Is co2 laser Hemorrhoidectomy superior to conventional open Hemorrhoidectomy?


Abstract

Background: Hemorrhoids are one of the most common surgical conditions. Conventional haemorrhoidectomy was the traditional operation for the treatment of hemorrhoids. Other modalities of treatment had been used as an alternative operations including CO2 laser haemorrhoidectomy.

Objectives: To determine the outcome of treatment of hemorrhoids by using CO2 laser haemorrhoidectomy and its advantages over conventional surgery.

Methods: This is a retrospective comparative interventional study of 1024 case of third degree haemorhoids selected out of 1300 case of hemorrhoids of different degrees, admitted to Al-Kindy, Al-Yarmook teaching hospitals and Abd Al-Majeed private hospital, from May 1998 to July 2002, they were treated by CO2 laser haemorrhoidectomy and conventional surgery. They are divided into 2 groups randomly, 512 cases treated by CO2 laser (group A), 512 cases treated by conventional surgery (group B). Both groups were studied regarding operative time, hospital stay, healing time, post operative complications and cost effectiveness.

Results:

GROUP A, the operative time ranged from 10 to 20 minutes with an average of 13 minutes. The hospital stay ranged from 4 to 12 hours with a mean time of 10 hours as all cases were treated as day cases. Post operative pain was minimal in 50% of patients and required simple analgesia for treatment while 50% had no pain. Bleeding occurred in less than 1% of cases, anal stenosis 3.3%, Infection recorded in 0.58% of patients.

GROUP B, The operative time ranged from 15 to 25 minutes with an average time of 19 minutes, hospital stay ranged from 24 to 48 hours with a mean time of 28 hours. Post operative pain recorded in all the patients (100%) and required narcotic analgesia for treatment, 25 patients (4.8%) had varying degrees of bleeding, 40 patients (7.8%) had infection, 25 patients (4.8%) had anal stenosis. In group A due to shorter hospital stay, earlier healing of wounds, earlier return to work which was within 7 to 10 days, the surgical treatment proved to be cost effective.

Conclusion: CO2 laser Hemorrhoidectomy was found to be easy and safe procedure with lower rate of complications, shorter hospital stay and cost effective.

Keywords: CO2 Laser, Hemorrhoids, Hemorrhoidectomy

Introduction

Hemorrhoids or piles are enlarged vascular cushions within the anal canal that have been described for many centuries and continue to form large part of colorectal work load. The incidence varies from 4.4 to 30% in different countries. Hemorrhoids are divided clinically into 1st degree bleeding only, no prolapse; 2nd degree prolapse but reduce spontaneously; 3rd degree prolapse and have to be manually reduced; and 4th degree hemorrhoids which are permanently prolapsed.

Options of treatment of hemorrhoids include:
1. CONSERVATIVE: home treatment, provides temporary relief of symptoms and achieved by, Hydrotherapy with a bath tub, bidet or extend – able shower head. The condition can improve with worm bath causing vessels around the rectal region to relax. Cold compression, Topical analgesics, Systemic analgesics, Topical steroids may weaken the skin and contribute for further flare up. Vasoconstrictors’ (phenylephrine), Topical moisturizers, Topical ointments and suppositories (proctocidyl).
2. SURGICAL: many modalities of surgical interventions are used for the treatment of mainly advanced 2nd, 3rd and 4th degree hemorrhoids.
A: Sclerotherapy, injection of a sclerosant agent into the hemorrhoid, this will cause collapse of the vessels & the hemorrhoid will shrivel up.
B: Rubber band ligation, Barron ligation; elastic bands are applied to the internal hemorrhoid to cut its blood supply, and within several days the hemorrhoid will slough off during normal bowel motion.
C: Hemorrhoidolysis, dessication of hemorrhoids by electrical current (3).

D: Cryosurgery, frozen tip of cryo probe is used to destroy hemorrhoid tissue. Rarely used anymore because of side effects (5).

E: Surgical excision, Milligan and Morgan reported a surgical procedure for hemorrhoids in 1937 (6), which had been passed down to the present time which is the basis of open conventional hemorrhoidectomy (7,8), this procedure was found to be followed post operatively by severe pain, bleeding, infection, stenosis and recurrence.

CO\textsubscript{2} laser hemorrhoidectomy is one of the popular alternative methods of treatment, it allows vaporization or excision of the hemorrhoid, it seals small blood vessels allowing a bloodless field, it seals superficial nerve endings giving the patient no or minimal post operative discomfort (9,10).

CO\textsubscript{2} laser energy is absorbed by water at the surface of soft tissue resulting in vaporization of that tissue with conduction of heat into surrounding tissues allowing surgical precision and unimpaired healing (11,12,13). Stapled hemorrhoidectomy, excision of tissue proximal to the dentate line which disrupts the blood supply to the hemorrhoid and it is generally less painful than complete removal of hemorrhoids and allow faster recovery time, it is mainly used for internal hemorrhoids that prolapse and bleed (14).

Tran’s anal de arterializations, is minimally invasive technique using Ultrasound Doppler (US) for localization of arterial blood inflow, then arteries are tied off with simple suture and prolapsed tissue is sutured back to anatomical position without excision of tissue, this is done above the dentate line (15,16,17).

**Methods**

From May 1998 to July 2002, 1300 cases of hemorrhoids were admitted to Al-Kindy, Al-Yarmook Teaching hospitals and Dr Abd Al-Majeed private hospital. 1024 cases were included in this study representing patients with 3\textsuperscript{rd} degree hemorrhoids. 167 cases with 2\textsuperscript{nd} and 4\textsuperscript{th} degree hemorrhoids were excluded.

Patients were divided randomly into 2 groups, group A (512) patients were treated by CO\textsubscript{2} laser hemorrhoidectomy, group B (512) patients were treated by conventional open hemorrhoidectomy.

All patients were examined by per rectal examination and proctoscopy. Only 40 patients required sigmoidoscopy to exclude the presence of rectal lesions resulting in secondary hemorrhoids. Both procedures were done under general anesthesia; patients were placed in lithotomy position.

**CO\textsubscript{2} LASER HEMORRHOIDECTOMY:**

(.COHERENT MEDICAL SYSTEM 450 CO\textsubscript{2} SURGICAL LASER XL)

Tissue forceps applied 2mm from the mucocutanous junction to bring internal pile into prominence, a hemostat applied to the internal hemorrhoid with slight traction, the pile is then mobilized from the lumen of the anal canal by cutting across the skin, and the cuts are made with laser energy which is delivered through a pen-shaped handle. A red light provided by low power laser, permits precise focusing of the therapeutic beam. The laser is aimed directly and perpendicularly to the surface of the pathology, the tip of the laser handle is kept approximately 5-15 cm away from tissues to allow perfect visualization. The pulse time is set as continues wave and the power is set at 20 to 30 watts. When the operator step on the pedal the laser red light and energy are shot out close to the pile and made only through the skin. The pile now is pedunculated and attached only by its feeding vessels which are ligated with 2/0 absorbable suture, and then the pile is excised. Hemostasis is achieved by defocusing beam of laser and no anal pack was used. as demonstrated in photos 1,2 and diagram 1.

Patients were discharged within 4 to 12 hours, and were followed for 2 to 6 months for healing progress and complications.
PHOTO 1: Showing laser machine (coherent medical system 450 CO2 surgical laser XL)

DIAGRAM 1: The procedure of laser hemorrhoidectomy.

PHOTO 2: Showing the bloodless field after laser hemorrhoidectomy.
TRADITIONAL OPEN HEMORRHOIDECTOMY:
This procedure was done for group B patients. The hemorrhoid is grasped by tissue forceps at the mucocutaneous junction and pulled downwards to bring the internal hemorrhoid outside the anal verge, a hemostat is applied to the pedicle, a V shaped incision is made in the skin and extended into the mucosa covering the hemorrhoid with sharp scissors, then the hemorrhoid is separated from the underlying internal sphincter by sharp and blunt dissection, with the hemorrhoid attached only by its feeding vessels it is ligated and excised with absorbable one O suture material, homeostasis’ is secured by 2/O suture material, the raw area is left open, anal canal is packed by Vaseline soaked pack which is removed after 15 to 24 hours and the patient is discharged in 24 to 48 hours. Patients were followed for 2 to 6 months with periodic examinations for healing progress and complications.

Results
In both groups age ranged from 14 to 74 years with mean age of 34 in group A and 38 in group B.
In group A there were 390 male and 122 female with a ratio of 3:1. In group B 412 male and 100 female with a ratio of about 4:1.
Operative time was 10 to 20 minutes in both groups. Hospital stay was 4 to 12 hours in group A as all were treated as day cases, while in group B hospital stay was 24 to 48 hours as patients were discharged after pack removal almost pain free and with no bleeding.

POST OPERATIVE COMPLICATIONS:
1- PAIN: in group A, 256 patients (50%) had no pain, 256(50%) had mild pain treated by simple analgesics. In group B all patients (100%) had moderate to severe pain and received narcotic analgesia.

2- BLEEDING: in group A, 5 patients (1%) had early simple bleeding and only 3 patients (0.58%) had late bleeding (10 to 14 days post op.) and were treated conservatively. In group B, 25 patients (5%) had early mild to moderate bleeding, 5 patients (0.9%) had late bleeding, and they were treated conservatively as well.

3- INFECTION: only 3 patients (0.58%) developed wound infection in group A, while 12 patients (2.3%) had infection in the form of wound infection or local abscess collection in group B.

4- EDEMA of skin bridges: not seen in group A, on the other hand 460 patients (89%) in group B had edema.

5- RETENTION OF URINE: only one patient (0.2%) in group A while 15 patients (3%) in group B and only 20% of them required catheterization the rest were treated by fluid restriction and encouraging urination.

6- MAJOR SHORT TERM INCONTINANCE: not seen in group A, forty patients (7.5%) in group B had early major incontinence that returned to normal within 10 days.

7- ANAL STENOSIS: in group A, 17 patients (3.3%) developed mild stenosis that responded to finger dilatation except one patient who required dilatation under general anesthesia and there was no fecal impaction.

8- In group B, 25 patients (4. 8%) had anal stenosis, 20 (80%) responded to finger dilatation, 5 (20%) of them had also fecal impaction and required dilatation under general anesthesia (G.A.) for removing fibrotic bands and evacuation.

9- RECURRENCE: no recurrence found in both groups during the follow up period.

10- COST EFFECTIVENESS: Group A patients had shorter hospital stay, less theater expenses, shorter sick leave, and early return to work, makes this modality of surgery more cost effective than that done for group B patients.
TABLE 1 (POST OPERATIVE COMPLICATIONS IN GROUP A & B)

<table>
<thead>
<tr>
<th>Post op. complications</th>
<th>GROUP A NO</th>
<th>%</th>
<th>GROUP B NO</th>
<th>%</th>
<th>P Value</th>
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<tr>
<td>Early</td>
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<tr>
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**Discussion**

Generally an uncomplicated hemorrhoidectomy is a satisfactory operation for both patient and surgeon. The findings of this study show that the treatment of hemorrhoids with carbon dioxide laser results in much lower incidence of complications compared to the traditional excision and suture ligation methods of hemorrhoidectomy whether open (Milligan) or closed (Ferguson) as shown in table one.

Ferguson reported complications of conventional hemorrhoidectomy as pain 100%, delayed bleeding 1%, infection 0.5%, recurrence 2%, fissure 1-2%, retention of urine 2-15%, tags 10%. (18,19)

Wang J Y and colleges performed a similar study and their results showed that 11% required narcotic analgesia in group A (CO₂ laser hemorrhoidectomy) vs. 56% in group B (conventional), urinary retention 7% in group A, 39% in group B. 84% of patients in group A were discharged within 24 hours vs. 84% of group B patients who were discharged 1 to 5 days post operatively, the cost was 20% less in group A. (20)
In a study of the university of SAO PAOLO, BRAZIL, they stated that CO₂ laser hemorrhoidectomy had the advantages of being, haemostatic, bactericidal, fast healing, does not affect neighboring structures, less post op. complications as 94% of patients required no or simple post op. analgesic, only 1.4% needed narcotics, hemorrhage and stenosis were about 1%. (21) Postoperative pain is the most important complication that worries our patients and makes them reluctant to surgery, in our study CO₂ laser hemorrhoidectomy post operative pain was either absent in 50% of cases and mild in the other 50% of cases as compared with conventional hemorrhoidectomy where all patients have severe pain this had been found to be statistically significant ( P value of 0.0001) this is supported by another study carried out in London which suggested that CO₂ laser hemorrhoidectomy is a safe procedure associated with reduced requirement for post op. analgesics and cause no alteration in anorectal physiology (22).

Bleeding was minimal and occur early in 0.98% of cases and late in 0.58% of cases which was treated by simple dressing in group A while early bleeding occur in 4.89% of cases and late in 0.98% of cases in group B which was statistically significant (P Value 0.0004).

There is mild statically difference in rate of infection between group A and B patients ( P Value 0.033).

Edema of skin bridges occurs only in group B ( P Value 0.0001).

Retention of urine occur in 0.19% of cases in group A while it occur in 2.93% of cases in group B ( P Value 0.0005).

Major short term incontinence occur only in group B patients (P Value 0.0001).

Anal stenosis occurs in 3.32% of cases in group A while 4.89% of patients in group B develop such complications this shows that there is no statistical difference between the 2 groups (P Value 0.2699).

Recurrence did not occur in both groups.

CO₂ laser hemorrhoidectomy is a cost effective procedure in spite of expensive instruments, as it required a short hospital stay, short post op. healing time with early return to work that was within 7 to 10 days when compared to the conventional surgery (23). Healing will progress uneventfully in all patients with complete elimination of symptoms (24,25,26,27,28,29,30,31,32,33).

**Conclusion**

CO₂ laser hemorrhoidectomy is a safe procedure associated with lower incidence of post-operative complications than conventional open hemorrhoidectomy but requires availability of expensive instruments and skilled well trained surgeons.

**References**


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