

QUALITY IMPROVEMENT PROJECT ASSESSING THE DIAGNOSTIC VALUE OF A CONTRAST ENHANCED SEQUENCE FOR MRI ENTEROGRAPHY

Dr Rohan Vashisht Dr Saroj Golay Dr Catalin Ivan Dr Shamas Zaman

Buckinghamshire Healthcare NHS Trust



BACKGROUND

- Magnetic Resonance Enterography (MRE) is increasingly being used to investigate Crohn's disease.
- Traditional MRE involves the use of various T2 sequences and contrast-enhanced sequences.
- More recently Diffusion weighted imaging (DWI) and cinematic (cine) sequences have also been added to these studies.
- Some studies showed T2 and DWI sequences alone had comparable diagnostic accuracy to using contrast sequences.^[1]

1. Neubauer H, Pabst T, Dick A, Machann W, Evangelista L, Wirth C, et al. Small-bowel MRI in children and young adults with crohn disease: Retrospective head-to-head comparison of contrast-enhanced and diffusion-weighted MRI. *Pediatric Radiology*. 2012;43(1):103–14. doi:10.1007/s00247-012-2492-1

Potential benefit

- Dropping contrast sequence has several advantages:
 1. Reduce cost per examination
 2. Time saving, hence increase throughput
 3. No risk of contrast reactions or contrast nephropathy
- About 18% of patients with Crohn's have impaired renal function, which prevent contrast studies from being used.^[2]

2. Seo N, Park SH, Kim K-J, Kang B-K, Lee Y, Yang S-K, et al. Mr enterography for the evaluation of small-bowel inflammation in crohn disease by using diffusion-weighted imaging without intravenous contrast material: A prospective noninferiority study. Radiology. 2016;278(3):762-72. doi:10.1148/radiol.2015150809

AIM

- To assess the value of contrast-enhanced sequences in evaluating MR enterography locally.

METHODOLOGY

- All Cases from October 2022 to December 2022 with Crohn's disease who had a MRE were included in our study.
- Details regarding the date of the examination, indication, sequences performed and administration of buscopan was initially collected.
- The case details were sent to two experienced consultant radiologists to observe the studies with a fresh set of eyes independently.
- The radiologists reported with the sequences – T2, DWI & ADC, Cine, followed by T1 pre and post contrast sequences

Methodology

- Their reports were independently tabulated. We observed the value of the contrast sequences:
 - 1) Has the intravevous contrast added any new information?
 - 2) Has contrast been helpful?
- Images were reviewed using PACS. Soliton was used to obtain other information.

RESULTS ANALYSIS

Sex-

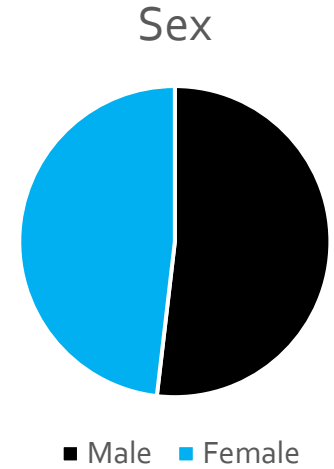
Male: 14 (51.8%)

Female: 13 (48.1%)

Indication-

Crohn's disease: 27 (100%)

Buscopan: 25 (92.6%)



RESULTS ANALYSIS

- Was contrast helpful?

1. Consultant 1

Additional info: 2 (7.4%)

Helpful: 27 (100%)

2. Consultant 2

Additional info: 4 (14.8%)

Helpful: 27 (100%)

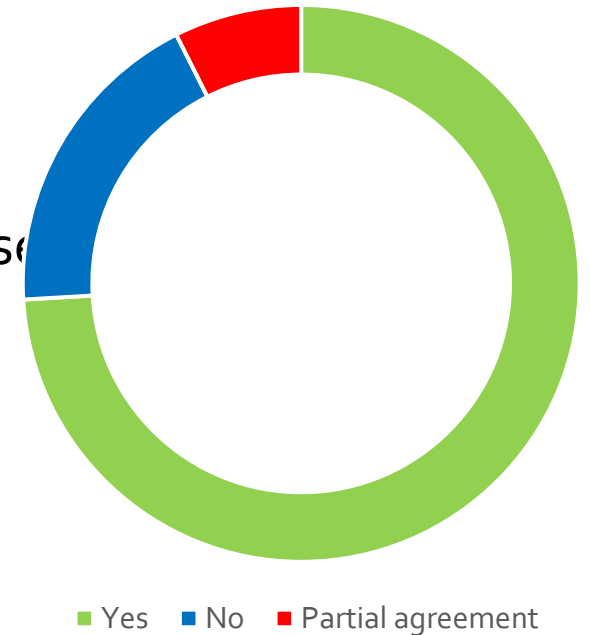
RESULTS ANALYSIS

- Agreement in diagnosis

Yes: 20 (74.1%)

Partial agreement: 2 (7.4%) (Terminal ileum +/- rectosigmoid disease)

No: 5 (18.5%) ~ (mild and subtle inflammatory changes of bowel)



CONCLUSION

- Additional info with contrast was gained for 7-15%.
- However Post contrast sequence were noted to be helpful in 100% of cases by both radiologists. With further discussions with the two radiologists, this was due to a number of factors predominantly:
 1. the contrast enhanced sequences increased confidence in reporting normal scans, and sometimes were helpful in identifying subtle disease.
 2. these sequences were also helpful in better delineating complications like abscesses and fistulae.

DISCUSSION

- There is a strong agreement among both consultants that contrast studies were helpful in increasing confidence to provide their final reports.
- Interestingly, both consultants found additional info with contrast in different cases.
- Similar to our QIP, one study proved non-inferiority of T2 and DWI sequences over post contrast exam in MRE. However, they did not recommend eliminating the contrast sequence but instead state that MRE can give an effective diagnosis without contrast in those who cannot tolerate it.^[1]

2. Seo N, Park SH, Kim K-J, Kang B-K, Lee Y, Yang S-K, et al. Mr enterography for the evaluation of small-bowel inflammation in crohn disease by using diffusion-weighted imaging without intravenous contrast material: A prospective noninferiority study. Radiology. 2016;278(3):762–72. doi:10.1148/radiol.2015150809

DISCUSSION

- Consultant 1 insights:
 - Contrast sequences help detect subtle findings.
 - It helps to confidently confirm normal scans when there are ambiguous findings.
- Consultant 2 insights:
 - It shows if a patient on treatment has any residual disease.
 - It helps delineate complex fistulae and abscesses.
 - It provides reassurance while reporting especially when there are poor quality of images due to poor distention or motion artefacts.
 - Identifying which cases would benefit from contrast is not possible by the vetting radiographer.

LIMITATIONS

- Small sample size.

Recommendations

- The results of the QIP suggest continuing the use of contrast sequences for MRE exams.
- In the future, other sequences such as cine could also be potentially reviewed to assess its value and requirement, however this is beyond the scope of this audit and requires further discussions amongst GI radiology team.