Anti-hemorrhoid Evaluation of Selected Medicinal plants used in North-East Nigeria for the Treatment of Hemorrhoids (Pile)

ABSTRACT

A medicinal plant is any plant in which one or more of it organs contain substance that can be used for therapeutic purpose or which are precursors for the synthesis of useful drugs. In this research, four(4) selected plants were screened for antihemorrhoid activities in mice. The extracts were obtained from whole plant or part of plants such as root, stem, leaves and seeds and include the following plants: Khaya senegalensis, Euphorbia hirta, Parkia biglobosa , Newbouldia leavis and Prosopis africana. Hemorrhoid (pile) was induced in group of five mice of five animals per group using Jatropha oil(Jatropha curcas, Euphorbiaceae)(I.P) and using Pilex granule as the control drug. Group I received 5mg/kg Pilex granule, and 200, 250, 300, 350 mg/kg b.w of A. leiocarpus, N. leavis, P. africana, and KEP for groups II, III, IV and V respectively. A. leiocarpus and KEP(mixture of K. senegalensis, E. hirta and P. africana) showed the best antihemorrhoidal activities in mice than the other plants and compared with the standard drug Pilex granule. However, all the plants extracts showed significant rectoanal coefficient at potent levels. The study showed that the extracts of the plants investigated possessed antihemorrhoid activities with A. leiocarpus demonstrating the best activity in mice.

Keywords: Anti-hemorrhoid, medicinal plants, mice, pilex granule, Jatropha oil.

Introduction

Hemorrhoids represent the dilation of varicose of the vessel of the superior of inferior rectal plexuses of veins. They have be noted common human affliction from the down history. The exact incident in population of developing countries has not been determined but in spite of ascertain to the contrary. The condition is frequently encountered in developing country [1]. Various dilation of the internal hemorrhoids; physiological dilation present already in infancy is presumed to develop into varicosities under the influence of wide range of factors. The predisposing factors include hereditary, age, sex pregnancy are the prepared state and even paramount. The precipitating factors comprise cathartic abuse, diarrhea, enemata,

constipation infection and spasms or a tony of the oral sphincter obesity and arise in extra-abdominal pressure [2]. There are two types of piles, internal piles and external piles. Internal piles expand inside, along the anal. The common symptoms of internal piles are the painless blood loss. The internal piles are the totally prolapsed. External piles extend close to the anus. The colour of external piles is same as the skin. The outside piles forms thrombus. The outside piles are painful. When the external pile ruptures it bleeds. The blood loss is more disturbing and blood loss is typical cause for considering a doctor. Prolapsed is on the other hand, oral dysfunctional special effect, and the other undeniable warning sign soreness, impatient are fewer dependable problem solving criterion [3].

MATERIALS AND METHODS

Plant Collection and Identification

The plants species (*Parkia biglobosa*, *Prosopis africana, Euphorbia hirta, Khaya senegalensis, Newbouldia leavis* and *Anogeissus leiocarpus*) were collected from Bali town and were identified by Mr. Cletus A. Ukwubile of Science Laboratory Technology Department , Federal Polytechnic Bali, where voucher numbers were deposited for the plants

Attempt has been made to expel scyballous masses from the rectal by traditional medical practitioners using different plant species in either of the following preparation methods: concoction, decoction and maceration. This research aims to identify the plant species used for the treatment of such ailment and also to identify the plant species which has the best anti-hemorrhoids properties, also the ecology, scientific names and method of preparation of the drug and also to make a herbarium press of the plant species.

Preparation and Extraction of Plant Materials

The plants were air-dried for two weeks and then, plants parts were ground into powder and weighed and stored for onward use. One of the plants was extracted with aqueous solution

(*Newbouldia leavis*) while others were extracted with absolute ethanol 99.1% (v/v), which was soaked for 24 h using cold maceration technique.

Grouping of Swiss albino rats

The animals were grouped into five (5) groups of 5 animals according to each plant extracts.

Experimental Animals

Inbred male and female Swiss albino mice (18-29g weights) that were housed in standard conditions of temperature (22 ± 3^0C), relative humidity (55 ± 5%), and light (12h light-dark cycle) before and during the study were included in the experiment. They were fed with standard pellet diet (obtained from animal house of Department of Pharmacology and Clinical Therapeutics, Ahmadu Bello University Zaria) and water *ad libitum*. All the experimental protocols were approved by the Institutional Animal Ethics Committee (IAEC) of the Ahmadu Bello University Zaria and Health Research Extension Act of 1985(Public Law November 20, page 99-158) USA. The animals received humane care as per the guidelines prescribed by committees for the purpose of control and supervision of control and supervision of experiments on animals (CPCSEA), the Ministry of Environment and Forests, Nigeria.

Experimental Protocols

Two sets of experiments were carried out. The first set was used to improve an existing experimental model of hemorrhoids mentioned by [3], and to validate the same by using pilex granules (PG), *Newbouldia leavis* extract (NE), and a combination of both extracts. The protocol was designed to quantify the extent of plasma exudation and to determine the levels of inflammatory cytokines such as TNF-α and IL-6 associated with hemorrhoids. In the second set, the effect of PG, AL, and a combination of some plant extracts were further

confirmed by determining the rectoanal coefficient (RAC), severity score, and the histopathological evaluation[4].

Evaluation of Anti-hemorrhoid property against Jatropha oil-induced hemorrhoid in mice

Mice of both sexes (20-29g) were randomized based on their body weights and were divided into 5 groups (G-1-G-5), with each group consisting of 5 animals (n=5). G-5 animals received PG (Pilex granule) (10mg/kg) and served as positive control ; G-1 animals received AL (200mg/kg):G-2 and G-3 animals received NL and KEP (200 and 400mg/kg b.w; i.p , respectively). Haemorrhoids were induced to all the groups, except normal control group, by applying croton oil preparation. 24h hours after induction, all the animals were subjected to respective treatment as assigned to the groups once daily for five days. On the fifth day, 1 h after the treatment, all the animals were euthanized by exsanguinations under deep isoflurane anaesthesia and rectoanal tissues (20mm in length) were isolated. They were evaluated for the severity score, weighed, and fixed in 10% formalin solution for histological examination.
The RAC was calculated using the formula

$$\textit{Rectoanal coefficient} = \frac{\textit{Weight of rectoanal tissue (mg}}{\textit{Body weight (g)}}$$

Histological observation of the rectoanal tissue was carried to determine the appearance of inflammatory cells, congestion, haemorrhage, vasodilatation, and medium to high degrees of necrosis [5].

RESULT

Table 1: LD_{50} Determination of Jatropha oil from *Jatropha curcas*

Dosage (mg/kg)	$\boldsymbol{No\ of\ animal\ died}/\boldsymbol{no\ of animal\ survive}$

100	0/5
200	0/5
250*	1/4
300	ND

99 LD_{50} = 1118 mg/kg b.w (Lorke , 1983), ND (not determine), * toxic dose

100 **Table 2: Effect of Jatropha oil on the body weights of mice before and after induction**

Test groups	Weight Before (g)	Weight After (g)
Group I Control 100mg/kg	29.6	25.2
Group II 200mg/kg	28.6	24.1
Group III 250mg/kg	25.2	20.1
Group IV 300mg/kg	28.0	22.2
Group V 350 mg/kg	26.6	20.2

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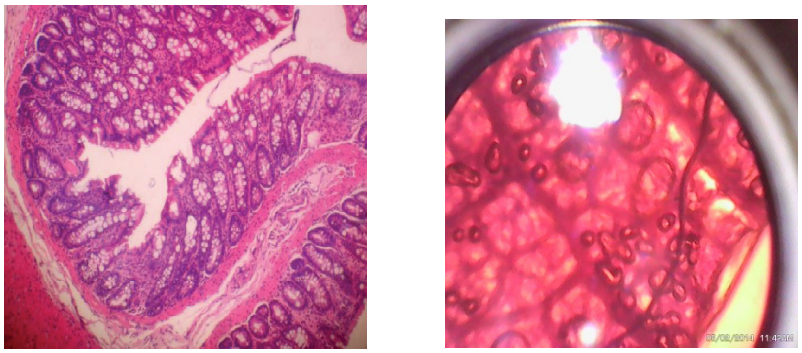
102 **Table 3: Effect of extracts on rectum after drug administration (i.p)**

Extract dose (mg/kg b.w) (n=5)	Rectoanal coefficients (g)	Inference
Group I Control Pilex (5mg)	0.6 ± 0.22	Moderate healing
Group II AL 100	0.1 ± 0.20™	*Strong healing
Group III NL 200	0.4 ± 0.18	Moderate healing
Group IV PA 400	0.3 ± 0.15	Moderate healing
Group V KEP 600	0.2 ± 0.10™	*Strong healing

103 AL (*Anogeissus leiocarpus*), NL (*Newbouldia leavis*), PA (*Prosopis africana*), KEP (*Khaya senegalensis*,
104 *Euphorbia hirta*, *Parkia biglobosa*), Results are means ± SEM. The lower the values, the more efficacy the
105 drug, ™ More efficacy.



a. **b.**

c. **d.**

Figure 1: Medicinal plants effects on rectoanal tissue in mice in Jatropha oil-induced hemorrhoids; a; hemorrhoid induced in recto anal tissue, b-c; healing of tissue after drug administration with *Anogeissus leiocarpus*, d; mouse developed pile after five days of induction with Jatropha oil.

DISCUSSION

Discussion

It is well proved that hemorrhoids are a pathological condition, which is characterized by a severe vasodilation at the rectoanal region, which leads to inflammation of the surrounding tissues, thus further leading to secondary complications such as extravasations of fluid into interstitial space mainly due to increased vascular permeability and migration of large quantity of inflammatory cells (granulocytes and monocytes)[6].

In the present study, Jatropha oil from seeds of *Jatropha curcas* (*Euphorbiaceae*) has been used as inducer/phlogiston agent to induce experimental hemorrhoids. Jatropha oil causes inflammation due to the release of soluble factors involving inflammatory lipid metabolites [7].These factors, alone and/or in combination, regulate the activation of resident cells (Fibroblasts, endothelial cells, macrophages, and mast cells) and newly recruited inflammatory cells (Monocytes, lymphocytes, neutrophils, and eosinophils) leading to systemic response to inflammation [8-9].

The normal control group showed normal cell architecture of the rectoanal region. The results showed the loss of weights in the animals after induction (Table 2), which is a symptoms of the disease. However, intraperitoneal administration of plant extracts of AL, NL, PA, and KEP showed remarkable vasoconstriction of the rectum (Table 3). The greatest healing of the rectum were shown by AL (*Anogeissus leiocarpus*) and KEP (*K. senegalensis, Euphorbia hirta, Parkia biglobosa*), and these signify the constriction of the mucosa linings of the anus in the mice by the plant extracts. These results were comparable with that of the standard control drug (Pilex). All the extracts produced a better rectoanal coefficient values than the first line drug (Table 3).

Conclusion

Medicinal plants are a source of many biological ingredient which cannot be ignored. The study therefore showed that extracts of *Anogeissus leiocarpus, Khaya senegalensis, Euphorbia hirta, Parkia biglobosa* and *Newbouldia leavis* posses antihemorrhoid properties in mice, and can be use as medication for the treatment of hemorrhoid (pile). These plants thus, represent sure source towards the development of orthodox medicine for the treatment of piles than surgery, which normal is expensive and risky. However, the precise molecular

mechanism behind the antihemorrhoidal activities of these plant extracts need to be explored in future studies.

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