

Laser Sphincterotomy: A Case Report on the Efficacy and Safety of Minimally Invasive Treatment for Chronic Anal Fissure

Md. Shahidul Islam^{1*}, Md. Anwarul Haque²

¹Consultant, Department of Surgery, Upazila Health Complex, Singra, Natore, Rajshahi, Bangladesh

²Consultant, Department of Surgery, Upazila Health Complex, Paba, Rajshahi, Bangladesh

Case Report

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*Corresponding Author:

Md. Shahidul Islam

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Abstract: Chronic anal fissures are a significant cause of anorectal pain and discomfort, frequently leading to a diminished quality of life. When conservative treatments fail, surgical interventions become necessary, with lateral internal sphincterotomy (LIS) being the traditional standard. However, advancements in medical technology have introduced laser sphincterotomy, a minimally invasive procedure, as an alternative. This case report discusses the treatment of a 45-year-old male with a chronic anal fissure who underwent laser sphincterotomy. The report covers the patient's clinical presentation, procedural details, postoperative outcomes, and a review of the current literature, highlighting the potential benefits and risks of laser sphincterotomy in comparison to traditional methods.

Keywords: Minimally Invasive, Chronic anal fissures, Laser Sphincterotomy.

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INTRODUCTION

Anal fissures are tears in the anoderm, often located at the posterior midline of the anal canal [1]. Chronic anal fissures are characterized by persistent symptoms lasting more than six weeks and are typically associated with hypertonicity of the internal anal sphincter, leading to ischemia and impaired healing [2]. Patients with chronic anal fissures commonly present with severe pain during and after defecation, bleeding, and a visible tear upon examination. The standard approach to treating chronic anal fissures involves conservative management, including dietary changes, topical ointments, and botulinum toxin injections. When these treatments fail, surgical intervention is warranted. Lateral internal sphincterotomy (LIS) is widely accepted as the most effective surgical option but carries a risk of fecal incontinence due to its impact on sphincter function [3]. Laser sphincterotomy offers a less invasive alternative, using targeted laser energy to relax the internal anal sphincter, thereby promoting healing while potentially minimizing complications.

CASE PRESENTATION

A 45-year-old male with a six-month history of chronic anal fissure presented to our clinic. The patient reported severe pain during defecation, often persisting for hours afterward, and occasional bright red blood on toilet paper. The pain had become progressively worse, significantly affecting his daily activities and quality of life. He had previously attempted conservative treatments, including high-fiber diets, sitz baths, and topical nitroglycerin, with little to no relief.

The patient had no significant medical history, no previous anorectal surgeries, and no history of inflammatory bowel disease. A physical examination revealed a well-defined posterior midline fissure with associated hypertrophic papilla and a sentinel pile. The anal sphincter was noted to be hypertonic upon digital rectal examination, which was limited by the patient's pain. Given the failure of conservative management, the patient was counseled on surgical options, including LIS and laser sphincterotomy. After discussing the benefits and risks, the patient opted for laser sphincterotomy due to its minimally invasive nature and the prospect of a quicker recovery.

Procedure

The patient was admitted for day surgery. After obtaining informed consent, the procedure was performed under general anesthesia. The patient was positioned in the lithotomy position, and the perianal area was prepped and draped in a sterile manner. A diode laser system with a wavelength of 980 nm was selected for the procedure, based on its efficacy in soft tissue surgery and minimal thermal damage to surrounding tissues.

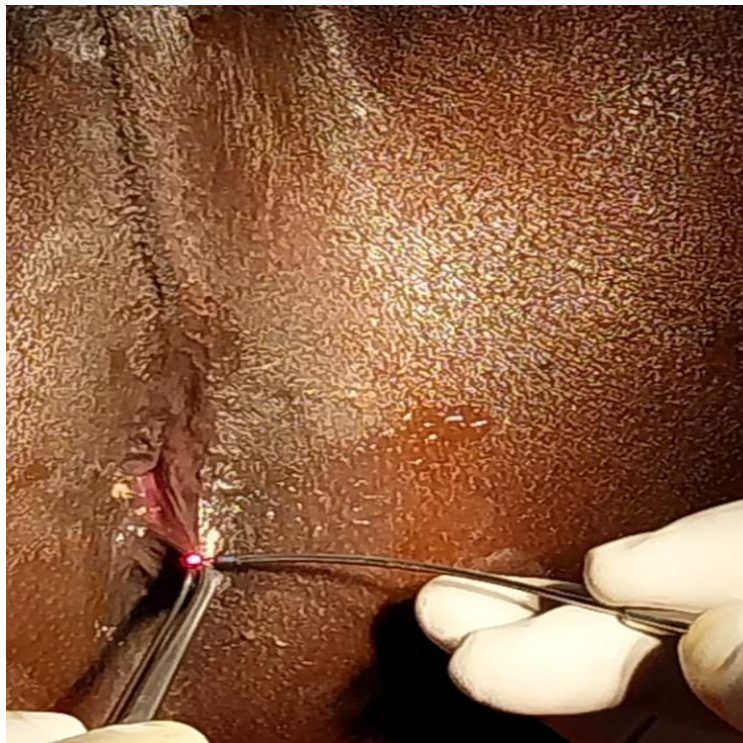


Figure 1: Intraoperative View of Laser Sphincterotomy Procedure

A small incision, approximately 1 cm in length, was made at the lateral aspect of the internal anal sphincter. The laser fiber was introduced into the incision, and laser energy was applied to the internal sphincter muscle in a controlled manner. The goal was to reduce the hypertonicity of the sphincter by ablating a portion of the muscle fibers, thereby lowering the resting pressure within the anal canal and improving blood flow to the fissure area. The procedure was completed in 20 minutes with minimal blood loss. The small incision was left to heal by secondary intention, with no sutures required. The patient tolerated the procedure well and was observed in the postoperative recovery area for a few hours before being discharged home with instructions for postoperative care, including pain management, stool softeners, and hygiene measures.

The patient reported significant improvement in pain within 48 hours postoperatively. He was able to pass stools with minimal discomfort, a marked difference from his preoperative condition. The hypertonicity of the anal sphincter was notably reduced, as observed during the follow-up examination. At the two-week postoperative follow-up, the patient reported no complications such as infection, bleeding, or incontinence. The fissure had healed completely, and the sentinel pile had reduced in size. The patient was able to resume normal activities, including work, within one-week post-surgery.

At the three-month follow-up, the patient continued to be symptom-free, with no recurrence of the fissure or development of new anorectal symptoms. The patient was highly satisfied with the outcome, particularly appreciating the quick recovery time and the absence of complications [4]. The patient's positive outcome is consistent with current literature, which indicates that laser sphincterotomy is effective and safe for the treatment of chronic anal fissures [5].

DISCUSSION

Laser sphincterotomy represents a promising alternative to traditional LIS, especially for patients who are concerned about the risks of fecal incontinence [6]. The laser technique allows for precise control of tissue ablation, which is crucial in preserving sphincter function while effectively reducing sphincter hypertonicity [7]. The minimally invasive nature of the procedure also results in less postoperative pain, faster recovery, and a reduced risk of complications such as infection or wound dehiscence. In this case, the use of a 980 nm diode laser was particularly beneficial, as it provided

sufficient penetration depth and tissue coagulation, leading to effective sphincterotomy without significant thermal damage to adjacent tissues [8]. The patient's rapid recovery and lack of postoperative complications further support the safety profile of laser sphincterotomy.

Despite its advantages, laser sphincterotomy is not yet widely adopted, partly due to the need for specialized equipment and training. Additionally, the long-term efficacy of laser sphincterotomy compared to traditional LIS remains under investigation. Some studies suggest that while the immediate outcomes are favorable, there may be a slightly higher risk of fissure recurrence with laser sphincterotomy, particularly in patients with predisposing factors such as chronic constipation or a history of multiple fissures [9].

Cost is another consideration, as the laser equipment and disposable fibers used in the procedure can make laser sphincterotomy more expensive than traditional LIS. This cost difference may limit access to the procedure in some healthcare settings, particularly in low-resource environments. However, for patients who prioritize a minimally invasive approach with a quicker recovery, laser sphincterotomy offers a compelling option [10]. Future studies, including randomized controlled trials with larger patient cohorts, are needed to further validate the benefits of laser sphincterotomy and to compare its long-term outcomes with traditional LIS. Such research will help in establishing standardized protocols for laser sphincterotomy and determining its place in the treatment algorithm for chronic anal fissures.

CONCLUSION

This detailed case report illustrates the successful application of laser sphincterotomy in the treatment of a chronic anal fissure. The procedure was well-tolerated, resulted in rapid symptom relief, and was associated with minimal complications. Laser sphincterotomy offers a valuable minimally invasive alternative to traditional LIS, particularly for patients concerned about the risks of fecal incontinence and those seeking a quicker return to normal activities. The positive outcomes observed in this case are consistent with the emerging literature on laser sphincterotomy, highlighting its potential as a safe and effective treatment modality for chronic anal fissures. As the procedure becomes more widely available, it may become a preferred option for patients and surgeons alike. Further research will be essential in solidifying its role in the management of this common and debilitating condition.

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