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Cystic Fibrosis Research News

Title:

Magnetic resonance imaging of the gastrointestinal tract shows reduced small bowel motility and altered chyme in cystic fibrosis compared to controls

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What was your research question?

We wanted to understand in more detail how digestion differs between people with cystic fibrosis (CF) and healthy controls, using magnetic resonance imaging (MRI).

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Why is this important?

Digestive problems including constipation are very common and burdensome in people with CF but their causes are not entirely understood. The CF community asked for more research into understanding and resolving digestive problems. MRI is a non-invasive, safe way to learn more about digestion.

What did you do?

We invited 12 people with CF (aged 12-40 years) and 12 healthy controls that were the same in age and gender to attend a single study day. During this day all participants ate standardised meals and were scanned repeatedly to follow the food through the digestive tract. We took MRI videos to measure small bowel motility, i.e. the movements of the small bowel to move food forwards, and still images to measure T_1, an MRI characteristic indicating wateriness of large bowel contents.

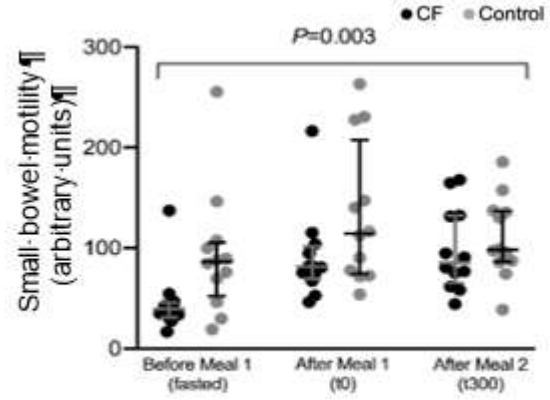

Figure 1: Small bowel motility before and after meals.

What did you find?

We found that small bowel motility is lower in people with CF before they have any food, but there is less of a difference after meals (Fig 1). We have already published some findings from this study, including that there is more water in the small bowel. Here we show that wateriness of digested food in the large bowel is similar in people with CF compared to healthy controls. We further observed that the small bowel and large bowel contents had a different appearance in people with CF compared to healthy controls; and that images of most people with CF we scanned had a thick white line following the folds of the large bowel, which we never see in healthy controls (Fig 2).

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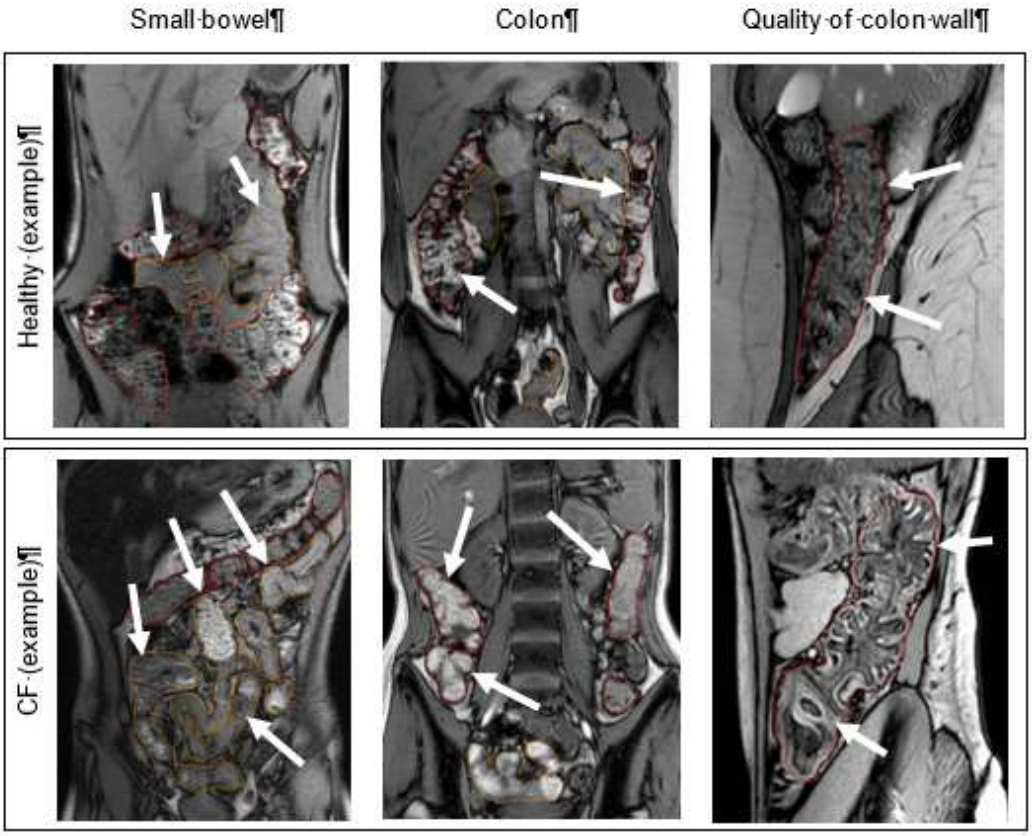

Figure 2: Typical appearance of small bowel (outlined in orange) and large bowel (outlined in red) in healthy controls (top row) and in participants with CF (bottom row).

What does this mean and reasons for caution?

We now know that the high water content we saw in the small bowel does not directly lead to watery large bowel contents, and that motility is lower at least some of the time. The resulting slow transit and loss in stool water can explain constipation. The differences in appearance of small bowel and large bowel contents may be signs of gut complications seen in CF. However, we need to do more work to confirm these conclusions.

What's next?

We are now working on using MRI to investigate whether new CF drugs, called CFTR modulators, affect digestion.

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