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Research Article
Clinical Trial

Randomized parallel group clinical trial to evaluate the efficacy of Virechana Karma and Khanda Pippali Avaleha in Amlapitta

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Introduction: Amlapitta is the result of faulty food habits and life style. Acid Reflux disease have similarity with Gastritis. **Material and methods:** 50 patients having Amlapitta's symptoms for at least 4 months and on at least 5 of the 7 days prior to screening, also fulfilling the criteria were selected (Group A- 25, Group B-25) and parallel randomized in two groups. Intervention given as Virechana Karma followed by placebo capsules for 45 days in Group A and Khanda Pippali Avaleha in the dose of 10 gram/day twice in a day after meal with lukewarm water in Group B for 60 days. The primary endpoint was the 14-item self-administered questionnaire dimension score on cardinal symptoms of Amlapitta. Obtained results were analyzed statistically by independent sample "t" test for difference in group A and B. Wilcoxon sign rank was used within group comparison. **Result & discussion:** Both the interventions were highly significant in both the groups but when compare the mean percent change relief was found more in Group A than Group B in Daha and Avipaka. Overall, Virechana and Khand Pippali Awaleha can be better treatment modality in the management of Amlapitta.

Keywords: Amlapitta, Acid reflux syndrome, Khanda Pippali Avaleha, Virechana

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Introduction

Approximately 80% of the top ten life threatening diseases of the world are due to faults in dietary habits[1] and *Amlapitta* is also one of them.[2] The signs and symptoms (acid regurgitation, nausea, heart burn etc.) of *Amlapitta*[3] are very much similar to Acid-reflux disorders such as acute gastritis, Gastro- oesophageal reflux disease, Non-ulcer dyspepsia etc. The incidence of gastritis in India is approximately 3 in 869 that is about 12,25,614 people suffering from gastritis out of the total 1,06,50,70,607 population. Due to Dyspepsia a large proportion of patients are visiting gastro-enterology clinics.[4],[5] A study from India reported prevalence of dyspepsia to be 30.4%.[6] The overall prevalence of GERD was 7.6%: 6.7% in northern India and 8.4% in the southern parts.[7] Various treatment given in modern science but only inhibit the acid release for certain period and remission of symptoms occurs after withdrawal of medicine. Prolonged use of PPIs may increase the risk of clostridium difficile infection of the colon, heart attacks, hypomagnesaemia. Thus, to combat these hazardous side effects, there is need to search a safe remedy with less side-effects and herbal drugs.

Khanda Pippali Avaleha (KPA)[8] as *Sanshaman yoga* was taken because of ingredients having *Sheeta virya*, *Madhura vipaka* which directly pacifies the abnormal *Pitta*. *Virechana* was selected as a *Sanshodhan* procedure as it has effect on *Agnisthana* which is hampered in *Amlapitta. Virechana karma* is indicated for the treatment of *Amlapitta.*[9]

Aim and Objective

To evaluate the efficacy of *Virechana Karma* and *Khanda Pippali Avaleha* in the management of *Amlapitta.*

Materials and Methods

Type of Trial: Interventional

Participants and study design

It was a randomized, non-blinded, two armed, parallel-group, clinical trial conducted in the *Panchkarma* and *Kaya-chikitsa* Department of Rishikul Campus, Haridwar, between March 2016 and November 2018. Participants were Recruited from among patients attending the OPD, IPD or individuals who visited the department to participate in the trial. The trial included individuals who were between 20 and 60 years old (inclusive), who had a diagnosis of uncomplicated symptomatic GERD without the metabolic complications as well as a history of Classical symptoms of *Amlapitta* i.e. frequent episodes of *Hridkanthadaah* (heartburn), *Aruchi* (loss of appetite), *Utklesha* (nausea), *Tikta-amlaudgar* (regurgitation), *Udaradhmana* (flatulence) or *Avipaka* (dyspepsia/indigestion) symptoms for at least 4 months and on at least 5 of the 7 days prior to screening. Patient fit for *Virechana* procedure were in inclusion. Individuals were excluded if they had (i) Patients aged below 20 years and above 60 years; (ii) a clinical history or symptom profile suggestive of complicated GERD, other GI diseases (including Barrett's oesophagus, acute peptic ulcer, or indication for *Helicobacter pylori* eradication therapy) or any severe diseases of other major body systems; (iii) any existing conditions that might compromise their safety or participation in the study like Pregnant/lactating women.

This study was approved by Institutional Ethics Committee (IEC and all participants provided written informed consent prior to the initiation of any study related activities. This study was conducted in accordance with the Declaration of Helsinki, the International Conference on Harmonization Good Clinical Practice (ICH GCP) guidelines, and applicable regulatory requirements, and is registered in the Clinical Trials Registry –India (CTRI/2018/03/012546).

Treatment allocation and treatment schedule

Participants were randomly assigned to receive either *Khand Pippali Awaleha* or *Virechana* followed by placebo capsule, based on a lottery randomization. The placebo capsules were composed mainly 250 mg of dry roasted wheat flour. The placebo capsules matched the Omeprazole in appearance and taste. All study personnel and participants were explained about the treatment allocated. Participants started treatment the day after their randomization visit.

In group A, *Virechana Karma* (Table 1) was given and after *Virechana,* patients were administrated with *placebo* for 45 consecutive days: in morning with lukewarm water as *Anupana.* In group B *Khanda Pippali Avaleha* was given in the dose of 10 gram /day twice in a day after meal with

Luke warm water for 60 consecutive days. Study total duration was 60 days followed by a period of 15 days after the completion of trial.

Table 1: Method of Drug Administration for *Virechana Karma*

SN	Procedure	Drug and Dose	Duration
1.	Deepana-Pachana	Ajmodadi Churna 3 gm BD with luke warm water	4 days
2.	Snehapana	Go-ghrita	3-7days
3.	Virechana Karma	Trivrita Avlaha, Triphla Kwatha	1 day
4.	Sansarjan Karma	Diet as per Shuddhi	3-7 days

Study assessments

Efficacy assessments were based on the questionnaire on symptoms of the disease. Participants completed the questionnaire before the start of treatment and completed at the end of treatment. The recall period used for questionnaire was 'the last 15 days.

The questionnaire is a 14-item self-administered questionnaire designed to assess symptom frequency and severity corresponding to cardinal and associated symptoms of *Amalpitta*. Responses are scored on a zero-to-five-point scale for cardinal symptoms, with higher scores indicating more severe or frequent symptoms. A validated English and Hindi language version of the questionnaire was used in this study. The primary endpoint was the questionnaire cardinal symptoms of *Amalpitta* dimension score. Secondary endpoints included the associated symptoms on questionnaire dimension scores. The change in each questionnaire dimension score was calculated as the difference between the baseline and post treatment scores. Changes in questionnaire dimension scores (from baseline to post treatment) were then compared between the *Virechana* along with placebo groups and *Khand Pippali Awaleha*.

Statistical analysis

Wilcoxon signed rank test was used for within group comparison and Independent sample "t" test was used to compare the mean difference between the groups A and B.

Observations and Results

Participant demographics and baseline characteristics

A total of 42 participants, 21 in each group Completed the study (Figure 1). Relief observed in cardinal symptoms of disease like *Daha, Amlodgara, Shula, Chhardi*, *Avipaka*, *Aruchi* and *Utklesha* was 79%,79%,74%, 85%, 86%, 85% and 86% respectively in Group A (Table 2). While in Group B relief found was 79%, 81%, 69%, 75%, 67%, 74 % and 93 % respectively (Table 3). Result was statistically highly significant (P < 0.001) in both the groups.

Table 2: Effect of therapy on Cardinal symptoms in Group A

Value	Daha	Amlodgara	Shoola	Chhardi	Avipaka	Aruchi	Utklesha	
Mean	BT	3.33	2.750	1.76	1.75	3.100	2.705	2.789
	AT	0.7143	0.5833	0.46	0.250	0.4502	0.1176	0.4211
S.E	BT	1.72	0.278	0.166	0.487	0.2164	0.2059	0.1636
	AT	0.196	0.1486	0.183	0.2500	0.1141	0.080	0.1589
$\bar{x}$		2.619	2.167	1.30	1.500	2.650	2.588	2.368
%		79	79	74	85	86	85	86
P value		<0.001	<0.05	<0.05	<0.05	<0.001	<0.001	<0.001

Table 3: Effect of therapy on Cardinal symptoms in Group B

Value	Daha	Amlodgara	Shoola	Chhardi	Avipaka	Aruchi	Utklesha	
Mean	BT	3.150	2.737	2.062	1.714	2.619	3.474	2.619
	AT	0.660	0.526	0.588	0.4286	0.857	0.2105	0.2381
S.E	BT	0.166	0.2142	0.2322	0.2857	0.2334	0.2341	0.2009
	AT	0.1313	0.1177	0.1929	0.2020	0.1429	0.9640	0.0954
$\bar{x}$		2.508	2.211	1.439	1.286	1.762	3.26	2.381
%		79	81	69	75	67	74	93
P value		<0.001	<0.001	<0.001	<0.05	<0.001	<0.001	<0.001

Relief observed in associated symptoms of disease like *Adhmana, Vibandha, Bhrama, Klama, Tandra, Bhaktodwesh, Lalasrava,* and *Kukshishool* was 62%, 91%, 52%, 34%, 80%, 87%, 84% and 72% respectively in Group A (Table 4). While in Group B relief found was 70%,78%,63%, 62%, 70%, 75%, 85% and 69% respectively (Table 5). Result was statistically highly significant (P < 0.001) in both the groups.

Table 4: Effect of therapy on associated symptoms in Group A

Value	Adhmana	Vibandha	Bhrama	Klama	Tandra	Bhaktodwesh	Lalasrava	Kukshishool	
Mean	BT	2.650	2.750	2.118	2.667	2.700	2.857	2.33	2.250
	AT	1.000	0.2500	1.000	1.762	0.5520	0.3810	0.38	0.624

S.E	BT	0.1957	0.7280	0.2829	0.1436	0.1933	0.1251	2.0	0.3134
	AT	0.2053	0.1230	0.2712	0.1176	0.1983	0.1086	0.0	0.2631
$\bar{x}$		1.652	2.508	1.118	0.9048	2.150	2.476	2.14	1.6252
%		62	91	52	34	80	87	84	72
P value		<0.001	<0.001	<0.05	<0.001	<0.001	<0.001	<0.001	<0.05

Table 5: Effect of therapy on associated symptoms in Group B

Value	Adhmana	Viban-dha	Bhrama	Klama	Tandra	Bhakto-dwesh	Lala-srava	Kukshi - shool	
Mean	BT	3.143	2.810	2.286	2.600	2.611	3.316	2.063	2.200
	AT	0.952	0.619	0.85	1.05	0.777	0.842	0.312	0.600
S.E	BT	0.1863	0.2451	0.285	0.224	0.1833	0.245	0.193	0.2430
	AT	0.1756	0.1887	0.173	0.1617	0.1906	0.1754	0.1197	0.2138
$\bar{x}$		2.190	2.190	1.429	1.632	1.8337	2.474	1.753	1.600
%		70	78	63	62	70	75	85	69
P value		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05

Independent samples t test was used to compare the mean difference between Group A and Group B. Result indicated that in cardinal symptoms mean percent difference between two groups was not statistically significant except symptoms *Daha* and *Avipaka* where relief was found more in Group A than Group B and statistically difference was significant ($p<0.05$) for both the symptoms. Other cardinal symptoms showed similar improvement in both the groups. (Table 6)

Where in associated symptoms mean percent difference was statistically significant ($p<0.05$) only in two symptoms that is *Klama, Bhaktodwesa*. All the other associated symptoms showed similar improvement in both the groups. (Table 7)

Table 6: Comparison of Percent change in Cardinal symptoms between Group A & Group B [100*(BT-AT) /BT)]

Percent Diff	Groups	n	Mean	Std. Deviation	$P Value	
Daha	A	21	80.23	25.13	0.002	<0.05
	B	20	80.66	17.11		
Amlodgar	A	12	80.27	18.55	0.846	>0.05
	B	19	78.77	22.10		
Shoola	A	13	79.48	27.34	0.509	>0.05
	B	16	71.87	32.75		
Chhardi	A	2	91.66	16.66	0.361	>0.05
	B	7	71.42	39.33		
Avipaka	A	20	85.66	17.16	0.003	<0.05
	B	21	57.93	35.88		
Aruchi	A	17	97.06	8030	0.302	>0.05
	B	19	92.98	13.96		
Utklesha	A	20	85.41	24.46	0.814	>0.05
	B	21	87.30	26.30		

Table 7: Comparison of Percent change in Associated symptoms between Group A & Group B [100*(BT-AT) /BT)]

Percent Diff	Groups	N	Mean	Std. Deviation	$P Value	
Adhmana	A	20	63.33	34.13	0.417	>0.05
	B	21	70.79	23.28		
Vibandha	A	20	93.00	14.42	0.116	>0.05
	B	21	82.85	24.43		
Bhrama	A	17	60.29	43.35	0.883	>0.05
	B	20	58.33	36.97		
Klama	A	21	32.14	19.41	0.001	<0.05
	B	20	31.66	30.15		
Tandra	A	20	81.66	29.69	0.192	>0.05
	B	18	67.60	35.45		
Bhaktodves	A	21	87.69	16.16	0.043	<0.05
	B	19	72.98	27.41		
Lalasrava	A	20	87.50	22.86	0.992	>0.05
	B	16	87.45	19.72		
Kukshishul	A	8	70.73	36.46	0.960	>0.05
	B	15	70.00	38.03		

Overall effect of therapy reveled that, maximum patients were seen with moderate improvement in Group A with a percentage of 76.2% while in Group B it was 71.4%. Marked improvement was observed 4.8% in Group A and 23.8% in Group B. Four (4) patients were seen with mild improvement in Group A with a percentage of 19% and one (1) patient in Group B with percentage of 4.8%. There was no patient in both the groups with no improvement at all. (Table 8) (Figure 2).

Table 8: Statistical analysis of overall effect of both groups [100*(BT-AT) /BT)]

Relief	Group A=21		Group B=21		Total	%
No. of patients	%	No. of patients	%	No. of patients		
Complete Improvement (100%)	0	0	0	0	0	0
Marked Improvement (75% to <100%)	1	4.8	5	23.8	6	14.3
Mod. Improvement (50% to <75%)	16	76.2	15	71.4	31	73.8
Mild Improvement (25% to <50%)	4	19.0	1	4.8	5	11.9
Unchanged (<25%)	0	0	0	0	0	0
Total	21	100.00	21	100.00	42	100.0

Relief Percentage are calculated from the average improvement of the all factors

Safety

No any adverse drug reactions (ADR) were noted or reported. No deaths or significant changes in vital signs were reported in either group during the study.

Discussion

In *Amlapitta*, *Pitta (Pachaka)*, *Vata (Saman)* and *Kapha* (*Kledaka*) *dosha* gets vitiated.**[10]** *Pitta dosha* mainly vitiate in terms of its *Drava* (liquidity) and *Amla guna (*sourness) which is increased. The involved *Dosha* decreases the *Jatharagni* (to below the normal level) i.e., *Jatharagnimandya*. Improper *Agni* results in to *Vidagadh paka* and further *Sukta paka* of the food. Vitiated *Pitta* gets mixed with *Sukta* and causes *Pitta Amavisa Sammurchhana***[11]** resulting in cardinal symptoms of *Amlapitta*.**[12]** *Acharya* explained the management by performing *Vamana, Virechan, Anuvasana, Niruha Basti, Raktamoksha,* and *Shaman* drugs, followed by the dietary restrictions for *Amlapitta*.**[13]**

Thus, to evaluate efficacy of *Virechana* and *KPA* in *Amlapitta,* randomized, interventional clinical trial was planned. *Virechana* was statistically superior to *KPA* for all primary end points and *KPA* was superior in *Klama, Bhaktodwesh* (secondary endpoints). On the basis of percentage, *Virechana* Group (group A) provided better results on all chief complains & on associated complains, KPA has provided good results.

Study participants were recruited from among attendees of Rishikul hospital across Haridwar and are likely to be representative of the local population of patients with mild to moderate symptomatic *Amalpitta*. Patients with severe reflux were excluded from this study, and therefore the findings may not be general-able to patients with more severe disease. Due to the inclusion of non severe cases in study, the findings are primarily applicable to patients having acute and mild symptoms of *Amalpitta* symptoms, whereas individuals with severe or chronic disease more likely to receive this treatment with higher dose of medicine of group B i.e. *Khand Pippali Avleha* and different *Rasayan* drugs indicated in Ayurvedic text for *Amalpitta* followed after *Virechana*.

Although the minimum dose (two tablets four times daily) was used in this Study to maximize compliance, a statistically significantly greater improvement was still observed in the group B.

In *Khanda Pippali Avaleha* all the main ingredients except *Pippali*, have *Madhura Rasa, Madhura Vipaka* and *Sheeta Veerya* which rectify the vitiated *Pitta* and *Vata dosha*. *Pippali* has *Deepan, Pachan, Vata-kaphah shamaka* property**[14]** which activate the *Mandagni* and acts on *Kledaka Kapha*. *Shakkar* also have properties like *chardi Hara* (anti emetic) and *Vata-pitta pacifying*.**[15]** *Aamlaki* with *Tridodh Hara Guna*, helps in expel out the excessive *Vidagdha Pitta* from the body because of its *Mrudu Rechaka Guna*. Ethanol extracts of *'Aamlaki' Emblica officinalis* carrying anti-secretory, antiulcer, and cyto-protective properties.**[16]** *Goghrita* has *Tridosha Nashaka* and *Agnivardhaka* property.**[17]** *Shatavri* have proven Anti-ulcer and Anti secretory property.**[18]**

Virechana is preferred in *Pitta pradhan* disorders as a *Shodhana*. With the *Deepan- pacchan Karma* increases *Jatharagni* by doing *Ama pachan*.**[19]** *Snehan* and *Swedana karma* helps the vitiated *doshas* to leave the peripheral part of and come in the *Kostha*. *Virechan* helps in expelling out the excessive accumulated *Pitta* and *Kapha Dosh*.**[20]** It removes *Avarana* of *Vayu* in *Kostha* and corrects the *Agnivaigiunyata.***[21]** No safety issues were observed with both groups, which showed tolerability.

Conclusion

Sustained effect with no reoccurrence after one month of *Virechana Karma* suggest that it can be chosen as main treatment option. Recurrence in some patients of KPA suggest that it may be an add on treatment option for patients with mild to moderate symptoms of *Amalpitta*.

Reference

01. Barling E, Brooks A. It's not your fault: Weight Gain, Obesity & Addictions. Outskirts Press: Denver. 1st edition, 2010. *[Crossref][PubMed][Google Scholar]*

02. Mishra SS, Gupta AK, Panja AK, Meena KL. An analytical review of Amlapitta in the purview of changing lifestyle. Ayurpharma Int J Ayurveda Allied Science. 2012 Dec, 29:1(8):172-178. *[Crossref] [PubMed][Google Scholar]*

03. Madhava Nidana. Amlapitta nidanam. 51/1-2. Available from: http://niimh. *nic.in/ebooks/madhavanidana. (Accessed on 1 October 2020) [Crossref][PubMed][Google Scholar]*

04. El-Serag H, Talley N. The prevalence and clinical course of functional dyspepsia. Alimentary Pharmacology and Therapeutics. 2004 March, 11;19(6):643-654. *[Crossref][PubMed][Google Scholar]*

05. Abid S, Siddiqui S, Jafri W. Discriminant value of Rome III questionnaire in dyspeptic patients. Saudi Journal of Gastroenterology. 2011 Mar-Apr;17(2):129-33. *[Crossref][PubMed][Google Scholar]*

06. Shah SS, Bhatia SJ, Mistry FP. Epidemiology of dyspepsia in the general population in Mumbai. Indian J Gav stroenterol. 2001May-Jun; 20(3):103-6. *[Crossref][PubMed][Google Scholar]*

07. Bhatia SJ, Makharia GK, Abraham P, Bhat N, Kumar A, Reddy DN, et al. Indian consensus on gastroesophageal reflux disease in adults: A position statement of the Indian Society of Gastroenterology. Indian J Gastroenterol. 2019 Oct; 38(5):411-440. *[Crossref][PubMed][Google Scholar]*

08. Vaidya Shri Laxmipatisashtri. Yogratnakar. Chukhamba Prakashan, Varanasi. Reprint Edition 7th, Amlapitta nidanam, verse 1-5, 2015,pg241-242. *[Crossref][PubMed][Google Scholar]*

09. Kaviraajshri Ambikadutt Sastri, Brahmashankar Mishra. Bhaisjya Ratnavali. Chukhamba Prakashan, Varanasi. Edition 18th, Chapter 56 verse 153, 2007, Pg931. *[Crossref][PubMed][Google Scholar]*

10. Sri Yadu nandan Upadhyay. Madhava Nidana. Chaukhamba Prakashan, Varanasi. Reprint Edition 13th, chapter 51 verse 1-2, 2009,Pg202. *[Crossref] [PubMed][Google Scholar]*

11. Charak Samhita, Chikitsasthana. Grahnidosha chikitsitam Adhyaya, 15/42-44. Available from: http://niimh. nic. *in/ebooks/echarak. (Accessed on 5 October 2020) [Crossref][PubMed][Google Scholar]*

12. Pandit Hemraja Sharma. Kashyapa Samhita, Khila Sthana. Chaukhamba Sanskrit Series Office, Varanasi. Reprint Edition 3rd, chapter 16 verse 7-13, 2008. *Pg335 [Crossref][PubMed][Google Scholar]*

13. Vaidya Shri Laxmipatisashtri. Yogratnakar. Chaukhamba Prakashan, Varanasi. Reprint Edition 7th, Amlapitta nidanam verse 1-2, 2015,pg239. *[Crossref][PubMed][Google Scholar]*

14. Sharma PC, Yelne MB, Dennis TJ. Database on Medicinal Plants Used In Ayurveda. New Delhi: Central Council for Research in Ayurveda and Siddha. Volume 3,2001. *[Crossref][PubMed][Google Scholar]*

15. Krishan Chandra Chunekar, Ganga sahay Pandey, editor. Bhavprakash Nighantu. Varanasi: Chaukhambha Bharti Academy. Reprint Edition 1st, Ikshu varga verse 29, 2018,Pg780. *[Crossref] [PubMed][Google Scholar]*

16. Al-Rehaily A, Al-Howiriny T, Al-Sohaibani M, Rafatullah S. Gastroprotective effects of 'Amla' Emblica officinalis on in vivo test models in rats. Phytomedicine. 2002 January 01;9(6):515-522. *[Crossref][PubMed][Google Scholar]*

17. Krishan Chandra Chunekar, Ganga sahay Pandey, editor. Bhavprakash Nighantu. Varanasi: Chaukhambha Bharti Academy. Reprint Edition 1st, Ghrita varga verse 4-6, 2018,Pg758. *[Crossref] [PubMed][Google Scholar]*

18. Bhatnagar M, Sisodia S. Antisecretory and Antiulcer Activity of Asparagus racemosus Willd Against Indomethacin Plus Pyloric Ligation-Induced Gastric Ulcer in Rats. Journal of Herbal Pharmacotherapy. 2006;6(1):13-20. *[Crossref] [PubMed][Google Scholar]*

19. Sailja srivastva. Jiwan prada- commentary on Sharanghdhar Samhita. Chaukhamba Orientalia, Varanasi. Reprint Edition 1st, Chapter 4 verse 1-2, 2018,Pg30. *[Crossref][PubMed][Google Scholar]*

20. Charak Samhita. Chikitsasthana, Jwarachikitsitam adhyaya, 3/171. Available from: http://niimh. nic. *in/ ebooks/echarak. (Accessed on 5 October 2020) [Crossref][PubMed][Google Scholar]*

21. Charak Samhita. Siddhisthana, Kalpanasiddhi Adhyaya, 1/17-18. Available from: http://niimh. nic. *in/ebooks/echarak. (Accessed on 5 October 2020) [Crossref][PubMed][Google Scholar]*