

Role of *Agni Karma* with *Pippali* on *Kadara*- An open labeled clinical trial

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Abstract

Introduction: Ayurveda has a rich and comprehensive concept of life and health. Callosity is a French word meaning a local thickened or hardened part of the skin. It is a plaque of hyperkeratosis caused by repeated friction or pressure. It is assumed that frictional forces induce hyperkeratosis leading to thickening of stratum corneum of the skin over certain areas prone to mechanical stresses. *Kadara*, as described by the *Samhitas*, can be closely related to lesions of the skin caused by hyperkeratosis. *Kadara* has been enumerated and described in the classical literature under the heading of *Kshudra Roga*. *Agni Karma* has been mentioned for the proper management of *Kadara*. **Aims and Objective:** The management of *Kadara* is aimed at removal of the hyperkeratosis lesion by *Agni Karma* along with or without *Shashtra Karma*. **Material and Methods:** *Pippali* has been mentioned as a *Dahana Upakarna* in *Sushruta Samhita* and *Ashtanga Samgraha*. It was a randomized, prospective, single-blind and clinical trial. Fifteen patients suffering from hyperkeratosis lesions were selected according to the conditions mentioned under inclusion and exclusion criteria and *Agni Karma* procedure was carried out for them. Assessment of the lesion was done before treatment and after 7 days and 14 days of treatment. **Results and Observation:** Based on the study, it was observed that *Pippali* can be used to create superficial burns only. The extent of tissue destruction due to burning with *Pippali* is very minimal. Hence, it was observed to be effective for treating superficial *Kadara* lesions. It was observed that eventually in 7 days the area of the lesion turned soft with reddish black discoloration. Softening of the lesion and its discoloration might be due to penetration of the volatile oil and active principles of *Pippali* into the affected area while doing the *Agni Karma* procedure. It was further observed that the area of lesion eventually dried and peeled off along with the *Kadara* tissue within about 15 days. **Conclusion:** Hence, *Pippali* was able to provide satisfactory results in case of superficial hyperkeratosis lesions.

Keywords: *Agni Karma*, cosmetology, hyperkeratosis lesions, *Pippali* *Agni Karma*

Introduction

Ayurveda has a rich and comprehensive concept of life and health; taking into account all parts of human existence from the abstract transcendental value to its most concrete expressions in human physiology.

Callosity is a French word meaning a local thickened or hardened part of the skin.^[1] It is a plaque of hyperkeratosis caused by repeated friction or pressure.^[2] It is assumed that frictional forces induce hyperkeratosis leading to thickening of stratum corneum of the skin over certain areas prone to mechanical stresses. If these frictional forces are distributed over a broader area, a callus occurs.^[3] In a callus, there is epidermal hyperplasia. The stratum corneum is thickened and compacted, sometimes with parakeratosis over the dermal papillae leading to expansion of the granular layer. The

underlying dermis may show an increase in dermal collagen and fibrosis around the neurovascular bundles.^[1]

Kadara as described in classical Ayurvedic literature can be closely related to lesions of the skin caused by hyperkeratosis. *Kadara* has been enumerated and described in the classical literature under the heading of *Kshudra Roga*.^[4-6] However, meager this disease may seem to be, it has a major impact on the physical fitness and mental tranquility of the patient.

Ayurvedic classics have advocated the use of various procedures to treat *Kshudra Roga*. *Agni Karma* has been mentioned for the proper management of *Kadara*.^[7-9]

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The management of *Kadara* is aimed at removal of the hyperkeratosis lesion by *Agni Karma* along with or without *Shashtra Karma*. *Agni Karma* can be done using different types of instruments depending on the nature of disease and the site of lesion. Some of the instruments include *Pippali*, *Aja Shakrita*, *Godanta*, *Kshara*, *Shalaka*, *Jambvoushta*, *Ghrita*, and *Majja*.^[10]

Agni has been considered superior among the *Anushastras* for possessing fast action and permanent cure. It has been attributed the quality of curing the diseases which cannot be cured by other therapeutic measures such as surgery treatment with *Kshara* and medicinal management.

Pippali has been mentioned as a *Dahana Upakarana* in *Sushruta Samhita*^[10] and *Ashtanga Hridayam*.^[11] *Pippali* had been chosen for this study as it is one of the *Dahana Upakarana* mentioned for skin lesions and also because it contains oleaginous, antibacterial and antifungal chemical constituents besides being available in abundance at cheap rates. *Pippali* contains coumapherine, N-5-(4-hydroxy-3-methoxyphenyl)-2E-pentenoyl piperidine, piperolactam A, 1-[1-oxo-5 (3,4-methylenedioxyphenyl)-2E,4E-pentadienyl]-pyrrolidine, 1-[1-oxo-5 (3,4-methylenedioxyphenyl)-2E-pentenyl]-pyrrolidine, 1-[1-oxo-9 (3,4-methylene dioxypheyl)-2E, 8E-nonadienyl]-pyrrolidine, (R)-turmerone, octahydro-4-hydroxy-3 α -methyl-7-methylene- α -(1-methylethyl)-1H-indene-1-methanol, (+)-aphanamol I, bisdemethoxycurcumin and demethoxycurcumin.^[12] Apart from this, *Agni Karma* also helps in controlling the bleeding. There would be less pain as the nerve fibers are destroyed by *Agni Karma*. Chances of infection are also less as *Agni Karma* itself is a sterile procedure.

Acharya Sushruta described *Agni Karma* as a parasurgical procedure and mentioned it as superior among all parasurgical procedures.^[13] *Agni Karma Vidhi Adhyaya* has been mentioned in *Sutra Sthana*.^[14] *Agni Karma* has also been elaborated under the context of *Agropaharaniya*^[15] as *Upayantra*^[16], *Anu Shashtra*^[17], for *Kanthagata Shalya Nirharana*^[18], one of 60 *Upakarma of Vrana*^[19], for the treatment of *Vata Vyadhi*^[20], *Ashmari*^[21], *Bhagandara*^[22], *Pleehodara*^[23] etc. Many references are available in *Sushruta Samhita* regarding *Agni Karma*.

Materials and Methods

Source of data

Subjects

Patients who were found to be suffering from hyperkeratosis lesions of the skin were screened. Among them, 15 patients fulfilling the inclusion criteria of the study were taken irrespective of sex, religion, marital status, socioeconomic status and occupation. Detailed history taking and physical examination were carried out for these patients. Relevant data along with an elaborate assessment of the lesion, pain and tenderness were taken note of in the case proforma specially designed for the study.

Inclusion criteria

1. Patients of age 16–60 years
2. Patients irrespective of sex, religion and occupation
3. Patients having hyperkeratosis lesions/*Kadara*.

Exclusion criteria

1. Patients contraindicated for *Agni Karma*.^[24] For example, pregnant women, children, old aged, individuals suffering from *Antahashonita*, *Raktapitta*, *Anudhruta Shalya*, *Bhinna Koshta*, *Aneka Vrana Peedita*, *Trishna*, *Jwara*, *Netra-Vrana*, *Kushtha Vrana*, *Vishajushta*, *Aswedya*-like *Pandu*, *Pramehi*, *Kshayarta*, *Kshama*, *Ajeerni*, *Udara Rogi*, *Chardi Peedita*, *Madya Peeta* and *Atisari*
2. Patients having any serious systemic disease
3. Pregnant women, children and patient aged below 16 years and above 60 years.

Research design

It was a randomized, prospective, single blind, clinical trial. Fifteen patients suffering from hyperkeratosis lesions were selected according to the conditions mentioned under inclusion and exclusion criteria and *Agni Karma* procedure was carried out for them.

Assessment criteria

The subjective and objective parameters before the procedure and post procedure were analyzed, recorded, and compared for assessment of the results. Following this, the outcome was analyzed statistically.

Subjective criteria:

- Pain [Table 1].

Objective criteria

- Tenderness [Table 2].

The assessment was made on the basis of improvement in signs and symptoms for which suitable scores were assigned.

Table 1: Mc. Gill's Questionnaire Rating Scale for pain

Pain	Grade
None	0
Mild	1
Discomforting	2
Distressing	3
Horrible	4
Excruciating	5

Table 2: Dr. Frank Painter's grading for soft-tissue tenderness

Tenderness	Grade
No tenderness	0
Tenderness to palpation with grimace	1
Tenderness with grimace or flinch on palpation	2
Tenderness with withdrawal (jump sign)	3
Jump sign with nonnoxious stimuli	4

Therapeutic intervention

Agni Karma with *Pippali* Treatment was done in a single sitting.

Follow up

Assessment of the lesion was done before treatment, after treatment, 7 days and 14 days after treatment.

Duration

The total duration of the study was 15 days. Results were statistically analyzed and assessed after treatment and on 14th day after treatment.

Procedure

Purva Karma (pre-operative procedure)

Initially, all the materials required for the procedures were collected [Figure 1] and written consent of the patient was taken after duly explaining the details of the treatment procedure. The patient was made to assume a comfortable position over the minor OT table, as per the site of the lesion. Then the site of lesion was cleaned properly with distilled water.

Pradhana Karma (main-operative procedure)

Then, the area was mopped, dried and draped in a sterile towel. The nursing assistant was told to firmly hold the body part as per need of the individual case. Then the site of the lesion was gently scraped with the help of a sterile surgical blade; until the area was made raw. Then the *Pippali* was heated to red hot and directly placed over the lesion [Figure 2]. The *Pippali* was reheated and reapplied to the lesion. The *Dahana* procedure was stopped when the *Samyaka Dagdha Lakshanas* were observed and there was complete hemostasis.



Figure 1: Materials required (Purav Karma)

Pashchat Karma (post-operative procedure)

Following this, a mixture of *Ghrita* and *Madhu* was applied over the site of *Agni Karma*. The patient was advised to rest in the supine position for half an hour and was advised to go home and to keep the area clean and dry.

After treatment regarding the changes in the symptoms lesion were recorded in the case proforma, especially designed for the study.

Results

An assessment of pain in patients of hyperkeratosis lesions/*Kadara* showed a reduction in the mean score from 2.467 to 1.667 after the treatment and further to 0.333 after follow-up with an improvement of 32.43% and 86.50%, respectively. It was found to be statistically highly significant ($P < 0.001$) [Table 3].

An assessment of Tenderness in patients of hyperkeratosis lesions/*Kadara* showed reduction in the mean score from 2 to 1.333 after the treatment and further to 0.133 after follow-up with an improvement of 33.35% and 93.35%, respectively. It was found to be statistically highly significant ($P < 0.001$) [Table 4].

Discussion

Ayurveda being a medical science is formulated on the scientific parameters available. This study was aimed at re-establishing old facts while contemplating newer ideas and comparing their relative efficacy in *Kadara*.



Figure 2: Pippali Agni Karma (Pradhan Karma)

Table 3: Effect on pain

Symptom	Mean score			Percentage	±SD	±SE	t	P
	BT	AT	BT-AT					
Pain	2.467	1.667	0.8	32.43	0.8164	0.2108	7.4833	<0.001
		0.333	2.134	86.50	0.6172	0.1593	12.9121	<0.001

AT: After treatment, BT: After treatment, SD: Standard deviation, SE: Standard error

Table 4: Effect on tenderness

Symptom	Mean score			Percentage	±SD	±SE	t	P
	BT	AT	BT-AT					
Tenderness	2.00	1.333	0.667	33.35	0.6172	0.1593	5.2914	<0.001
		0.133	1.867	93.35	0.3518	0.0908	11.2972	<0.001

AT: After treatment, BT: After treatment, SD: Standard deviation, SE: Standard error

Pippali has been mentioned as one of the *Dahana Upakarna* in the classical literature. It has been mentioned to be effective in conditions where the lesion is situated in the superficial layers of skin. For the purpose of *Agni Karma*, dried fruit of *Pippali* (*Piper longum* L.) is used.

When heated properly, this *Pippali* attains an average temperature ranging from 55°C–60°C. As soon as it is removed from fire, it immediately dissipates 10°C–12°C heat; followed by heat dissipation at the rate of 20°C/min.^[25]

Pippali was selected for *Agni Karma* due to the following reasons:

1. *Kadara* has been considered as a *Vatadosha Pradhana Vyadhi*. *Pippali* contains *Snigdha* and *Tikshana Guna*. Due to the *Snigdha Guna*, it shows *Vatahara* properties and *Tikshana Guna* promotes better penetration of the active principles into the skin
2. When *Pippali* is used for *Agni Karma*; essential oil present in it evaporates from the burning surface in the form of fumes. When this red-hot fuming *Pippali* is touched to raw skin surface, the fumes condense over the tissue and the essential oil containing various active principles of the plant penetrates deeper into the skin. These eventually cause discoloration, drying and peeling off of the diseased tissue; hence healing the surface lesion
3. *Pippali* contains essential oils that have been proven to exhibit antibacterial and fungicidal activity^[26]
4. The *Adhishthana* of the disease *Kadara* is the skin tissue; hence, *Pippali* proved effective to treat superficial hyperkeratosis/*Kadara* lesions.

Based on the study, it was observed that *Pippali* can be used to create superficial burns only. The extent of tissue destruction due to burning with *Pippali* is very minimal.

It was observed that *Pippali* as a *Dahana Upakarana* was able to produce a superficial physical burn due to its property of being able to attain and maintain only a lower range of temperature. However, it was observed that eventually within 7 days the area of the lesion turned soft with reddish-black discoloration. This might be due to penetration of the volatile oil and active principles of *Pippali* into the affected area while doing the *Agni Karma* procedure. It was further observed that the area of lesion eventually dried and peeled off along with the *Kadara* tissue within about 15 days.

Hence, *Pippali Agni Karma* was observed to be effective in treating superficial hyperkeratosis over the elbows, knuckles, lateral aspect of ankle, foot and hands. Besides this, the

therapy did not left scar or disfigured the skin and produced cosmetically good results.

Conclusion

The study concludes that *Pippali Agni Karma* can be used as an effective cosmetology procedure for the treatment of superficial hyperkeratosis lesions.

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Conflicts of interest

There are no conflicts of interest.

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