

To compare the short term outcomes of Stapled hemorrhoidectomy with Open Hemorrhoidectomy

Dr. Ashutosh Tiwari, Dr. Vaibhav Mudhale, Dr. Uday Ghate, Dr. Sheetal Murchite

* Associate professor department of general surgery

DOI: 10.29322/IJSRP.12.03.2022.p12335
<http://dx.doi.org/10.29322/IJSRP.12.03.2022.p12335>

Paper Received Date: 8th March 2022
Paper Acceptance Date: 13th March 2022
Paper Publication Date: 20th March 2022

Abstract- Hemorrhoids are the most common benign anorectal problems occurring worldwide. The preferred treatment for third- and fourth-degree hemorrhoids is surgical. Hemorrhoidectomy is one of the most commonly performed anorectal operations. Stapled hemorrhoidectomy, which was termed as stapled hemorrhoidopexy (PPH), was first described in 1995. It has been associated with improved short-term outcomes, including less postoperative pain, short operating time, early recovery and greater patient satisfaction.

Aim - Compare the short-term outcomes of Stapled hemorrhoidectomy with Open Hemorrhoidectomy

Methods: 50 Haemorrhoids patients who have given consent to participate in the study were divided into two groups randomly and alternative basis. Patients were subjected to clinical examination and routine laboratory investigations preoperatively. Pain is assessed using a visual analogue scale (VAS) where 0 represented no pain and 10 represented the worst pain ever. The pain score was recorded every 6 hr during the first postoperative day, at the time of first motion and daily until the end of the first week. Patients were reviewed at 1 week and 3 weeks postoperatively and between 6-10 weeks postoperatively. Student t test two tailed independent was used for continuous parametric variable. Mann Whitney u test two tailed dependent was used for continuous non parametric variable Chi square / fisher exact test was used to study parameters in categorical scale. P value <0.05 was considered statistically significant.

Conclusion – The study confirms that staple hemorrhoidectomy is associated with lower pain score post-operatively and associated with shorter operative time and decreased post operative stay in the hospital.

Advantages of stapler for the correction of hemorrhoids were shown in the safety and minimal pain with fewer complications than a conventional hemorrhoidectomy.

I. INTRODUCTION

Hemorrhoids are one of the commonest ailments that afflicts mankind, and their treatment has been subject of consideration in medical literature since Egyptian papyrus earlier than 3000 BC. Hippocrates in 400 BC mentioned burning, strangling and excision^[1]. Haemorrhoids are one of the most common anorectal diseases for referral to a surgeon and the treatment is done through a procedure called as haemorrhoidectomy which is common. Complaints pertaining to haemorrhoids are one of the most common afflictions of western civilizations. Although the condition is rarely life threatening the complications of therapy can be for haemorrhoids of grade III AND IV the effective treatment even today remains to be hemorrhoidectomy. Owing to low expense and technical ease open hemorrhoidectomy is the procedure of choice, even though newer modalities have come in to play⁽²⁾. Today as, it is difficult to obtain any accurate idea of their incidence, but rate of surgery for hemorrhoids varies from their incidence, but rate of surgery hemorrhoids varies from country to country⁽³⁾. Many alternative treatment methods have been developed for hemorrhoids. Milligan – Morgan hemorrhoidectomy i.e., conventional or open hemorrhoidectomy was described in 1937, and is still the most popular surgical treatment for hemorrhoids. It has good result but is a very painful procedure resulting in increased hospital stay and having complications like immediate hemorrhage, urinary retention and late complication like incontinence, stenosis^[4].

With the advent of minimal invasive surgery, the scenario has changed. More recently, Dr. Antonio Longo (1998) has advocated circular stapler hemorrhoidectomy for hemorrhoids^[5]. This technique has been named “Procedure for Prolapse and Hemorrhoids (PPH)” and should be referred to as stapled hemorrhoidectomy. It has come up as a day care procedure with minimal post-operative pain and early return to work. Although it showed early promising results, expensive instrument, specialized training and a long learning curve limits the use of stapler hemorrhoidectomy. The present study is designed to compare outcomes of the Stapled hemorrhoidectomy against Open hemorrhoidectomy in terms of post-operative pain, post-operative complications, post-op incontinence scoring and symptomatology.



II. MATERIAL AND METHODS

A prospective comparative study was conducted at D.Y. Patil Hospital in the department of general surgery, Kolhapur. 50 Haemorrhoid patients who had given consent to participate in the study were divided into two groups randomly and alternative basis. Patients coming to the hospital were divided randomly for stapler (Group A) and open hemorrhoidectomy (Group B). Mean age of the patients from group A was 40±10.74 years and that for Group B was 38±9.56 year, ranging from 18 to 63 years.

A signed informed consent was obtained for all subjects; confidentiality of the study participants was maintained. The hospitals ethics committee approved the research protocols. The data collection for this study was done between October 2019 to October 2021. Patients were subjected to clinical examination and routine laboratory investigations preoperatively. All patients were operated on an in- patient basis. Patient’s hospital stay for analysis is calculated starting from the day of surgery.

Technique – the procedure was performed under the effect of general anesthesia. A circumferential mucosal purse string suture is placed per anum 3-5 cms above the dentate line, so that tightening of this purse string will draw mucosa and submucosa into the stapler. once the stapler was closed and fired, a ring of staples is delivered and a doughnut of mucosa and submucosa excised. Compression on the gun was maintained for about 20–30 seconds for hemostasis before the stapler was opened and removed. Active bleeding points, if present, were stick tied with an absorbable suture.

III. STATISTICAL ANALYSIS –

Descriptive statistical Analysis was carried out in the present study with the help of SPSS software version 22. Confidence interval considered 95 %. Significance assessed at 5% level of significance.

Student t test two tailed independent was used for continuous parametric variable.

Mann Whitney u test two tailed dependent was used for continuous non parametric variable Chi square / fisher exact test was used to study parameters in categorical scale. P value <0.05 was considered statistically significant.

IV. RESULTS –

A total of 50 patients were included, the patients were divided into two groups, group A and group B. The patients in group A underwent open hemorrhoidectomy while the patients in Group B underwent stapler. Mean age of the patients from group A was 40±10.74 years and that for Group B was 38±9.56 year, ranging from 18 to 63 years.

Age groups (Years)	Group Name		Total	Chi Square P value
	Group A (Open)	Group B (Staple)		
≤ 20	1 (4%)	0 (0%)	1 (2%)	2.20 0.699
21 to 30	3 (12%)	6 (24%)	9 (18%)	

31 to 40	8 (32%)	8 (32%)	16 (32%)
41 to 50	11 (44%)	9 (36%)	20 (40%)
≥ 51	2 (8%)	2 (8%)	4 (8%)
Total	25 (100%)	25 (100%)	50 (100%)
Mean Age	40±10.74	38±9.56	P value 0.668

1.) In the present study, proportion of male patients was comparatively more (92%) in Group A and 76% in group B. Grade III Haemorrhoids were slightly more in Group A (44%) in comparison 36% in Group B

Major Presenting Complaints	Group Name		Total	P value
	Group A (Open)	Group B (Staple)		
Bleeding	18 (72%)	15 (60%)	33 (66%)	0.370
Pain	4 (16%)	4 (16%)	8 (16%)	1.000
Constipation	17 (68%)	20 (80%)	37 (74%)	0.333
Prolapse	8 (32%)	10 (40%)	18 (36%)	0.556

2.) Above table shows that in Group A, most common presenting complaint was bleeding in 18 (72%) patients followed by constipation in 17 (68%) patients. Similarly in the Group B, most common presenting complaint was constipation in 20 (80%) patients followed by bleeding in 15 (60%)

3.) Grade III Haemorrhoids were slightly more in Group A (44%) in comparison 36% in Group B. The difference in proportion of Grades of Haemorrhoids was not significant (P value 0.564).

Grade	Group Name		Total	P value
	Group A (Open)	Group B (Staple)		
II	14 (56%)	16 (64%)	30 (60%)	0.564
III	11 (44%)	9 (36%)	20 (40%)	
Total	25 (100%)	25 (100%)	50 (100%)	

4.) Above table shows that in almost 56% of the patients from group A had operation time between 41 to 50 minutes and 60% patients from group B, operation time was 31 to 40 minutes. The difference of duration of surgery was statistically significant (**p value <0.01**). Mean operation time for group B was significantly less as compared to that for group A (49.24±3.56 and 40.20±4.32 respectively) (**p value <0.01**).

Duration of Surgery (Minutes)	Group Name		Total	P value
	Group A (Open)	Group B (Staple)		
31 to 40	0 (0%)	15 (60%)	15 (30%)	<0.001
41 to 50	14 (56%)	10 (40%)	24 (48%)	

≥ 51	11 (44%)	0 (0%)	11 (44%)	
Total	25 (100%)	25 (100%)	50 (100%)	
Mean Operative Time (Minutes)	49.24±3.56 and 40.20±4.32		P value <0.01	

5.)
score

VAS
of the

patients was assessed after surgery to measure post-operative pain. It was found that mean VAS score of the patients of group B at 6 hours as well as after 24 hours of surgery (5.56±0.77 and 4.56±0.87 respectively) was significantly less as compared to that for group A (6.68±0.80 and 5.16±0.75 respectively) (**p value <0.05**).

At 48 hours, after 3 and 7 days, mean VAS score of group B was less compared to group A but the difference was not statistically significant (p value >0.05).

Time after Surgery	Group A (Open)	Group B (Staple)	P value
6 hrs	6.68±0.80	5.56±0.77	0.000
24 hrs	5.16±0.75	4.56±0.87	0.012
48 hrs	2.84±0.75	2.56±0.58	0.146
3 Days	1.92±0.64	1.72±0.46	0.210
7 Days	1.72±0.68	1.52±0.51	0.244

6.) Almost 2/3rd of the patients from group B (60%) stayed in hospital for ≤ 2 days as compared to group A (52%) but the difference was not statistically significant. 12% of the patients from group A stayed in hospital for ≥ 5 days as compared to group B (4%). (p value 0.565). Average number of days of stay in hospital was less in group B as compared to group A (2.80 ± 1.12 and 2.44 ± 0.77 days respectively) (p value 0.191).

Duration of Hospital	Group Name		Total	P value
Stay (Days)	Group A (Open)	Group B (Staple)		
≤ 2	13 (52%)	15 (60%)	28 (56%)	0.565
3 to 4	9 (36%)	9 (36%)	18 (36%)	
≥ 5	3 (12%)	1 (4%)	4 (8%)	
Total	25 (100%)	25 (100%)	50 (100%)	
Mean Duration of Hospital Stay	2.80 ± 1.12	2.44 ± 0.77	P value 0.191	

7.) Wound healing in most of the patients from group B (88%) was done within 2 to 4 weeks as compared to group A (44%) and the difference was statistically significant (p value < 0.05). Mean wound healing time in group was significantly less (2.67 ± 0.70 days) as compared to group A (4.76 ± 0.97 days) (p value < 0.05).

Wound Healing Time (Days)	Group Name		Total	P value
	Group A (Open)	Group B (Staple)		
2 to 4 Weeks	11 (44%)	22 (88%)	33 (66%)	0.045
> 4 Weeks	14 (56%)	3 (12%)	17 (34%)	
Total	25 (100%)	25 (100%)	50 (100%)	
Mean Wound Healing Time (Days)	4.76 ± 0.97	2.67 ± 0.70	P value < 0.01	

V. DISCUSSION –

After hemorrhoidectomy, major worry is post-operative pain. Conventional hemorrhoidectomy that is considered as gold standard treatment has withstood the test of time, but has been associated with significant post-operative morbidity that is pain. Emphasis has been applied for management of post-operative pain as it is also related to urinary symptoms. Varied number of studies has been published in the literature in an attempt to identify approaches with reduced post-operative morbidity. Stapled hemorrhoidectomy has been shown in many randomized trials to have less post-operative morbidity.

Conventional hemorrhoidectomy is still the procedure of choice because of low expense and ease of technique, Even Though Many Newer Procedures Have Subsequently Been Proposed. As open hemorrhoidectomy leaves a large wound are for healing by secondary intention, they are associated with considerable post-operative pain. Due to loss of anoderm there is reduced anal sensation in open procedure. Open hemorrhoidectomy may be associated with anal stenosis due no scar retraction. Open wound in anal canal has been implicated in post op morbidity. For the same reason stapled hemorrhoidectomy can be recommended.

In many countries now stapled hemorrhoidectomy has gained attention because of faster wound healing, better patient compliance and less post-operative pain. Nonetheless, randomized controlled trials have reported conflicting results about stapled vs. open hemorrhoidectomy.

The present study is designed to compare outcomes of the Stapled hemorrhoidectomy against Open hemorrhoidectomy in terms of post-operative pain, post-operative complications, post-op incontinence scoring and symptomatology. Patients coming to D.Y. Patil Hospital with grade II and III were divided randomly, 25 patients for stapler and 25 patients for open haemorrhoidectomy. In the present study, in group A (**Open Hemorrhoidectomy**), most of the patients, 11 (44%) were from age group 41 to 50 years (middle year age group) and in the group B (**Staple Hemorrhoidectomy**), in which, most of the patients, 9 (36%) were from age group 41 to 50 years (middle year age group). **Bikhchandani J et al.**^[51] mean age of patients was 46.02 years (SD, 12.33) in the stapled group and 48.64 years (14.57) in the open group. **Shukla S et al.**^[52] most common age group for patients of haemorrhoids was 41-50 years. In the study by **Thejeswi PL et al.**^[53] mean age was 45 years. In the present study, proportion of male patients was comparatively more (92%) Similarly, mean satisfactions score was slightly more for group B but lacks statistical significance (3.84±0.75 and 3.88±0.60 respectively). in Group A and 76% in group B. The difference in gender distribution was not significant in both groups and were comparable in terms of gender. (P value 0.247)

Bikhchandani J et al.^[51] Hemorrhoids were more common in men (ie, 80.9% and 85.7% in the stapled and open group, respectively). **Shukla S et al.**^[52] Males are more in number than females in both the study group. In the study by **Thejeswi PL et al.**^[53], males are more commonly affected than females. There is male predominance in all the studies as those working population staying away from home and irregular and less fibre and water intake leading to haemorrhoids.

In Group A, most common presenting complaint was bleeding in 18 (72%) patients followed by constipation in 17 (68%) patients. Similarly in the Group B, most common presenting complaint was constipation in 20 (80%) patients followed by bleeding in 15 (60%) patients. Occurrence of pain and prolapse was less common in both groups. The most common problem reported by the patients before the operation in the study by **Gravie et al.**^[34] was the impression of a mass at the anus (90%). Other problems included frequent bleeding (47%), itching (35%), constipation (31%), and pain (15%). Most common presentation of haemorrhoids reported and present in our study is constipation and bleeding per rectum and something coming out per rectum as patient feel shy and thus presents late and neglecting their complaints. More number of patients from group A had lesser satisfaction score as compared to group B. but the difference was not significant Similar findings shown by **Sourav Baur et al.**^[56], significantly higher satisfaction score was seen in patients with stapled compared to conventional . In a study by **Idoor D. Sachin et al.**^[57], on Stapled versus open hemorrhoidectomy found that significantly higher satisfaction score was noted among patients in stapled group.

In almost 56% of the patients from group A had operation time between 41 to 50 minutes and 60% patients from group B, operation time was 31 to 40 minutes. The difference of duration of surgery was statistically significant (**p value <0.01**). Mean operation time for group B was significantly less as compared to that for group A (49.24±3.56 and 40.20±4.32 respectively) (**p value <0.01**). **Shukla S et al.**^[52] also observed similar results with mean duration of surgery for patients' having conventional hemorrhoidectomy as 44±5 minutes while patients having stapler hemorrhoidectomy as 39.75±5.73 minutes (p<0.01). **Thejeswi PL et al.**^[53] observed average time taken for a stapled hemorrhoidectomy as 45.75 minutes (30-70min.) while conventional hemorrhoidectomy took an average of 62 minutes (45-80 mins). **Bikhchandani et al.**^[51] observed the mean operative time to be shorter in the stapled group 24.28 minutes (4.25) versus 45.21 minutes (5.36) in the Milligan-Morgan group (P < .001). **Gravie et al.**^[34] also observed Stapled hemorrhoidectomy to be significantly faster than the Milligan-Morgan technique (21 minutes versus 31 minutes; P <0.001). VAS score of the patients was assessed after surgery to measure post-operative pain. It was found that mean VAS score of the patients of group B at 6 hours as well as after 24 hours of surgery (5.56±0.77 and 4.56±0.87 respectively) was significantly less as compared to that for group A (6.68±0.80 and 5.16±0.75 respectively) (**p value <0.05**).

Bikhchandani et al.^[51] in their study also observed that pain scores and requirement of analgesics to be significantly less in the stapled group. **Gravie JF et al.**^[34] finds that the patients in the Stapler hemorrhoidectomy group experienced less postoperative pain during bowel movement and had fewer total analgesics requirement over the first 3 days. **Thejeswi et al.**^[53] observed the average pain scores on post-op day 1, day 2 and day 3 in the stapled group as 3.8, 2.4 and 1.6 as against 5.4, 4.3 and 3.9 in the conventional group. Almost 2/3rd of the patients from group B (60%) stayed in hospital for ≤ 2 days as compared to group A (52%) but the difference was not statistically significant. 12% of the patients from group A stayed in hospital for ≥ 5 days as compared to group B (4%). (p value 0.565) Average number of days of stay in hospital was less in group B as compared to group A (2.80±1.12 and 2.44±0.77 days

respectively) (p value 0.191). **Bikhchandani et al.**^[51] observed mean hospital stay as 1.24 days (0.62) and 2.76 days (1.01) (P < .001) in the stapled and open group, respectively. **Thejeswi et al.**^[53] observed the average duration of stay in the hospital for the stapled group as 1.5 days, with 13 patients being discharged within 24 hrs of the surgery. The average duration of stay in the hospital for conventional group was 6.2 days (p<0.01). **Shukla S et al.**^[52] observed the mean duration of hospital stay in conventional group as 6.16±2.135 days while in stapler group as 3.25±1.932 days (p<0.01). **Gravie JF et al.**^[34] observed similar results with mean length of stay varying from 1.00 to 3.50 days in the Stapler group and from 1.67 to 5.00 days in the conventional group.

Bleeding (at 24 hours as well as 48 hours) was less in group B (32% and 24% respectively) as compared to group A (52% and 36% respectively) but the difference was not significant. Infection was equal more in both groups (12% each). Anal stenosis was less in group B (4%) as compared to group A (12% each).

Occurrence of incontinence after 3 weeks as well as after 6 weeks was slightly less in group B (4% and 0% respectively) as compared to group A (16% and 8% respectively). Incontinence was equal in both groups (8% in each group). Urinary retention was also equal in both groups. Anal incontinence was seen in 8% patients from group A and none of the patients from group B had anal incontinence. Anal incontinence score was higher (C&D) in 08% of the patients from Group A and patients from group B had very low anal incontinence score.

Shukla et al.^[52] also observed bleeding as the most common symptom present in the post-operative period. At the end of 1st month, only 20% of patients with stapler procedure comes with complains of bleeding while it was present in 30% of conventional group patients. Urinary retention and wound infection were seen in 2 patients each in conventional group. **Bickchandani et al.**^[51], **Shalaby et al.**^[65] and **Gravie et al.**^[34] also found no difference in the rate of complications in the open and stapler groups respectively.

Conventional hemorrhoidectomy has an open wound leading to higher incidence of bleeding and wound infection then stapler hemorrhoidectomy. Also, with stapler which requires expertise there are incidence of bleeding due to improper suture line and donut.

VI. CONCLUSION-

Open hemorrhoidectomy is associated with more post-operative pain, longer duration of surgery, longer duration of hospital stays, longer duration to return to work, higher chances of wound infection and post-operative bleeding as compared to stapler hemorrhoidectomy.

Patients with grade II and III haemorrhoids who are operated with stapled hemorrhoidectomy have better results. Stapler hemorrhoidectomy is safe with many short- term benefits. It is a novel technique and has emerged as an alternative to open hemorrhoidectomy, long considered the “gold standard”.

Although stapled hemorrhoidectomy offers much less pain when compared to the conventional methods, it requires skills to perform it and the cost of the procedure is much higher. So, it cannot be offered to all patients as an option. So, it is up to the treating surgeon to use his experience, skill and acumen in selecting the procedure for treating his patient with haemorrhoids, which is suitable to the patient economically, socially and curatively.

However, there is a need to conduct larger prospective double-blind trials with longer period of follow-up to study rate of recurrence along with trials for cost effectiveness.

REFERENCES

- [1] Ellesmore S, Windsor AC. Surgical history of haemorrhoids. In *Surgical Treatment of Hemorrhoids*. London : Springer. 2009 (pp. 1-5).
- [2] Brunicaudi FC, Anderson DK, Billar TR, Dunn DL, Hunter JG, Matthews JB, et al. *Schwartz's principles of surgery*. Tenth edition: Mc Graw Hill; 2015:1222.
- [3] Johanson JF, Sonneberg A. The procedure of haemorrhoids & chronic constipation. An epidemiological Study. *Gastroentology* 1991;380-386.
- [4] Longo A. Treatment of hemorrhoid disease by reduction of mucosa and hemorrhoidal prolapse with a circular suturing device: a new procedure. *Bologna: Proceedings of the 6th World Congress of Endoscopic Surgery, Rome, Italy; Monduzzi Publishing, 1998:777-84.*
- [5] Morgagni JB. *Seats and causes of diseases*, Vol 2. Letter 32, Article 10 London A. Millar Quoted by Thomson 1975; Pg. 105.
- [6] Mehigan BJ, Monson J RT, Hartley JE. Stapleing Procedure for haemorrhoids VS milligan. *Morgan haemorrhoidectomy. Randomised control trial. Lancet* 2000;355:782-5.
- [7] Adams F. *The genuine work of Hippocrates*. London printed for Sydenham society. Pg825. Quoted by Eisenhammer S. *Dis Colon Rect* 1969; 12:288.
- [8] Arederne JC. In *Treatises of fistula in ano, haemorrhoids and clysters*. Ed D' Arcy Power K Paul, Trench Truber & Co Ltd London. Quoted BY Eisenhammer 1910: pg 68.
- [9] Bhagvat VM, Aher JV, Bhagvat SR. Comparative study between open (milligan morgan) haemorrhoidectomy and stapled haemorrhoidectomy. *Int Surg J* 2016;3:43-52.
- [10] Eastman PF and Applebaum IA. Critical evaluation of internal haemorrhoidal ligation as an outpatient procedure. *Amer J Proctol* 1969;201-9.
- [11] Turell R. in *Diseases of the colon and anorectum* Ed. R Turell. Philadelphia and London, Saunders 1960;Pg 888
- [12] Seow Choen F. Stapled haemorrhoidectomy: pain or gain. *Br J Surg* 2001;88:1-3.
- [13] Nivatvongs S, Stern HS, Fryd DS. The length of the anal canal. *Dis Colon Rectum* 1982; 24:600–601.
- [14] Milligan ETC, Morgan CN. Surgical anatomy of the anal canal: with special reference to anorectal fistulae. *Lancet* 1934; 2:1150–1156.
- [15] Johnson FP. Quoted in *Gray's Anatomy* 35th Ed. Oriented Longman P 1914; Pg1293
- [16] Duthie HL, Gairns FW. Sensory nerve endings and sensation in the anal region of man. *Br J Surg* 1960; 47:585–594
- [17] Seow-Choen F, Ho JMS. Histoanatomy of anal glands. *Dis Colon Rectum* 1994;37:1215– 1218

- [18] Fenger C. The anal transitional zone. *Acta Pathol Microbiol Immunol Scand* 1987; 85(suppl 289):1-42.
- [19] Parks AG. The surgical treatment of haemorrhoids. *Br J Surg* 1965;43:1305.
- [20] Milligan ETC. Haemorrhoids. *Br Med J* 1939;2:412
- [21] Morgan CN. The surgical anatomy of the anal canal. *Postgrad Med J* 1939;12:287.
- [22] Fowler R, Jr. Landmarks and legends of the anal. *Aust NZ J Surg.* 1957;27:1.
- [23] Akande B, Esho JO. Relationship between haemorrhoids and prostatism: results of a prospective study. *Eur Urol.* 1989;16(5):333-4.
- [24] Williams NS. In *Bailey and love's Short Practice of Surgery. The anus and anal canal.*
25 th ed. Arnold 2004;Pg1242-71.
- [26] Cleave TL, Campbell GC, Painter NS. Diabetics, Coronary thrombosis and saccharine disease. *BR M J* 1969;2:556.
- [27] Burkitt D. Varicose veins, deep veins thrombosis and haemorrhoids Epidemiology and suggested aetiology. *Br Med J*1972;2:256.
- [28] Mattana C, Maria G, Pescatori M. Rubber band ligation of hemorrhoids and rectal mucosal prolapse in constipated patients. *Dis Colon Rectum.* 1989 May;32(5):372-5. Hanock BD and Smith K. Internal Sphincter and Haemorrhoids. *Br J Surg* 1975;61:918.
- [29] Lin JK. Anal manometric studies in haemorrhoids and anal fissures. *Dis Colon Rectom* 1989;32(1):839-42.
- [30] Goenka M et al. Rectosigmoidvarices and other mucosal changes in patients with portal hypertension. *Am J Gastroenterol* 1991;86:1185.
- [31] Thomas HR. *Clinical surgery : abdomen, Rectum and Anus.* Ed by Charles Rob. Rodney Smith Vol 10,1966;Pg 523.
- [32] Gass OC, Admas J. Haemorrhoids: aetiology and pathology. *Am JSurg* 1950;79:40.
- [33] Ponsky JL. *Gastrointestinal Endosc* 1991;37(2): 1550-8.
- [34] Gravié JF, Lehur PA, Hutten N, Papillon M, Fantoli M, Descottes B et al. Stapled hemorrhoidectomy versus milligan-morgan hemorrhoidectomy: a prospective, randomized, multicenter trial with 2-year postoperative follow up. *Ann Surg.* 2005 Jul;242(1):29-35.
- [35] Lord PH. Diverse methods of managing haemorrhoids: dilatation. *Dis Colon rectum* 1973;16:180.
- [36] Lewis AAM, Roigers HS, Leighton M. Trial of maximal anal dilation, cryotherapy and elastic band ligation as alternatives to haemorrhoidectomy in the treatment of large prolapsing haemorrhoids. *Br J Surg* 1983;70:54.
- [37] Leicester RJ, Nicholls RJ, Mann CV. Infrared Coagulation in the treatment of haemorrhoids. *Gut* 1981;22:436.
- [38] Ferguson JA and Heaton JR Closed haemorrhoidectomy. *Dis Colon rectum* 1959;2;176.
- [39] Khubchandani M. Results of whitehead operation. *Dis Colon Rectum* 1984;27:730-5.
- [40] Watts J et al. healing and pain after different forms of haemorrhoidectomy. *Br. J Surg* 1695;51:88.
- [41] Hodgson WJ, Morgan J. ambulatory haemorrhoidectomy co2 laser. *Dis Colon Rectum* 1995;38(12):1265-9.
- [42] Eddy HJ, Yu JC, Eddy EC Dual laser haemorrhoidectomy. *Lasers Surg Med* 1986;6:201.
- [43] Wang JY et al. the role of lasers in haemorrhoidectomy. *Dis Colon Rectum* 1991;34(1):78- 82.
- [44] Left EL haemorrhoidectomy-laser vs non laser: outpatient surgical experience. *Dis Colon rectum* 1992;35(5):743-6.
- [45] Mlankar B, Kosorok P. Complications and results after stapled haemorrhoidectomy as a day care surgical procedure. *Tech Coloproctol* 2003;7:164-8.
- [46] Fazio VW. Early promise of the stapling technique for haemorrhoidectomy. *Lancet* 2000;355:768-9.
- [47] Ortiz H, Marzo J, armenderiz P. Randomized clinical trial of stapled haemorrhoidectomy versus conventional diathermy haemorrhoidectomy. *Br J Surg* 2002;89:1376-81.
- [48] Mehigan BJ, Monson JRT, Hartley JE. Stapling procedure for Haemorrhoids versus milligan-morgan haemorrhoidectomy: randomized controlled trial. *Lancet* 2000;355:779-81.
- [49] Senagore AJ, Singer M, Abcarian H. A prospective, randomized, controlled multicentre trial comparing staple haemorrhoidectomy and Ferguson haemorrhoidectomy: perioperative and one-year results. *Dis Colon Rectum.* 2004;47(11):1824-36.
- [50] Browning GG, Parks AG. Postanal repair for neuropathic faecal incontinence: correlation of clinical result and anal canal pressures. *Br J Surg.* 1983 Feb;70(2):101-4.
- [51] Bikchandani J, Aggarwal PN, Ravikant, Malik VK. Randomized controlled trial to compare the early and mid-term results of stapled versus open haemorrhoidectomy. *The American Journal of surgery* 2005;189:56-60.
- [52] Shukla S, Damor M, Kumar K, Burman J. Comparison between conventional haemorrhoidectomy and stapler haemorrhoidectomy. *Int Surg J* 2016;3:614-20.
- [53] Thejeswi PC, Kumar Y, Ram SH. Comparison Of Surgical Treatment Of Hemorrhoids- Stapled Versus Open And Closed Hemorrhoidectomy. *The Internet Journal of Surgery.* 2012;28(2)
- [54] Bhandari RS, Lakhey PJ, Singh YP, Mishra PR. K. P. Singh KP et al. Stapled haemorrhoidectomy versus open haemorrhoidectomy: a prospective comparative study. *Journal of Chitwan Medical College.* 2015;4(4):7-11.
- [55] Henry MM, Swash M. *Coloproctology and pelvic floor: pathophysiology and management.* London. 1991:373-393.
- [56] Baur S, Chougule PG, Nagre N, Deka H, Kulkarni SR. Comparative Study of Stapled and Open Hemorrhoidectomy. *JMSCR.* 2017;5(1):15768-78.
- [57] Sachin ID, Muruganathan OP. Stapled hemorrhoidectomy versus open hemorrhoidectomy: a comparative study of short-term results. *Int Surg J* 2017;4:472-8.
- [58] Tjandra JJ, Chan MKY. Systematic review on procedure for prolapsed and haemorrhoids (stapled haemorrhoidectomy). *Disease Colon Rectum* 2007; 50:878-92.
- [59] Shao WJ, Li GC, Zhang ZH, Yang BL, Sun GD, Chen YQ. Systematic review and meta- analysis of randomized controlled trials comparing stapled haemorrhoidectomy with conventional haemorrhoidectomy. *Br J Surg.* 2008;95(2):147-60.
- [60] Boccasanta P, Capretti PG, Venturi M, Cioffi U, De Simone M, Salamina G, et al. Randomised controlled trial between stapled circumferential mucosectomy and conventional circular hemorrhoidectomy in advanced hemorrhoids with external mucosal prolapse. *Am J Surg.* 2001; 182:64-68.
- [61] Ganio E, Altomare DF, Gabrielli F, Milito G, Canuti S. Prospective randomized multicentre trial comparing stapled with open haemorrhoidectomy. *Br J Surg.* 2001;88(5):669- 74.
- [62] Chen JS, You JF. Current status of surgical treatment for haemorrhoid-systematic review and meta-analysis. *Chang Gung Med J.* 2010;33(5):488-500.
- [63] Mattana C, Coco C, Manno A, Verbo A, Rizzo G, Petito L, et al. Stapled haemorrhoidectomy and Milligan Morgan haemorrhoidectomy in the cure of fourth degree haemorrhoids: long term evaluation and clinical results. *Dis Colon Rectum* 2007;50(11):1770-5. 18.
- [64] Bhandari RS, Lakhey PJ, Singh YP, PR Mishra, Singh KP. Stapled Haemorrhoidectomy versus Open Haemorrhoidectomy: A prospective comparative study. *Journal of Chitwan Medical College* 2014; 4(10): 7-11

[65] Shalaby R, Desoky A. Randomised clinical trail of stapled vs M-M haemorrhoidectomy. Br. J. Surn. 2001, 88, 149-1053.

AUTHORS

First Author – Dr. Ashutosh Tiwari, ashutosh00099999@gmail.com mob no- 9870330798

Second Author – Dr. Vaibhav Mudhale, Associate proffesor department of general surger, vaibhavmudhale@yahoo.in mob no- 9403465365

Third Author – Dr. Uday Ghate, Associate proffesor department of general surgery, udayghate@hotmail.com mob no- 7798425795

Fourth Author – Dr. Sheetal Murchite Proffesor of department of general surgery, sheetalmuchite@gmail.com mob no- 9325007452