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The patient's experience of defaecating proctography: Comparing magnetic resonance with conventional fluoroscopy techniques

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ABSTRACT

Introduction: Fluoroscopy and MRI are currently used to investigate defaecation and pelvic floor dysfunction, with advantages and disadvantages to both modalities. Anecdotally it is suspected that MRI, allowing more privacy, may be better tolerated by patients but that symptoms may be more easily replicated with fluoroscopic technique due to the physiological position. The aim of this study was to evaluate the patient experience of both techniques to potentially help guide the choice of defaecating proctography modality in the future.

Methods: This prospective study was conducted June 2015–March 2017 in a large teaching hospital. Patients undergoing fluoroscopy (FDP) or MR defaecating proctography (MRDP) completed a post-procedure questionnaire rating their satisfaction (1–5, 5 being most satisfied) of different aspects of the test.

Results: 24 patients underwent FDP and 17 MRDP. Both procedures were scored highly in general for all questions with mean >4.1 and median 5, out of 5. Though not statistically significant, the mean scores for all aspects of the test were slightly higher for fluoroscopy than MR. As well as scoring higher for comfort (4.8 vs 4.4) and dignity maintained (4.6 vs 4.1), the patients who underwent fluoroscopy thought it was easier to replicate symptoms than the patient who underwent MR defaecating proctography (4.6 vs 4.2).

Conclusion: This study shows that both FDP and MRDP are well tolerated in the investigation of defaecation and pelvic floor dysfunction. FDP was scored consistently higher than MRDP, but this was not statistically significant. Thus, this study suggests that patient tolerance of the test is unlikely to be any worse for FDP than for MRDP. Clinicians and radiologists should take into account risks of radiation exposure as well as potential for surgical management when making their decision as to which test is appropriate. The authors recommend that if the patient is unable to replicate their symptoms in MRDP, fluoroscopy should be performed to ensure significant pathology is not being missed.

Introduction

Defaecating proctography, also known as defaecography, is dynamic imaging allowing the anatomy, function and mechanics of the anorectum and pelvic floor to be visualised in real-time during defaecation.

Currently, fluoroscopy and MRI are both used as imaging modalities in defaecating proctography. Fluoroscopy defaecating proctography (FDP) is the older conventional imaging method.[1] Advances in MR imaging led to the introduction of MR defaecating proctography (MRDP) in 1993.[2]

The advantages and disadvantages of both techniques have been previously described (Table 1). Fluoroscopy defaecating proctography (FDP) has the advantage of imaging the patient in a physiological sitting position. It is widely available, more cost efficient and simpler to perform compared to MRDP. However, the patient is exposed to ionising radiation (around 3.6–6.5 mSV).[4] MRDP has the

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Table 1
Comparison of FDP and MRDP.

	FDP	MRDP
Advantages	• Patient in physiological position • Widely available • Cost efficient • Simple to perform	• Less embarrassing: as no one else in the room • Able to visualise all the pelvic compartments • No ionising radiation
Disadvantages	• Radiation: 3.6–6.5 mSv (100–360CXR) • More embarrassing: staff members are in the same room	• Expensive • Not as easily available • Non-physiological position

advantage of imaging all the pelvic compartments, which can be useful for surgical planning, whilst avoiding ionising radiation.

The supine positioning in MRDP, however, has led to some patients not achieving defaecation and as such the anatomical abnormalities (especially intussusception) may not be demonstrated. Several studies have found that pathologies such as rectocoeles, rectal prolapse, pelvic floor hernias and intussusceptions are thus under-diagnosed on MRDP.[3–7] A systematic review and meta-analysis found that in 16 studies, MRDP had a statistically significant lower detection rate of rectocoeles, recto-anal intussusception and perineal descent.[9] Studies have shown that upright dynamic MR performed in an open-magnet MR scanner can improve replication of symptoms and detection rate of intussusception,[10,11] however these scanners are not widely available and therefore this is not an option in general clinical practice.

The patient demographic for anorectal and pelvic floor disorders in the authors' practice is predominantly female. Many of the patients have had difficulty in defaecating for years, usually after child birth, but delay their presentation to primary care due to the perceived embarrassing nature of the symptoms. It is anecdotally felt that patients are anxious to defaecate in an unnatural setting with a potential audience.

The potentially embarrassing nature of this procedure makes patient opinion and experience very important. This is not only for patient satisfaction but also to allow patients to replicate their symptoms whilst having the procedure to enable diagnosis. Anecdotally, MRDP is thought to be less embarrassing than FDP as no one else is in the room with the patient during defaecation. Zafar et al. found that in their study comparing the two imaging modalities that 50% of the 55 patients preferred MRDP, 38% preferred FDP and 13% expressed no preference between the two imaging modalities.[3] In another study by Pilkington et al., 71 patients were asked their preference between the two modalities. Patients reported that they found MR proctography less embarrassing but harder to empty their bowels.[4]

The choice of imaging in the authors' centre is primarily based on best practice, patient symptoms and age. If the patient is younger than 25 years, MRDP is chosen to avoid radiation. MRDP is also used if there is a specific query regarding the anterior or middle pelvic compartment such as presence of cystocele or uterine prolapse. Otherwise, FDP is the preferred imaging investigation as the patient is in a physiological position.

As a department, however, the authors recognise that patient experience can also be a factor in decision making. A questionnaire was devised to determine whether both imaging modalities were well tolerated.

Methods

This was a prospective study carried out between June 2015 and March 2017. The project was registered with the Hospital's audit department.

The devised questionnaire (see Fig. 1) was completed by the patient immediately after they had undergone the test. Verbal consent was obtained from the patient prior to them filling out the questionnaire. Written patient consent was deemed not necessary due to the simple nature of the research. Inclusion criteria were that the patient should have just undergone FDP or MRDP. There were no exclusion criteria.

The patient was asked to score between 1 and 5 (1 = strongly disagree, 2 = disagree somewhat, 3 = neutral, 4 = agree somewhat, 5 = strongly agree) different aspects before, during and after the test. Results were analysed using mean and median averages and the Mann–Whitney U test to calculate p values.

The imaging techniques used in the authors' centre are as follows:

Fluoroscopy defaecating proctography

FDP imaging protocol varies from centre to centre. In the authors' hospital, fluoroscopy is performed using a GE Advantx machine.

Prior to the examination, the supervising radiologist explains to the patient what it will involve and gains verbal consent. The radiographer completes the safety questionnaire with the patient including LMP. The patient is then asked to change into a gown and drink 300 mls of barium contrast 45 min prior to the procedure to opacify the small bowel. 6 dessertspoons of barium are mixed with instant porridge oats and 100 mls of warm water to create a thick paste, which is then inserted into the patient's rectum whilst they are in the lateral decubitus position. Video-fluoroscopy is performed including in a seated position on a radiolucent commode where the patient is asked to empty their rectum. There are usually 2–4 staff members present in the room; the operating radiologist and the radiographer, with additional trainee staff members. There are no facilities to play music in the fluoroscopy room. A privacy screen is used, with all staff other than the operating radiologist, standing behind the screen during the procedure. The patient is then led to an adjoining toilet where they can clean themselves if required.

Magnetic resonance defaecating proctography

The appointment letter sent to the patient gives the following information about the MRDP procedure:

Prior to the examination the supervising radiologist explains to the patient what it will involve and gains verbal consent. The radiographer goes through the safety questionnaire with the patient including LMP.100 mls of ultrasound jelly is inserted into the rectum, and the patient is then imaged during rectal evacuation whilst in a supine position in the MR scanner. No staff members are in the same room as the patient during rectal evacuation. The radiographer in the MR control room communicates with the patient through an intercom. After the procedure, the patient is led to an adjacent toilet where they can clean themselves if required. A survey scan, a reference scan, axial T2 pelvis, coronal T2 pelvis, and a CINE loop is performed whilst the patient squeezes up, bears down and evacuates. The patient can request their choice of music that they can listen to during the procedure.

Results

In total, 17 patients completed MRDP questionnaires, 15 of whom were female and 2 were male. Out of the 24 FDP questionnaires, 23 were female and the other questionnaire gender option was left blank. The average age of the patient completing the questionnaire was 35 years for MRDP and 49 years for FDP. Some

Patient Experience Questionnaire

Please rate from 1-5 (1- strongly disagree, 2- disagree somewhat, 3- neutral, 4- agree somewhat, 5- strongly agree)

Before the test, please rate 1-5

1. *In the appointment letter* the explanation given of what the test involved was satisfactory.....
2. *Just before the test (in the radiology dept)* the explanation given of what the test involved was satisfactory.....

During the test- please rate the procedure 1-5, was it

3. Easy to replicate your symptoms?.....
4. Comfortable positioning?.....
5. Dignified?.....
6. Pain-free?.....
7. Not too lengthy?.....
8. Easy to *hear* instructions from staff during the procedure?.....
9. Easy to *understand* instructions from staff during the procedure?.....
10. Easy to *speak* to staff during the procedure?.....
11. Was the main staff member carrying out the test male or female?.....
12. Would you have preferred a staff member of the same gender as you?.....
13. How many staff members were in the room during the test?.....
14. Would you have preferred less staff members in the room? .....

After the test

15. Were the facilities to clean oneself up after the test satisfactory?.....
16. Was the toilet in a convenient place?.....
17. Did the explanation given before the test match with your experience of the test?.....
18. Any further comments on what was satisfactory or unsatisfactory about this test.....

Your comments are very much appreciated, thank you.

Figure 1. Patient questionnaire.

patients omitted some answers or wrote a non-numerical answer such as 'yes'. These answers were not included in the mean scores.

Questionnaire data

As is seen in Table 2, high scores were given for all questions for both imaging modalities. The lowest score was 4.1 out of 5 for maintaining patient dignity in MRDP (compared to 4.6 in FDP). FDP was rated higher mean than MRDP in every category except for 'pain-free?' which was scored the same as MRDP (mean 4.6). Though not statistically significantly, FDP mean score was higher than MRDP for 'letter explanation' (4.7 vs 4.6), 'pre-test explanation' (5.0 vs 4.7), 'ease to replicate symptoms' (4.6 vs 4.2), 'comfortable body positioning' (4.8 vs 4.4), 'dignified' (or maintaining dignity) (4.6 vs 4.1), 'facilities to clean up afterwards' (4.7 vs 4.4), 'toilet in a convenient place' (4.8 vs 4.5) and 'explanation given before matched experience' (5 vs 4.7).

Discussion

The patient demographics were as expected, with mostly female patients overall, and MRDP having a younger cohort of patients than in FDP.

FDP was rated higher mean than MRDP in every category except for 'pain-free?', for which it was scored the same. The mean score for 'ease of replicating symptoms' was higher in FDP than MRDP (4.6 vs 4.2 out of 5), however both high scores suggest that at least subjectively most patients in this study felt that their symptoms were replicated during their MRDP study. The trend in results from this study contradicts the anecdotal evidence that patients prefer MRDP to FDP.

Perhaps unexpected given the nature of the tests, high scores were given to both imaging modalities in all aspects. One of the factors that may have influenced this is that the patients was asked to fill out the questionnaire straight after the test. The authors'

Table 2

	FDP	MRDP	p-value*
Total number of patients	24	17	
Gender: female (%)	23 (96%)	15 (88%)	
Age			
Number	24	17	
Mean (SD)	49.0 (13.6)	34.9 (18.1)	
Median (range)	50 (25,70)	27 (17,79)	0.5922
Letter explanation			
Number	19	13	
Mean (SD)	4.7 (0.7)	4.6 (0.8)	
Median (range)	5 (2,5)	5 (3,5)	0.7378
Pre-test explanation			
Number	21	14	
Mean (SD)	5.0 (0.2)	4.7 (1.1)	
Median (range)	5 (4,5)	5 (1,5)	0.2589
Easy to replicate symptoms			
Number	23	13	
Mean (SD)	4.6 (1.0)	4.2 (1.3)	
Median (range)	5 (1, 5)	5 (1,5)	0.3688
Comfortable body positioning			
Number	24	17	
Mean (SD)	4.8 (0.4)	4.4 (1.1)	
Median (range)	5 (4,5)	5 (1,5)	0.2404
Dignified			
Number	24	17	
Mean (SD)	4.6 (0.7)	4.1 (1.3)	
Median (range)	5 (3,5)	5 (1,5)	0.8205
Pain-free			
Number	24	16	
Mean (SD)	4.6 (0.8)	4.6 (1.0)	
Median (range)	5 (2,5)	5 (1,5)	0.3058
Facilities to clean up afterwards			
Number	24	17	
Mean (SD)	4.7 (0.9)	4.4 (1.1)	
Median (range)	5 (1,5)	5 (1,5)	0.5343
Toilet in a convenient place			
Number	24	15	
Mean (SD)	4.8 (0.7)	4.5 (1.1)	
Median (range)	5 (3,5)	5 (1,5)	0.2037
Explanation given before matched experience			
Number	21	13	
Mean (SD)	5 (0)	4.7 (1.1)	
Median (range)	5 (5,5)	5 (1,5)	

attempted to prevent this bias by explaining to the patient that the questionnaire was anonymous. In addition the form was completed outside the room in which the imaging took place. It could be argued that the results may have been different if the questionnaire had been posted to the patient and answered completely anonymously. The authors felt, however, that postal questionnaires would have led to the test not being recent in the patient's memory which may have affected the accuracy of the feedback and that this method of data collection would have led to smaller patient cohorts due to patients not returning questionnaires.

This study was also somewhat limited by small patient numbers due to the infrequency of these tests being performed, particularly MRDP which is performed less frequently than FDP. The authors were also not able to randomly allocate patients to MRDP or FDP as the modality decision is based on clinical symptoms, age (and therefore susceptibility to risk of radiation) and MR suitability.

Conclusion

In conclusion, this study demonstrates that both FDP and MRDP are well tolerated in the investigation of defaecation and pelvic floor dysfunction. FDP was scored consistently higher than MRDP, but this was not statistically significant. Thus this study suggests that patient tolerance of the test is unlikely to be any worse for FDP than for MRDP. Clinicians and radiologists should take into account risks of radiation exposure as well as potential for surgical management when making their decision as to which test is appropriate. The authors recommend that if the patient is unable to replicate their symptoms in MRDP, fluoroscopy should be performed to ensure significant pathology is not being missed.

Conflict of interest statement

There are no conflicts of interest.

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