Original Research Article

PREVALENCE OF FUNCTIONAL DEFECATION DISORDER AMONG PATIENTS WITH FUNCTIONAL CONSTIPATION – EXPERIENCE FROM A TERTIARY CARE HOSPITAL

ABSTRACT

Aims: To study the manometry findings and its association with clinical symptoms in patients with functional constipation (FC) and prevalence of Functional defecation disorder (FDD) among them.
Study design: Prospective observational study.
Place and Duration of Study: Patients from the department of Gastroenterology, Apollo Main Hospital Chennai between March 2020 to October 2021.
Methodology: Consecutive patients with FC between age 18-70 years presenting to our institute and undergoing anorectal manometry (ARM) and balloon expulsion test (BET) were enrolled. Patients with mechanical obstruction or severe cardiopulmonary co-morbidities were excluded. Patients with abnormal ARM and absent BET were diagnosed as FDD and were classified into dyssynergic defecation (DD) I-IV according to Rao's classification.
Results: 75 patients (M:F-39:36) were enrolled. Mean age and mean duration was 44.59 (±13.89) years and 3.32(±2.87) years, respectively. Common symptoms were sensation of incomplete evacuation (67%), use of manual manoeuvres (55%) and excessive straining (53%). 69.2% males (27/39) had a FDD compared to 44.4% females (16/36) which was statistically significant (*P* = .037). 83% (20/24) of the patients presenting with sensation of blockage/obstruction had a FDD while 17% (4/24) had a normal manometry study which was statistically significant (*P* = .002). No other symptoms could predict an abnormal finding in manometry.

Conclusion: A large number of patients with FC had FDD. Male patients and those presenting with symptom of sensation of obstruction/blockage were more likely to have FDD.

Keywords: Functional constipation, Functional defecation disorder, Chronic constipation, Dyssynergic defecation, Anorectal manometry, Balloon expulsion test.

1. INTRODUCTION

Chronic constipation (CC) is a common medical problem throughout the world. (1)(2)(3) The prevalence in the community ranges from 11% to 18% across the globe (4); Various Indian community studies have reported a prevalence of CC ranging from 11.6% to 23%. (5)(6)(7) Specific pathophysiological abnormalities like slow colonic transit and defecatory disorder contribute to chronic constipation especially among patients presenting to tertiary care

facilities. Chronic constipation adds a significant burden to healthcare utilization which includes the cost for diagnostic procedures, laboratory tests, outpatient and inpatient. (8)(9)

ROME IV further categorizes CC into Functional constipation (FC) and irritable bowel syndrome (IBS) with constipation. Those patients who have received reasonable trials of empiric therapy and have not responded should be further evaluated to identify the three overlapping pathophysiological subtypes, i.e. normal-transit constipation, slow transit constipation, and Functional defecatory disorder (FDD). (3)(10)ROME IV describes two categories of FDD, F3a-Dyssynergic defecation and F3b-Inadequate defecatory propulsion.(11)
Approximately 50 % of the patients referred to tertiary care centers for constipation in the West have FDD.(12)(13) Studies from Asian countries have reported FDD to be a common cause (14.9% to 52.9%) of constipation for visits to tertiary care centers. (1)(14)(15). It is particularly important to diagnose Functional defecation disorder in patients with refractory chronic constipation as these patients respond better to anorectal Biofeedback therapy than to laxatives.(16) Diagnosis of FDD requires detailed history of symptoms, Digital rectal examination along with special tests like Defecography, Balloon expulsion test (BET) and anorectal manometry (ARM).(11) These tests may not be routinely used and may lead to missing on patients with FDD.

The data on prevalence of defecatory disorders among patients satisfying the clinical criteria for FC is scarce. This study is aimed to describe the clinical and anorectal manometry profile of patients with FC.

2. MATERIAL AND METHODS

2.1 Study Design - Patients with age between 18 and 70 years, CC of > 6-month duration and defined according to ROME IV criteria to have FC were enrolled. Patients with age <18 years, Mechanical obstruction on endoscopy or imaging and those with severe Cardio Pulmonary disorders were excluded from the study.
Diagnosis of FC was Based on ROME IV consensus(10) - Patients with FC should not have obvious anatomic or physiologic abnormalities identified by routine diagnostic examinations and not meet IBS criteria, although abdominal pain and/or bloating may be present but are not predominant symptoms. Symptom onset should occur at least 6 months before diagnosis, and atleast 2 of the following 6 symptoms should be present during the last 3 months viz. Straining during more than one-fourth (25%) of defecations, Lumpy or hard stools (BSFS 1-2) more than one-fourth (25%) of defecations, Sensation of incomplete evacuation more than one-fourth (25%) of defecations, Sensation of anorectal obstruction/blockage more than one-fourth (25%) of defecations, Manual maneuvers to facilitate more than one fourth (25%) of defecations (e.g. digital evacuation, support of the pelvic floor), Fewer than 3 spontaneous bowel movements per week in the absence of Loose stools and Insufficient criteria for irritable bowel syndrome.
Based on the above criteria, patients were asked questions to find out for the presence of the symptoms of excessive straining at stools, sensation of incomplete evacuation, sensation of blockage/ obstruction, use of manual maneuvers, passage of hard lumpy stools and stool frequency along with the other history. Patients who fulfilled the criteria were considered to be having FC.

2.2 Technical Information - All the patients underwent either a colonoscopy or a flexible sigmoidoscopy to rule out presence of any mechanical obstruction followed by ARM and BET. The procedure was done in the left lateral position with hips flexed. High resolution ARM was performed using a 16-channel water perfusion manometric assembly the side

holes for channels 1-13 spaced at 0.5cm apart and the last three placed 1cm apart. Data were recorded at 25Hz and analyzed using specialized software (Trace Version 1.3v, Hebbard, Australia). Anorectal pressures, Squeeze pressures, straining pattern, Recto-anal inhibitory reflex (RAIR) and Rectal sensations were recorded. The findings of manometry were classified into normal or dyssynergic defecation based on Rao's type into 4 types Dyssynergic defecation type I-IV(3) BET was recorded after distending a rectal balloon with 50 ml of air and asking the patient to expel the balloon in the left lateral position in a stipulated time period of 1 minute.(17)(14)(18)(19)
Based on ROME IV consensus (11) FDD is diagnosed in patients satisfying criteria for FC based on impaired evacuation in 2 of the following 3 tests viz. a. Abnormal BET, b. Abnormal anorectal evacuation pattern with manometry or anal surface EMG, c. Impaired rectal evacuation by imaging. All the patients included in the study had FC. ARM and BET was done. Imaging for impaired evacuation was not done. Patients were considered to have FDD when Manometry showed abnormal pattern and they failed to expel the balloon in BET.

2.3 Statistics - All categorical variables were represented by percentage, Other continuous variables were represented by mean ±SD, if they followed Gaussian Distribution. Comparison of categorical variables was done by either chi square test or Fisher's exact test based on the number of observations. Comparison of continuous variables was done by independent sample t test.
Data entry was done in MS excel spread sheet. Data analysis was carried out by SPSS version 25.0. All 'p' values <0.05 were considered as statistically significant.

3. RESULTS AND DISCUSSION

3.1 Demographics - Total 75 patients who fulfilled the inclusion criteria were included in the study including 39(52%) males and 36(48%) females. Mean age of patients was 44.59 (±13.89) years. The mean duration of constipation was 3.32(±2.87) years. In a study from India by Goyal et al. The median age was 52 years (range 32–70) years and 87.8% were males. The median duration of constipation was 60 (6–480) months.(20) In a study done by Zhao et al. the mean age was 51±1.7 years (range, 16-83 years) and 30% were males.(21) In another from India by Ghoshal et al, the mean age of patients was 43.7±16.2 years and 70 % patients were males.(22)

3.2 Symptoms - Among the symptoms reported by patients (Figure -1), Sensation of incomplete evacuation (67%) was the most common symptom while sensation of Blockage or obstruction (32%) and presence of hard lumpy stools (24%) were least common. In the study from India by Goyal et al. the most commonly reported symptom was Sensation of incomplete evacuation and the least common was use of manual manoeuvres to facilitate defecation.(20) In the study by Zhao et al, Excessive straining at stools was the most common symptom while passage of hard lumpy stools and sensation of blockage or obstruction was least common.(21) In another study by Shah et al from India, Excessive straining at stools and sensation of incomplete evacuation were the common symptoms while sensation of blockage and manual manoeuvres were less common. (14) In a survey study of patients with chronic constipation by Johansen et al, the most frequent symptoms was straining (79%).(23)

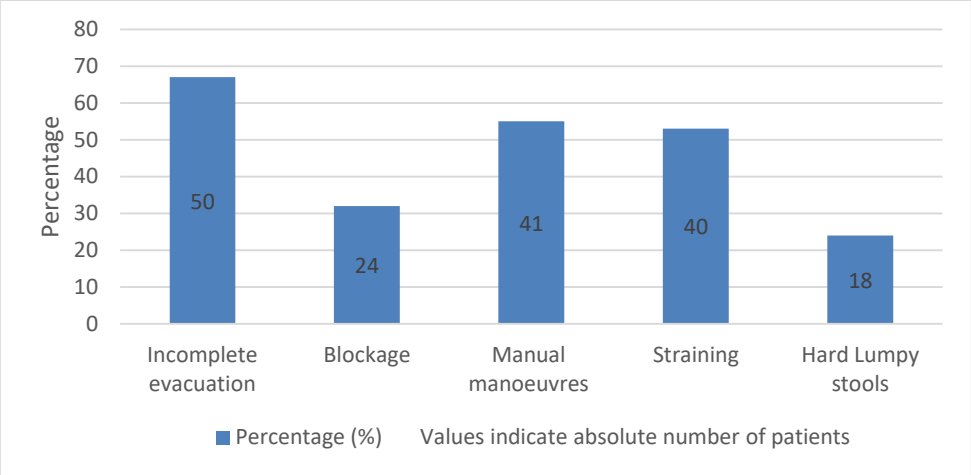

Fig. 1. Symptoms of patients

3.3 ARM and BET findings - The presence of FDD was defined by anorectal Dyssynergia on manometry along with a negative balloon expulsion test. Of the total 75 patients, 43(57%) patients had dyssynergic defecation. Type I Dyssynergic defecation (DD1) pattern was seen in 37/75 (39%) patients and type II dyssynergic defecation pattern (DD2) in 6/75 (8%) patients while none of the patients had Type III and type IV dyssynergic defecation pattern. In the study by Goyal et al, 55.3% patients in the functional constipation group had a defecatory disorder.(20) while in the study by Zhao et al, 73.2% patients had a Functional defecation disorder.(21) In another study by Shah et al, Dyssynergic defecation was seen in 40% patients with primary constipation.(14)

Table 1 – Manometry parameters

	Mean±SD
Basal anal pressure (mm of Hg)	64.92±12.55
Squeeze Pressure (mm of Hg)	145.96±30.09
Volume of first sensation (mL)	65.53±27.03
Volume for urgency (mL)	150.93±40.58
Maximum tolerable volume (mL)	217.6±53.65

3.4 Manometry findings and Gender - The number of males and females in the study were almost equal but a greater number of males were found to have FDD i.e 69.2% as compared to 44.4% females (Table - 2). This difference was statistically significant (*P* = .037) thereby indicating that male patients having FC were more likely to have FDD as compared to females. In the study by Zhao et al, Men were significantly more likely than women to have FDD [(23/25, 92%) v/s (37/57, 64.9%) (*P* = 0.014)].(21)

Table 2 - Gender and Manometry findings

	Normal Manometry	**Dyssynergic defecation (FDD)**	**Total**
Male	12 (30.8%)	**27 (69.2%)**	39 (100%)
Female	20 (55.6%)	16 (44.4%)	36 (100%)
Total	32 (42.6%)	43 (57.3%)	75 (100%)

3.5 Symptoms and manometry findings - FDD based on anorectal manometry and Balloon expulsion test was seen in 60% of patients presenting with sensation of incomplete evacuation, 83% with Blockage/obstruction, 61% with manual manoeuvres, 52% with excessive straining and 50% patients with hard lumpy stools. (Table 3)

TABLE 3 - Symptoms and Manometry findings

	Normal Manometry	Functional defecation disorder (FDD)		Total	*P* - Value
		DD 1	DD 2		
Incomplete evacuation	20 (40%)	25 (50%)	5 (10%)	50	0.509
Blockage	4 (17%)	19 (79%)	1 (4%)	24	**0.002**
Manual manoeuvres	16 (39%)	22 (54%)	3 (7%)	41	0.484
Straining	19 (47.5%)	19 (47.5%)	2 (5%)	40	0.366

Hard lumpy stools	9 (50%)	7 (39%)	2 (11%)	18	0.471

When analysing individual symptoms, maximum patients presenting with sensation of Blockage/ obstruction (83%) had a functional defecation disorder which was statistically significant (*P* = .002). In the study from India by Goyal et al. where patients with Functional constipation and IBS-C were included, Univariate analysis of factors predicting functional defecatory disorder showed Prolonged straining [118 (99.2%) v/s 52 (46.4%) *P* = .001], Sensation of incomplete evacuation [119 (100%) v/s 63 (56.3%) *P* = .001], Sensation of anorectal obstruction/blockage [105 (88.2%) v/s 25 (22.3%) *P* =.001] and Manual manoeuvres to facilitate defecation [18 (15.1%) v/s 2 (1.8%) *P* = .003] to be more common in patients with FDD as compared with those without FDD with statistical significance.(20). In the study by Zhao et al. none of the symptoms of Straining [52 (86.7%) v/s 20 (90.9) *P* = .722], Lumpy or hard stools [17 (28.3%) v/s 6 (27.3%) *P* = .99], Sensation of incomplete evacuation [41 (68.3%) v/s 14 (63.6%) *P* = .792], Sensation of anorectal obstruction/blockage [18 (30%) v/s 2 (9.1%) *P* = .080], Manual manoeuvres to facilitate [44 (73.3%) v/s 19 (86.4%) *P* = .254] had a statistical significance. (21) It was found that, symptom of 'blockage' alone could predict the presence of functional defecation disorder.

3.6 Limitations - Single centre study with small sample size. Sample collected from a tertiary referral centre and thus could have a higher prevalence of FDD due to referral bias which may limit the generalisability in general population. BET was performed in left lateral position while recent data suggests performing the test in a more natural sitting position on a commode.

4. CONCLUSION

In our study a large number of patients with functional constipation had a Functional defecation disorder. Male patients and those presenting with symptom of sensation of obstruction/blockage were more likely to have a Functional defecation disorder.

COMPETING INTERESTS

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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ABBREVIATIONS

ARM Anorectal manometry

BET	Balloon expulsion test
BSFS	Bristol stool form score
CC	Chronic constipation
DD	Dyssynergic defecation
DD 1	Dyssynergic defecation Type I
DD 2	Dyssynergic defecation Type II
FC	Functional constipation
FDD	Functional defecation disorder
IBS	Irritable Bowel syndrome
SD	Standard deviation