bowel wall thickening; Abdominal computed tomography; Radiology practice; Abdominal CTs; Colonic diseases; Diverticular disease

Accepted on October 26, 2016

Introduction

Computed tomography (CT) is a widely used and important imaging modality for investigating the cause of abdominal symptoms. In particular, abdominal CT is highly sensitive for detecting both intramural and extramural extension of colonic diseases [1,2]. While indications for ordering abdominal CTs are broad, radiological practice parameters for its use have been developed to assist clinicians in providing appropriate care [3]. Bowel wall thickening (BWT) is a common, non-specific finding on abdominal CT and is caused by a variety of underlying aetiologies including inflammatory, infective, ischaemic and neoplastic [4,5]. It frequently leads to further invasive investigations including colonoscopy; however, the relevance of BWT to the clinical presentation is often unclear. There have been only a few studies regarding the final causes of incidental BWT and its correlation with subsequent endoscopic findings. Recommendations from these studies are conflicting, with many authors suggesting high rates of underlying pathology requiring colonoscopy [6-10], while others found benign or no pathology in the majority of patients and only recommended colonoscopy in high-risk patients [11]. Our group aimed to assess the causes and significance of BWT on abdominal CTs at an Australian metropolitan hospital and to review its significance when the CT ordered was appropriate or inappropriate for the clinical indication.

Methods

We retrospectively reviewed all consecutive abdominal CTs between February and May 2015 with findings of colonic 'bowel wall thickening' on the formal report. These were identified from our hospital's radiology department reporting database. The CT request details, formal report and medical records were reviewed for each patient. The indication for ordering the CT and the appropriateness of this indication was assessed. Patients' past medical history, associated symptoms, faecal cultures, inflammatory markers, inpatient course and subsequent colonoscopy findings were also reviewed. The American College of Radiology Practice Parameter for the Performance of CT of the Abdomen and Pelvis 2014 3 was used to determine the appropriateness of CT ordering. The Peninsula Health Human Research Ethics and Governance Committee approved the study.

Results

Of the 175 abdominal CTs identified, the final causes of bowel wall thickening were diverticulitis (28%), infection (24.6%), reactive to extra-colonic inflammation (10.9%), flare of known inflammatory bowel disease (7.4%), bowel obstruction (5.7%), new cancer (5.7%) and ischaemic colitis (0.6%). Surprisingly, none of the patients had a new diagnosis of inflammatory bowel disease. Table 1 outlines the patient characteristics and the complete list of final causes. 10/175 (5.7%) CTs ordered were deemed inappropriate for the indication given. Of these, 3/10 (30%) underwent subsequent colonoscopy as a result, and none of these patients had any significant pathology identified. Overall, 50/175 (28.6%) patients underwent subsequent colonoscopy and of these, 41/50 (82%) were either normal (17/50) or showed uncomplicated diverticular disease only (24/50). Table 2 outlines the findings on colonoscopy. Mean age for patients with new cancer diagnosed was 73 years (standard deviation 10.7; range 56 - 86). The distribution of BWT in all of these patients was focal. 5/10 of the new cancer diagnoses were confirmed with endoscopic correlation. Of the remaining 5 cases, 3 cases progressed directly to surgery, and 2 were palliated without endoscopy.

Discussion

Our findings reveal that most causes of BWT could be attributed to either diverticulitis or infectious colitis and that a new diagnosis of malignancy as the underlying cause of BWT was a relatively uncommon occurrence. Modi et al showed similar findings in their retrospective study, with low rates of underlying malignancy and new IBD as the cause for lower gastrointestinal tract wall thickening (5.1% and 3.8% respectively) and high rates of infection and diverticulitis (16.5% and 12.7% respectively) 12. This represents a large number of patients with underlying benign aetiology as a cause of their BWT and suggests the need for guidelines

Table 1:*Patient characteristics and final causes of bowel wall thickening*

	Number (n = 175)	Percentage (%)
Mean age, years (range)	61.3 (20-96)	
Sex		
Male	72	41.2
Female	103	58.8
Final cause of BWT		
Diverticulitis	49	28
Infective	43	24.6
Reactive †	19	10.9
New malignancy	10	5.7
Bowel obstruction	10	5.7
Flare of known CD	9	5.1
Flare of known UC	4	2.3
New IBD	0	0
Known GI malignancy	2	1.1
Ischaemic colitis	1	0.6
Portal hypertensive	2	1.1
Constipation	5	2.9
Artefact	6	3.4
Chemotherapy-related ‡	2	1.1
Haemorrhoid-related	1	0.6
Post-operative	7	4
Non-specific/unknown	5	2.9

†Reactive to extra-colonic inflammation (cholecystitis, pancreatitis or appendicitis).
‡Chemotherapy for extra-colonic malignancies. BWT, bowel wall thickening; UC, ulcerative colitis; CD, Crohn's Disease; IBD, inflammatory bowel disease; GI, gastrointestinal.

Table 2: *Appropriateness of indication for ordering CT and colonoscopic findings*

	Number of patients	Percentage (%)
Indication for CT		
Appropriate	165	94.3
Inappropriate	10	5.7
Colonoscopies performed	50	28.6
Colonoscopic findings (n=50)		
Normal	17	34
Diverticular disease only	24	48
New GI malignancy †	5	10
Non-specific inflammation	3	6
Active IBD	1	2

† Note that 5 other cases of new malignancy were diagnosed without endoscopic correlation. GI, gastrointestinal; IBD, inflammatory bowel disease.

and clear management parameters to determine the need for endoscopic correlation. Despite the lack of clear data regarding the significance of non-specific BWT, the majority of authors recommend subsequent endoscopic correlation.

We support the use of practice parameters for ordering CTs, because adherence to these practice parameters more frequently identified significant pathology when compared to non-adherence. Benefits of reducing inappropriate investigations include reductions in cost, unnecessary workload, 'incidentalomas', procedure related complications and radiation exposure.

Our study has inherent limitations being a single-centre retrospective review. All possible and relevant clinical information is not always available on request forms and medical records. In addition, all relevant CT findings are not necessarily available in formal reports and there is often considerable inter-reporter variability amongst radiologists. There is also significant inter-endoscopist variability regarding colonoscopic pathology identification, terminal ileal intubation and decision to biopsy. Attributing a final aetiology as the cause for BWT is also complex, and although every effort was made to correlate all relevant information, an intrinsic subjective bias is difficult to avoid. There is also likely to be a sub-group of patients who underwent colonoscopy at alternative institutions with no further follow-up at our hospital. Our study however, identifies the need for guidelines or practice parameters to aid in decision-making about performing subsequent colonoscopy in the setting of non-specific BWT.

In conclusion, BWT is a highly non-specific finding on CT abdomen that requires careful correlation with the clinical scenario for accurate interpretation. Further research is needed to identify patients with high-risk CT characteristics that require prompt investigation with colonoscopy.

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