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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

ABSTRACT

The most common diagnosis for any anorectal complaint particularly of rectal bleeding in adults is haemorrhoidal disease. Regardless of grading conservative treatment is used primarily in symptomatic haemorrhoids. In Ayurveda, Sthanik Chikitsa (Local application) in the management of Arsha (Hemorrhoids) includes pralepa/pratisaran (Paste application). Instead of applying the lepa in the clinics by the clinician/proctologist, those formulations could be developed into Gudavarti (traditional suppository) & used in the management of Raktarsha (bleeding piles) for better compliance. Hence, development of ‘Durvadi Gudavarti’ using the indigenous medicinal herbs mentioned in Charaka Sanhita (Classical Ayurveda text) for pratisaran/pralepa in Raktarsha & its efficacy will be evaluated.

Objectives: To study & compare the efficacy in patient treated with standard- Hydrocortisone suppository group & interventional- Durvadi Gudavarti group in the management of Raktarsha (Bleeding piles).
Methodology: 130 patients of 2nd grade hemorrhoids will be selected and will be allocated into two equal groups by computer randomization. Experimental group will be treated with Durvadi Gudavarti & control group with Hydrocortisone based suppository for 2 weeks. Following Symptoms- PR Bleeding, Anal Pain, Prolapse of Pile mass/Lump, Anal pruritus, Mucous discharge & Constipation will be assessed subjectively and Size/ (Volume in cubic millimeter) of pile mass will be the objective parameter for study. Clinical evaluation will be done at Baseline and 3rd, 5th, 10th, 15th day after treatment onset. Proportion of patients that would respond clinically on 10th day will be the main end point, determined via disappearance of the clinical symptoms & more than or equal to 50 % reduction in the initial size of pile mass/lump. Time to response & need for any oral/ parenteral medication for pain, bleeding and constipation would be the secondary variables. Side effects (type, duration & severity) will be registered carefully.

Expected Results: Durvadi Gudavarti contains indigenous herbs having anti-inflammatory, analgesic, haemostatic, wound healing, astringent, & laxative properties. Hence, it is expected to be as efficacious as Hydrocortisone suppository with lesser side effect in the management of Raktarsha. Results will be assessed on the basis of clinical assessment criteria using proper statistical values and tools. Changes will be observed in objective outcomes.

Conclusion: Durvadi Gudavarti will be efficacious in the management of Raktarsha.

Keywords: Raktarsha; hemorrhoids; Gudavarti; suppository; bleeding PR.

1. INTRODUCTION

Background: Presently, one of the most common ills of man is considered to be hemorrhoids. The most common diagnosis for any anorectal complaint particularly of rectal bleeding in adults is haemorrhoidal disease [1]. At least one out of two in the western world over the age of 50 years has formation of some degree of haemorrhoids as suggested by Goli in 1967. It seems to have more prevalence in rural Indians than in Africans, Black and white Americans & Western Europeans. With the progressive adoption western way of life it became more common. The cost to the community is reduction in working time & economical loss due to which it is considered to be a major health hazard [2]. Very few articles have been there regarding the epidemiology of hemorrhoids, therefore the prevalence of hemorrhoids is not well documented, it range between 4.4 to 5% worldwide [3].

Rationale: Majority of symptomatic haemorrhoids are treated conservatively, but for cases with pronounced symptoms surgery may be considered [4]. Primarily haemorrhoidal illness is managed using conservative measures like dietetic, Hygienic, life style changes, and symptomatic treatment. Along with oral medication, topical administration of ointments/ suppositories containing corticosteroids (eg. hydrocortisone) and anaesthetics (e.g. lidocaine) is widely used & probably most useful in clinical practice. It gives fast local relief from pain, itch, bleeding & discomfort [4,5]. However, these ointments/suppositories are not free from side effects like rectal ulcerations, burning sensation, skin/mucosal atrophy, contact dermatitis, telangiectasia & also there is limitation in duration of administration (not more than 2-4 weeks is advisable) [6]. Thus there is a need of the effective and safe herbal medicine for topical administration in hemorrhoids. Application of lepa/medicinal herbal paste (Haridradi lepa, Pipalyadi lepa, Shuranadi lepa) or Ksharkarma/Caustic therapy in clinics/operating rooms for the management of Raktarsha (bleeding piles) is clinician/ proctologist dependent procedure, So those formulations could be developed into Gudavarti (traditional suppository) so that patient himself can administer it at home so as to save time, money & for better compliance as well. Hence, this study is proposed to evaluate the efficacy of newly developed ‘Durvadi Gudavarti’ using the indigenous medicinal herbs mentioned in Charaka Sanhita (Classical Ayurveda text) for pratisaran/pralepa in Raktarsha & compare it with standard hydrocortisone base suppository. So, single blind (Participant blind) double arm Randomized reference standard controlled clinical trial will be conducted. It will be a interventional study for equivalence hypothesis testing of two parallel group with 1:1 allocation ratio.

2. AIM AND OBJECTIVES

Aim: Development of a better treatment modality & dosage form in the management of Raktarsha.
Objectives:

- To study the efficacy of Hydrocortisone suppository in the management of Raktarsha.
- To study the efficacy of Durvadi Gudavarti in the management of Raktarsha.
- To compare the efficacy of Hydrocortisone Suppository and Durvadi Gudavarti in the management of Raktarsha.

Case Definition: Diagnosed case of Internal grade 2 haemorrhoids (Goligher classification) patient of either sex between the age group 20 to 60 years characterized by bleeding PR, anal pain, pile mass/lump possibly of red-violet/blue color appearance, anal pruritus, mucous discharge and constipation.

Research question: Whether Durvadi Gudavarti is as efficacious as Hydrocortisone Suppository in Raktarsha?

Research Hypothesis

Null hypothesis (H₀): There is difference in efficacy of Hydrocortisone suppository and Durvadi Gudavarti in Raktarsha.

Alternative hypothesis (H₁): There is no difference in efficacy of Hydrocortisone suppository and Durvadi Gudavarti in Raktarsha.

3. METHODOLOGY

Trial design: Single blind (Participant blind) double arm Randomized reference standard controlled clinical trial. It is an interventional study for equivalence hypothesis testing of two parallel group with 1:1 allocation ratio.

Study setting: The study will be conducted in academic hospital MGACH & RC, Salod (H), Wardha, Maharashtra, India.

Sample Source: This study will be performed at the DMIMS Mahatma Gandhi Ayurveda College Hospital and Research Centre, Salod, Wardha, M.S, India. The patients needed for study will be selected from the OPD of Department of Shalyatantra in the above said hospital.

Drug source: Raw drugs required for preparation of Gudavarti will be collected from local market, will be identified in Dravyaguna Department and preparation of Gudavarti will be done in Rasashastra & Bhaishyajyakalpana Department of MGAMC, Salod, Wardha, M.S.

Hydrocortisone based suppository (Correct/Anomex Suppository) is available in local medical stores; that would be purchased and provided to the patient.

Composition of Durvadi Gudavarti (Trial drug): Durva swarasa (Cynodon dactylon), Yashtimadhu churna (Glycyrrhiza glabra), Daruvaridra churna (Berberis aristata), Sarjarasa churna (Vateria indica Linn.), Nimba churna (Azadirachta indica), Manjishtha churna (Rubia cordifolia), Shatadhout ghrita (Butyrum Departum) & Guda (Jaggery).

Hydrocortisone based suppository: Composition – Hydrocortisone (0.25% w/w) + Zinc oxide (5% w/w) + Lidocaine/Lignocaine (3% w/w) + Allantoin (0.5% w/w).

Registration Number: REF/2021/04/043081, the registration number for this trial is under process.

4. ELIGIBILITY CRITERIA

Inclusion Criteria:

- Patients of 20 to 60 Years of age of either sex.
- Diagnosed case of internal grade 2 haemorrhoids (Goligher classification) patient (characterized by bleeding PR, anal pain, pile mass/lump possibly of red-violet/blue colour appearance, anal pruritus, mucous discharge and constipation).
- Patients having hemoglobin more than or equal to 10 gm%.
- Patient who will give written, informed consent to participate.

Exclusion criteria:

- Patient of below the age of 20 and above age of 60.
- Patient having hemoglobin less than 10 gm%.
- Grade 1, 3 and 4 Haemorrhoids (Goligher classification), external haemorrhoids, external thrombosed haemorrhoids. Haemorrhoids associated with acute Fissure-in-Ano, Fistula in ano, Ulcerative colitis, Crohn’s disease, Malignancy, Intestinal Polyps, Diverticulitis.
- Patients of TB, Diabetes mellitus and uncontrolled hypertension, portal hypertension, septic or severe
hemorrhagic complications, bleeding disorders, acute diarrhoea in last 12 hours, on corticosteroids therapy or have allergy to corticosteroids, on anticoagulant medications, planning for any surgical procedure for haemorrhoids or taking other antihaemorrhoidal drugs.

- Pregnant & nursing female.
- HIV and HbsAg positive patients.
- Those who are not consenting for conservative management

**Laboratorial investigations:** HB, RBS, BT/CT, HIV, HBsAg.

### 4.1 PT(INR) and Liver Function Test

**Procedure/Intervention** – After taking the written informed consent, on 1st day of treatment demonstration to the patient and/or close relative of patient will be done regarding procedure of medicine administration. Patient will be advised to lie down in left lateral position. Interventional drug (Suppository/Gudavarti) will be gently inserted in anal canal about 1 inch, ensuring sufficient lubrication with Glycerine/Ghrita. Then patient will be asked to lie down for a minimum period of 10 minutes in same position.

From 2nd day up to the 2 weeks of treatment period patient will be advised to administer by self at home after defecation twice daily (12 hourly).

**Criteria for discontinuing or modifying allocated interventions:** Subject will be withdrawn from the study if development of severe drug reactions, profuse bleeding, or occurrence of any other serious illness happens, the subjects will be provided free treatment till recovery.

<table>
<thead>
<tr>
<th>Table 1. Intervention table</th>
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</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>Sample size</td>
</tr>
<tr>
<td>Intervention</td>
</tr>
<tr>
<td>Dose</td>
</tr>
<tr>
<td>Visits for evaluation</td>
</tr>
<tr>
<td>Total Duration of treatment</td>
</tr>
<tr>
<td>Follow up</td>
</tr>
</tbody>
</table>

Sample size formulae for Two-sided equality hypothesis testing for two parallel sample proportion designs:

\[ H_0 = \theta_1 - \theta_2 = 0 \text{ versus } H_1 = \theta_1 - \theta_2 \neq 0 \]

\[ n_1 = (Z_{1-\alpha}^2 + Z_{1-\beta}^2) \frac{r(\theta_1(1-\theta_1) + \theta_2(1-\theta_2))}{(\theta_1 - \theta_2)^2} \quad [7,8] \]

\[ n_2 = r n_1 \]

Here \( r = 1 \) for equal size \( n_1 = n_2 \)

\[ n_1 = (1.96 + 0.84)^2 \times (0.24+0.22) = 7.84 \times 0.46 = 60.15 \]

\[ (0.25)^2 \times 0.06 \]

\[ n_1 = n_2 = 60, \text{ considering 5% drop out rate = Total 6, 3 in each group = 63} \]

Round up to 65 samples needed in each group. Total sample size, \( N = 130 \)
Table 2. Variables and descriptions for sample size calculation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>α</td>
<td>Two-sided significance level = 0.05</td>
</tr>
<tr>
<td>1-β</td>
<td>Power of the test = 0.80</td>
</tr>
<tr>
<td>θ₁</td>
<td>Expected success proportions of Experimental group = 0.42</td>
</tr>
<tr>
<td>θ₂</td>
<td>Expected success proportions of Control group = 0.67</td>
</tr>
<tr>
<td>θ₁- θ₂</td>
<td>The difference between the true mean response rates of experimental group and control group = 0.25</td>
</tr>
<tr>
<td>R</td>
<td>Ratio of sample size of control group to experimental group = 1</td>
</tr>
<tr>
<td>n₁</td>
<td>Sample size of experimental group = 65</td>
</tr>
<tr>
<td>n₂</td>
<td>Sample size of control group = 65</td>
</tr>
<tr>
<td>N</td>
<td>Total sample size = 130</td>
</tr>
</tbody>
</table>

Statistical Analysis: The following descriptive and inferential statistics will be used in the statistical analysis: Chi-square test, one-way ANOVA, and multiple comparisons: Tukey test & software for analysis is SPSS 26.0 Version & graph Pad Prism 7.0 Version and P < 0.05 is considered as level of significance. Results will be reported as per CONSORT guidelines.

Criteria for Assessment: [9]

- **Objective Criteria:** Size/ (Volume in cubic millimeter) of pile mass. Anoscopy using anoscope & measurement of pile mass will be done using calibrated millimeter rulers.
- **Subjective Criteria:** PR Bleeding, Anal Pain, Prolapse of Pile mass/Lump, Anal pruritus, Mucous discharge & Constipation.

Subjective Parameters *viz.* Gudagat Raktstrava (PR Bleeding), Guda Shool (Anal pain), Arshaankur Prachiti (Prolapse of lump/pile mass), Guda Kandu (Itching), Gudagata Picchilata (Mucous Discharge) and Vibandha (Constipation) will be assessed:

- Qualitatively as Yes/No and
- Frequency will be measured quantitatively as Never/>2days apart/every day or alternate day.
- Severity of Anal pain will be assessed using linear visual analogue scale (VAS) – range 0-10 (0- no pain and 10- worst pain, it will be regrouped as mild: 1-3, moderate: 4-6 & severe: 7-10) [9,10].
- Severity of PR Bleeding will be assessed subjectively as: No bleeding, Mild bleeding - Found in toilet paper/Fingers, Moderate bleeding- Few (~01-10) drops/Dripping, Severe- Splash of blood/Sluice [11].

Clinical evaluation will be done at Baseline and 3rd, 5th, 10th, 15th day after treatment onset.

Primary Outcome: Proportion of patients that would respond clinically on 10th day will be the main end point, determined via disappearance of the clinical symptoms & more than or equal to 50% reduction in the initial size of pile mass/lump.

Secondary Outcome: Time to response & need for oral/parenteral medication for pain, bleeding and constipation will be secondary variables.

Side effects (type, duration, severity) will be recorded. Severity of side effects will be classified as: 1- mild, if no therapy or only topical treatment would be sufficient, 2- moderate, if a specific oral medication would be needed; and 3-severe, if hospitalization and/or parenteral medication would be required.

Groupings: Two groups, Group A- Experimental Group (EG) & Group B- Control Group (CG).

Allocation: Allocation of the patients in two different groups will be done by computer generated random number method. (Allocation ratio- 1:1).

Allocation sequence & enrolment of participants will be done by PI & assignment of participants to interventions & blinding them by the PI & Co supervisor. Both the medicament will be provided to the participants in an identical packing.

5. DATA COLLECTION, MANAGEMENT, AND ANALYSIS METHODS

Data collection methods: Case registration form with detailed history and examination i.e. Case Record Form (CRF).

Consent form in English, Hindi.
Assessment of objective criteria & subjective parameters will be recorded.

Data of all participants will be collected and reported in case sheet form.

Patients will be in touch by means of telephone calls and timely advice for medication.

Patients Visits and follow up findings data of the patient will be recorded.

Data management: The data entry coding will be done by PI & co-supervisor.

Dissemination policy: The data information will be disseminated by paper publication, authorship eligibility guidelines, and any other competent writer's intended use.

6. DISCUSSION

Raktarsha (Bleeding Piles) causes complications like anemia & needs to be managed immediately. The cause of bleeding according to Ayurveda parlance is increase pitta dosha which involves the rakta dhatus & cause bleeding from bahirmukh strotas (external orifices). So, stambhan (haemostatic) treatment is to be done after pachana of dosha. For stambhan effect the drug should have Tikta &/or Kashaya ras, Sheet virya, & Madhur vipak. Durvadi Gudavarti contains indigenous herbs having all these properties. It has anti-inflammatory, analgesic, haemostatic, wound healing, astringent, & laxative properties.

It would reduce the varicosity of the hemorrhoidal veins due to tikta, kasaya ras and astringent property, reduce the swelling due to anti-inflammatory property, and due to its laxative property it would reduced the amount straining while defecation. Hence, it is expected to be as efficacious as Hydrocortisone suppository with lesser side effect in the management of Raktarsha. Few of the related studies were reviewed [12-14].

Translational Outcome:

- The positive outcome of this study would provide better efficacious therapeutic modality with lesser side effect as compared to widely used corticosteroid based suppositories.
- Patients can be obtained for the newly developed Durvadi Gudavarti. Patients who are often reluctant to surgery, who can’t visit clinic frequently for procedures like Ksharkarma, lepa/pratisaran in the management of Raktarsha would be benefited.

7. CONCLUSION

Conclusion will be drawn by suitable analysis of data.

CONSENT

Before the research begins, the patient's written informed consent will be obtained. Every patient's privacy will be protected & confidentiality will be maintained during the study.

ETHICAL APPROVAL

Research ethics approval; approval from research ethics committee has been taken. Ref. No. MGACHRC/IEC/July-2020/43, dated- 28-07-2020.

COMPETING INTERESTS

Authors have declared that no competing interests exist.
REFERENCES


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