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A comparison between conventional milligan morgan hemorrhoidectomy and stapled hemorrhoidopexy in a tertiary care center

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Abstract
Introduction: Hemorrhoids are known to man since ancient days due to high prevalence, easy observability and symptoms are well appreciated by patients. Oldest literature dates back to 1500 BC from Mesopotamia. Even today, the search for the exact origin and most appropriate treatment continues. Initially it was thought to be due to, varicose veins in anal cushions, but recently sliding of anal canal lining is gaining popularity. Treatment modalities ranging from dietary changes, defecation habit (life style and behavioral changes), medications, injection sclerotherapy and banding (office procedures), various operative procedures. While excisional hemorrhoidectomy remains the gold standard modality of treatment, patient acceptance for the procedure is limited by the very high postoperative pain. Thus, newer modalities are still being developed with the aim to reduce post-operative pain and early recovery. The most researched among the recent operative modalities is stapled hemorrhoidopexy. In this present study we compared conventional Milligan Morgan hemorrhoidectomy and stapled hemorrhoidopexy in grade III and IV hemorrhoid patients.
Material and Methods: After approval from institutional ethical committee and informed consent from each patient, we conducted a prospective study in the Department of General surgery of Silchar Medical College and Hospital, Silchar. It included 67 (n) patients symptomatic for grade III/IV selected randomly for each procedure. Of these 33 (n1) underwent conventional Milligan Morgan hemorrhoidectomy and 34 (n2) underwent stapled hemorrhoidopexy. Patients were followed up for a period of 24 weeks Follow up was done at 2nd, 8th, and 24th weeks routinely and in between if required. Parameter observed were degree of disease, sex ratio, mean age operating time, intraoperative blood loss, postoperative pain, postoperative blood loss, hospital stay, anal incontinence (fecal/flatus), anal stenosis/stricture.
Observations and Results: Of the 67 patients, 40 were male and 27 females. Sex ratio (M: F) was 21: 12 in MMH and 19: 15 in SH. Overall mean age was 49.13±11.08. For MMH it was 46.03±13.45 and for SH it was 52.15 ±7.92. Total 41 patients had grade III and 26 patients had grade IV hemorrhoids. 19 grade III patients underwent MMH and 22 patients underwent SH. 14 grade IV patients underwent MMH, and 12 under SH. Bleeding was the most common symptom in 61 patients followed by prolapse in 47 patients and 11 patients complained of pruritis discharge and constipation. Operating time was slightly less with SH. (24.12±2.18 min vs 18.82±3.7 min) Intraoperative blood loss was much more in MMH in comparison to SH (38.48±5.13ml vs 13.65±3.07ml). Length of hospital stay was more in the MMH group (4.18±0.46 Days vs 1.85±0.5 days). The need for injectable analgesics and duration of hospital stay was thus considered to be an indirect measure of pain. The complications encountered in our study were bleeding (8.9%), urinary retention (7.46%), fecal impaction (2.98%), surgical site Infection (7.46%), delayed wound healing (10.44%), and residual prolapse (14.92%) and anal stenosis (1.49%). All complications were more in MMH group, but residual prolapse and anal stenosis were noted only in the SH Group.
Conclusion: To conclude, while SH is relatively less painful and equally efficacious in smaller grade III disease, better results are obtained with MMH when dealing with larger grade III and IV hemorrhoids. Also, SH has a longer learning curve and is relatively costlier.

Keywords: milligan Morgan hemorrhoidectomy, stapled hemorrhoidopexy, Grade III hemorrhoids, Grade IV hemorrhoids

Introduction

Hemorrhoids are among the most common disease in the world. Known to man since ancient days due to common prevalence, direct observability and symptoms such as bleeding, pain, itching, etc. are easily appreciated by the patients, the understanding of the disease origin is still variable. Treatment modalities have varied a lot over time and continue to evolve even today. The oldest literature available on hemorrhoids dates back to 1500 BC in Mesopotamia. However, even older undated records are found in the Indian and Chinese scholarly texts.

Hemorrhoids are clusters of vascular tissue, smooth muscles, and connective tissue, arranged in the columns along the anal canal. These clusters are called anal cushions. Based on their position with relation to dentate line, hemorrhoids are divided into external (those below the dentate line) and internal (those above the dentate line). There are typically three major anal cushions right anterior, right posterior and left lateral and some minor

cushions in between them**.** Loosening of supporting connective tissue and dilatation and distortion of vessels in anal cushions is a more or less consistent finding of hemorrhoidal disease. There is associated loss of vascular tone and hyperplasia of vessels, and subsequent inflammatory reaction is also noted. These changes play important role in development of symptoms. While the pathophysiology is still unclear, initially it was thought to be due to varicose veins in anal cushions. But recently, the theory of sliding anal canal lining is gaining acceptance.

Most consistent physiological abnormality noted is raised maximum resting anal pressure. Anorectal manometry and electrophysiology studies show that mean minimal basal pressures were significantly higher in patients with non-prolapsing hemorrhoids than in normal or patients with prolapsing hemorrhoids**.** Aigner *et al* noted that terminal branches of superior rectal artery supplying anal cushions with hemorrhoids had a significantly larger diameter, greater flow, high peak velocity when compared to normal volunteers. A study by Thompson, concluded that a break in the elastic support of the anal cushions makes it more sensitive to the increase of pressure from straining and to the trauma from hard stool and subsequent progressive downward displacement.

Table 1: Grading of hemorrhoids on the basis of extent of prolapse internal hemorrhoids from I to IV.

Grade	Characteristics
Grade I	Visible hemorrhoids that do not prolapse.
Grade II	Hemorrhoids that prolapse during Valsalva maneuver but reduce spontaneously.
Grade III	Hemorrhoids that prolapse during Valsalva maneuver and need manual reduction.
Grade IV	Non reducible

Treatment modality, ranging from dietary changes, defecation habit changes (lifestyle and behavioral changes) medications, injection sclerotherapy and banding (office procedures) to various operative procedures, is chosen on the basis of grade of disease, degree of discomfort, bleeding comorbidities and patient preference.

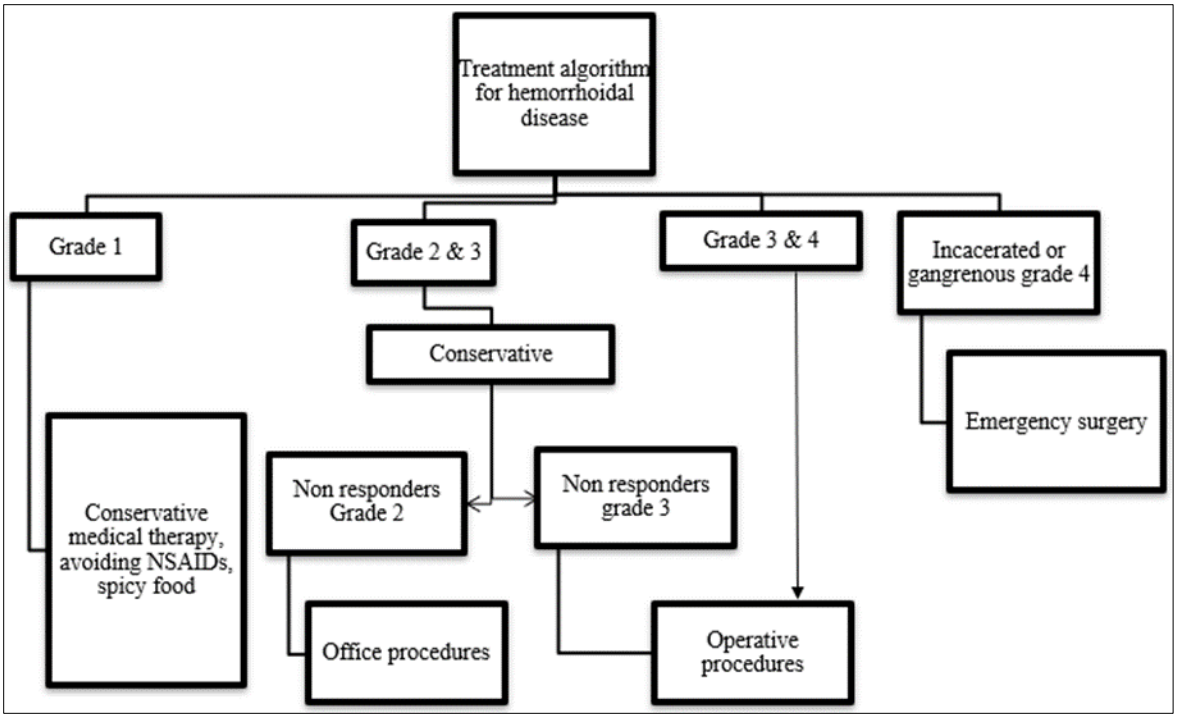

Fig 1: Treatment algorithm for hemorrhoidal disease

Materials and Methods

A prospective study was conducted in the Department of General Surgery of Silchar medical college and hospital at Silchar for a period of 30 months (August 2016 to January 2019). After approval from the institutional ethical committee and informed consent from each patient the study was carried out. It included 67 (n) patients symptomatic for gd III/IV hemorrhoids. Of these, 33 (n1) underwent conventional Milligan Morgan hemorrhoidectomy (MMH) and 34 (n2) underwent stapled hemorrhoidopexy (SH) randomly. Data was collected regarding patient demographics, procedure details, period of hospitalization, postoperative complications and time taken to return to routine life functionally and socially.

Who were excluded?

1. Patients who underwent surgery for hemorrhoids earlier (recurrent cases).
2. Associated with other anal canal pathology like fissure, fistula, incontinence etc.
3. Associated pregnancy or cirrhosis of liver.
4. Associated diabetes mellitus or immunosuppression.
5. Patients on steroids, anticoagulants or chemotherapy.

Who were included?

Patients with grade III/IV hemorrhoids and not having any exclusion criteria.

Patients were followed up for a minimum period of 24 weeks.

Follow up was done at 2nd, 8th and 24th week routinely and in between if any patient had any complaints. Parameters observed were a) degree of disease b) sex ratio c) mean age d) operating time e) intra operative blood loss f) postoperative pain score (resting and post defecation) g) postoperative blood loss h) hospital stay i) anal incontinence (fecal/flatus) j)anal stenosis/stricture.

Surgical Technique

All patients were put on high fiber diet and stool softeners for a week prior to admission for surgery for reduction in postoperative pain and risk of fecal impaction. Patients were admitted a day prior to surgery after necessary investigations and pre anesthetic checkup, light diet was advised on that night. Glycerin enema was administered twice, once the night before surgery and next in the morning on the day of surgery.

Milligan Morgan Hemorrhoidectomy (MMH)

Antibiotic injection
Anesthesia – Spinal anesthesia
Position – Lithotomy position
Skin preparation - Povidone iodine
Position of surgeon – Sits facing the perineum
Procedure

- The perineum was inspected and Parkes anal speculum inserted to display the hemorrhoids to be operated.
- The hemorrhoid was grasped at the mucocutaneous junction and traction applied medially for better visualization of the skin over base of the hemorrhoid.
- A V-shaped incision was made over the skin at base with the apex of the V lying outside.
- The incision was extended into the mucosa on the either side, and the hemorrhoid was raised from underlying internal sphincter by blunt and sharp dissection just beyond the dentate line.
- The pedicle was transfixed and ligated with 2.0 polyglycolic acid suture leaving approximately 1cm of suture behind.
- Hemorrhoids were excised ½ cm distal to the ligature.
- The procedure was repeated for other prolapsed hemorrhoids (maximum 3) leaving a mucocutaneous bridge between each hemorrhoid to reduce any subsequent anal stricture.
- At the end, povidone iodine and paraffin-soaked gauge pack was placed to reduce postoperative bleeding, reinforced by T-bandage.

Stapled hemorrhoidopexy (SH)

Preoperative antibiotics, anesthesia, position of patient and surgeon were similar to Milligan Morgan technique.
This procedure required a special set of instruments (Hemorrhoidopexy set) which included

- Hemorrhoidal circular stapler
- Obturator
- Circular anal dilator
- Purse string suture anoscope
- Suture threader

Procedure

- A digital rectal examination was performed followed by insertion of the obturator alone to dilate the anus. Then, a circular dilator with an obturator was introduced with a tubal portion (3cm) of dilator crossing the dentate line. Perineal skin was milked slightly so that the flange of the dilator lay flatly on perineal skin and the obturator removed. Dilator was fixed to perineal skin using 2.0 polyamide suture.
- After fixing the dilator, purse-string anoscope was introduced and purse-string suture was applied using 2.0 polypropylene suture near the apex of anoscope (approximately 2-3 cm above the dentate line) including only mucosa and submucosa. 8-12 small circumferential bites were taken maintaining uniformity of depth. After every 1 or 2 bite, anoscope was removed and reintroduced as rotating within might result in twisting of mucosa and cause asymmetry in circumferential suture. After completion of purse-string suture, anoscope was removed and index finger was introduced and the suture was gently tightened over the finger to look for any gaps or asymmetry.
- After applying purse-string suture, the anvil of the stapler was introduced through it after opening the stapler fully, such that the anvil crossed the suture line completely and only half of the shaft was visible. Suture was tightened over the shaft and a surgical knot was applied. Suture ends were extracted through the lateral channels of stapler using the threader. Both the ends were tied together forming a loop.
- Once the purse-string was applied, the stapler was partially closed and housing was advanced maintaining gentle and uniform traction on the suture, such that the 4cm mark of stapler lay over anal verge. Now stapler is fully closed.
- Before firing, with the safety lock in position, all checks were done ensuring that the posterior vaginal wall was not involved in females.
- Once satisfied, safety lock was removed and stapler was fired in one fluid motion keeping it fully closed for 30 seconds before firing and 20 seconds after firing. Marker on stapler showed the stapled height (always kept in range).
- After 20 seconds of firing, adjuster knob was turned ¾ for easy extraction of stapler, avoiding additional turn to prevent injury.
- Anoscope was reintroduced to inspect suture line. Donut was inspected for its uniform width approx. 3cm and minimal muscle fiber (circumferential and depth symmetry).
- Paraffin gauze pack soaked in povidone iodine applied.

Postoperative Care

Patients of both groups were given 2 doses of injection tramadol hydrochloride 50 mg 12 hours apart. Additional doses of paracetamol infusion were given to patients who required more analgesics (always tried to keep the VAS to 3 or below). On Day 2, oral analgesics (paracetamol tablets 500 mg sos) were started. Patients were observed for urinary retention and bleeding. Sitz bath thrice daily was advised to patients undergoing Milligan Morgan hemorrhoidectomy. VAS was recorded daily during resting hours and post-defecation. Next day patients were discharged if they were comfortable with oral analgesics but those who needed injectable analgesics or had any other complaints such as bleeding, urinary retention etc. were kept in hospital. On discharge, patients were prescribed oral antibiotics (ofloxacin 200 mg + ornidazole 500 mg), analgesics (paracetamol tablets 500 mg SOS pc) and stool softeners. Hemorrhoidectomy (MMH) patients were advised Sitz bath for 2 weeks.

Follow up

Follow up was done at 2nd, 8th and 24th week for complains such as anal discomforts, reduction of mass/prolapse, bleeding, surgical site infection, incontinence for flatus/fecal matter, stenosis or stricture.

Observation and Results

At Silchar Medical College and hospital, Department of Surgery this study was conducted. It included 67 patients (n) of which 33 (n1) undergone Milligan Morgan hemorrhoidectomy and 34 (n2) had undergone stapled hemorrhoidopexy. 40 patients were male and 27 were female. Male to female ratio (M:F) was 21:12 in MMH and 19:15 in SH.

Table 2: patient demographics and presenting symptoms.

	MMH (n1= 33)	SH (n2= 34)	Overall average
Age	46.03± 13.45	52.15±7.92	49.13±11.08
Gender ratio (M:F)	21:12	19:15	40:27
Degree (Grade III/IV)	19/14	22/12	41/26
Bleeding	31 (93.93%)	30 (88.24%)	61 (91.04%)
Prolapse	22 (66.67%)	25 (73.53%)	47 (70.15%)
Pruritus and discharge	4 (12.12%)	7 (20.58%)	11 (16.42%)
Constipation	3 (9.09%)	8 (23.53%)	11 (16.42%)

Table 3: shows intraoperative findings and length of hospital stay

	MMH	SH
Operative time	24.12±2.18	18.82 ± 3.70
Intraoperative blood loss	38.48±5.13	13.65±3.07
Length of hospital stay	4.18±0.46	1.85±0.50

At all times, we aimed to keep the pain scores below 3, and the patients were discharged when they were comfortable with oral analgesics.

Table 4: Patients discharged from the hospital daywise

	MMH	SH
Day 1	-	7
Day 2	-	25
Day 3	2	2
Day 4	25	-
Day 5	6	-

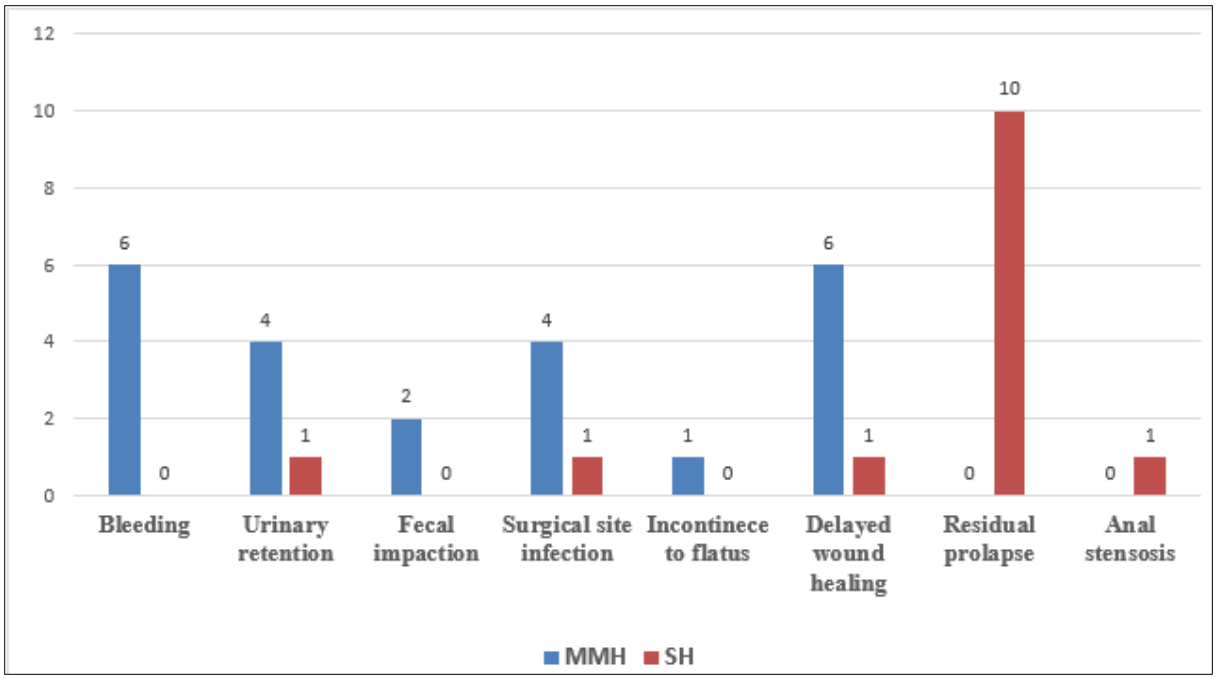

Fig 2: Incidence and comparison of postoperative complications on both the groups

Table 5: shows the incidence of complications during hospital stay and during follow up and sequelae

Complication	Sequelae
Urinary retention	4 patients in the MMH group developed postoperative urinary retention and required catheterization. Trial without catheterisation was done prior to discharge.
Fecal impaction	2 patients of the MMH group developed fecal impaction which was managed by manual evacuation and glycerine enema. Stool softeners were added on discharge.
Postoperative bleeding	6 patients of the MMH group developed post operative bleeding which was managed conservatively with tranxamic acid and sitz bath. Only one patient required blood transfusion. None of the patients were readmitted for delayed postoperative bleeding.
Surgical site infection	4 patients in the MMH group and 1 patient in the SH group developed surgical site infection which was treated on OPD basis with oral antibiotics and continued Sitz bath.
Delayed wound	6 patients in the MMH group and 1 in the SH group had delayed wound healing.

healing	
Incontinence	Only one patient in the MMH group developed incontinence to flatus up to 6 weeks of follow-up. At 24th week follow-up, there was no residual incontinence.
Residual prolapse	10 patients in the SH group had residual prolapse at 6 weeks follow-up which urther regressed to only 7 patients at 24 weeks follow-up.
Anal stricture	Only one patient developed anal stenosis in the SH group, but the patient only complained of difficulty in passing stool only when constipated. Additional laxatives were added to manage constipation.

Discussion

While a wide range of options are available for hemorrhoidal disease, even today surgical excision i.e., hemorrhoidectomy remains the gold standard procedure for grade 3 and 4 disease**.**

All surgical interventions concentrate on removing the outcome of the pathophysiological process. But better results are obtained if surgical interventions are followed by changes in food habits and toilet behavior (to avoid or delay the recurrence).

Though no age is immune to hemorrhoids but most of our patients presented in 4^{th} & 5^{th} decade of their life. Mean age for MMH (n1) was 46.03± 13.45 and 52.15±7.92 for SH (n2). The overall mean age was 49.13±11.08. While men are more susceptible to developing symptomatic hemorrhoids, there was no statistical difference between the patients in the two groups. Patients usually present with bleeding, anal discomfort due to pruritus and discharge, and prolapse/mass. Many patients also presented with constipation, presumably due to increased strain and time to evacuate the stool when compared with those with normal bowel habit. Chronic straining initiates the inflammatory pathophysiological changes in rectal mucosa & submucosa favoring the development of hemorrhoids.

While mean operative duration was similar, intraoperative blood loss was more in MMH than SH due to increased tissue dissection. Dissection time and bare surface were considerably more in MMH. However, reduction of prolapse/mass was better in MMH as the procedure concentrates on excising the hemorrhoid mass. On the other hand, SH works by lifting and shrinking the mass/prolapse indirectly by excising a rim of tissue (mucosa and submucosa deep) which lifts and disconnects vascular continuity by using a circular stapler. Patients with small grade III hemorrhoids get equivalent results in mass/prolapse reduction in both groups immediately after surgery. But in larger grade III/IV hemorrhoids, mass/prolapse reduction in immediate postoperative period is less in SH than MMH. Over time, reduction is noted. On following up to 24 weeks, mass/prolapse reduction was observed but it was not complete as in MMH. 7 patients had residual prolapse. Although bulge was visible in 7 patients during follow-up clinical examination but not symptomatic to them. This could reduce further on prolonged follow-up. Postoperative pain during resting hours and on defecation was more in MMH. In MMH patients experience more pain due to increased tissue dissection, more bare area and site of surgery being supplied by somatic nerves. In SH group minimal tissue dissection, no bare area practically and site of surgery above dentate line so less painful to trauma. Postoperative bleeding was more in MMH due to more bare area which was exposed to trauma (defecation). Bare surface again was responsible for wound site infection in MMH but it was controlled by sitz bath. Fecal impaction was noted more in MMH than SH again pain being the reason (delays defecation in postoperative period). If procedures are executed properly incidence of incontinence can be minimized but can occur in MMH if sphincter gets injured. Delayed wound healing was more common in MMH due to higher infection rate and bigger wound to heal. Anal canal stricture/stenosis was higher in SH group. As the SH is a relatively new procedure (in comparison to MMH) there is a learning curve. If deeper bites are taken in purse string suture and/or hemorrhoidopexy done at lower level (near or below dentate line) than usual, incidence of complications like bleeding, pain and stenosis increases considerably. Chances of recurrence are more in SH than MMH as hemorrhoids are not excised though we have not encountered any recurrence. Last but not the least was expenses associated with each procedure. SH was much more expensive than MMH. Financial background of the patient must be considered before choosing the procedure. Choice of procedure depends on many factors like grade of disease, comorbidities, experience of surgeon for any procedure, patient's preference and affordability of patient.

Conclusion

Though small grade III hemorrhoids, when treated with SH by an experienced surgeon, provide excellent results immediately after surgery with much lesser pain and complication rate, larger grade III and grade IV are better treated by MMH for better reduction of mass/prolapse and better patient satisfaction.

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