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Review

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Argon plasma photocoagulation for prevention of chronic ulcers and bleeding in solitary rectal ulcer syndrome: Scoping review and narrative summary

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Abstract

Introduction: Solitary Rectal Ulcer Syndrome (SRUS), often called the "three-lies illness," involves ulcers or hyperemic mucosa without ulcers. Its complex and not fully understood etiology makes treatment challenging, focusing primarily on the underlying disease mechanisms. Argon Plasma Photocoagulation (APC) offers potential benefits worth considering for SRUS. This thermal coagulation technique effectively stops bleeding and promotes tissue healing. This review evaluates the effectiveness of APC compared to traditional therapies for managing chronic ulcers and bleeding in SRUS.

Methods: Following PRISMA guidelines, we conducted a scoping review using specific search syntaxes related to SRUS and Argon Plasma Coagulation. We systematically searched PubMed, Cochrane, and Google Scholar for articles up to December 2022.

Results: Out of 431 articles screened, 32 studies met the inclusion criteria. Standard treatments for SRUS include behavioral therapy, sucralfate enemas, bulk laxatives, high-fiber supplements, corticosteroid therapy, and rectopexy. Research indicates that conservative therapy may increase ulcer recurrence and delay healing. In contrast, APC showed improved postoperative ulcer healing, better bleeding control, and lower recurrence rates. Importantly, no complications such as intestinal perforation, fistula, or infection were reported following APC treatment. APC consistently outperformed conventional therapies, enhancing SRUS management when used alongside traditional treatments.

Conclusion: Argon Plasma Photocoagulation significantly improves postoperative ulcer healing, bleeding control, and recurrence rates in SRUS patients. APC, combined with conventional therapies, is more effective than traditional treatments alone. Further extensive and conclusive studies comparing APC to conventional therapies are necessary to determine the most effective treatment option for SRUS.

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Background

Solitary Rectal Ulcer Syndrome (SRUS) is a benign rectal condition commonly affecting young adults aged 30-40, with rectal bleeding being the typical clinical presentation. Known as the "three lies illness," SRUS is not limited to the rectum and can be identified by single or multiple ulcers, or hyperaemic mucosa without ulcers [1]. Lesions are mostly found in the anterior or anterolateral rectal wall and can also develop in the left colon [2]. The exact cause of SRUS is unknown, but trauma and ischemia are considered primary contributors. Histopathological findings are often misdiagnosed as inflammatory bowel disease (IBD), rectal polyps, or cancer [3].

Treatment focuses on behavioral therapy to address underlying causes. Bowel training, avoiding straining, anal digitations, and improving rectal blood flow are recommended [4]. Various treatment options aim to manage symptoms, control bleeding, and promote healing, with argon plasma photocoagulation (APC) being one of the latest methods. APC uses thermal coagulation to achieve hemostasis and tissue devitalization, facilitating ulcer healing [5]. Argon is ideal for treating surface ulcers due to its shallow penetration depth and biological inertness, making APC an effective alternative for SRUS treatment [6].

Methods

This study adhered to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines [7]. We conducted an extensive literature search across three major databases: PubMed, Cochrane Library, and Google Scholar. The search strategy was designed to identify all relevant studies on Solitary Rectal Ulcer Syndrome (SRUS) and Argon Plasma Coagulation (APC). We employed specific syntaxes and medical subject headings (MeSH) to refine our search. The primary MeSH terms used were "solitary rectal ulcer syndrome" and the combination "solitary rectal ulcer syndrome AND argon plasma coagulation." The search strategy involved the following steps:

1. PubMed: We used advanced search options with the following syntax: ("solitary rectal ulcer syndrome"[MeSH Terms] OR "solitary rectal ulcer syndrome"[All Fields]) AND ("argon plasma coagulation"[MeSH Terms] OR "argon plasma coagulation"[All Fields]).

2. Cochrane Library: A similar search syntax was applied, focusing on systematic reviews and clinical trials relevant to SRUS and APC.

3. Google Scholar: We utilized broad search terms and reviewed the first 200 results to capture grey literature and additional studies that might not be indexed in PubMed or Cochrane Library.

Inclusion and Exclusion Criteria

Inclusion Criteria: (1) Studies published in peer-reviewed journals up to December 2022; (2) Studies that investigated SRUS, APC, or both; (3) Full-text articles available in English; (4) Studies that provided clinical data, outcomes, or reviews on the efficacy of APC in treating SRUS. Exclusion Criteria: (1) Abstracts, conference papers, and editorials without full-text availability; (2) Non-English language publications; (3) Studies lacking specific data on SRUS or APC.

Study selection

Two independent reviewers screened the titles and abstracts of the identified articles. Full-text reviews were conducted for articles that met the inclusion criteria or when the abstract provided insufficient information to make a decision. Discrepancies between reviewers were resolved through discussion or consultation with a third reviewer.

Data extraction

We developed a standardized data extraction form to capture relevant information from each included study. Data extracted included study design and setting, sample size and patient demographics, intervention details (APC

Figure 1: Flowchart of study inclusion

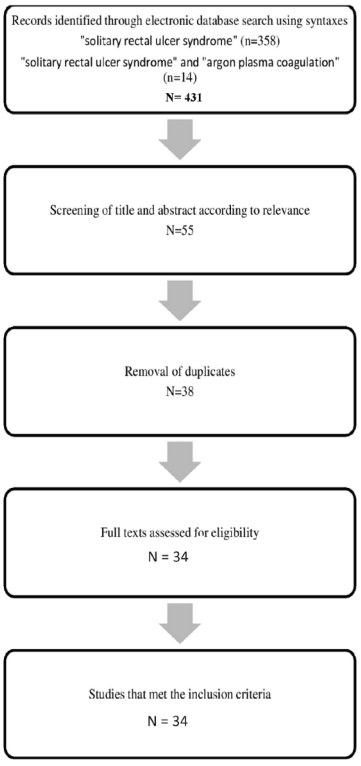
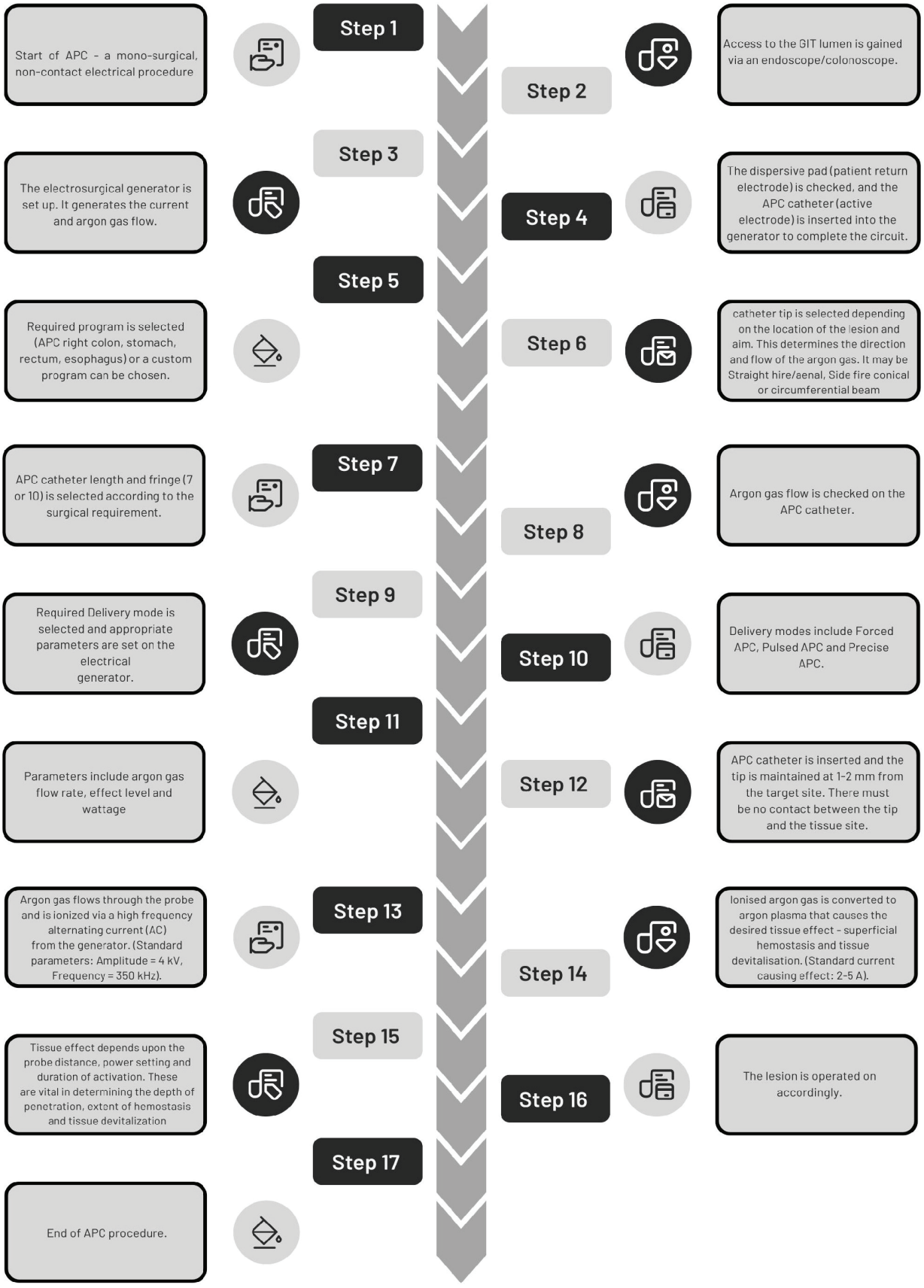


Figure 2: Flowchart depicting a standardized protocol for APC



protocols), outcomes measured (efficacy, recurrence rates, adverse effects), follow-up duration. The extracted data were then synthesized to provide a comprehensive overview of the current evidence regarding the use of APC in the treatment of SRUS.

Results

Epidemiology

A total of 431 articles were screened, with 32 included in the review (figure 1). SRUS affects approximately 1 in 100,000 people annually, with equal prevalence among males and females. Young adults aged 30-40 are typically affected, but constipation-prone individuals of all ages can develop the condition. SRUS is more prevalent in Asia, particularly Iran. Although rare, recent years have seen an increase in pediatric cases, with the youngest patient reported being 4.5 years old [8, 9].

Etiology

The etiology of SRUS remains unclear, but trauma and ischemia are considered major factors [3]. Pathogenesis theories include trauma from pelvic floor straining and paradoxical contraction [10]. Incomplete stool evacuation may lead individuals to manually stimulate bowel movements, causing rectal lining damage [4].

Presentation

SRUS presents with a range of symptoms, with rectal bleeding being the most common. Other symptoms include anorectal pain, abdominal pain, blood-tinged mucus discharge, severe constipation, fecal incontinence, and pelvic discomfort [11]. Some patients are asymptomatic, with diagnoses made incidentally. Signs of rectal prolapse and paradoxical contraction of pelvic floor muscles can also be elicited.

Diagnosis

SRUS diagnosis requires rectal bleeding and endoscopic findings confirmed by biopsy. The main diagnostic tool is recto-sigmoidoscopy, revealing ulcers, polypoid lesions, proctitis without ulceration, or mid-rectal stenosis [12]. Histopathology often shows fibrous obliteration of the lamina propria, muscularis mucosa thickening, and crypt distortion, which can resemble other rectal pathologies.

Treatment

Treatment aims to correct pathogenic mechanisms. Behavioral interventions, bulk laxatives, high-fiber supplements, sucralfate enemas, and corticosteroid enemas are common [4]. Rifaximin shows promise for inflammatory bowel disease, including Crohn's disease [14, 15]. Surgical options like rectopexy are considered when medical therapy fails or in cases of rectal prolapse. APC is increasingly used for its efficacy in bleeding control and ulcer healing, outperforming traditional methods [13].

Argon Plasma Coagulation

APC utilizes ionized argon gas for thermal coagulation, hemostasis, and tissue devitalization [16]. It is particularly effective for superficial ulcers due to its limited penetration depth. APC has shown success in treating various conditions, including gastric antral vascular ectasia (GAVE) and radiation-induced proctopathy, with minimal complications [19-27].

Procedure

APC involves a high-frequency current passing through argon plasma to target tissue, causing coagulation without direct contact [5, 6]. The procedure typically lasts 0.5 to 2 seconds, with power settings adjusted based on the specific application. Proper technique and equipment settings (figure 2) are crucial to avoid complications such as deep thermal injury and gas entry into the submucosa [5].

Efficacy Comparison

Studies show that APC is more effective in healing SRUS ulcers and controlling bleeding compared to traditional treatments [17, 30]. Meta-analysis and clinical trials support APC's superior outcomes in reducing recurrence rates and promoting ulcer healing [3, 30].

Discussion

SRUS, though rare and often underdiagnosed, can significantly impact quality of life. APC has emerged as a promising treatment modality, offering advantages over traditional methods. While the current literature supports APC's efficacy, more extensive and long-term studies are needed to establish its role in SRUS treatment.

This study had limitations. It included only English-language studies, which may introduce selection bias. The lack of long-term data and studies from non-English-speaking regions limits the generalizability of the findings. Further research is needed to fully understand APC's efficacy and safety in SRUS treatment.

Argon plasma coagulation significantly improves ulcer healing and reduces recurrence rates in SRUS patients compared to traditional treatments. While APC shows promise, further research with larger sample sizes and long-term follow-up is necessary to validate its effectiveness and safety.

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