ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 09 | September - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PATTERNS OF HIGH-RESOLUTION ANORECTAL MANOMETRY IN FUNCTIONAL CONSTIPATION: A CROSS-SECTIONAL STUDY FROM INDIA

Gastroenterology

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ABSTRACT

Background: Functional constipation is a common gastrointestinal disorder, often linked with pelvic floor dysfunction. High-resolution anorectal manometry (HRAM) provides superior detail compared to conventional manometry, but Indian data are limited. **Methods:** We conducted a cross-sectional observational study at a tertiary care gastroenterology center in South India between August 2022 and February 2024. Eighty-seven adult patients fulfilling Rome IV criteria for functional constipation underwent HRAM and balloon expulsion test (BET). The London classification was applied to categorize anorectal dysfunction. **Results:** The mean age was 45.3 ± 13.7 years; 59.8% were female. Most participants reported incomplete evacuation (71%), straining (74%), and laxative use (72%). HRAM was abnormal in 40.2% and BET abnormal in 35.6%. Based on the London classification, 33.3% had dyssynergic defecation, 10.3% had poor propulsion, 18.4% had combined poor propulsion with dyssynergia, and 11.5% were inconclusive. Anal resting pressure was normal in 72.4%, while 18.4% had hypotension and 9.2% hypertension. Rectal hyposensitivity was noted in a subset of patients. **Conclusion:** Approximately one-third of Indian patients with functional constipation demonstrated dyssynergic defecation on HRAM. The prevalence of abnormal BET and anal tone disturbances highlights the importance of incorporating HRAM into the diagnostic work-up. These findings provide region-specific insights and support the role of anorectal manometry in guiding biofeedback therapy for constipation in India.

KEYWORDS

INTRODUCTION

Functional constipation (FC) is a prevalent gastrointestinal disorder affecting 14–20% of the global population, with a significant impact on quality of life and healthcare costs [Ref]. In India, prevalence ranges from 8% to 25%, influenced by dietary patterns, socioeconomic status, and cultural factors [Ref].

Rome IV criteria provide a standardized definition of FC, emphasizing stool consistency, straining, incomplete evacuation, and manual maneuvers [Ref]. A key contributor to chronic constipation is pelvic floor dysfunction, particularly dyssynergic defecation (DD), characterized by paradoxical anal contraction or inadequate relaxation during attempted defecation [Ref]. DD has been reported in up to 40–60% of constipated patients worldwide [Ref].

Anorectal manometry is central to diagnosing DD. Conventional waveform manometry has long been used, but high-resolution anorectal manometry (HRAM) offers better spatial and temporal resolution, improved visualization of rectoanal coordination, and greater reproducibility [Ref]. The London classification (International Anorectal Physiology Working Group, 2020) provides standardized reporting of HRAM, encompassing disorders of anal tone, contractility, rectoanal coordination, and rectal sensation [Ref].

Despite HRAM's growing use globally, Indian data remain scarce. Understanding regional patterns is important because stool frequency, diet, and gut physiology differ from Western populations [Ref].

Objective: To describe HRAM patterns in Indian patients with functional constipation and evaluate associated findings from the balloon expulsion test and London classification.

METHODS

Study Design and Participants: This cross-sectional observational study was conducted in the Department of Medical Gastroenterology, Gandhi Medical College and Hospital, Secunderabad, from August 2022 to February 2024. We recruited 87 consecutive adult patients (>18 years) presenting with functional constipation, as defined by Rome IV criteria. Inclusion required Bristol stool scale types 1–3. Patients with organic causes of constipation (strictures, malignancy), prior anorectal surgery, pregnancy, or refusal of consent were excluded.

Ethical Approval: The study was approved by the Institutional Review Board of Gandhi Medical College, Secunderabad. Written informed consent was obtained from all participants.

Procedures: All patients underwent high-resolution anorectal manometry (HRAM) using a solid-state catheter with circumferential sensors, following International Anorectal Physiology Working Group (IAPWG) standardized protocol. Measurements included resting pressure, squeeze pressure, rectoanal inhibitory reflex (RAIR), push maneuvers, and rectal sensation thresholds. Balloon expulsion test (BET) was performed with a 50 mL water-filled balloon; inability to expel within 3 minutes was considered abnormal. The London classification was applied to classify anorectal disorders into anal tone/contractility, rectoanal coordination, and rectal sensation categories.

Outcomes: Prevalence of abnormal HRAM findings, BET outcomes, and London classification categories of rectoanal dysfunction.

Statistical Analysis: Data were analyzed using SPSS v24. Continuous variables were summarized as mean ± SD, categorical variables as frequencies (%). Associations between HRAM findings and demographic/clinical variables were assessed with chi-square or t-tests, as appropriate. A p-value <0.05 was considered statistically significant.

RESULTS

Demographics and Clinical Profile: The mean age of participants was 45.3 ± 13.7 years (range 18–72). Females constituted 59.8%. A majority (54%) reported a sedentary lifestyle. Co-morbidities included hypertension (20.7%), diabetes (17.2%), and thyroid disorders (5.7%).

Symptom Prevalence Included: Incomplete evacuation (71.3%), straining (73.6%), laxative use (72.4%), manual removal (27.6%), and anorectal blockage sensation (33.3%).

HRAM and BET Findings: HRAM was abnormal in 40.2% and BET was abnormal in 35.6%. London Classification Outcomes: Dyssynergic defecation was seen in 33.3%, poor propulsion in 10.3%, combined poor propulsion with dyssynergia in 18.4%, and 11.5% were inconclusive. Anal Pressure: Hypotension in 18.4%, normal in 72.4%,

and hypertension in 9.2%. Rectal hyposensitivity was observed in a subset of patients.

Key demographic and physiological findings are summarized in Figure X below (to be inserted as TIFF separately).

Figure X. Distribution of demographic, clinical, and anorectal manometry findings in patients with functional constipation (n = 87). (A) Age distribution: majority of patients were between 31–50 years. (B) Gender distribution: females predominated. (C) HRAM results: 40.2% showed abnormalities. (D) BET results: 35.6% were abnormal. (E) London classification outcomes: dyssynergic defecation (33.3%) was the most common abnormality, followed by poor propulsion and combined patterns. (F) Anal resting pressure distribution: most patients had normal pressures, while 18.4% showed hypotension and 9.2% hypertension.

DISCUSSION

This study provides one of the first comprehensive analyses of HRAM patterns in Indian patients with functional constipation using standardized London classification criteria.

Key Findings: About one-third of patients had dyssynergic defecation, consistent with prior Indian (Jain et al., 2018) and Asian reports (Zhao et al., 2019) [Ref]. Abnormal BET was present in over one-third, underscoring its role as a simple screening adjunct to HRAM. Anal pressure abnormalities highlight the heterogeneity of anorectal dysfunction in FC. Rectal hyposensitivity further supports the need for sensory assessment alongside motor function.

Comparison with Literature: Western cohorts report dyssynergia prevalence of 40–60% in refractory constipation [Ref]. Our findings (33%) align more with Indian data and suggest potential dietary or cultural influences. Recent Asian consensus emphasized regional variability in stool form and transit, reinforcing the value of country-specific HRAM studies [Ref].

Clinical Implications: Recognition of dyssynergia is crucial, as biofeedback therapy is more effective than laxatives in this subgroup [Ref]. HRAM provides an objective basis for therapy. Given the rising burden of chronic constipation in India, wider availability of HRAM could improve outcomes and reduce unnecessary surgical interventions.

Strengths: Prospective design, standardized London classification, use of HRAM and BET. Limitations: Single-center, modest sample size, lack of healthy controls, no long-term outcomes.

Future Directions: Establish multicenter Indian HRAM registry, integrate colonic transit studies, and assess cost-effectiveness of HRAM-guided therapy.

CONCLUSION

In this Indian cohort, HRAM revealed that approximately one-third of functional constipation patients had dyssynergic defecation, with significant proportions also exhibiting abnormal BET and anal pressure disturbances. These findings highlight the utility of HRAM in characterizing anorectal dysfunction and guiding targeted therapy. Routine incorporation of HRAM into the evaluation of refractory constipation could optimize management strategies and improve patient outcomes.

Table 1. Demographic and Clinical Characteristics of Study Participants (n=87)

Variable	n	%
Mean age (years)	45.3 ± 13.7	-
Female	52	59.8
Sedentary lifestyle	47	54.0
Hypertension	18	20.7
Diabetes mellitus	15	17.2
Thyroid disorder	5	5.7

Table 2. Symptom Profile of Patients with Functional Constipation

Symptom	n	%
Straining	64	73.6
Incomplete evacuation	62	71.3
Laxative use	63	72.4
Manual disimpaction	24	27.6
Sensation of anorectal blockage	29	33.3

Table 3. High-Resolution Anorectal Manometry (HRAM) and Balloon Expulsion Test (BET) Findings

Parameter	n	%
HRAM normal	52	59.8
HRAM abnormal	35	40.2
BET normal	56	64.4
BET abnormal	31	35.6

Table 4. London Classification Outcomes in Functional Constipation Patients

Outcome	n	%
No disorder of rectoanal coordination	48	55.2
Abnormal expulsion + dyssynergia	4	4.6
Abnormal expulsion + poor propulsion	9	10.3
Abnormal expulsion + combined DD + poor propulsion	16	18.4
Normal expulsion + abnormal manometry pattern	7	8.0
Inconclusive	10	11.5

Table 5. Anal Resting Pressure Distribution

Resting Pressure	n	%
Hypotension (<55 mmHg)	16	18.4
Normal (55–110 mmHg)	63	72.4
Hypertension (>110 mmHg)	8	9.2

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