

## Introduction

Previous work developed a novel diagnostic test using magnetic resonance imaging (MRI) to assess colonic response (volume, motility and fluid movement) to a macrogol challenge drink to define the underlying mechanisms of severe constipation<sup>1</sup>. We aimed to measure the intra-subject reproducibility of these measures, which has not been previously assessed.

## Method

Healthy subjects aged  $\geq 18$  attended for MRI on two occasions (identical protocols, minimum 1 week apart). They underwent a fasted scan then consumed the macrogol (polyethylene glycol 3350 with electrolytes) drink (10 mL/kg of bodyweight rounded to the nearest 100mL, maximum 1000mL,) consumed at 2.5mL/kg per 15 minutes. Subjects were scanned at 60 and 120 minutes.

Colonic volumes, fluid movement and motility were measured as previously described 2-5. The baseline and maximum value after the drink for the MRI measures were determined for each subject to allow for different oro-caecal transit times of the macrogol drink over the two visits. The time to first bowel movement was also recorded.

## Results

12 subjects completed the study: 9 female, 3 male, mean age  $26 \pm 5$  years and body mass index  $24.8 \pm 3.2$  kg/m<sup>2</sup>.

Colonic volumes, fluid flow and motility all consistently increased above baseline post stimulus. The colonic volume and flow data had good intra-subject reproducibility (ICC volume =0.84, flow =0.79,  $p < 0.001$ ), but larger inter-subject variability (Table 1). AC and DC motility were reasonably repeatable at baseline but response to the challenge was variable between visits resulting in a lower ICC overall (AC =0.63, DC =0.67,  $p < 0.001$ ) (Table 1). Time to first bowel movement showed low variability across the visits (ICC TBM=0.98,  $p < 0.001$ ) (Table 1).

Using a definition of a motility responder as above 90% of baseline all subjects kept the same status for AC motility and only 2 changed for DC motility across visits (Figure 1). At present there is no gold standard to compare these measures against.

## Conclusion

The colonic response to the macrogol stimulus as assessed by MRI is heterogeneous but large compared to baseline data making it a suitable test to study potential pathologies underlying GI disorders such as constipation. More data is needed to better define the normal range for comparison with patient groups who may have both hypo- and hyper-motile responses.

## References

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