Comparison of Ligasure Hemorrhoidectomy with Conventional Ferguson's Hemorrhoidectomy

Rahul Khanna · Seema Khanna · Shilpi Bhadani ·
Sanjay Singh · Ajay K. Khanna

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Abstract Conventional hemorrhoidectomy for grade III and IV hemorrhoids is a tedious procedure associated with significant morbidity and a prolonged convalescence. We compared Ligasure™ hemorrhoidectomy with conventional 'closed' Ferguson's hemorrhoidectomy for the treatment of grade III and IV hemorrhoids. Forty-eight consecutive patients of grade III and IV hemorrhoids were randomized to either the Ligasure™ hemorrhoidectomy (28 patients) or Ferguson's hemorrhoidectomy (20 patients). The hemorrhoidal pedicle was coagulated with Ligasure™ in the Ligasure™ group and transfixed with 2/0 chromic catgut in Ferguson's method. In comparison with Ferguson's method, Ligasure™ hemorrhoidectomy had a shorter operating time (29 vs 12.5 min), less blood loss (22 vs 11.5 ml), less postoperative pain as measured on VAS scale and less postoperative complications including hemorrhage (10% vs 3.5%), urinary retention (10% vs 3.5%) and wound breakdown (20% vs 14%). The submucosal dissection technique with Ligasure™ coagulation of the hemorrhoidal pedicle is safe and effective. The blood vessels and tissue are reduced to a wafer thin seal with good hemostasis. Suturing is not required as the mucosal tissue over the pedicle is sealed off with the current. There is minimal lateral spread of either thermal or electrical energy. The external components of the hemorrhoids can also be treated at the same time. Because of its ease of use and less postoperative pain and complication Ligasure™ hemorrhoidectomy can be preformed as a day-care procedure.

Keywords Hemorrhoidectomy · Ligasure · Ferguson's

Symptomatic hemorrhoids are one of the commonest surgical afflictions of the Indian population. For grade I and II hemorrhoids conservative medical therapy is usually successful but grade III and IV hemorrhoids require surgical intervention. The therapeutic options include rubber band ligation, sclerotherapy, cryotherapy and photocoagulation. However hemorrhoidectomy of the Milligan and Morgan variety (open hemorrhoidectomy) or the Ferguson variety (closed hemorrhoidectomy) remain the gold standard. Recently stapled hemorrhoidectomy (MIPH) for prolapsed hemorrhoids has come into vogue but has not gained popularity because of technical and cost considerations.

A modified electro-surgical device, the Ligasure™ (Valleylab, Boulder, CO, USA) has become available for the last decade as a 'vessel-sealing system'. This system delivers electro-diathermy energy across its jaws much like a bipolar diathermy device with minimal lateral spread of current or heat. We used the Ligasure device for hemorrhoidectomy in grade III and IV hemorrhoids and compared our results with conventional closed hemorrhoidectomy of the Ferguson variety.

Patients and Methods

This prospective randomized study was carried out in the Department of Surgery, Banaras Hindu University. Included in the study were 48 consecutive patients of symptomatic grade III and IV hemorrhoids who were randomized into receiving either Ligasure hemorrhoidectomy (28 patients) or the Ferguson's hemorrhoidectomy (20 patients). Excluded were patients with liver cirrhosis, HIV positive, uncontrolled diabetes or a bleeding diathesis. Patients on

R. Khanna (✉) · S. Khanna · S. Bhadani · S. Singh ·
A. K. Khanna
Department of General Surgery, Institute of Medical Sciences,
Banaras Hindu University,
Varanasi, India
e-mail: dr_rahul_khanna@rediffmail.com

anticoagulant medication or aspirin had to stop their medication 5 days prior to surgery. The patients were admitted in the Surgery Ward on the morning of the procedure and discharged the next day except when they had to stay longer for a post operative complication.

All procedures were carried out under caudal block and IV sedation (midazolam) administered by the surgical team. The procedure was carried out with the patient in lithotomy position and a slight reverse Trendelenberg tilt. The initial steps in both procedures were same and included:

1. Manual Anal sphincter stretching upto 4 fingers
2. Delivery of hemorrhoidal masses with artery forceps, one being applied at the base of hemorrhoid, the other at the apex
3. Skin incision at the base of hemorrhoids and submucosal dissection to lift the hemorrhoid mass off the internal sphincter by monopolar diathermy.

After this in the Ferguson method the hemorrhoid pedicle was transfixed with 2/0 chromic catgut sutures and the mucosal edges of the defect opposed with 2/0 chromic catgut. In the Ligasure group the jaws of the handset were applied on the pedicle and the instrument activated by the foot paddle (Fig. 1). A computer controlled feedback loop automatically stopped the flow of energy when coagulation of the vessels and mucosa was achieved. Scissor was used to excise the hemorrhoid mass by cutting across the coagulated tissue seal. No sutures were applied as the Ligasure device also achieved mucosal fusion. Anal canal packing was not routinely done except when there was doubt regarding complete hemostasis.

The patients were encouraged to take Sitz bath on the evening of surgery and were given osmotic laxative in the form Syp Lactulose 4 tsf bd for a week. They were asked to grade the severity of pain on 0–10 Visual Analogue Scale (VAS) on the evening of surgery (day 0), the next day (day 1) and after a week on follow up (day 7).

Fig. 1 Clinical photograph of grade IV hemorrhoids demonstrating application of Ligasure across pedicle along with tissue seal of rectal mucosa

Results

The mean age of patients undergoing Ligasure hemorrhoidectomy was 43 years (range 22–63 years) and for the Ferguson's hemorrhoidectomy group was 47 years (range 27–64 years). The male: female ratio was 17: 11 in Ligasure and 11:9 in Ferguson's hemorrhoidectomy groups.

The average operating time (excluding anesthesia administering time) in the Ligasure and Ferguson's hemorrhoidectomy groups was 12.5 ± 3 min and 29 ± 5.2 min respectively (<0.001). The number of hemorrhoidal masses excised varied from 2–4 in both groups. The average intra-operative blood loss as estimated by the number of gauze pieces soaked (4 ml/gauze piece) was 11.5 ± 2.5 ml with Ligasure and 22 ± 4.5 ml with Ferguson's hemorrhoidectomy (<0.001). The VAS pain scores on day 0, 1 & 7 in Ligasure group were 4.1 ± 0.8 , 3.2 ± 0.6 and 1.2 ± 0.2 respectively and in the Ferguson's group were 6.8 ± 1.8 , 5.2 ± 1.2 and 1.4 ± 0.2 respectively (<0.001).

In the early post operative period (within 7 days of surgery) in the Ligasure group (28 patients) 1 patient had hemorrhage, 1 (3.5%) developed urinary retention and 4 (14%) had break down of the tissue seal with raw area, which healed secondarily. In the Ferguson's group 2 patients (10%) had hemorrhage, 2 (10%) developed urinary retention and 4 (20%) had wound breakdown with secondary healing (p value, not significant).

At 6 weeks follow-up all patients had healed wounds in both groups. One patient each in Ligasure (3.5%) and Ferguson's group (5%) had residual hemorrhoidal tissue requiring additional procedure. None of our patients developed delayed complications like incontinence to flatus or anal stenosis. The average postoperative stay in the Ligasure group was 1.4 days and in the Ferguson's group was 3.2 days (Table 1).

Discussion

For symptomatic grade 3 and 4 hemorrhoids, some form of hemorrhoidectomy remains the accepted modality of treatment. The traditional methods like the Milligan—Morgan method [1] and the Ferguson's method [2] have been in practice for more than half a century for want of a better alternative. Recent years have seen the introduction of newer techniques with relative merits and demerits. The most significant recent introduction has been the circular stapling device for prolapsed hemorrhoids. This has been criticized for not treating the external component of hemorrhoids and the skin tags [3]. Additionally the stapler cartridges are expensive and beyond the reach of most patients.

Table 1 Comparison of operative outcomes and postoperative complications in patients undergoing Ligasure and Ferguson's hemorrhoidectomy (NS = Not significant)

Parameter	Ligasure (n=28)	Ferguson's (n=20)	p value
Average operating time	12.5±3 min	29±5.2 min	<0.001
Average blood loss	11.5±2.5 ml	22±4.5 ml	<0.001
Vas pain scores			
Day 0	4.1±0.8	6.8±1.8	<0.001
Day 1	3.2±0.6	5.2±1.2	<0.001
Day 7	1.2±0.2	1.4±0.2	<0.0013
Post operative complications			
Hemorrhage	1 (3.5%)	2 (10%)	NS
Urinary retention	1 (3.5%)	2 (10%)	NS
Wound breakdown	4 (14%)	4 (20%)	NS
Hospital stay	1.4±0.2 days	3.2±1.4 days	<0.001
Residual hemorrhoids	1 (3.5%)	1 (5%)	NS

About 2 years ago we acquired the Ligasure™ device. It is an electro-surgical device, which is an improved version of bipolar diathermy. It is so effective in achieving hemostasis that it is described as a 'vessel sealing system'. The energy is delivered only to the tissue grasped within the jaws of the hand piece with minimal spread of electrical or thermal energy to adjacent tissues. Complete coagulation of vessels and also tissues is achieved with minimal charring in contrast to conventional diathermy. A computer controlled feed back loop automatically stops the flow of energy when coagulation of the vessels and mucosa is achieved. The vascularized tissue caught between the jaws is reduced to a wafer thin seal, which can be cut across with scissors.

Conventional hemorrhoidectomy is associated with significant pain-related complications such as urinary retention and constipation. Additionally meticulous hemostasis needs to be ensured to avoid postoperative hemorrhage. Occasionally the operative field can become quite bloody, prolonging the surgery. We found that Ligasure™ hemorrhoidectomy was a major improvement over the conventional technique in all these parameters. Technically the Ligasure method is much more simpler and can be safely and effectively carried out by relatively inexperienced surgeons. In comparison with Ferguson's method Ligasure™ hemorrhoidectomy had a shorter operating time (29 vs 12.5 minutes, p value <0.001:) and had less blood loss (22 vs. 11.5 ml, p value: <0.001). The VAS pain scores at day 0, 1 and 7 were lesser in Ligasure™ than Ferguson's hemorrhoidectomy. Postoperative complications such as hemorrhage (3.5% vs 10%), urinary retention (3.5% vs 10%) and wound break down (14% vs 20%) were all lower in the Ligasure™ group. The postoperative hospital stay (1.4 vs 3.2 days) was also less with Ligasure™ as was the incidence of residual hemorrhoids (3.5% vs 5%) on follow- up.

Previous randomized controlled trials have also found similar results. The submucosal dissection avoids inadvertent anal sphincter injury [4]. Compared with Ferguson's hemorrhoidectomy, the Ligasure™ method reduces post-operative pain and the requirement for parenteral analgesia because of minimal collateral thermal spread, limited tissue charring and absence of sutures [5]. Pain during the first 24 h is particularly important as it can precipitate urinary retention and constipation.

Other trials have also emphasized the significantly shorter convalescence period. With Milligan—Morgan technique patients were incapacitated for 3 weeks while with the tissue sealing method; patients resumed daily activity after a week [6]. Comparison of Ligasure™ with Harmonic Scalpel™ for hemorrhoidectomy has found that the operative time and postoperative pain were lesser with Ligasure™ [7].

At present conventional hemorrhoidectomy is an in-patient procedure with patients spending 3–7 days in hospital. Ligasure™ hemorrhoidectomy with its numerous proven advantages has the potential to make hemorrhoidectomy in to a day—care procedure. It scores over stapled hemorrhoidectomy because of cost advantages and the inherent treatment of the external component of hemorrhoids which are left untreated in stapled hemorrhoidectomy.

Conclusion

Ligasure™ hemorrhoidectomy is a sutureless, closed hemorrhoidectomy technique dependent on a modified electro-surgical unit to achieve tissue and vessel sealing. It is safe and effective, has less blood loss, postoperative pain and complications compared to conventional hemorrhoidectomy. Technically it is much simpler because suturing is not required and hemostasis is easy to achieve. It has the potential of making hemorrhoidectomy in to a day-care procedure.

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