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Original Article

Pathology Section

Solitary Rectal Ulcer Syndrome: A Cross-sectional Study on Diagnostic Dilemma of the Three-lies Disease

KB AARTHI[1], PAYEL DAS[2], AARTI TYAGI[3], MINI CHAURASIA[4], PRIYANKA YADAV[5], MONA BARGOTYA[6]

ABSTRACT

Introduction: Solitary Rectal Ulcer Syndrome (SRUS) displays a wide spectrum of clinical manifestations and varied endoscopic presentations. It is a significant imitator of various ulcerative and non ulcerative lower gastrointestinal entities and misdiagnosis has significant implications for both clinicians and patients.

Aim: To characterise the clinical, endoscopic, demographic and histopathological features of SRUS for early and accurate diagnosis.

Materials and Methods: This cross-sectional study was conducted on all cases diagnosed as SRUS in the Department of Pathology at Rajiv Gandhi Super Speciality Hospital (RGSSH), Delhi, India between July 2018 and July 2023. The parameters taken into consideration included: (a) demographic - age and gender; (b) clinical - symptoms and endoscopic findings (ulceration, mucosal prolapse, polypoidal mass, haemorrhoids, erythematous mucosa, rectal wall thickening, altered rectal mucosa, inflammation); (c) laboratory - histopathological findings. The data was compiled in Microsoft Excel and descriptive statistics were computed and presented in tables and graphs.

Results: A total of 43 patients diagnosed with SRUS were reviewed and analysed retrospectively. Of all the cases, 19 were males (44.18%) and 24 were females (55.81%), with a median age of 25 years (range, 8-85 years). Rectal bleeding (76.74%) was the most commonly observed symptom, followed by changes in frequency and mucous discharge (41.86%). Endoscopy revealed ulceration (single or multiple) in 35 patients (81.39%), 10 patients (23.25%) had mucosal prolapse and a polypoidal mass was seen in seven patients (16.27%) with SRUS.

Conclusion: Despite its name, there is no true syndromic association, nor do all patients present with ulcers endoscopically. Clinically, it may simulate inflammatory bowel disease or malignancy, which necessitates meticulous evaluation of endoscopic biopsy specimens for accurate diagnosis.

Keywords: Crypt architecture distortion, Crypt hyperplasia, Inflammatory bowel disease, Multiple ulcers, Rectal bleeding

INTRODUCTION

The SRUS is a well-recognised, rare and diagnostically challenging entity. It is a benign disorder that remains underdiagnosed due to its wide spectrum of clinical manifestations and varied endoscopic presentations. SRUS is a misnomer, often referred to as "the three-lies disease," as despite the term "solitary," there may be multiple ulcers and the lesion is not always ulcerative or restricted to the rectum [1]. The condition is a well-recognised entity in adults but is less commonly reported in the paediatric age group [2]. Not only does it present with non specific symptoms, but macroscopically, it can also mimic various serious conditions such as IBD, dysplasia, or rectal polyps, which may account for the low prevalence of the entity and lead to diagnostic disasters [3].

Several underlying mechanisms responsible for its occurrence can be attributed to rectal hypersensitivity, which leads to a persistent desire to defecate and a sensation of incomplete evacuation [4]. Inappropriate and paradoxical contraction of the puborectalis muscle causes obstruction during defaecation and compresses the anterior wall of the rectum, resulting in prolapse and intussusception of the rectal mucosa [5]. Additionally, venous congestion and trauma to the rectal mucosa lead to congestion, oedema and ulceration, while excessive straining during defaecation causes the anterior rectal mucosa to move downwards against the underlying pelvic floor, resulting in trauma and focal ischaemia of the rectal mucosa [6].

Patients may be asymptomatic, or they may report commonly encountered non specific symptoms, including rectal bleeding, tenesmus, mucus discharge, chronic constipation or diarrhoea, prolonged straining during defaecation, or a sense of incomplete evacuation [7]. Additionally, rectal digitation for stool removal may be considered another cause leading to trauma and ulceration [7].

Endoscopically, SRUS presents variable features. Most commonly, the lesions are ulcerative; they can appear either polypoidal or flat and may vary in size from millimeters to several centimeters. Ulceration has been reported on both the posterior and anterolateral walls and these lesions can be solitary or multiple [8-10].

Histological examination of the rectal lesion is Key to diagnose SRUS. The syndrome is characterised by histomorphological features, including fibromuscular obliteration of the lamina propria with upward extension from hypertrophic and splayed muscularis mucosae, along with the presence of glandular crypt abnormalities. These lesions are modified to a considerable degree by secondary changes such as surface erosion, with or without a pseudomembrane, inflammation, haemorrhage, ectatic and congested vessels, submucosal fibrosis, deep cyst formation, or misplaced glands in the submucosa [11,12].

The combination of symptomatology, endoscopy and histology aids in the diagnosis of SRUS. However, underdiagnosis and misdiagnosis continue to be reported in the literature [8,13]. The present study is an effort to characterise the clinical, endoscopic and histopathological features of SRUS for better diagnosis, thereby preventing misdiagnosis and reducing management disasters.

The objective of the study was to enumerate the demographic, clinical, endoscopic and histopathological profiles of SRUS.

MATERIALS AND METHODS

The cross-sectional study was conducted in the Department of Pathology at Rajiv Gandhi Super Speciality hospital (RGSSH), Delhi, India, from July 2018 to July 2023. This was a retrospective analysis of 43 patients. Administrative approval from the Medical Superintendent of the hospital and the Head of the Department

was obtained. Since the study did not involve contacting patients or prospective follow-up, Institutional Ethical Committee approval was not sought.

Inclusion and Exclusion criteria: Clinical records of diagnosed cases, confirmed by endoscopy and rectal histopathological examination, were retrieved from the medical records and included in the study. Patients with incomplete records were excluded from the study.

Study Procedure

The study involved the collection of de-identified information, excluding Patient Identifying Information (PII) from the available hospital clinical records in the Medical Records department. Haematoxylin and Eosin (H&E) stained slides were retrieved and reviewed. If needed, fresh tissue sections were taken from stored paraffin-embedded blocks and stained. All clinical features, along with endoscopic findings and histopathological illustrations, were combined to emphasise the diagnostic dilemma of SRUS.

The parameters taken into consideration included: (a) demographic - age, gender; (b) clinical - symptoms, endoscopic findings (ulceration, mucosal prolapse, polypoidal mass, haemorrhoids, erythematous mucosa, rectal wall thickening, altered rectal mucosa, inflammation); and (c) laboratory - histopathological findings. No specific classification is available for SRUS. Only endoscopic and histopathological examinations were carried out and no markers were needed in the study.

STATISTICAL ANALYSIS

The data was compiled in Microsoft Excel and descriptive statistics were computed and presented in tables and graphs.

RESULTS

During the study period, only 43 cases were documented, indicating that this is not a common entity. All included cases underwent colonoscopy for various presentations. Demographically, 19 males and 24 females were included in this study. The majority of the patients were young, with 34 patients (79.06%) under 40 years of age and 9 (20.93%) above 40 years of age [Table/Fig-1]. The median age was 25 years, with a female-to-male ratio of 1.2:1.

Age distribution (in years)	Male	Female
0-40	18	16
40-60	1	2
>60	1	5

[Table/Fig-1]: Demographic features including gender and age distribution.

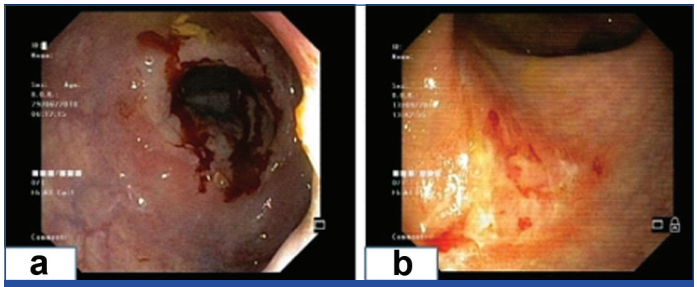
Clinically, patients presented with a variety of symptoms. Rectal bleeding was the most commonly reported symptom, observed in 33 (76.74%) patients, followed by increased frequency in 18 (41.86%) patients. Perianal pain was reported by 13 (30.23%) patients, while the passage of mucus and tenesmus were observed in 18 (41.86%) and 13 (30.23%) cases, respectively. Constipation and prolonged toilet sitting were complaints in 12 (27.90%) cases and diarrhoea was reported in 10 (23.25%) cases. Additionally, 6 (13.95%) patients had a history of rectal digitation to assist with defaecation [Table/Fig-2].

Endoscopy revealed ulceration in 35 (81.39%) cases involving the anterior or posterior mucosal wall. Some cases exhibited multiple ulcerations. Mucosal prolapse was observed in 10 (23.25%) cases, while 7 cases (16.27%) had a polypoidal mass that macroscopically could not be differentiated from a neoplastic polyp. Three patients had haemorrhoids. Erythematous mucosa, rectal wall thickening, altered rectal mucosa and inflammation were among other findings [Table/Fig-3].

Among the histopathological findings [Table/Fig-4], 20 cases (46.51%) had crypt hyperplasia. Other commonly observed findings included

Symptoms	n (%)
Rectal bleeding	33 (76.74)
Mucous discharge	18 (41.86)
Frequency	18 (41.86)
Tenesmus	13 (30.23)
Perianal pain	13 (30.23)
Constipation	12 (27.90)
Diarrhoea	10 (23.25)
Prolonged defaecation	9 (20.93)
Digitalisation	6 (13.95)

[Table/Fig-2]: Presenting symptoms of the patients.



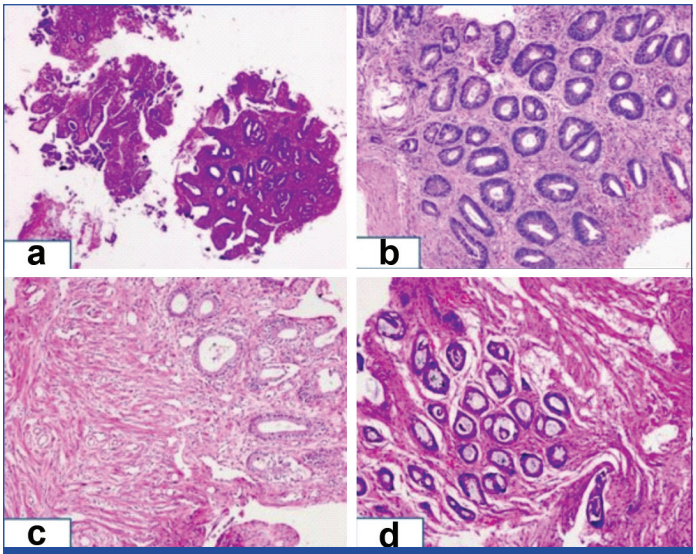
[Table/Fig-3]: Endoscopic findings. a) Friable mucosa; b) Ulcerated mucosa.

Histopathological findings	n (%)
Congestion or ectatic vessels	43 (100)
Crypt hyperplasia	20 (46.51)
Hypertrophy/thickening of muscularispropria with splaying fibres	18 (41.86)
Mucosal architecture distortion	18 (41.86)
Fibromuscular hyperplasia/obliteration of lamina propria	18 (41.86)
Inflammation	17 (39.53)
Surface erosions	17 (39.53)
Superficial ulceration	15 (34.88)
Serrated mucosa	5 (11.62)
Reactive atypia	2 (4.65)
Pseudomembrane	1 (2.32)
Villiform changes	2 (4.65)
Polypoidal appearance	1 (3.22)
Haemorrhage	1 (3.22)

[Table/Fig-4]: Histopathological findings of cases.

mucosal architectural distortion, hypertrophy of the muscularis propria with splaying fibres and fibromuscular hyperplasia with obliteration of the lamina propria, which were reported in 18 patients (41.86%). Superficial ulceration was noted in 15 cases (34.88%). Surface erosion with mild to moderate inflammation was observed in 17 cases (39.53%). A total of 5 cases (11.62%) had serrated mucosa and 2 cases (4.65%) showed villiform mucosal changes. Two cases were reported with reactive atypia and a pseudomembrane was seen in one of the cases. However, secondary changes, such as congestion and ectatic vessels, were observed in all the reported mucosal biopsies. The pictorial representation of the histomorphological findings is depicted in images [Table/Fig-5a-d].

Key histological features included ectatic vessels, crypt abnormalities, fibromuscular obliteration of the lamina propria, hypertrophied splayed muscularis mucosae with extension of muscle fibres upward between the crypts, surface ulceration and mild inflammation. Other minor microscopic changes included reactive epithelial atypia, pseudomembrane, villiform changes, polypoidal changes and haemorrhage. None of the cases showed granuloma, crypt abscess, goblet cell depletion, or nuclear atypia. The clinical information, endoscopic findings and pathological features of all patients is summarised in [Table/Fig-6].



[Table/Fig-5]: a-d) Pictorial representation of the histomorphological findings (H&E,).

Clinical features	No. of cases	Histopathological findings	No. of cases	Endoscopic findings	No. of cases
Rectal bleeding	29	Congestion or ectatic vessels	31	Ulaceration	35
Mucous disharge	17	Crypt hyperplasia	30	Mucosal Prolapse	10
Frequency	16	Hypertrophy/ thickening of muscularispropria with splaying fibres	30	Polypoidal mass	7
Tenesmus	14	Mucosal architecture distortion	29	Haemorrhoids	3
Perianal pain	13	Fibromuscular hyperplasia/ obliteration of lamina propria	28	Erythematous mucosa	
Constipation	11	Inflammation	27	Rectal wall thickening	
Diarrhoea	10	Surface erosions	27	Altered rectal mucosa	
Prolonged defaecation	9	Superficial uceration	16	Inflammation	
Digitalosation	5	Serrated mucosa	6		
		Reactive atypia	3		
		Pseudomembrane	2		
		Villiform changes	2		
		Polypoidalapperance	1		
		Haemorrahage	1		

[Table/Fig-6]: Depicting various clinical features, histopathological and endoscopic findings.

DISCUSSION

The present study was conducted at a tertiary care centre in North India. Over a two-year period, we documented 43 histopathologically confirmed cases of SRUS. The predisposing mechanisms responsible for the condition remain mystifying. Several proposed hypotheses include congenital malformation harmatomas [14], unrelaxation of puborectalis muscles, localised bowel ischaemia and rectal prolapse [15].

In most cases of SRUS reported previously from other countries, the male-to-female ratio was approximately one [16,17]. In the present series, there was a slightly higher proportion of male patients. Chiang JM et al., studied a series of 10 patients and reported a similar result of male preponderance. The present series exhibited a wide age range (8-85 years) [18]. A similar study with a wide age range of 14-76 years was conducted by the Cleveland Clinic, while Marchal F et al., reported an age range of 25-86 years [19]. SRUS has been reported in both sexes and across all ages; however, it is most frequently observed in adulthood, typically in the third or fourth decades [20]. Notably, one of the patients was an eight-year-old and can be considered part of the paediatric age group. Very few reports of SRUS have focused on this age group in the literature [21]. In the study conducted by Thirumal P et al., the median age of children was eight years [13].

There exists a range of symptoms and clinical features in SRUS that simulate a variety of other disease entities. Endoscopy and histology are crucial for distinguishing the condition from other rectal ulcer-associated conditions [22].

Rectal bleeding and constipation are reported to be the most common presentations in the previously reported series [8,18,19]. The bleeding is likely due to ulceration of the mucosa. Rectal bleeding was reported in 76.74% of cases in the present study. It is also assumed that rectal bleeding can be an indication of this entity, as almost all previously reported cases had the same presenting symptom [23]. The present study revealed that more than half of our patients experienced frequency, perianal pain, tenesmus and mucous discharge.

The association of rectal prolapse is often studied with this condition in the literature [24]. Furthermore, Morson and Churchill described the lesion as mucosal prolapse syndrome [25], which could lead to congestion and ischaemia, resulting in ulceration. Among our study group, 23.25% had mucosal prolapse.

A few patients presented with diarrhoea, accounting for 23.25% of the total cases. This was reported in 22% of patients in another study by Torres C et al., [24].

Rectal digitations and self-inflicted injury have been claimed to contribute to the rectal injury resulting in ulceration [26] and this has been reported in up to 13.95% of the patients in the series reported by Chiang JM et al. In the present study, 23.8% of the patients provided such a history [18].

Colonoscopy in SRUS usually reveals ulceration, whether single or multiple, on the anterior or posterior aspect of the rectal wall [2]. The previously reported studies found ulceration to be the most commonly encountered endoscopic finding [18]. In contrast to its name, it can present without any ulceration; 10% to 23% of cases present as nodular or polypoid mucosa [27]. The present case series includes 18 reported cases with ulcers. However, three had a polypoid lesion without any ulceration. The presence of multiple ulcerations has been reported in the literature [28]. Similarly, the present case series had 38% of cases with multiple ulcers, including both the anterior and posterior rectal wall mucosa. This contradicts its coined terminology ie. 'solitary ulcer', as the term is misapplied, since there are cases with neither single ulcers nor all cases presenting with ulceration.

Although colonoscopic findings are important for the diagnosis of SRUS, it can be misdiagnosed as inflammatory bowel disease by endoscopists and true polyps while in the polypoidal stage. Regarding these misdiagnosis, Torres C et al., published a study that included 65.3% of the patients with ulceration [24]. Tjandra et al., and Tendler DA et al., reported 29% of cases with ulcers and 44% with polyps [12].

Though colonoscopic findings are important for the diagnosis of SRUS, it can be misdiagnosed as inflammatory bowel disease by endoscopists. In the polypoid stage, SRUS is very similar to true polyps [8].

Histopathological examination is considered the mainstay for the diagnosis of SRUS. In various reported studies, fibromuscular obliteration of the lamina propria, along with thickening of the muscularis propria, is one of the specific findings used to reach the diagnosis. Tendler DA et al., documented such changes in 93% of the cases studied, with mucosal architecture distortion and surface serration seen in 100% of his series [12].

In the present series, the rectal mucosal biopsies displayed hypertrophied muscular propria with splaying fibres, mucosal architecture distortion and fibromuscular hyperplasia/obliteration of the lamina propria as the most common findings, occurring with a frequency of 41.86% [Table/Fig-4]. It is worth mentioning that such presentations can also be seen in inflammatory bowel diseases, which include both ulcerative colitis and Crohn's disease. The pathologist needs to conduct a detailed examination for the presence of dense inflammation, cryptitis, crypt abscesses and granulomas to differentiate these entities.

Different vascular changes have been noted in biopsies of SRUS. Lonsdale, in his series, reported ectasia with congestion in 95% of cases [29]. Another common feature he noted was muscularised capillaries, which were observed in 50% of his cases. Tendler DA et al., also encountered similar mucosal capillary abnormalities, including dilatation, congestion and thrombosis, in 87% of their patients [12]. The present study revealed similar findings, with ectasia and congestion seen in 100% of cases. A few biopsies showed a villiform configuration of the mucosa, leading to the overdiagnosis of adenoma. Other minor microscopic changes recorded include surface erosion, mild inflammation, distorted crypts and reactive epithelial atypia, which may lead to erroneous diagnosis of dysplastic changes or neoplasia.

Limitation(s)

A limitation of the study is that it is a single-centre study with a small number of cases. However, the study highlights the infrequent nature of this entity and the potential dilemmas faced by clinicians. Nevertheless, the present study uncovers the erroneous nature of the presentation of a relatively uncommon entity.

CONCLUSION(S)

The SRUS is a misnomer and a rare entity that is likely to be confused with clinically similar conditions like IBD, rectal polyps and neoplasms. SRUS has characteristic histological features, but the presentation varies in different patients. Comprehensive understanding and awareness of such variations in clinical and pathological findings will prevent underdiagnosing and misdiagnosing. Both underreporting and overreporting are disastrous for its management. Thus, it requires the strenuous efforts of the pathologist to provide an accurate diagnosis to the extent possible, enabling the clinician to develop an optimal treatment plan.

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PARTICULARS OF CONTRIBUTORS:
1. Senior Resident, Department of Pathology, Rajiv Gandhi Super Specialty Hospital, Tahirpur, New Delhi, India.
2. Assistant Professor, Department of Pathology, Rajiv Gandhi Super Specialty Hospital, Tahirpur, New Delhi, India.
3. Senior Resident, Department of Pathology, Rajiv Gandhi Super Specialty Hospital, Tahirpur, New Delhi, India.
4. Secondary DNB, Department of Pathology, Rajiv Gandhi Super Specialty Hospital, Tahirpur, New Delhi, India.
5. Senior Resident, Department of Pathology, Rajiv Gandhi Super Specialty Hospital, Tahirpur, New Delhi, India.
6. Associate Professor and Head, Department of Pathology, Rajiv Gandhi Super Specialty Hospital, Tahirpur, New Delhi, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Mona Bargotya,
Block 7, 4th Floor, Rajiv Gandhi Super Specialty Hospital, New Delhi-110093, India.
E-mail: pathologyrgssh@gmail.com

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