ZANCO Journal of Pure and Applied Sciences

TYPE Original article
DOI http://dx.doi.org/10.21271/ZJPAS.38.1.6

OPEN ACCESS

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RECEIVED :14 /07 /2025
ACCEPTED :15/09/ 2025
PUBLISHED : 28/ 02/ 2026

KEYWORDS:

Dysphagia,
Esophageal motility disorders,
Manometry,
EGD.

Prevalence of Esophageal Motility Disorders Among Patients Presenting with Dysphagia

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ABSTRACT

Esophageal motility disorders impair normal peristalsis of the esophagus and often lead to dysphagia and represent a clinically significant problem with increasing recognition worldwide. These disorders are commonly encountered in patients presenting with esophageal symptoms, yet their true prevalence remains underreported, particularly in regions where diagnostic facilities are limited including Erbil, Kurdistan region-Iraq. Understanding their burden is essential for improving diagnostic accuracy and patient outcomes. The study aims to clarify the prevalence of oesophagal motility disorders among participants with dysphagia and to study the sensitivity of the diagnostic methods. Additionally, to illustrate demographic, clinical, lifestyle, and psychosocial characteristics of esophageal dysmotility (ED) patients with confirmed esophageal motility disorders. A case-series study was conducted from June 2024 to June 2025 at the Hawler Center for Gastroenterology and Hepatology. A total of 113 adult participants with dysphagia underwent a standardized diagnostic workup including esophageal gastroduodenoscopy (EGD), barium swallow and manometry. Participants with confirmed esophageal motility disorders on manometry were classified as a patient group, while participants without motility disorders served as controls. Data on demographics, medical history, clinical symptoms, lifestyle habits, and psychosocial impact were collected via structured questionnaires. Among participants with dysphagia (113), manometry identified oesophagal motility disorders in 67 (59.3%) of cases, with 22 EGJ outflow obstruction (19.46%) and 21 achalasia (18.58%) being the most common findings. Regurgitation (n=47, 70.15%), vomiting (n=45, 67.16%), and weight loss (n=51, 76.11%) were significantly more prevalent in ED group compared to controls. Alcohol use was lower in ED group, while smoking and hot drink intake were similar. Psychosocial burden, including emotional distress (n=47), impaired quality of life (n=49), and altered eating behaviors (n=34), was significantly greater (p-value <0.0001) in ED group. More than half of ED patients presented with dysphagia are manifested in esophageal dysmotility. Manometry being the gold standard in diagnosis of this group. Lifestyles were more prevalent in such patients. Dysphagia due to motility disorders is associated with older age, specific gastrointestinal symptoms, and a significant psychosocial impact.

1. Introduction

Dysphagia is the impairment of the swallowing process and can occur at any stage of swallowing (Mascarenhas et al., 2023). It arises from a complex interplay of anatomical, neurological, and physiological factors, disrupting the normal passage of liquids and solids from the oral cavity to the stomach (Pant et al., 2021, Balabram et al., 2025). Dysphagia represents a significant clinical challenge that can arise from a multitude of underlying etiologies, including neurological disorders and esophageal dysmotility (González-Fernández and Daniels, 2008). Esophageal motility disorders are caused by the impaired relaxation of the esophageal sphincters and/or defective esophageal peristaltic contractions, resulting in dysphagia (Hoshikawa and Iwakiri, 2024). Esophageal motility disorders can result in major morbidity and, in some cases, in an increased risk of cancer and death (Massey, 2007). Achalasia, esophagogastric junction outflow blockage, absent contractility, distal esophageal spasm, hypercontractile esophagus, and inefficient esophageal motility are just a few of the many issues that fall under the esophageal motility disorders (Vasireddy et al., 2025). Despite the increasing recognition of these disorders, accurate diagnosis remains challenging, particularly in low-resource settings where access to advanced diagnostic modalities is limited.

The precise evaluation of dysphagia is often involving a combination of barium swallow studies, esophagogastroduodenoscopy (EGD), and esophageal manometry, each offering unique insights into the structural and functional integrity of the swallowing apparatus (González-Fernández et al., 2013). The barium swallow is a long-established and widely used esophageal diagnostic test. Uniquely, it provides information about both esophageal structure and function (Sanagapalli et al., 2023). EGD is the most common diagnostic procedure performed in the evaluation of esophageal dysphagia as this allows direct visualization of the entire esophagus and tissue acquisition via biopsy (Krishnamurthy et al., 2012). However, diagnostic yield of barium swallow and EGD for esophageal motility disorders is limited. Therefore, high-resolution esophageal manometry (HRM) has emerged as the gold standard for evaluating esophageal motor function (Kahrilas et al., 2015, Gyawali and Penagini, 2021).

In addition, the presence of dysphagia can significantly impact an individual's quality of life, leading to malnutrition, dehydration, aspiration pneumonia, and diminished social interaction (Shen et al., 2022, Leonidou et al., 2023). Moreover, in older patients, dysphagia is often well compensated for by altered eating habits and physiologic changes (Le et al., 2023). Chest pain and heart burn may accompany motility disorder-associated dysphagia, which will further impair patients quality of life (Wilkinson and Halland, 2020).

The present case-series study was conducted to evaluate and compare the diagnostic performance of barium swallow, EGD, and high-resolution manometry in patients presenting with dysphagia in Erbil city, Kurdistan region, Iraq. Additionally, the study aimed to investigate the demographic profile, medical history, clinical symptoms, lifestyle habits, and psychosocial impact associated with confirmed esophageal motility disorders.

2. Materials and methods

2.1. Participants with dysphagia

This is a case control study, that was conducted in Erbil city, Kurdistan region, Iraq, between 1st June 2024 to1st June 2025. Participants with dysphagia were referred to Hawler center for Gastroenterology and Hepatology in Rizgary Teaching Hospital. Participants aged below 13 years or having a history of esophageal cancer or having a history of previous esophageal surgery were excluded. Lastly, 113 participants with dysphagia participated in the present study. Informed consent was obtained from all participants.

2.2. Demographic and clinical data collection

For all participants, sociodemographic information, including age, sex, BMI, education level, income, and family history, were collected by structured questionnaires. Family history of chronic diseases (e.g., hypertension, diabetes, stroke, asthma) was also recorded.

2.3. Assessment of medical history and

symptoms

Medical history, including diabetes mellitus (DM), hypertension (HTN), cerebrovascular accident (CVA), connective tissue disease (CTD), and peptic ulcer disease (PDU) were collected from ED patients and controls interviews and medical records. In addition, clinical symptoms like regurgitation, vomiting, weight loss, nausea, odynophagia, and heartburn were documented. Difficulty swallowing was categorized into oropharyngeal (initiation) and esophageal (post-initiation) types were also recorded. Then, the assessment was performed for all mentioned medical history and clinical symptoms.

2.4. Assessment of lifestyle habits and psychosocial impact

For all ED patients and controls, assessment was performed for lifestyle habits, including smoking, alcohol consumption, and intake of hot drink. In addition, psychosocial impact was evaluated through assessing quality of life, emotional distress, eating behavior, and social interaction. Then, responses were quantified and compared between groups.

2.5. Diagnostic approach using EGD, barium swallow and high-resolution manometry

All participants with dysphagia were instructed to fast overnight and to stop medications known to affect esophageal motor function for 28 hr before the test. Then, participants with dysphagia initially underwent EGD using standard endoscopic technique. EGD was used to evaluate structural abnormalities of the esophagus and to assess its potential predictive value for esophageal motility disorders. Findings such as mucosal erythema, ulcerations, food residue, strictures, mass, and dilated esophageal lumen were documented. Afterwards, the same participants underwent a barium swallow examination according to standard protocol. Abnormal findings were categorized, including shouldering, rat tail, dilation, food residue and peristalsis. Finally, all participants were subjected to high-resolution manometry system (Sandhill Scientific, Inc, Highlands Ranch, Colo, USA) which utilize solid-state catheters according to the manufacturer's protocol. Normal and abnormal findings (EGJ outflow obstruction, achalasia, ineffective esophageal motility, absent contractility, jackhammer esophagus) were recorded.

The diagnostic performance of EGD in predicting motility disorders was evaluated by calculating the positive predictive value (PPV) and negative predictive value (NPV), using HRM as the reference standard. To find PPV, the PPV = TP / (TP + FP) equation was used. While NPV = TN / (TN + FN) used to find NPV.

Patients presenting with dysphagia and confirmed oesophagal dysmotility via manometry were recruited as the case (ED) group, while participants without motility disorders served as controls.

2.6. Statistical analysis

Data analyses were achieved by GraphPad Prism version 9.0. Categorical variables were compared using chi-square or Fisher's exact test. Continuous variables were presented as medians with minimum and maximum. Additionally, the frequency and proportion of most findings were presented. A p-value < 0.05 was considered statistically significant.

3. Results

3.1. Demographic characteristics and family history of esophageal motility disorder patients and controls

Patients with oesophagal motility disorder had a higher median age compared to controls. The BMI was similar between groups. The majority of both groups had a high level of education. Most participants in both groups reported income as barely sufficient. The gender distribution showed a higher proportion of females in both groups (Table 1).

Regarding family history, in both esophageal motility disorder patients and controls, around 45% reported no relevant family history. The most common family history among ED patients was hypertension (22.39%), followed by DM + HTN (11.94%). In controls, hypertension (23.91%) and diabetes mellitus (19.57%) were most frequent. Stroke was absent in both groups (supplementary Table 1).

Table 1: Demographic characteristics of participants based on manometry findings

Characteristics	Groups	
	Patients (n = 67)	Controls (n = 46)
Gender (F/M)	40 / 27	29 / 17
Age	43 (15 - 79)	35 (15 - 62)
BMI	26.40 (16.60 - 31.55)	25.55 (18.73 - 32.41)
Education level		
Illiterate	5 (7.46%)	2 (4.35%)
Primary	4 (5.97%)	2 (4.35%)
Secondary	15 (22.39%)	16 (34.78%)
High education	43 (64.18%)	26 (56.52%)
Income level		
Insufficient	7 (10.45%)	3 (6.52%)
Barley sufficient	34 (50.75%)	25 (54.35%)
Sufficient	26 (38.81%)	18 (39.13%)

Note: Median with minimum to maximum for age and BMI used. Abbreviations: F: female, M: male, BMI: body mass index.

3.2. Association of medical history and symptoms with esophageal motility disorder

There was no significant association between medical history variables and esophageal dysmotility. The odds of having DM or HTN were higher in ED group than controls, but not statistically significant. CVA, CTD, and DU were absent or rare in both groups (Table 2). In addition, regurgitation, vomiting and weight loss were significantly associated with esophageal dysmotility. Other symptoms, including odynophagia, nausea, and heartburn, were observed but showed no significant association (Fig. 1). Regarding difficulty in swallowing, all participants (100% of ED group and controls) reported difficulty after eating. At the same time, none experienced difficulty initiating swallowing (Supplementary Table 2).

3.3. Association of lifestyle habits and psychosocial impact with esophageal dysmotility

The association of lifestyle habits including smoking, using alcohol and hot drink with esophageal motility disorder was analyzed. Smoking was similar between ED group and controls. Alcohol use was significantly less common in ED group. In addition, all participants reported consumption of hot drinks (Fig.2). Regarding the association of psychosocial impact with esophageal dysmotility (Table 3), patients reported significantly higher impact on quality of life, emotional/psychological distress, altered eating habits. Their social interaction was hampered by the disease compared to controls ($p < 0.0001$ for all comparisons).

Table 2: Association of medical history with esophageal motility disorder

Medical history	Groups		OR	95% CI	*P-value*
	Patients	Controls			
DM	15 (22.39%)	9 (19.57%)	1.19	0.49 to 2.80	0.82
HTN	19 (28.36%)	8 (17.39%)	1.82	0.73 to 4.52	0.26
CVA	1 (1.49%)	0 (0%)			
CTD	0 (0%)	0 (0%)			
DU	0 (0%)	0 (0%)			

Abbreviations: OR: odds ratio, CI: confidence interval, DM: diabetes mellitus, HTN: hypertension,

CVA: cerebrovascular accident, CTD: connective tissue disease, DU: duodenal ulcer.

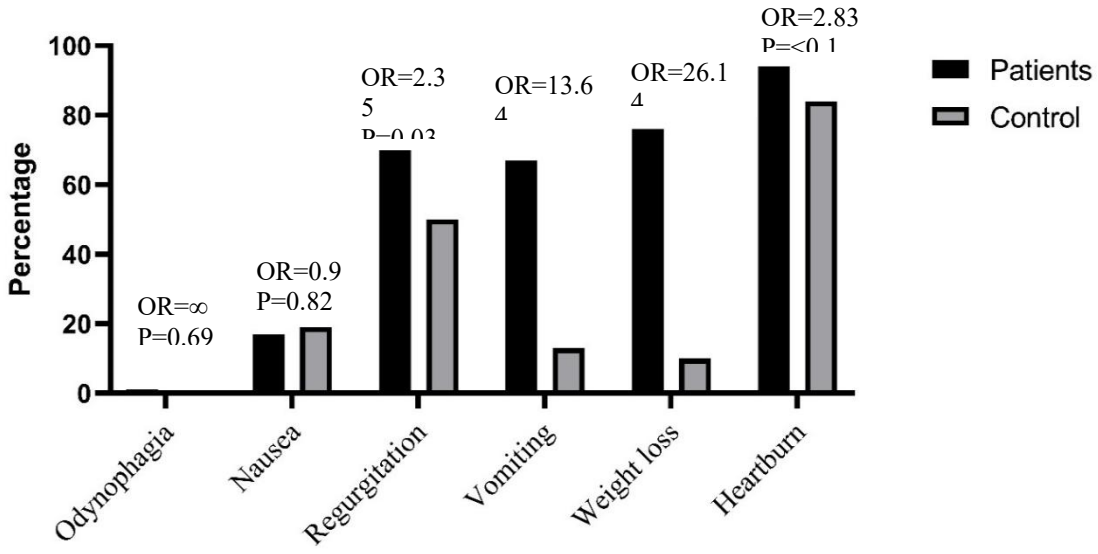

Figure 1: Association of symptoms with esophageal motility disorder. In most symptoms, the percentage of patients was greater than controls

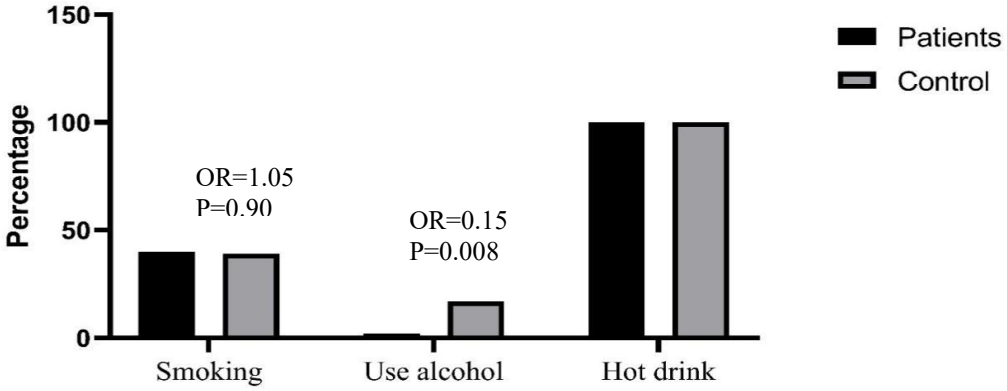

Figure 2: Association of smoking, use alcohol and hot drink with esophageal motility disorder. The percentage of all three habits around the same in both patients and controls.

Table 3: Impact of esophageal dysmotility on quality of life, emotional distress, eating habits, and social interactions

Characteristics	Groups		Chi-square
	Patients	Controls	
Quality of life impact			
Yes	49 (73.13%)	7 (15.22%)	
No	4 (5.97%)	17 (36.96%)	<0.0001
Sometimes	14 (20.9%)	22 (47.82%)	
Emotional or psychological distress			
Yes	47 (70.15%)	4 (8.7%)	
No	7 (10.45%)	22 (47.83%)	<0.0001
Sometimes	13 (19.4%)	20 (43.47%)	
Eating habits			
Yes	34 (50.75%)	1 (2.17%)	<0.0001

No	7 (10.45%)	5 (10.89%)	
Sometimes	26 (38.8%)	40 (86.95%)	
Social interactions			
Yes	33 (49.25%)	1 (2.17%)	
No	6 (8.96%)	7 (15.22%)	<0.0001
Sometimes	28 (41.79%)	38 (82.6%)	

3.4. EGD, Barium swallow and manometry findings of dysphagia participants

Out of all participants with dysphagia who underwent EGD, 44.24% had normal findings, whereas 55.76% showed abnormalities. The most frequently observed abnormality was gastroesophageal reflux disease (GERD) in 30.97% (Table 4). Then, the same participants underwent a barium swallow technique, 61.06% showed normal findings, while 38.94% had abnormal findings. Among the abnormal findings, the most common was shouldering (14.15%) (Table 5). In addition, oesophagal manometry used on the same participants and normal findings was 40.7%, while 59.3% had abnormal motility patterns. The most prevalent abnormalities included esophagogastric junction (EGJ) outflow obstruction (19.46%) and achalasia (18.58%) (Table 6). Most importantly, a statistically significant difference in detection rates across the three techniques ($p = 0.0003$) was observed, with esophageal manometry demonstrating the highest diagnostic yield (Table 7). Regarding sensitivity and specificity of barium swallow and EGD, which were validated by manometry, EGD demonstrated higher sensitivity and specificity compared to barium swallow for detecting oesophagal abnormalities (Table 8). Regarding the predictive values, results showed that PPV was 72.4% and NPV was 84.6%.

Table 4: Distribution of EGD findings among participants with dysphagia

EGD findings	Frequency
Normal	50 (44.24%)
Abnormal	63 (55.76%)
GERD	35 (30.97%)
Narrowing	18 (15.92%)
Ulcer	4 (3.53%)
Food particle	3 (2.65%)
Mass	3 (2.65%)
Dilated	1 (0.88%)
Others	1 (0.88%)

Abbreviations: GERD: gastroesophageal reflux disease.

Table 5: Distribution of barium swallow findings among participants with dysphagia

Barium swallow findings	Frequency
Normal	69 (61.06%)
Abnormal	44 (38.94%)
Shouldering	13 (14.15%)
Rat tail	9 (7.96%)

Dilated	8 (7.07%)
Food residue	5 (4.42%)
Peristalsis	2 (1.77%)
Others	3 (2.65%)

Table 6: Distribution of manometry findings among participants with dysphagia

Manometry findings	Frequency
Normal	46 (40.70%)
Abnormal	67 (59.30%)
EGJ outflow obstruction	22 (19.46%)
Achalasia	21 (18.58%)
Ineffective esophageal motility	15 (13.27%)
Absent contractility	8 (7.07%)
Jackhammer esophagus	1 (0.88%)

Table 7: Diagnostic yield of EGD, barium swallow and manometry in dysphagia participants

Technique		Normal	Abnormal	chi-square
EGD	No	50	63	0.0003
	%	44.20%	55.80%	
Barium swallow	No	74	39	
	%	66.60%	33.40%	
Manometry	No	46	67	
	%	40.70%	59.30%	

Abbreviations: EGD: esophagogastroduodenoscopy

Table 8: The validity of barium swallow and OGD techniques in diagnosing motility disorders by using manometry

	Barium swallow	EGD
Sensitivity	70.53%	94.36%
Specificity	38.33%	47.92%

Abbreviations: EGD: esophagogastroduodenoscopy.

4. Discussion

This study was conducted to address the challenge of accurately diagnosing esophageal motility disorders, a major cause of dysphagia that can impair nutrition, and reduce quality of life. While barium swallow and EGD provide structural assessment, their ability to detect motility disorders is limited, making high-resolution manometry the gold standard. By comparing these diagnostic tools and examining clinical, demographic, and psychosocial factors, this study aimed to improve understanding and management of ED patients.

Demographically, ED patients with confirmed motility disorders were significantly older, suggesting age-related neuromuscular decline in esophageal function. In addition, the female predominance observed in both groups which means that women may be more likely to seek medical attention for gastrointestinal symptoms,

including dysphagia. However, hormonal and functional factors may also contribute to sex-based differences in esophageal sensitivity and motility. These findings are consistent with previous research indicating that dysphagia was more likely to occur in women and older individuals (Wilkins et al., 2007, Mohammed et al., 2015). Educational level and income were broadly comparable between groups, with a majority reporting higher education but insufficient income. These findings may reflect the general socioeconomic profile of the population attending the tertiary care centre, rather than a true association with oesophagal motility disorders.

Symptom analysis revealed that regurgitation, vomiting, and weight loss were strongly associated with esophageal motility disorders which is valuable for clinicians to prioritize functional testing. Based on population-based surveys, nearly half of the US population might have esophageal symptoms, including heartburn, regurgitation, or dysphagia (Delshad et al., 2020). In addition, typical symptoms of achalasia, a type of esophageal motility disorders, include progressive dysphagia to solids and liquids, regurgitation, chest pain, heartburn, and weight loss (Vaezi et al., 2013).

Moreover, lifestyle habits showed lower alcohol consumption in ED group, which may reflect self-imposed avoidance behaviors to minimize symptoms. Hot drink intake was uniform and culturally prevalent. Moreover, psychosocial assessments revealed that ED patients with motility disorders have significantly worse quality of life, emotional distress, altered eating behaviors, and impaired social interactions. Lifestyle risk factors that may contribute to GERD, as oesophagal motility disorder, include moderate/high alcohol consumption (Taraszewska, 2021, Pan et al., 2019). Furthermore, GERD has a detrimental effect on quality of life (Mahajan et al., 2022) and psychological distress, especially somatization, was more prevalent in patients with esophageal achalasia than healthy controls (Xu et al., 2023). Eating habits such as irregular meal patterns, consuming large volumes of food, and eating meals just before bedtime may be associated with the symptoms of GERD (Taraszewska, 2021).

Finally, participants with dysphagia were assessed with EGD, barium swallow and manometry in diagnosis, and the findings demonstrate that manometry is significantly superior in detecting esophageal motility abnormalities, aligning with its established role as the gold standard for diagnosing such disorders (Denzer et al., 2023, Yadlapati et al., 2021). Previous studies have recommended manometry for the diagnosis of esophageal dysmotility (Liu et al., 2018) as both upper endoscopy and barium swallow study had low sensitivities for detecting features of achalasia as a kind of esophageal motility disorder (Mohammed et al., 2015). While barium swallow and EGD remain essential to exclude structural or mucosal pathology, their limited sensitivity for functional disorders is well-recognized (Voulgaris et al., 2025). In addition, in the present study, esophagogastric junction (EGJ) outflow obstruction and achalasia were predominant, is consistent with data from diverse populations (Voulgaris et al., 2025). Therefore, the results of current and previous studies confirm that relying solely on anatomical imaging can delay diagnosis, whereas manometry enables earlier detection and targeted intervention.

4. Conclusion

Esophageal manometry demonstrated higher diagnostic accuracy than barium swallow and EGD in detecting motility disorders, especially EGJ outflow obstruction and achalasia. Patients were generally older, and females were more represented among those with motility disorders and controls. While demographics and medical history had limited influence, symptoms such as regurgitation, vomiting, and weight loss were strongly associated. Lifestyle differences were minimal, except for lower alcohol intake in ED patients. The findings highlight the clinical and psychosocial impact of motility disorders and support the need for thorough diagnostic and management strategies.

Limitations

This study has several limitations. First, it was conducted only in Erbil city, which may limit the generalizability of the findings to other

populations. Expanding the study to include additional cities could provide a larger sample size and more representative data. Second, while we included detailed demographic and clinical characteristics, some variables were not analyzed in depth, which could be addressed in future studies.

Ethical approval

The current research project (No: 5, July 21, 2024) has been approved by the Ethics and Scientific committee of the Kurdistan Higher Council of Medical Specialties for Scientific and ethical approval.

Informed consent

Written informed consent was obtained from all participants prior to their inclusion in the study

Acknowledgements

The authors would like to express their sincere gratitude to Hawler Centre for Gastroenterology and Hepatology in Rizgary Teaching Hospital, Erbil, Kurdistan Region, Iraq, for continuous support throughout this study. The authors also wish to thank all participants of this study.

Author contributions

Zrar Hussein Rasul was responsible for methodology, data collection, data analysis, and manuscript writing. Mohammed Omer Mohammed designed the study, supervised the overall project implementation, and contributed to the critical revision of the manuscript. Blund Sirwan Abdulla was responsible for recruiting participants, conducting clinical assessments, and interpreting the results. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Funding

This research received no specific grant from any funding agency.

Conflict of interest

The authors declare no conflicts of interest.

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