



A COMPARATIVE STUDY OF DOPPLER GUIDED HAEMORRHOIDAL ARTERY LIGATION VERSUS CLASSIC SCALPEL HAEMORRHOIDECTOMY

General Surgery

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ABSTRACT

Background- Haemorrhoids are common clinical conditions affecting anal canal. The incidence is estimated at 8%, the prevalence at 10%. Male: female ratio varies, and might occur at any age. The last 30 years have studies characterizing their anatomy and etiology. This has led to a resurgence in interest in the pathology leading to a variety of novel treatments.

Materials and methods- This study enrolled seventy patients grouped into two of thirty five each, allotted for classic scalpel haemorrhoidectomy [Milligan Morgan haemorrhoidectomy or MMH] and doppler guided haemorrhoids artery ligation [DG-HAL] treatment.

Result- DG-HAL has emerged as a minimally invasive procedure for treating haemorrhoids, considering less pain and rapid recovery. Owing to some qualms in its usage in grade IV haemorrhoids, MMH still takes a lead as a healer for the latter cases [1,2].

KEYWORDS

DG-HAL, haemorrhoids, minimally invasive, MMH

INTRODUCTION:

Haemorrhoids (or piles) are enlarged arteriovenous anal cushions. They originate either above the dentate line (internal or true) or below the dentate line (external or false). They occur at 3, 7 and 11 o'clock positions to begin with, where they are called primary piles. Enlarging cushions at other positions are called secondary piles. Internal piles are sinusoidal dilatations of the internal rectal venous plexus. They bleed profusely during straining at stool, classically as a splash in a pan. So, symptoms could be through bleeding or prolapse. However, these do not always co-exist. Arteriovenous anastomoses within the submucosa gradually increase the volume of the piles, sealing the canal. This arterial component explains why haemorrhoidal bleed resemble an arterial blood, considering the look and pH. Secondary subset of symptoms include pain, pruritus and mucus discharge. A cascade of etiological factors are-

- Poor supporting loose connective tissue
- Lack of valves in the superior rectal and portal veins and hence a gradual transference of increased pressure at the portosystemic communications
- Veins getting squeezed at the sites where they enter the muscular coat.

For these reasons, the pathogenesis is accelerated by constipation, prolonged straining at stool, pregnancy, portal hypertension, and doubtful hereditary factors. The connective meshwork of submucosa, which anchor the anal cushions to the underlying internal sphincter, tends to degenerate with age, provoking piles. The conventional Goligher classification describes four grades of haemorrhoids-

- Grade I- Haemorrhoids bleed, but do not prolapse out from the anal canal
- Grade II- Haemorrhoids prolapse on defecation but can be reduced spontaneously
- Grade III- Haemorrhoids require manual reduction
- Grade IV- Haemorrhoids permanently prolapsed

There is no such classification for external haemorrhoids. Diagnosis is confirmed clinically by digital rectal examination and proctoscopy. Differentials comprise anal skin tags, fibrous anal polyp, perianal haematoma, rectal prolapse, anal fissure, dermatitis and rectal tumour. The surgical therapeutics of haemorrhoids have changed over centuries. Parks viewed relative resistance of the anal canal to infection as a clarification. Whitehead's procedure, in 1882, advocated a circumferential excision of the anal cushions, anastomosing the anoderm to the rectal mucosa, but complications like excessive blood loss, mucosal ectropion and stricture formation, made the technique fossilized. Milligan Morgan, in 1937, patronised an excision-ligation

method, with preservation of skin bridges in between to forestall stricturing. The technique has seen the latter-day adaption of diathermy, laser, ligasure and harmonic scalpel. In 1959, Ferguson suggested filleting the haemorrhoidal plexus from overlying mucosa, and the defect was approximated with sutures [3,4]. Faster relative painless recovery cheered the proponents while wound breakage was a constraint. Doppler-guided haemorrhoidal arterial ligation was first described in 1995. By combining a proctoscope with a Doppler transducer, it became possible to detect the arterial inflow of the plexus and selective ligation managed to cut off the inflow and thus, reduce the bulk [5,6].

Postoperative complications of any abovesaid procedure are Early- pain, infection, early bleeding, edema, incontinence, urinary retention, delayed haemorrhage [due to sloughing of vascular pedicles or infection]

Late- anal stenosis, formation of skin tags, recurrence

Anatomy: The human gut concludes at the anus, which provides continence to flatus and feces. The anatomic landmarks are the anal verge, dentate line and anorectal ring. Anal canal stretches from true mucocutaneous junction, the dentate line till anal verge. Anal verge is where the anal canal meets the perianal skin. The dentate line marks the union of the embryonic ectoderm with endoderm, approximately 1.0-1.5 cms from the anal verge. It is classically a stretch of 6-12 mm in length, where the columnar epithelium changes to cuboidal epithelium. The upper limit of the anal sphincteric complex is the anorectal ring, 1.0-1.5 cms above the dentate line. While anatomists ponder the anal canal to start at the dentate line, most surgeons conclude it to begin at the anorectal ring and end at the anal verge. Anoderm [lining anal epithelium] lacks hair follicles, sebaceous glands and apocrine glands. 8-14 longitudinal rectal columns stow just above the dentate line. Between each 2 columns at the dentate line, small rudimentary anal glands open into anal crypts. These crypts are seen to extend through the internal sphincter as far as the intersphincteric plane, but they definitely fall short off the external sphincter. The afferent nerve fibres caudal to the dentate line, are conveyed by the inferior rectal nerves [S2, S3, S4]; unlike the parasympathetic fibres or pelvic splanchnic nerves [S2, S3, S4] carrying the cephalad dull sensations. External piles are therefore very painful and internal piles are painless. The superior rectal artery, the terminal offshoot of inferior mesenteric artery, descends to upper rectum and divides into lateral branches penetrating the rectal wall. The middle rectal arteries branch from the internal iliac arteries and supply the distal rectum and upper anal canals. The inferior rectal arteries, branches from the internal pudendal arteries, cross the ischioanal fossae to supply the anal sphincters. Above the dentate line, venous flux pours into the portal system via the superior rectal and inferior mesenteric veins. Below, the

external haemorrhoidal plexus drains into the internal iliac vein via middle rectal vein or the pudendal vein via inferior rectal vein.

Aim of the study: Our study was conducted at Patna Medical College and Hospital, Patna, Bihar from August 2012 to August 2014. In this prospective study of seventy patients, we compared the results of the MMH and DG-HAL techniques. A comparative assessment of

1. Postoperative analgesia
2. Postoperative bleeding, urinary retention and painful defecation
3. Number of days required for resumption of normal daily activities
4. Follow up episodes of bleeding or prolapse

were tabulated for the 2 procedures. Basic statistics such as proportions, percentages, mean standard deviation and p-values were used to conclude. p-value of 0.05 was the categorical limit of significance.

Limitations: Scalpel haemorrhoidectomy had its restrictions in its use in haemorrhoids with predominant internal components and of smaller grades. Likewise, although DG-HAL technique could help with postoperative relief of other symptoms leaving out prolapse which bothered the study results.

Materials and methods: Inclusion criteria-

- I. Symptomatic haemorrhoids grades I to IV
- II. Patient's written consent
- III. Who qualified preanesthetic checkup

Exclusion criteria-

- I. Prolapsed thrombosed piles
- II. Haemorrhoids associated with anal fistulas, abscesses, fissures or growth in rectum
- III. Portal hypertension, inflammatory bowel disease
- IV. Haematological disorders, or those on anticoagulants
- V. Anal sepsis
- VI. Previous history of anorectal surgery, pregnant females

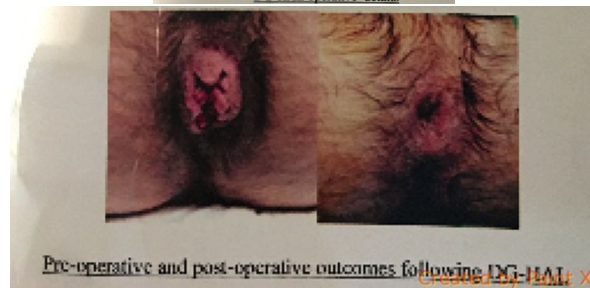
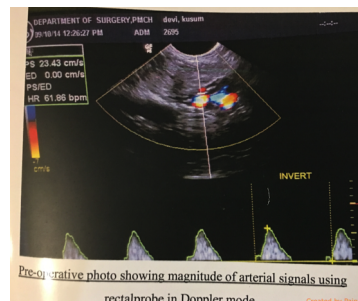
A thorough preoperative workup included detailed history, routine investigations and special ones required to rule out other anal pathologies. All patients underwent bowel preparation with two bisacodyl suppositories and a phosphate enema, liquid diet since evening before surgery. Also, preoperative shots of metronidazole and ceftriaxone were given.

Technique- In MMH, after prior anal dilatation, one artery forceps was applied on skin element and second on the prolapsing mucosa of each haemorrhoid. Through the V-shaped incision, haemorrhoidal tissue was dissected from the underlying internal sphincter. A transfixation suture was placed through the pedicle. Excision included the external skin component in continuity with a strip of anal canal mucosa and haemorrhoidal plexus. Adequate skin and mucosal bridges were left intact between the excisions. Wounds were left to heal by secondary intention [Photograph 1].



Photograph 1: Photograph showing preoperative and postoperative results in a patient undergoing classic scalpel haemorrhoidectomy [Milligan Morgan]

The DG-HAL deploys a Doppler fluxometry unit. This has a cold light source with a fiberoptic cable; an anoscope containing a fixed part and a sliding bar to perform the arterial ligations; a central hub at the end, so as the stitches depth remain the same. Suture and threader usually come with the gadget. The double crystal transducer records the sonic waves emanated by the arterial branches of the rectum. After prior anal dilatation and localisation of arteries, dearterialisation was performed with monofilament [2-0], absorbable suture and a 5/8 circumference, 2.65 length needle, in a figure of eight fashion. Six arterial branches at 1,3,5,7,8 and 11 were targeted and the first to sacrifice was 3 o'clock branch [Photograph 2].



Photograph 2: Photograph showing intraoperative doppler signals and preoperative and postoperative results in a patient undergoing Doppler guided haemorrhoidal artery ligation [DG-HAL]

Rectal packs were placed after either of the technique completion.

Postoperative care- Patients were kept for 24 hours observation and then discharged with advice of soft diet, added fibre, oral antibiotics, analgesics and sitz bath thrice daily. Follow-ups at 1,4 weeks and at 1 month interval was done and there was no loss to follow-up.

Observation:

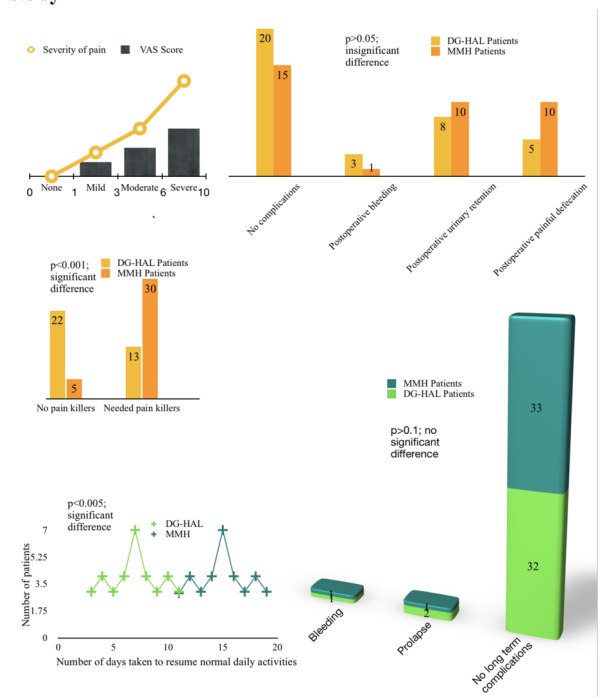
Table 1: Tabulated chart showing the absolute figures of the study

S No.	Grade of haemorrhoids	Type of surgery	Postoperative pain (VAS SCORE)	Postoperative bleeding	Postoperative urinary retention	Postoperative painful defecation	Return to normal daily activities (in days)	Recurrence of symptoms after 18 months
1	II	MMH	2	No	No	No	11	Yes, bleeding
2	II	MMH	2	No	Yes	No	19	No
3	II	MMH	3	No	No	Yes	15	No
4	II	MMH	2	No	No	No	15	No
5	II	MMH	4	No	No	No	15	No

6	II	MMH	5	No	No	No	16	No
7	II	MMH	4	No	No	No	18	No
8	II	MMH	5	No	No	Yes	11	No
9	II	MMH	5	No	No	Yes	11	No
10	II	MMH	5	No	Yes	No	12	No
11	II	MMH	0	Yes	No	No	12	No
12	II	MMH	4	No	Yes	No	18	No
13	II	MMH	0	No	No	No	16	No
14	II	MMH	0	No	No	Yes	17	No
15	II	MMH	0	No	Yes	No	17	No
16	II	MMH	3	No	Yes	No	16	Yes, prolapse
17	II	MMH	0	No	No	Yes	13	No
18	II	MMH	2	No	No	No	13	No
19	I	MMH	6	No	No	Yes	17	No
20	II	MMH	5	No	Yes	No	18	No
21	I	MMH	3	No	Yes	No	19	No
22	II	MMH	1	No	Yes	No	12	No
23	I	MMH	1	No	No	No	12	No
24	I	MMH	2	No	No	Yes	19	No
25	I	MMH	4	No	No	No	18	No
26	III	MMH	5	No	No	No	15	No
27	IV	MMH	5	No	No	No	15	No
28	IV	MMH	4	No	Yes	Yes	13	No
29	III	MMH	4	No	No	No	14	No
30	III	MMH	4	No	No	No	14	No
31	III	MMH	4	No	No	Yes	16	No
32	IV	MMH	4	No	Yes	No	15	No
33	III	MMH	5	No	No	No	15	No
34	III	MMH	4	No	No	Yes	14	No
35	III	MMH	4	No	No	No	14	No
36	II	DG-HAL	0	No	No	No	7	No
37	II	DG-HAL	0	No	No	No	7	No
38	II	DG-HAL	0	Yes	No	No	10	No
39	I	DG-HAL	0	No	No	No	9	No
40	II	DG-HAL	0	No	No	Yes	9	No
41	II	DG-HAL	4	No	Yes	No	10	No
42	II	DG-HAL	0	No	No	No	8	No
43	II	DG-HAL	0	No	No	No	8	No
44	I	DG-HAL	0	No	No	Yes	5	No
45	I	DG-HAL	0	Yes	No	No	4	No
46	I	DG-HAL	5	No	No	No	3	No
47	II	DG-HAL	1	Yes	Yes	Yes	3	No
48	II	DG-HAL	0	No	No	No	3	Yes, bleeding
49	II	DG-HAL	0	No	No	No	11	No
50	II	DG-HAL	0	No	No	No	9	No

S No.	Grade of hemorrhoids	Type of surgery	Postoperative pain (VAS SCORE)	Postoperative bleeding	Postoperative urinary retention	Postoperative painful defecation	Return to normal daily activities (in days)	Recurrence of symptoms after 18 months
51	II	DG-HAL	0	No	Yes	No	11	No
52	I	DG-HAL	0	No	No	No	7	Yes, prolapse
53	I	DG-HAL	1	No	Yes	No	6	No
54	II	DG-HAL	4	No	Yes	No	6	No
55	II	DG-HAL	1	No	No	No	7	No
56	II	DG-HAL	1	No	No	No	7	No
57	I	DG-HAL	0	No	Yes	No	7	No
58	I	DG-HAL	0	No	Yes	No	5	No
59	III	DG-HAL	0	No	No	No	7	No
60	III	DG-HAL	0	No	No	No	6	No
61	III	DG-HAL	0	No	No	No	6	No
62	III	DG-HAL	1	No	No	No	10	No
63	III	DG-HAL	4	No	No	No	10	Yes, prolapse
64	III	DG-HAL	0	No	No	No	4	No
65	IV	DG-HAL	0	No	No	No	8	No
66	IV	DG-HAL	0	No	Yes	No	4	No
67	IV	DG-HAL	5	No	No	Yes	11	No
68	III	DG-HAL	2	No	No	No	4	No
69	III	DG-HAL	5	No	No	No	5	No
70	III	DG-HAL	4	No	No	Yes	8	No

Table 2: Table showing pictorial analysis of the observations of the study



DISCUSSION and review of literature: In the study, severity of postoperative pain was measured on visual analogue scale. We analysed, only 13[37%] patients in DG-HAL group reported pain while 30[86%] in MMH group and lower analgesic use and faster recovery in the former[p<0.001, significant]. Felice et al[2005] reported the same. The incidence of painful defecation after operation was 14% in DG-HAL patients versus 29% in MMH patients[p<0.05]. Whereas 1 patient had postoperative bleeding in MMH group, 3 patients had bleeding in DG-HAL group[p<0.02]. Scheyer et al[2006] found HAL to be a painless, effective and low complication surgery. An average of 15 days were required in MMH category to return to normal daily activities as against 7 days in DG-HAL category[p<0.005, significant]. Greenberg et al[2006] observed a complete functional recovery by third postoperative day in DG-HAL method. Faucheron et al[2008] reported 84% patients were discharged on the day of operation itself. Forrest et al[2010] concluded this proportion to be 96%. Jeong et al[2011] indicated mean return time to daily activity as 2.3+/-2.0 days. The authors attribute the difference to the better post operative care abroad. In context to recurrence of symptoms, bleeding or prolapse on long term follow-up, the difference was insignificant[p>0.1]. Khafagy et al compared MMH, haemorrhoidopexy, stapled haemorrhoidectomy and DG-HAL, and they concluded the latter two techniques have similar outcome as MMH, with more patient satisfaction[1,7].

CONCLUSION:

DG-HAL surfaced as one of the first approach in the arduous quest towards minimally invasive proctology, compared to a much elaborate conventional MMH procedure. Though a marked varied outcome couldn't be established in our study, but amendment and adaption is likely to attract surgeons in times to come[8,9,10].

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Conflict of interests- none

Ethical approval: not required

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