

# The clinical and therapeutic approach to anal stenosis



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## The clinical and therapeutic approach to anal stenosis

*Anal stenosis is a fibrous narrowing of the anal channel. It develops, in most cases, in the aftermath of proctologic surgical procedures with extensive anoderm excision or in the presence of chronic anal inflammation in patients with Crohn Disease. However rare, this condition is thoroughly debilitating for the patients. Symptoms include constipation, pain and bleeding with defecation and a reduction of the caliber of stools. Diagnosis is essentially clinical. Prevention of post-surgical stenosis is based on a scrupulous surgical technique and on an extensive and carefully-planned follow up. Treatment is based on an initially conservative approach with regularization of stool transit through hydration, dietary fibers and bulk-forming laxatives. The role of mechanical dilatation in the treatment of AS is still debated. For severe cases and cases that are not responsive to conservative treatment we must resort to surgery. Surgical approach is tailored on the severity, position and extension. The most severe cases require anoplasty procedures with mucosal or anal flaps.*

KEY WORDS: Anal stenosis, Anal stricture, Proctology

## Definition

Anal stenosis (AS) is a rare but thoroughly debilitating <sup>1</sup>the direct consequence of the constriction of the anal channel and include constipation, pain and bleeding with defecation and a reduction of the caliber of stools <sup>1,2</sup>. In the most severe cases, patients tend to abuse of laxatives to achieve liquid stools, thus leading to a further worsening of the stenosis that is no longer modelled by fecal transit <sup>2,3</sup>. We can distinguish between anatomical

stenosis, and functional stenosis, which is usually secondary to anal hyper-tone and associates with anal fissures <sup>3</sup>. Khubchandani divided anal stenosis in three groups according to etiology distinguishing congenital, primitive and secondary stenosis <sup>4</sup>. *Congenital stenosis* is a pediatric condition secondary to alterations in embryological development such as anal atresia and imperforate anus. *Primitive stenosis* is typical of elderly patients; it develops in the absence of associated anal pathology and is due to a fibrous involution of perianal tissues. *Secondary stenosis* is the most common. It often recognizes an iatrogenic origin and follows hemorrhoid surgery. Otherwise, it can develop in presence of a chronic inflammation of the anal region <sup>1,4</sup>. Surgical techniques that include the excision of vast anoderm portions are more prone to the development of circumferential scarring causing anal stricture <sup>3</sup>. Although the exact incidence of this condition is not known, data from literature show that 70-90% of anal stenosis derive from open or semi-open haemorrhoidectomy <sup>5,6</sup>.

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## Classification

In 1982, Milson and Mazier proposed a classification based on the degree of severity of the stricture and on the level of involvement of the anal channel <sup>5</sup>. To date, this classification is considered as a point of reference. AS can be graded as mild, moderate and severe. In *Mild stenosis*, the stricture is still transitable through digital exploration or with the use of a medium-sized Hill-Ferguson anoscope. In *Moderate stenosis*, digital exploration is difficult and the stenosis can be forced only with a small sized Hill-Ferguson anoscope. *Severe stenosis* is a serrate stricture that is not transitable, not even with a small-sized Hill-Ferguson anoscope. Based on the length of the stricture tract we can also distinguish between *diaphragmatic stenosis* (a thin fibrous ring), *ring-like stenosis* (extending for less than 2 cm) and *tubular stenosis* (over 2 cm of length). Another parameter is AS position. *Low stenosis* locate in the distal anal channel, more than 0.5 cm below the pectinate line; *intermediate stenosis* fall between 0,5 cm below and 0,5 cm above the pectinate line; *high stenosis* locate over 0.5 cm above the pectinate line and *diffused stenosis* occupy the whole length of the rectal channel.

## Etiology

Secondary AS recognizes multiple causes. We can distinguish two main categories: stenosis consequent to surgery and stenosis consequent to chronic inflammation <sup>1,7</sup>. Hemorrhoid surgery with traditional techniques is considered the most common cause of AS overall <sup>6,8,9</sup>. It is generally accepted that the excision of vast anoderm portions can cause excessive fibrous scarring leading to stenosis <sup>3</sup>. In the past AS was traditionally associated to Whitehead Haemorrhoidectomy. This technique, now obsolete because of the high tax of complications, includes a circular excision of the haemorrhoidal prolapse with a few stitches to attach the rectal mucosa to the pectinate line. In many cases, in the aftermath of this procedure, patients experienced post-operative fibrosis leading to <sup>6,9,10</sup>. The development of stenosis after Milligan-Morgan haemorrhoidectomy is much less frequent. Incidence ranges between 1.5% and 3.8%<sup>11</sup>. Milligan Morgan haemorrhoidectomy typically results in a low, ring-like AS. This complication is more common in presence of large surgical wounds with small skin-mucosal bridges <sup>3,12</sup>. In the last decades we witnessed a vast diffusion of stapled prolassectomy techniques both for haemorrhoidal prolapse and for full thickness rectal prolapse with obstructed defecation <sup>13-16</sup>. The incidence of AS after stapled mucosectomy ranges around 0.8% <sup>17</sup>. In these cases stricture formation is usually due to anastomotic dehiscence leading to the development of a diaphragmatic stenosis 0.5-1 cm above the pectinate line <sup>17</sup>. Ileus-anal and colon-anal anastomosis can also be complicated

by the development of anal stenosis after surgery for ulcerative colitis and distal rectal neoplasia <sup>1,6</sup>. Anastomosis dehiscence, even partial, and absent stool transit in presence of protective stoma, are linked to fibrosis and scarring in patients with ultra-low anastomosis. The treatment of giant condyloma lesions of the anal channel (e.g. Bushke-Lowenstein tumor) can require vast skin-mucosal excisions. These circumferential vegetative lesions, however rare, are potentially pre-cancerous and require radical excision <sup>18,19</sup>. In Crohn Disease patients can develop chronic anal and perineal phlogosis with fissures, abscess and fistula formation. Chronic inflammation can lead to a fibrotic degeneration of tissues causing AS <sup>7</sup>. The development of AS is also favored by the loose stools typical of this condition. For these reasons a high percentage (almost 30%) of patients suffering from Crohn Disease with anus involvement, develop AS over the years <sup>20</sup>. Pelvic irradiation (for uterine cervix cancer in female patients or prostatic cancer in males) can lead to cicatricial stenosis even years after treatment. Rare chronic infections on the anal channel such as tuberculosis and a number of sexually transmitted diseases can also lead to anal stricture <sup>1</sup>. Further, rare causes of stenosis include Inferior Mesenteric artery occlusion, treatment with Ergotamine and chronic abuse of laxatives <sup>1,2</sup>.

## Clinical Manifestations

The main symptoms of AS include anal pain, bleeding with defecation and constipation <sup>8,21</sup>. Rarely, patients report soiling and diarrhea <sup>1</sup>. In some cases, pain can be very intense but is always in strict relation with the passing of stools <sup>21</sup>. Pain severity depends on the degree of stenosis and on stool consistency <sup>1,7</sup>. Many of these patients make regular use of laxatives to ease stool transit and avoid pain during defecation <sup>3</sup>. In time, obstructed defecation can lead to rectal distension leading to the development of mega rectum <sup>1</sup> in a few exceptional cases. The typical sign of this condition is soiling. AS patients report a reduction in stool caliber, its entity depending on to the severity of anal stricture <sup>1,7</sup>. The clinical suspect of AS is supported by a history of proctologic surgery or Crohn Disease. Rectal examination confirms diagnosis and allows estimating the severity and position of the stenosis. Malignancy should be suspected in presence of a hard or ulcerous mass. Possible differential diagnosis include verrucous and squamous-cells anal carcinoma <sup>1</sup>.

## Diagnosis

The diagnosis of AS is essentially clinical. Alternative diagnosis such as functional stenosis (due to a spasm of the internal anal sphincter) or neoplastic stricture should be ruled out <sup>2,3</sup>. Rectal examination and anoscopy alone

often allow reaching a diagnosis, if the stenosis is not serrated<sup>3</sup>. They can prove very painful and require sedation in most cases<sup>7</sup>. General anesthesia is usually recommended and has the advantage cause a better sphincter relaxation. In mild to moderate cases, however, an adequate clinical examination can sometimes be performed also under loco-regional anesthesia<sup>9, 22</sup>. Anal-rectal manometry allows evaluating the tone of the sphincter, the sensitivity and compliance of the rectal ampulla and the integrity of the rectal-anal inhibitory reflex. When the stenosis is transitable, manometry can differentiate between a functional and an organic stenosis. Together with trans-anal ultrasound examination, it also allows for a correct evaluation of pre-operative conditions and anatomic disposition in view of a future sphincterotomy or plastic intervention<sup>2</sup>.

## **Prevention**

Prevention of stenosis is based on the careful selection and execution of surgical techniques and on a regular post-operative follow up. Minimal anoderm excision, limited tractions a controlled use of electric-coagulation are fundamental for correct healing<sup>2,7</sup>. During Milligan-Morgan haemorrhoidectomy, surgeons must take care to preserve adequate skin-mucosal bridges<sup>2,12</sup>. During the excision of giant warts or verrucous anal neoplasia, no effort must be spared to preserve the healthy anoderm tissue<sup>18</sup>. All proctologic surgery procedures, especially those that lead to the formation of vast anal-perineal scars, must be followed by regular control visits to promote a progressive healing without excessive scarring<sup>2,7</sup>. Follow up should include weekly evaluations until complete healing. Recent data from literature, in fact, show that wounds from circumferential anoderm excisions for neoplastic or pre-neoplastic lesions heal correctly without resulting in stenosis in presence of a careful post-operative management<sup>23,24</sup>.

## **Conservative Management**

Treatment strategy depends on the entity of stenosis and on the severity of symptoms<sup>7</sup>. A severe stenosis that develops over a long period of time may present with just few symptoms: in these cases surgery is not always indicated. Treatment options include both conservative and surgical approaches. On a general basis, the first approach should be conservative and surgery reserved to cases where medical therapy has failed<sup>2</sup>. Most cases of mild stenosis with limited extension can be managed conservatively with success<sup>2</sup>. For moderate stenosis, most attempt a conservative approach first and eventually turn to surgery in case of failure of medical treatment<sup>2</sup>. Severe stenosis always requires opera-

tive management<sup>3,6</sup>. Conservative treatment for AS is based on regularization of intestinal transit through lifestyle and dietetic measures and on mechanical dilatations. A regular stool transit allows for a natural dilatation and modeling of the stenosis. Patients are prescribed abundant hydration and regular dietary fibers intake in the diet<sup>2,7,36</sup>. Some also recommended bulk-forming laxatives. The natural and gradual dilatation that follows is often curative for mild stenosis<sup>1,2</sup>. Another option for conservative treatment is digital or mechanical progressive dilatation. The first dilatation procedure can elicit severe pain and usually requires general or loco-regional anesthesia. Afterward, patients must undergo further procedures and regularly scheduled control visits as outpatients. In the end, they are prescribed daily mechanical dilatations at home. There is no general agreement on the effectiveness of mechanic dilatation in the treatment of AS. Some authors report that mechanical dilatations, especially if performed under anesthesia, can lead to a further degeneration of AS caused by the edema of perianal tissues leading to increased fibrosis and to a worsening of the stenosis<sup>4,6</sup>. If executed carefully and in expert hands, however, dilatations can prove useful in the treatment of mild and intermediate level stenosis<sup>25</sup>. Dilatations are also recommended in the treatment of secondary forms of AS and in strictures from Crohn Disease<sup>3,5</sup>.

## **Surgical Treatment**

Many surgical techniques have been proposed for moderate to severe stenosis that do not respond to conservative treatment. They employ flaps of rectal mucosa or perianal skin. The aim is to bring areas of well distensible tissue into the anal channel to re-establish its original elasticity. These procedures employ advancement, transposition or rotation flaps and can be carried out on a single quadrant of the anal channel, or on two or four quadrants, according to the severity of the stenosis<sup>3,5</sup>. Lateral internal sphincterotomy is a further possible first option in the treatment of moderate intermediate stenosis<sup>5</sup>. This procedure is the treatment of choice in cases of functional stenosis but can also be employed in mild organic stenosis, eventually in association with anoplasty<sup>8,26</sup>. Surgery must be carried out with an open technique: the lateral incision interests both the fibrotic ring and the internal sphincter. The wound must be left open to allow healing by secondary intention<sup>2</sup>. Some authors suggest a bilateral sphincterotomy for a better anal dilatation<sup>27</sup>. Sphincterotomy eases anal pain and obstruction, but patients must be kept under regular control in the post-operative period to avoid a recurrence<sup>2</sup>. For severe stenosis not responsive to conservative treatment, it is necessary to recur to an anoplasty procedure with the transposition of flaps of rectal mucosa or perianal skin

in order to re-attain the elasticity of the anal-perineal region<sup>1-3</sup>. *Mucosal advancement flaps* can be attached in correspondence with fibrotic areas in the treatment of intermediate and high stenosis<sup>7</sup>. After the debridement of the cicatricial fibrous tissue, you practice a transverse lateral incision at the level of the pectinate line, cranially to the stricture area. Then you isolate a 2-5 cm wide flap of rectal mucosa keeping the muscular tunic underneath intact in order to maintain a good vascular supply. The flap is advanced caudally and attached to the internal sphincter so that it falls beyond the stricture area<sup>4,28</sup>. The mucosal advancement flap is an excellent option for intermediate and high stenosis. In low AS, instead, *anal advancement flaps or anal transposition flaps* from perianal skin are more commonly employed. Currently, the two most diffused techniques are the “Y-V flap” and the “diamond flap” procedures<sup>6</sup>. The “Y-V flap” is an advancement flap technique. You practice a Y-shaped incision, with the double-branched portion oriented caudally and falling on perianal skin and the linear portion falling in the site of the stricture. A flap is prepared from the skin between the two branches of the Y-shaped wound. The incision must reach the muscular fascia underneath. The sub-dermal plexus is kept intact to maintain a good vascular supply. The flap is mobilized completely and attached to the anal channel with a linear suture. In the end, we obtain a V-shaped wound<sup>6,29,30</sup>. This technique presents with two possible pitfalls: the apex of the “V” can be too narrow leaving too little elastic tissue for the anal channel, and there is a risk of ischemia and necrosis on the pedicle flap<sup>6</sup>. However, it shows good results with a resolution of the stenosis in 90% of cases<sup>6,29-30</sup>. The “Y-V” pedicle flap technique was initially proposed for mucosal ectropion but was later employed for the treatment of AS as<sup>31</sup> with good results<sup>5</sup>. Among *anal transposition flap* techniques the one that actually knows the vastest distribution is the “diamond flap” technique<sup>6</sup>. Scar tissue is excised leaving a diamond-shaped wound. The flap is prepared from perianal skin caudally to the wound and includes the subcutaneous fat tissue. The size of the flap must be such as to cover the wound completely. The subcutaneous vascular pedicle must be preserved. The flap is sutured to the margins of the wound and the “donor” site is sutured directly. This procedure has shown good results<sup>6,32</sup>. Other techniques include the “U-shaped” flap and the “house-shaped” flap procedures. They can be considered as variants of the “diamond” and of the “V-Y” flap techniques, respectively, and have registered positive outcomes as well<sup>33-35</sup>. A rotational pedicle-flap technique with S-shaped anoplasty was proposed by Ferguson for the treatment of strictures following Whitehead haemorrhoidectomy<sup>10</sup>. The procedure creates wide wounds that require a long healing process. Presently this technique is reserved to exceptional circumstances, when there is the need to cover vast defects of the anal channel<sup>6</sup>.

## Conclusions

AS is a scar stenosis of the anus that develops following proctologic surgical procedures with extensive anoderm excision or in the presence of chronic anal inflammation in patients with Crohn Disease. In most cases, the initial approach is conservative and based on the regularization of alvine transit through a high-fiber diet, hydration and bulk-forming laxatives. The role of mechanical dilatation in the treatment of AS is still debated. Intermediate moderate stenosis can be treated with lateral internal sphincterotomy. In the most severe cases, anoplasty procedures with mucosal or anal flaps are indicated. In high and intermediate stenosis, the preferred treatment is a mucosal advancement flap technique. In low stenosis, the procedure usually includes the creation of a “Y-V” or a “diamond shaped” anal flap.

## Riassunto

La stenosi anale è un restringimento fibroso del canale anale. Si sviluppa, nella maggior parte dei casi, in seguito a procedure chirurgiche proctologiche con ampia escissione anodermica o in presenza di infiammazione anale cronica in pazienti con malattia di Crohn. Per quanto rara, questa condizione è molto debilitante per i pazienti. I sintomi includono stitichezza, dolore e defecazione con anguinamento e una riduzione del calibro delle feci. La diagnosi è essenzialmente clinica. La prevenzione della stenosi post-chirurgica si basa su una scrupolosa tecnica chirurgica e su un follow-up ampio e attentamente pianificato. Il trattamento si basa su un approccio inizialmente conservativo con la regolarizzazione del transito delle feci attraverso l'idratazione, fibre alimentari e lassativi formanti massa. Il ruolo della dilatazione meccanica nel trattamento della stenosi anale è ancora oggetto di discussione. Per i casi gravi che non rispondono al trattamento conservativo si deve ricorrere alla chirurgia. L'approccio chirurgico è adattato alla gravità e all'estensione fino ad arrivare all'anoplastica con flap mucoso.

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