Title: Open-magnet MR defaecography compared with evacuation proctography in the diagnosis and management of patients with rectal intussusception

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1. **Clinical Question:** For patients with rectal intussusception, will the use of open-magnet magnetic resonance (MR) defaecography in addition to evacuation proctography (EP) result in better diagnosis and management?

   P – Patients with rectal intussusception
   I – Open-magnet MR defaecography
   C – Evacuation proctography
   O – Better diagnosis and management of rectal intussusception

   a. Database(s) searched: Ovid Medline
   b. Keyword Search Terms used: Intussusception, diagnosis
   c. MeSH Search Terms used: Magnetic Resonance Imaging, Defecography

3. **Methods Description (setting, population, sample size, study design):**

   **Setting:** Interventional Magnetic Resonance Unit, St Mary’s Hospital, London, UK
   **Population and sample size:** The population consisted of ten patients, four male and six female with median age of 43 years and age range of 30–65 diagnosed with symptomatic circumferential rectal intussusception using evacuation proctography, EP, and open-magnet MR defaecography.
   The median time between evacuation proctography and MR defaecography was nine and a half months (range: 3–32 months) during which no patient underwent treatment for rectal intussusception. Intussusception pathologies visible with each technique were recorded, and twelve parameters of anorectal configuration and morphology were recorded and compared.
   **Study design:** Prospective Cohort study
4. Methods Interpretation (Validity):

a) Was there an independent “blind” comparison with reference standard? Yes. The open magnet MR defaecography was compared to evacuation proctography. One of the investigator analyzing the EP and MR defaecography images was blinded to the results of patient’s history and physical exam, while the other investigator was not.

b) Did the sample include an appropriate spectrum of patients to whom the diagnostic/screening test will be applied in clinical practice? No. Only 10 patients were used and it fails to treat patient age ranges that most commonly suffer from intussusception and/or rectal prolapse. Additionally, the patients studied were already diagnosed, so it doesn’t reach the type of patient who may be asymptomatic.

c) Did the results of the diagnostic/screening test being evaluated influence the decision to perform the reference standard? The reference standard will still be the first line for diagnosis, however, MR defaecography could be used to complement it. 

d) Were the methods for performing the diagnostic/screening test described in sufficient detail to permit replication? Yes, they were described in sufficient detail. Patient's preparation and clinical history were adequately describing. However, typically the condition is observed in patients with malignancies, which is a more complicated population than the one studied. Also, only two people evaluated the scans, which is not enough to evaluate user variation.

5. Results: EP remains the most sensitive imaging technique in diagnosis of rectal intussusception, as 10/10 circumferential intussusceptions were detected by EP compared to only 7/10 by MR defaecography. However, MR defaecography provides images of vaginal and bladder descents greater than 3 cm that are not available via EP, and these additional information complement EP by clarifying diagnosis and management plan. Of concern, the gold standard, EP, is known to give false positives, so while it caught 10/10 cases, it would indicate treatment for healthy individuals when put into practice. Finally, statistical analysis used the Wilcoxon signed rank test, but there was no ANOVA analysis which is required when numerous comparisons and parameters are being evaluated.

6. Translational applications (How does this study apply to your patients?):

The results of this study highlight the limitations of using MR defaecography in addition to EP in diagnosing rectal intussusception. The information is based on 10 patients, and needs a larger sample size to provide a more precise assessment. Though the study suggests that EP should still be the standard for diagnosing rectal intussusception, it indicates that MR defaecography supplements EP by providing information on movements of the pelvic floor, especially since EP results in a higher false positive diagnosis. This information is used in case of surgery, although surgery typically provides poorer outcomes, which limits the usefulness of detection. Finally, the primary patient populations that suffer intussusception, the very old, very young, and patients with malignancies, were not included in this study, and this oversight greatly limits the usefulness of the acquired information.