

# Clinical and Morphological Condition of Strictures of the Anal Canal

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**Abstract** Anal stricture disease occupies a leading position among complications after surgical operations in the perianal areas. The main causes of anal and rectal strictures are surgical trauma, inflammatory bowel diseases, infections and fibrosis, sexually transmitted diseases, tuberculosis, and chronic laxative abuse. Morphologically, with strictures around the anus, scar growths, deformation of the walls of venous vessels, and inflammatory infiltrates in the interstitial tissue are revealed. The morphological picture of a scar lesion in the anorectal area makes it possible to assess the maturity of the pathological connective tissue and determine the treatment tactics for this process.

**Keywords** Anal canal, Strictures, Morphological condition, Diagnosis

## 1. Introduction

Postoperative anal stricture is a serious disease caused by pathological narrowing of the anus resulting from excision of the perianal skin and anal mucosa, which were replaced by connective tissue [3,5,8,11,12]. The most common cause of postoperative anal strictures is hemorrhoidectomy, ranging from 1.5% to 3.8%. The incidence of the disease, according to various authors, has fluctuated over several decades in the range of 2-9% of all patients operated on for benign diseases of the rectum [1,4,6,10]. V.V. Balitsky et al. (2021) summarizing the experience of treating postoperative summarizing the experience of treating postoperative anal canal stenoses, note that strictures of the anal canal after hemorrhoidectomy occur in 5-10% of cases. There are various approaches of specialists to this problem. These are conservative methods, including adherence to a slag-free diet, the use of laxatives, enemas, and various bougienage techniques. Treatment of postoperative anal canal stenosis remains a difficult problem in modern surgery.

## 2. Aim of the Study

To study the basics of clinical and morphological features of various strictures of the anal canal and rectum.

## 3. Materials and Methods

For 2020-2023 30 patients with cicatricial strictures of the anal canal were operated on in the department of coloproctology. The main cause of cicatricial stenosis was surgery on the rectum and anal canal. The average age of patients was 28-51 years. There were 23 women, 7 men. Postoperative strictures looked like dense ring-shaped formations measuring 0.5-1.5 cm in diameter. Materials obtained from dense formations of the anal canal were fixed in Carnoy's fluid and in a 10% solution of neutral formalin. After appropriate processing, the materials were embedded in paraffin and sections with a thickness of 4-6 microns were prepared from them. Afterwards, the sections were stained with hematoxylin-eosin and Van Gieson. Finished microspecimens were studied in MBS-9 microscopes.

## 4. Results and Discussions

Our research data showed that the narrowing may be the result of a true stricture (organic) or functional muscle stenosis. With organic stenosis, the normal epithelial lining of the anal canal is replaced to varying degrees by dense scar tissue, which causes morphological changes in the anal canal with a subsequent decrease in its function and leads to difficult and painful defecation. The stenotic segment may be located in the proximal or distal part of the anal canal, but often the pathologically altered tissues are located diffusely and circularly, involving the entire anal canal. The causes of anal strictures may be other operations on the anal canal, which require wide excision of the affected tissue, removal of the perianal skin and mucous membrane of the anal canal,

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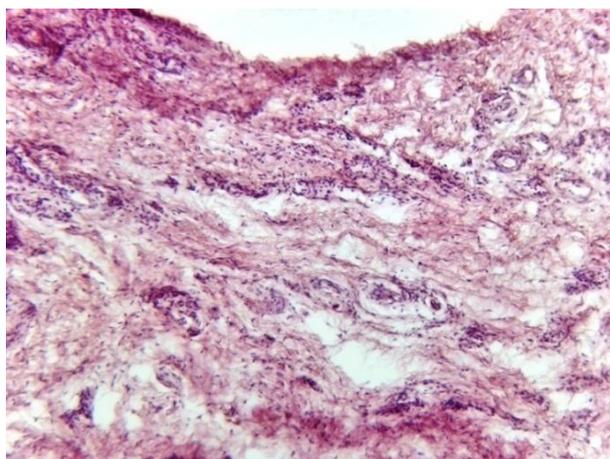
Received: Mar. 1, 2024; Accepted: Mar. 20, 2024; Published: Mar. 22, 2024

Published online at <http://journal.sapub.org/ajmms>

trauma, inflammatory bowel diseases (in particular Crohn's disease), radiation therapy (for example, with uterine cancer, prostate cancer), sexually transmitted diseases (Nicola-Favre disease), tuberculosis and chronic laxative abuse, sepsis, ischemia due to occlusion of the inferior mesenteric artery or superior rectal artery, AIDS, infections, fibrosis and spasm of the anal sphincter, perineal trauma, chronic inflammatory process in the rectum, chemical burn of the anal canal and rectum.

Wide excision of the mucous membrane of the anal canal, without leaving adequate mucocutaneous bridges, leads to the formation of scars, the occurrence and progression of postoperative stenosis of the anal canal. Radical operations performed against the background of ongoing bleeding and severe anemia may be accompanied by the formation of rough scars in the anal canal.

In the natural anatomical configuration in healthy people, the anal canal is an inverted tube, where its diameter is smaller than the diameter of the anal verge. In this example, it is important to distinguish between acute anal stenosis and chronic anal stenosis. Acute anal stenosis (spasm) is defined by a strong and sudden narrowing with constant pain (anal fissure). Morphologically, infiltration and swelling and proliferation of coarse fibrous structures in the tissue structures of the anal canal are observed (Fig. 1). This stenosis is reversible. In this case, the anorectal meatus becomes cylindrical.

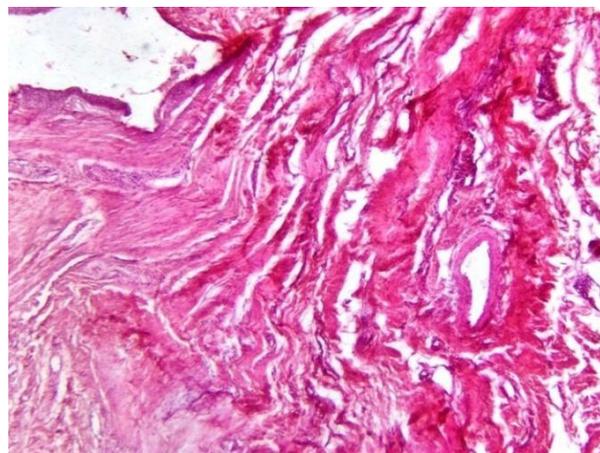


**Figure 1.** Acute stenosis of the anal canal. Infiltration and swelling, proliferation of coarse fibrous structures in the tissue structures of the anal canal. G.E. 10×10

Chronic anal stenosis (scar stricture) occurs secondary to surgery, infection and fibrosis, the narrowing is irreversible and the anal canal progressively decreases in diameter. In patients who use laxatives inappropriately, these patients have impaired physiological regular dilatation of the anal canal. Morphologically, scar growths are detected around the anus, the walls of the venous vessels are deformed, and inflammatory infiltrates in the interstitial tissue (Fig. 2). Gradual and irreversible fibrosis occurs in the subcutaneous layer of the anal canal with an abnormal funnel-shaped configuration in which the diameter of the anal canal is

greater than the diameter of the anus.

Our research shows that there are 3 degrees of stricture of the anal canal: 1 degree of narrowing - compensation stage (Fig. 3) - a well-lubricated finger can be inserted into the anal canal, moderate stenosis; In this case, Hegar's bougie can be inserted into the anal canal painlessly up to No. 13-18 and the lumen of the narrowing is 1.3-1.8 cm.



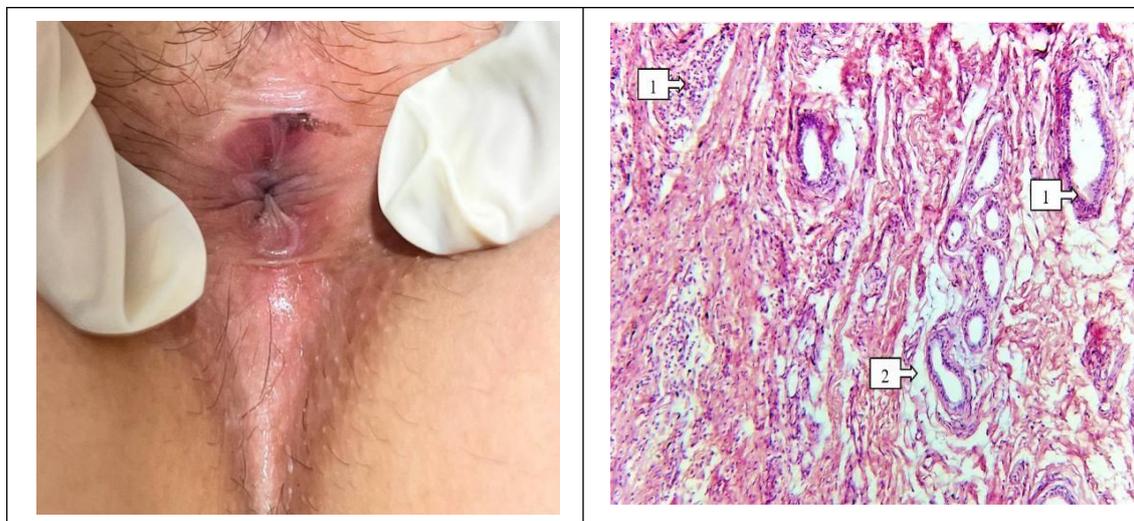
**Figure 2.** Chronic anal stenosis. There are scar growths around the anus, the walls of the venous vessels are deformed, inflammatory infiltrates in the interstitial tissue. G.E. 10×10

2nd degree of narrowing - subcompensation stage (Fig. 4) - effort is required to insert the index finger and pronounced anal stenosis. In this case, the Hegar bougie can be inserted into the anal canal up to No. 7-12 and the lumen of the narrowing is 0.7-1.2 cm.

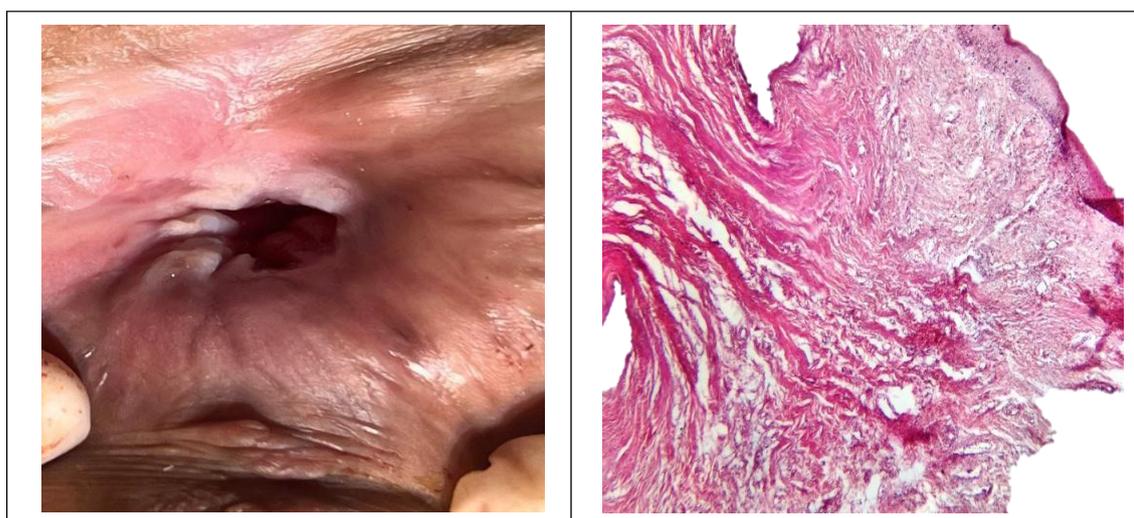
3rd degree of narrowing - stage of decompensation (Fig. 5) - it is impossible to insert a finger into the anal canal without using forceful dilatation. In this case, Hegar's bougie can be inserted into the anal canal up to No. 6 and the lumen of the narrowing is 0.6 cm.

They also distinguish ring-shaped or circular stenosis - after surgical or traumatic injury, less than 2 cm in length, and tubular stenosis - more than 2 cm in length. The final formation of cicatricial narrowing of the anal canal occurs 2-3 months after the operation, corresponding to the timing of formation mature scar tissue. Clinical manifestations of symptoms of cicatricial narrowing of the anal canal depend on the localization of the process, the presence or absence of inflammatory phenomena in the area of narrowing, and the degree of narrowing.

Thus, our research data show that the causes of anal canal stenosis are postoperative trauma and insufficient postoperative treatment of organic and functional damage to the tissues of the rectum and anal canal. All patients with postoperative strictures of the anal canal and rectum need a morphological and clinical assessment of the degree of narrowing of the anal canal in order to determine treatment tactics. If 1<sup>st</sup> and 2<sup>nd</sup> degree narrowing of the anal canal is detected, conservative treatment methods and bougienage of the anal canal should be started, and in 3rd degree narrowing, planned surgical treatment should be carried out.



**Figure 3.** Stricture of the anal canal is a stage of compensation. Metaplasia of glandular structures and sinusoids (1); chaotically located fibromatous fibrous structures are visible (2). Muscular components are not detected. Coloring by G.E. 10 ×10



**Figure 4.** Stricture of the anal canal is the stage of subcompensation. The stricture consists of coarse fibrous tissue (1), the scars protrude towards the anus, vascular formations are not detected (2). Coloring by G.E. 4×10



**Figure 5.** Stricture of the anal canal - stage of decompensation. Hyalinosis of the walls of blood vessels and obliteration of blood vessels around the anus are detected (1), infiltration of the interstitial tissue is noted (2), and destruction occurs in the fibrous structures (3). Coloring by G.E. 40 ×10

## 5. Conclusions

1. The main causes of strictures of the anal canal and rectum are surgical trauma, inflammatory bowel diseases, infections and fibrosis, sexually transmitted diseases, tuberculosis, and chronic laxative abuse.
2. Morphologically, with strictures around the anus, scar growths, deformation of the wall of venous vessels, inflammatory infiltrates in the interstitial tissue are revealed.
3. The morphological picture of a scar lesion in the anorectal area allows us to assess the maturity of the pathological connective tissue and determine the treatment tactics for this process.

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