

Assessing clinical appropriateness: A retrospective audit of CTEs performed in St. John's, Newfoundland and Labrador, during 2022

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ABSTRACT

Objectives: Computed tomography enterography (CTE) is an abdominopelvic computed tomography (CT) specifically designed to evaluate the small bowel. Guidelines exist regarding what clinical situations warrant CTE. This study intends to assess how CTE is currently used locally in St. John's, Newfoundland and Labrador (NL) and compare the results to the literature to determine whether CTEs are being requested according to best practices.

Methods: This study consisted of a retrospective audit of all CTEs (n = 422) performed in St. John's, NL in 2022. CTEs were performed at three major hospitals (Health Science Centre, St. Clare's Mercy, Janeway Children's Hospital and Rehabilitation Centre). Extracted information included the patient's clinical history, age and sex, and results of the imaging study. Results were compared to the Canadian Association of Radiologists gastrointestinal imaging referral guideline as well as the American College of Radiology appropriateness guidelines to determine whether the use of CTE was appropriate.

Results: CTEs had been ordered to investigate iron deficiency anemia, patients with a known Crohn's diagnosis, and patients with suspected small bowel Crohn's. Based on the guidelines, its use in such situations was appropriate. 41 CTEs were ordered to investigate vague abdominal symptoms; upon comparing to guidelines, it was determined that its use in such situations is inappropriate. Infrequently, CTEs were ordered to investigate suspected gastrointestinal bleeding; guidelines recommend use of CTE in suspect chronic gastrointestinal bleeding, but not acute. Unfortunately, the acuity of the bleed was rarely noted on the requisition.

Conclusions: CTE is, undoubtedly, a valuable imaging modality to visualize the small bowel. Most of the clinical indications prompting CTE requests within the St. John's region aligned with published indications for CTE referral. However, the majority of studies did not identify a small bowel cause for the patient's symptoms.

Keywords: CT Enterography, Crohn's Disease, Anemia, Iron Deficiency, Malignancy

INTRODUCTION

Computed tomography enterography (CTE) is an abdominopelvic computed tomography (CT) specifically designed to evaluate the small bowel. CTE requires distention of the small bowel, typically via oral contrast.¹ Canadian guidelines exist regarding what clinical situations require assessment by CTE.¹⁻² The American College of Radiology (ACR) has also put forth a set of guidelines to help providers determine which clinical scenarios require imaging via CTE.³ Notably, CTE has proven useful in the assessment of patients with Crohn's, chronic diarrhea, abdominal pain, suspected small-bowel bleeding, among other patient presentations.^{1,2-6}

In recent years, CTE has become a prominent imaging modality for small bowel disease.⁴ CTE can identify both intramural and extra-intestinal manifestations of small bowel disease.⁵ The most sensitive indicator on CTE of active Crohn's disease is mural hyperenhancement.⁶ It also allows for the differentiation between active and fibrotic disease. Such differentiation guides treatment strategy.^{4,6} CTE's accuracy in detection of Crohn's disease is comparable to biopsy.⁷

CTE is also a reliable tool to evaluate and monitor treatment effectiveness.⁸⁻⁹ In patients with Crohn's disease, research has demonstrated that CTE results correlate highly with clinical remission and is therefore useful in evaluating treatment response.⁸ As such, CTE can be used to evaluate Crohn's disease status and aid in stratification of disease thereby helping with prognosis and assessment of therapeutic response.⁸

CTE takes approximately two hours in comparison to 24 hours for capsule endoscopy and can visualize the entire small bowel wall, mesentery and perienteric fat.¹⁰ In patients with suspected chronic gastrointestinal bleeding, CTE is recommended as the initial imaging modality.² If CTE is negative and further imaging is required, capsule endoscopy can be used as a second imaging modality.² CTE also has a role in assessing small bowel bleeding as it is able to better detect protruding lesions, such as tumors of the small bowel, which may be a source of obscure gastrointestinal bleeding (OGIB).¹⁰

INDICATIONS FOR CTE

Indications for CTE include the diagnosis of suspected inflammatory bowel disease (IBD), surveillance of known IBD and its complications, suspected chronic mesenteric ischemia, detection/characterization of small bowel masses (SBM) and obscure small bowel bleeding.¹¹ CTE is also useful in the investigation of celiac disease as well as to assess polyposis.^{6,12} CTE may be beneficial in the evaluation of suspected low grade or intermittent small bowel obstructions (SBO) but is not typically used in the setting of acute SBO as patients are often unable to tolerate the large amount of oral contrast administered into the obstructed bowel.¹³

In 2022, 422 CTE studies were performed in the St. John's region (Health Science Centre, St. Clares Mercy Hospital, Janeway Children's Health and Rehabilitation Centre) of Newfoundland and Labrador (NL). At present, no studies have been conducted to assess whether CTE is used appropriately in the St. John's region of NL. Therefore, via a retrospective audit, we intend to assess whether its use is consistent with recommendations and published guidelines.

Our usage of the term "appropriateness" refers to whether the clinical indication warranted ordering of the CTE. As such, we will be referring to the Canadian as well as the ACR appropriateness guidelines. These guidelines exist to help guide clinicians in choosing the most appropriate imaging study for their patient's presentation.²⁻³

METHODS

This study took the form of a retrospective chart review. All CTEs (n = 422) performed in the St. John's Region (Health Science Centre, St. Clare's, Janeway) of NL from January 2022 to December 2022 were collected and reviewed. Using the picture archiving and communication system (PACS), the date range had been set from January 2022 to December 2022 inclusive. The imaging modality of interest was set to CTE, and the location was set to the Eastern Health region. From there, all CTEs performed within the St. John's region (Health Science Centre, St. Clare's, Janeway) were able to be identified and reviewed. From each CTE, patient demographics (age and sex only), the patient's clinical history (i.e., indication for referral), and results of the imaging study were recorded. The indication for referral was obtained from the clinical diagnosis section of the CTE requisition. This information was compiled and results were compared to the literature, including the Canadian Association of Radiologists gastrointestinal imaging referral guidelines as well as the ACR appropriateness guidelines, to determine whether CTE use in St. John's, NL is following best practices.

RESULTS

422 CTEs were reviewed, with the aforementioned details compiled. The average patient age was 56.6 years. Of the patients, 234 were female and 188 were male. Of note, the youngest patient age was 19. As such, there will be no discussion of CTE use among the paediatric population. The following results were categorized based on clinical indication for referral.

Table 1 provides a summary of results and Table 2 provides a summary of results by clinical indication.

Table 1. Summary of results.

Total number of Studies	Age Range (years)	Avg. Age (years)	Gender	Results	% Normal Study
422	19-95	56.6	Female = 234 Male = 188	Normal Study = 289 Abnormality identified = 133	68.5%

Table 2. Summary of results by clinical indication.

Indication	Number of Requests	Age Range	Avg. Age	Gender	Results	% Normal study
Iron deficiency anemia	114	29-86	63.8	Female = 68 Male = 46	Normal study = 92 Abnormality identified = 22	80.7%
Known Crohn's	91	21-82	51.4	Female = 47 Male = 44	Normal study = 32 Abnormality identified = 59	35.2%
Suspected small bowel disease	80	19-88	46.8	Female = 44 Male = 36	Normal study = 58 Abnormality identified = 22	72.5%
Abdominal Symptoms	41	20-82	53	Female = 25 Male = 16	Normal study = 36 Abnormality identified = 5	87.8%
Gastrointestinal Bleeding	28	26-95	68	Female = 14 Male = 14	Normal study = 27 Abnormality identified = 1	96.4%
Malignancy	17	37-84	66.5	Female = 8 Male = 9	Normal study = 10 Abnormality identified = 7	58.8%
Small Bowel Obstruction	14	33-84	56	Female = 7 Male = 7	Normal study = 9 Abnormality identified = 5	64.2%
Other	37	21-90	60	Female = 21 Male = 16	Normal study = 26 Abnormality identified = 11	70.2%

Iron Deficiency Anemia

114 CTEs were requested to assess a cause for iron deficiency anemia (IDA). This accounted for 27.0% of all CTE requests in 2022 within the St. John's region. Of these requests, 68 patients were female and 46 were male. The average patient age was 63.8 years.

The majority of the CTEs were requested by gastroenterologists (44), general surgeons (33) and general internists (18); 4 were requested by family physicians. The remaining CTEs (19) were requested by subspecialties including respiratory, haematology, cardiology, endocrinology, urology, and neurology. 1 was requested by a nurse practitioner.

Of the CTEs, 92 (80.7%) did not identify a small bowel lesion to account for the patient's symptoms. 13 (11.4%) studies found evidence of angiodysplasia within the small bowel (Figure 1). 2 studies found evidence of Crohn's disease. Other findings included ileal mass (1), malabsorptive disease (3), malignancy (2), and small bowel obstruction (SBO) (1).

Known Crohn's

91 (21.5%) CTEs were ordered to investigate the small bowel in patients with known Crohn's disease. Specifically, studies were ordered to assess disease extent. 17 requisitions had explicitly stated that the patient was being treated for their Crohn's. However, not all requisitions stated the specific medication. Among this group, 47 patients were female and 44 were male. Average patient age was 51.4 years.

Those requesting CTE included 66 gastroenterologists, 11 were general surgeons, and 11 were general internists. The remaining 3 CTEs were requested by a respirologist, haematologist, and a nephrologist.

Of the 91 CTEs ordered, 59 (64.8%) CTEs demonstrated findings of active Crohn's disease (Figure 2). 32 studies reported normal small bowel appearance. Other findings included malignancy (1), fistula (2), and query findings of chronic Crohn's disease manifestation versus normal variant (1).

Suspected Small Bowel Disease

80 (18.9%) studies were ordered to investigate patients for possible small bowel Crohn's (undiagnosed patients). Among this category, 44 patients were female and 36 were male. The average age was 46.8 years.

12 studies were limited by under-distention. Referring providers included gastroenterologists (23), general surgeons (22), general internists (18), and family physicians (17).

58 (72.5%) studies demonstrated no evidence of active IBD. 19 (24.1%) had reported findings of Crohn's disease (Figure 3). 2 studies had reported evidence of angiodysplasia, and 1 made note of a stricture visualized in the small bowel.

Abdominal Symptoms

This category consists of patients referred for imaging based on various gastrointestinal symptoms including nausea, bloating, pain, vomiting, diarrhea, constipation and weight loss. This category accounted for 41 (9.7%) of CTE requisitions in 2022. The average patient age was 53 years and consisted of 25 females and 16 males.

15 studies were ordered by family physicians, 12 by gastroenterologists, 9 by general surgeons, 4 by general internists, and 1 by a nurse practitioner.

36 studies (87.8%) did not demonstrate any small bowel pathology. 2 found evidence of active small bowel disease, 2 had noted evidence of angiodysplasia, and 1 study made note of changes consistent with malabsorptive disease (celiac disease).

Gastrointestinal Bleeding

Unsurprisingly, CTEs were periodically requested for investigation of a possible small bowel source for a patient's gastrointestinal (GI) bleeding. Requests were submitted to investigate patients presenting with query lower GI bleeding as well as patients with query upper GI bleeding.

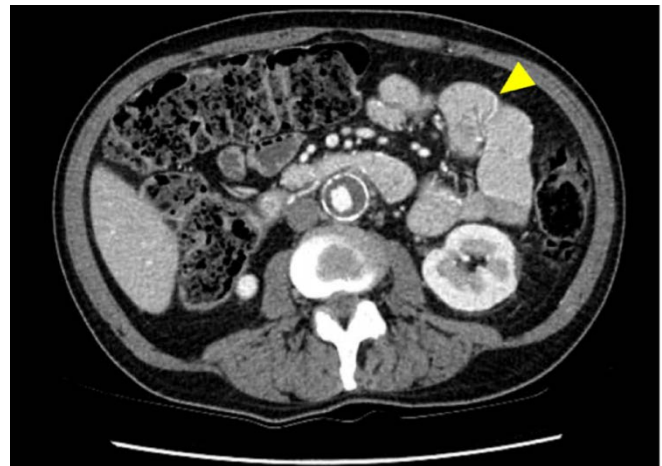


Figure 1. 67 year old male undergoing CTE to investigate for possible small bowel source of patient's iron deficiency anemia. Transverse image above demonstrates a foci of angiodysplasia within the proximal jejunum (arrowhead).



Figure 2. 40 year old female with known Crohn's disease. Coronal image demonstrates mild hyperenhancement with moderate mural stratification and luminal narrowing at level of the terminal/distal ileum (arrowheads). These findings are in keeping with acute on chronic Crohn's disease.

This accounted for 28 (6.4%) of the 422 studies ordered in 2022. Of these, 14 were female and 14 were male. Average patient age was 68 years. Among specialties requesting CTEs for this reason, 11 were general surgeons, 9 were general internists, and 3 were gastroenterologists. Of the 28 studies, 4 explicitly stated that the bleeding was chronic in nature, and

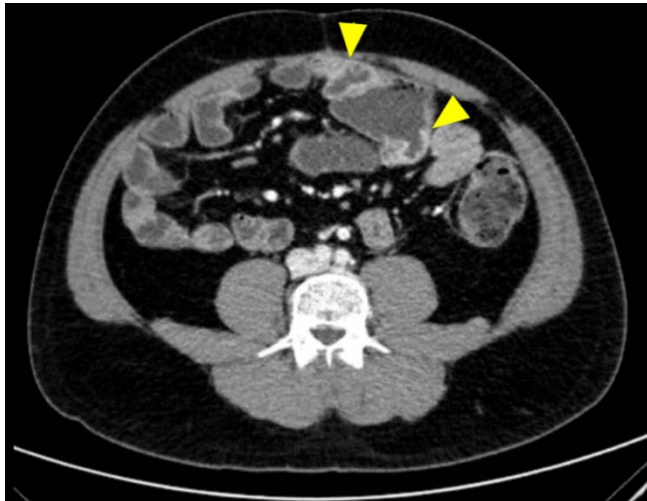


Figure 3. 34 year old male undergoing CTE for investigation of possible small bowel Crohn's disease. Two segments of mural hyperenhancement demonstrated in the ileum above demonstrates active Crohn's disease with skip lesions (arrowheads).

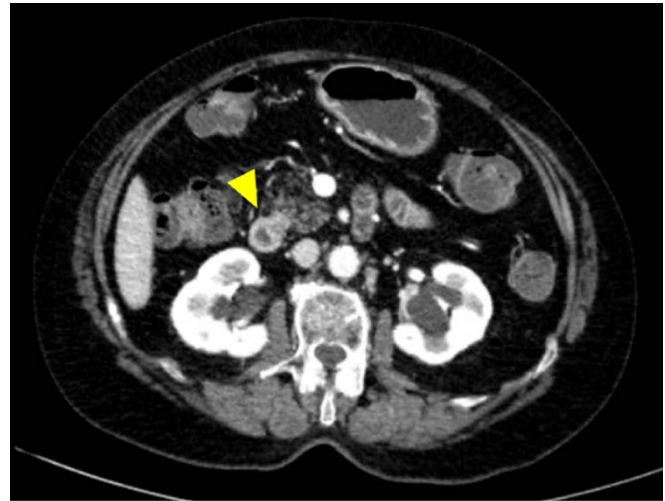


Figure 4. 76 year old female referred for CTE after CT demonstrated duodenal stricture and questioned possible malignancy. Transverse image demonstrates an abnormality of the medial wall of the duodenum with heterogenous enhancement (arrowhead) – a finding concerning for malignancy.

1 stated the bleeding had been acute. 27 studies (96.4%) studies did not localize a small bowel source for the patient's symptoms. 1 study identified angiodysplasia which could be a possible explanation for the patient's presentation.

Malignancy

CTEs were infrequently requested as part of an investigation for possible malignancy in 17 patients (4%); 8 patients were female and 9 were male. Average age was 66.5 years. Studies were ordered by family physicians (4), general internists (4), general surgeons (4), gastroenterologists (2), nurse practitioners (2), and 1 haematologist. Of these studies, 10 (58.8%) concluded that the small bowel had a normal appearance, 1 had stated that there was evidence of active IBD, 2 identified polyps, and 1 noted evidence of angiodysplasia. 1 study noted that the duodenum had an abnormal appearance that was concerning for malignancy and required further investigation (Figure 4). 2 studies identified enhancing lesions within the small bowel requiring further imaging for characterization.

Small Bowel Obstruction

In 2022, 14 (3.3%) CTEs were ordered to investigate the cause of small bowel obstruction. This category included 7 females and 7 males, with an average patient age of 56 years. Studies were ordered by general surgeons (9), gastroenterologists (4), and a family physician. 9 (64.2%) studies demonstrated normal small bowel. 3 found active inflammatory small bowel disease. Only 1 of these 3 studies identified evidence of stricturing with upstream dilatation, noting this as a possible cause for the patient's symptoms. 1 study identified a right lower quadrant mass, and 1 identified a small bowel obstruction that was quoted as presumably due to stricture or adhesions.

Other

37 CTEs (8.8%) ordered in 2022 had been requested for reasons that did not fit the above categories. Examples of clinical histories within this category include "RLQ mass", "abscess", "stomach lesion", "peutz-jeghers syndrome", "endometriosis and fecal incontinence", "protein losing enteropathy", "Crohn's vs malignancy", "IBD and IDA" and "query malabsorptive disease". 21 patients were female, 16 were male; the average patient age was 60 years. Studies were ordered by a variety of specialists including 12 general surgeons, 8 gastroenterologists, and 3 family physicians.

26 (70.2%) patients had a normal small bowel appearance and 5 demonstrated active IBD. Ischemia, soft tissue prominence, intraperitoneal mass, and "unchanged mass" were each noted on one occasion, respectively, with angiodysplasia identified twice.

DISCUSSION

CTE is, undoubtedly, a valuable imaging modality to visualize the small bowel.^{2,5,11} The most common clinical histories for CTE referral among our patient population included investigation of the small bowel in the setting of IDA, assessment of patients with known Crohn's disease, suspected Crohn's disease, and bleeding. These histories align well with published indications for CTE referral.^{2-6,11,14-16} Uncommon indications for referral included investigation of malignancy, query SBO and vague abdominal symptoms.

Iron Deficiency Anemia

While IDA was a common reason for CTE requisition, few studies have documented CTE's clinical use in the investigation of the same.¹⁵ That said, in situations where imaging is required to investigate IDA, Canadian guidelines

recommend CTE as the initial imaging study. Of the 114 studies ordered to investigate IDA, 92 (80.7%) resulted in normal small bowel. Documented small bowel causes of IDA include IBD, malignancy, vascular malformations (angiodysplasia), and malabsorptive conditions such as celiac disease.¹⁷ The most common cause of IDA in adult men and postmenopausal women is chronic blood losses from the GI tract.¹⁷⁻¹⁸ The most common cause of IDA in premenopausal women is menstrual losses.¹⁷⁻¹⁸ Given that the average patient age within this category was 64 years, it is reasonable that patients were referred for CTE with the intent of investigating for possible small bowel causes of the patient's IDA. Therefore, the use of CTE within this category is considered appropriate.

Twenty-two studies ordered for investigation of IDA identified abnormalities within the small bowel. In this category, 13 identified the presence of angiodysplasia, 3 identified malabsorptive disease and 2 identified changes consistent with malabsorptive disease – all of which are documented causes of IDA.¹⁷ Evidently, in this patient population, IDA is infrequently caused by a small bowel source. It is also documented that, in the elderly population, IDA is often multifactorial which should be considered among this patient demographic.¹⁷ Other causes include malabsorptive disease, non-steroidal anti-inflammatory use, dietary intake, and iron chelation (tea, coffee, calcium, etc.).¹⁷ Future research should focus on exploring causes of IDA among elderly patients in NL to guide the use of appropriate investigations.

Known Crohn's

CTE is a commonly used imaging technique for surveillance of known IBD.¹¹ Of the 91 studies ordered, 59 identified evidence of active disease. While CTE has proven useful for surveillance of disease in patients with known small bowel Crohn's it is recommended that, where possible, such patients be followed with magnetic resonance enterography (MRE).¹³ In St. John's, NL access to MRE is poor, which may explain the large number of CTEs requested to evaluate patients who had been previously diagnosed with Crohn's. In such a case, the use of CTE is considered appropriate.²⁻³ Therefore, it can be concluded that CTE is being used appropriately in this patient population. Furthermore, the ability to identify active disease in such patients will help guide disease management.⁸

Of the 91 studies reported, 9 reported underdistention. Underdistention can complicate assessment of the small bowel as it is difficult to differentiate between thickened loops of bowel from normal, poorly distended bowel.¹⁹ It is important to keep this in mind when interpreting the results outlined herein.

Suspected Small Bowel Disease

In 2022, 79 patients in the St. John's region were referred for investigation of suspected IBD. Based on both Canadian and American guidelines for assessment of suspect small bowel Crohn's, the use of CTE as a first line imaging study is considered appropriate.²⁻³ That said, among our patient

population undergoing investigation for suspected small bowel IBD, only 19 CTEs reported evidence of the same. Furthermore, 12 had reported underdistention. While this impacts our results, it remains that over 50% of patients referred for suspected IBD, did not show evidence of the same on CTE. Such findings guide management plans, as CTE has high sensitivity and specificity for detecting Crohn's disease; negative results provide clinicians with reassurance that they can exclude IBD as a cause for the patient's symptoms.²⁰

Abdominal Symptoms

Among patients referred for vague abdominal symptoms, the majority of CTEs did not localize a cause originating from the small bowel (87.8%). We are unable to comment on what investigations this patient population had prior to their CTE, as such information was not included on the requisition. Given that CTEs expose patients to radiation, our results raise the question as to whether CTEs should be ordered for vague abdominal symptoms. Canadian imaging guidelines exist for specific abdominal symptoms including diarrhea, dyspepsia, and pain with recommendations differing slightly for each category. That said, across all categories, CTE was not a recommended imaging modality to investigate such presentations. Therefore, it can be concluded that the use of CTE to investigate vague abdominal symptoms does not align with current guidelines and is considered inappropriate.

Gastrointestinal Bleeding

Of the 28 referrals requested to investigate possible small bowel bleeding, 27 demonstrated normal small bowel. While seven referrals explicitly stated that both an Oesophagogastroduodenoscopy (OGD) and colonoscopy were negative, it is unclear whether the remaining 20 patients had other imaging investigations prior to their CTE. Canadian guidelines indicate that endoscopy should be the initial investigation in this clinical scenario.² In the setting of an acute GI bleed (both upper and lower), where imaging is needed, the study of choice is a CT angiography.² CTE is not recommended.²⁻³ When investigating suspected chronic small bowel bleeding, CTE is recommended as first line.² Capsule endoscopy may be used if further imaging is required after CTE is completed.² In the case of the four GI bleeds identified as chronic, it can be concluded that CTE was appropriately ordered. However, given that only 5 of the 28 requisitions had outlined the acuity of the bleed, we are unable to comment on whether CTE was appropriately ordered for the 23 remaining studies. As such, we simply highlight the importance of ensuring that patients undergoing investigation for possible GI bleeding – both acute and chronic – follow the appropriate protocol to avoid unnecessary radiation.

Malignancy

Infrequently, CTEs were requested to investigate for possible malignancy. Of the 17 studies ordered, only 1 study noted an abnormal appearance of the duodenum that was concerning for malignancy, and 2 other studies identified enhancing lesions requiring further visualization.

The ACR appropriateness guidelines as well as the Canadian Association of Radiologists GI referral guidelines do not comment on the use of CTE in investigating suspected GI malignancy. That said, literature exists which has proven that CTE is reliable in the diagnosis and staging of small bowel malignancy.^{6,21} Therefore, clinicians can be reassured when small bowel malignancies are not identified on CTE.

Small Bowel Obstruction

In 2022, 14 (3.3%) patients underwent CTE to assess for a cause of their SBO. Based on the ACR guidelines, the first line investigation for suspected acute SBO is a standard CT abdo-pelvis with IV contrast.¹³ CTE is typically not recommended in the acute setting due to lack of toleration of the large volume of oral contrast required to perform the study.¹³ In the case of suspected intermittent or low-grade SBO, CT abdo-pelvis with IV contrast or CTE are considered appropriate studies; however, CT abdo-pelvis is generally recommended over CTE as the clinical utility of CTE to diagnose intermittent or low grade SBO is not well established.¹³

Of the 14 studies ordered to investigate SBO, 3 noted that the patient had recurrent SBOs, making CTE an appropriate investigation.¹³ However, CT abdo-pelvis may be more appropriate due to reduced cumulative radiation dose if the patient requires repeated scans or multiphase CTE acquisition studies. 1 study noted that the patient had a prior CT but no transition point was identified. Therefore, CTE was requested. In such a case, CTE is an appropriate complimentary tool.¹³ The 10 remaining studies did not specify whether the SBO was considered acute or low grade. To comment on whether the use of CTE for these remaining patients was appropriate, information is needed regarding the acuity of the SBO. That said, overall, it appears that CT abdo-pelvis should be the initial investigation of choice.¹³

Other

The CTEs included in this section consisted of a variety of clinical histories which were infrequently requested and were unable to be included in other outlined categories. Given that the majority of clinical indications within this category are inconsistent with the published indications for CTE, it can be assumed that CTE may not have been appropriate in some cases.

The clinical histories of “IBD and IDA” and “Crohn’s vs malignancy” align with indications for CTE and was used appropriately in these specific cases.

Limitations

As with all research, limitations were identified throughout this study. First, 49 (11.6%) studies were complicated by underdistention of the small bowel. As discussed previously, underdistention compounds the radiologist’s ability to discriminate between normal, collapsed bowel, from thickened loops of bowel.¹⁹ Appropriate distention may have resulted in different outcomes for such studies, which would impact the outcomes documented herein.

Secondly, few referrals indicated what investigations patients had had prior to CTE and what the outcomes of these studies were. Such information would be beneficial to guide our suggestions with regards to appropriate investigations and work up prior to CTE.

With regards to suspected GI bleeding, only five requisitions made note of the acuity of the bleed. As outlined, the recommended imaging modality changes based on acuity.² Without this information, we are unable to comment on whether the use of CTE in this category was appropriate.

Finally, many referrals were quite vague with regards to the reason(s) for CTE request. In the future, it would be beneficial if clinicians provided specific information, as well as the results of previous investigations, to help aid radiologists in the interpretation of the CTEs. Providing detailed information assists radiologists, prompting them to look for specific small bowel changes that may align with the patient’s symptoms.

CONCLUSION

Several conclusions can be drawn from this study. First, the use of CTE to investigate IDA was considered appropriate. Among this cohort of patients, those with IDA typically had a normal CTE. This provides guidance for management plans, but also suggests that IDA is infrequently due to a small bowel cause among this patient population.

Secondly, the use of CTE to investigate known small bowel Crohn’s also aligned with guidelines.²⁻³ However, as discussed, MRE is typically the imaging modality of choice, but access is limited across our centres. In such a case, the use of CTE is considered appropriate, and is assumed to be the explanation for its use in this population. Evidently, CTE is able to detect active inflammation among patients with known Crohn’s disease, aiding in medical management of this population. Furthermore, in patients with suspected IBD, CTE is the imaging study of choice and was appropriately ordered to investigate this.

With regards to GI bleeding, guidelines recommend visualization with endoscopy prior to obtaining a CTE.² Unfortunately, we are largely unable to comment on whether CTE had been used appropriately to investigate GI bleeding as any prior investigations were rarely noted, and the acuity of the bleed was infrequently stated. As such, we take this opportunity to remind clinicians to ensure their patients obtain the appropriate investigations and consider the acuity of the GI bleed prior to advancing to CTE.

As outlined, the use of CTE to investigate vague abdominal symptoms does not align with current guidelines, and other imaging modalities are recommended in place of this.²⁻³ Finally, with regards to SBO, CTE did not often identify a small bowel source. ACR guidelines indicate that CT abdo-pelvis with IV contrast is first line in acute SBO and should be considered prior to CTE in the setting of intermittent/low grade SBO.¹³ Ultimately, CTE is a valuable tool to help investigate a wide variety of patient presentations. However, it is important that the use of this imaging modality follows best practices.

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