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Ayurvedic Management of *Asthidhatu kshaya*: A Comparative clinical study

Research Article

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Abstract

Joint disorders are most commonly occurring in the world and India also. *Asthidhatu kshaya* has become one of the major health hazard that cripple millions of lives. Age related degeneration in the bone mass, over exercise, *vataprakopaka ahara vihara* etc are the causes of *Asthidhatu kshaya*. *Asthishoola, sandhishaithilya, srama* etc are the symptoms produced due to *Asthidhatu kshaya.* Charaka and Vagbhata have mentioned *ksheera vasti* with *tikta dravyas* to treat *asthivaha srotas vyadhis*. In this *ksheera vasti, Amruta* and *Patola* are used as *tikta dravyas.* The present study was a open clinical trial. In this study, total 30 patients were taken for the study and divided into 2 equal groups: Group A & Group B. (Group A) - *Pana prayoga : Amruta patola ksheerapaka* - 160 ml for 45 days. (Group B) -*Vasti prayoga: Amruta Patola ksheeravasti* - 160 ml for 45 days.

The effect of the therapy was assessed on the basis of changes observed in the subjective and objective parameters. Subjective parameters taken for the assessment were *asthishoola, sandhi shaithilyam, srama, sparshasahatwa*. The objective parameters taken were assessment of bone mineral density (BMD) and serum calcium. Tests were done on standard parameters, before and after the treatment. It was observed that *Amruta Patola ksheera pana* and *vasti* both are effective in *Asthidhatu kshaya*. But, *ksheera vasti* was more effective and useful than *ksheera pana* in *Asthidhatu kshaya*. The detail scientific data will be discussed in full paper.

Key words: *Asthidhatu kshaya, tikta dravyas, Amruta, Patola, ksheera pana* and *vasti.*

Introduction

Joint disorders are most commonly occurring in the world and India also. *Asthidhatu kshaya* has become one of the major health hazard that cripple millions of lives. In the present study, *Asthidhatu kshaya* was taken for the study in relation to osteoporosis, a metabolic disorder of the bone. In the contemporary science, osteoporosis is defined as "A progressive systemic skeletal disease characterised by low mineral density and micro architectural deterioration oftrabecular bone tissue with a consequent increase inbone fragility & susceptibility tofracture."

Osteoporosis is a global health problem which is increasing with the growing elderly population. The condition affects both the sexes, but mostly females. Thus women are at high risk compared to men. The risk even increases at menopause, which is a physiological

transition period of hormonal imbalance (1).

Government of India through its autonomous body C. C. R. A. S., which is meant for the development of Ayurveda, has laid down about 30 conditions which are to be tackled immediately. *Asthidhatu kshaya* (osteoporosis) is one among them. Keeping in view, the severity of this disease World Health Organization has declared a decade from 2000 to 2010 as the ***'Bone and Joint Decade'.*** The aim was to create awareness about musculoskeletal disorders and ***osteoporosis*** in particular.

In Ayurveda, *samanya nidanas* for all *kshaya* has mentioned. *Vata vriddhi nidanas* are also the contributory factors for *Asthidhatu kshaya*. Apart from these, the *nidanas* mentioned for *dushti* of *asthivaha srotas* can be considered as *nidanas* for *asthidhatu kshaya.* The *lakshanas* seen in *Asthidhatu Kshaya* are either due to the *rachanatmaka* or *kriyatmaka vikriti* of the *asthi dhatu.* Hence the *lakshanas* considered for the study are: *Asthishoola, Sandhishaithilya, Srama , Sparshasahatwa, Kesha loma shmashru prapatana, Danta nakha bhanga and roukshya* (2)(3)(4). Out of these *lakshanas* first four *lakshanas* were commonly observed but other two *lakshanas* were not so commonly observed in this disease, it may be observed in very chronic condition of the disease.

While treating *asthivaha sroto vyadhis*, charaka has prescribed *vasti* with *tikta dravya siddha ksheera & ghrita*(5). Vagbhata also mentioned *tikta dravya siddha ksheera & ghrita vasti*(6).

Materials and Methods

The objectives of the present study are:

1) To evaluate the efficacy of "*Amruta patola ksheerapaka*"by *pana* and *vasti prayoga* in *Asthidhatu kshaya* (Osteoporosis).
2) To study either *pana prayoga* or *vasti prayoga* is more effective in *Asthidhatu kshaya.*

Materials

Sources of data:

In the present study 30 patients were randomly selected for the trial.

Criteria for selection of the patients:

The patients were randomly selected and only the patients who were diagnosed as *Asthidhatu kshaya* (Osteoporosis) on the basis of the subjective and objective parameter were taken for the study.

Inclusion Criteria:

1) Patients presenting with the symptoms *Asthishoola* (pain), *Sandhishaithilya, srama, Sparshasahatwa (Tenderness), Kesha-loma-shmashru prapatana and danta-nakha bhanga & roukshya, .*
2) Patients were selected above the age group of 35 years and below 75 years of either sex.
3) Patients of osteoporosis diagnosed by bone mineral densitometry (BMD).

Exclusion Criteria:

1) Patients below the age 35 years and above 75 years.
2) Patients suffering from pathological Osteoporosis and neoplasms of the bone.
3) Patients with the history of prolonged cortico-steriod therapy.
4) Patients of Osteoporosis with major fractures.

Diagnostic criteria:

The following laboratory investigations were carried on the patients of *Asthidhatu Kshaya.*

1) Serum calcium
2) Bone Mineral Density (BMD)

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Methodology

Study design:

The present study was an open clinical trial.

Sample size:

In this study, total 30 patients were taken for the study and divided into 2 equal groups: Group A & Group B.

Plan of the work:

A special case Performa was designed which consists of all the important data related to patients of *Asthidhatu Kshaya*, treatment adopted and other information. Standard scorings were given for the subjective as well as objective parameters for the assessment before and after treatment.

Trial drug:

- (Group A)- *Pana prayoga: Amruta Patola ksheerapaka* – 160 ml for 45 days.
- (Group B) -*Vasti prayoga: Amruta Patola ksheeravasti* – 160 ml for 45 days.

Materials for *ksheerapaka:*

Amruta (guduchi) - 10 gm., *Patola* - 10 gm., *Ksheera* - 160 ml., Water - 640 ml.

Procedure of *ksheerapaka*:

This procedure was followed according to *ksheerapaka* procedure of *sharangadhara.*

Then prepared *ksheerapaka* is filtered and residue gets separated. This *ksheerapaka* is allowed to luke warm and thereafter used for *pana* and *vasti prayoga.*

Administration of *amruta patola ksheera vasti*:

After proper evacuation of bowel and bladder, this *vasti* was given in the morning following light meals. As a preoperative preparation, the patient was subjected to *abhyanga* and *swedana* therapy and was followed by administration of the *vasti.*

Ksheerapana procedure:

- After preparation of *amruta patola ksheera paka,* 160 ml luke warm *ksheerapaka* was taken in a glass for *pana prayoga.*
- It was given on empty stomach in the morning.

Follow-up:

Follow up was done for every one month for consecutive 3 months.

Duration of the study:

- *Pana prayoga: 45* days continuously.
- *Vasti prayoga* :45 days (10 days *vasti* and 3 days gap)

Parameters of the study:

The effect of the therapy was assessed on the basis of changes observed in the subjective and objective parameters. Subjective parameters taken for the assessment were *asthishoola, sandhi shaithilyam, srama, sparshasahatwa and kesha-loma-shmashruprapatana and danta-nakha bhanga & roukshya.* The objective parameters taken were assessment of bone mineral density (BMD) and serum calcium. Tests were done on standard parameters, before and after the treatment. Standard scales were also used for grading the subjective parameters.

Criteria for statistical assessment:

All the values of the subjective and objective parameters before and after treatment were recorded. Mean difference, standard deviation and standard error of these values were calculated. Then these values were subjected to calculate t-value and p-value. In this statistical assessment paired t-test was used.

Observations & Results

Table 1: Effect of therapy on subjective parameters in patients - Group-A

Lakshanas	Mean difference	Standard Deviation	Standard Error	t- value	p-value	Significance
Asthishoola	1. 0667	1. 0328	0. 2667	4. 0	<0. 05	S.
Sandhishaithilya	0. 3333	0. 4880	0. 1260	2. 6458	<0. 05	S
Srama	0. 7333	0. 7037	0. 1817	4. 0359	<0. 05	S
Sparshasahatwa	0. 9333	0. 8837	0. 2282	4. 0904	<0. 05	S

Table 2: Effect of therapy on subjective parameters in patients - Group-B

Lakshanas	Mean difference	Standard Deviation	Standard Error	t- value	p-value	Significance
Asthishoola	1. 8667	0. 7432	0. 1919	6. 72	<0. 001	H. S.
Sandhishaithilya	1. 1333	0. 9904	0. 2557	4. 4318	<0. 001	H. S.
Srama	1. 0667	0. 7988	0. 2063	5. 1717	<0. 001	H. S.
Sparshasahatwa	1. 5333	0. 9904	0. 2557	5. 9960	<0. 001	H. S

Results of the subjective parameters (*Kesha-loma-shmashru prapatana and danta-nakha bhanga & roukshya)* which were not found in the study have been not interpreted statistically.

Table 3: Effect of therapy on objective parameters in patients - Group-A

Investigations	Mean difference	Standard deviation	Standard error	t-value	p-value	Significance
S. Calcium	0. 407	0. 3845	0. 0993	4. 0970	<0. 05	S
B. M. D.	0. 187	0. 2232	0. 0576	3. 239	<0. 05	S

Table 4: Effect of therapy on objective parameters in patients - Group-B

Investigations	Mean difference	Standard deviation	Standard error	t-value	p-value	Significance
S. Calcium	0. 533	0. 5728	0. 1479	3. 606	<0. 05	S
B. M. D.	0. 307	0. 3173	0. 0819	3. 743	<0. 05	S

(H. S. – Highly significant, S. – Significant)

Table 5: Total effect of Treatment in patients - Group-A

Result	No. of patients	Percentage
Marked	02	13. 33%
Moderate	05	33. 33%
Mild	05	33. 33%
No relief	03	20. 00%

Among 15 patients, 02(13. 33%) showed marked relief, 05(33. 33%) showed moderate relief, 05(33. 33%) showed mild relief and 03(20. 00%) showed no relief.

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IMAGE NO: 1

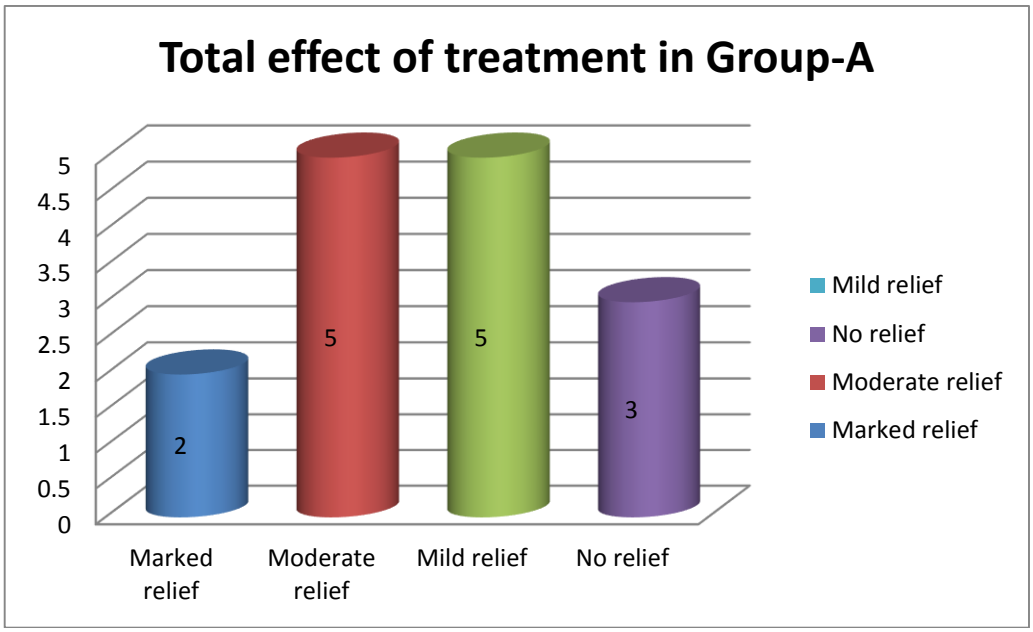
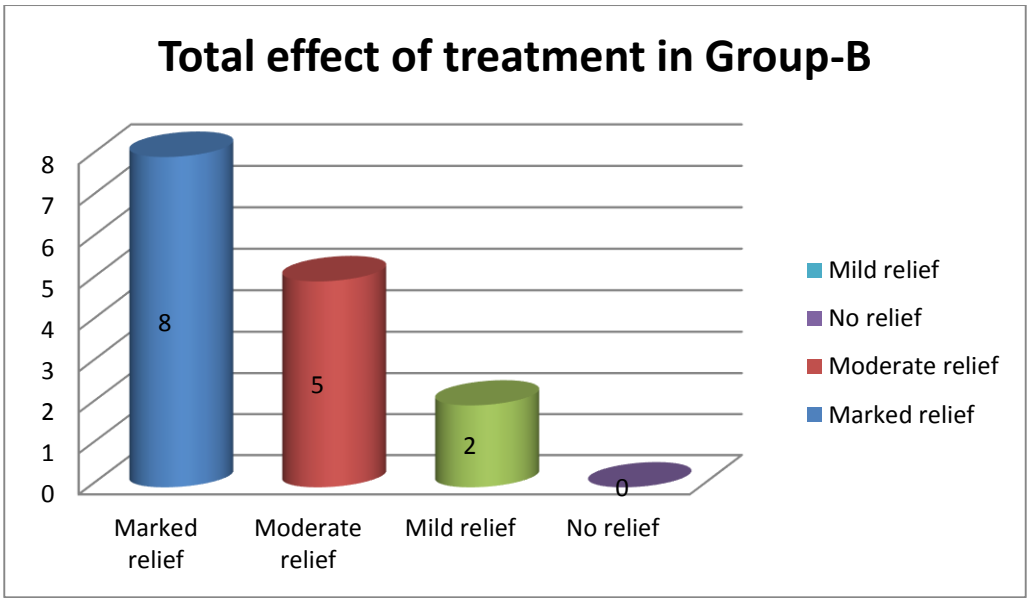


Table 6: Total effect of Treatment in patients - Group-B

Result	No. of patients	Percentage
Marked	08	53. 33%
Moderate	05	33. 33%
Mild	02	13. 33%
No relief	0	0. 0%

Among 15 patients, 08(53. 33%) showed marked relief, 05(33. 33%) showed moderate relief, 02(13. 33%) showed mild relief and no one patient had showed no relief.

IMAGE NO: 2



Discussion

Ksheera is considered as the best *dravya* in nourishing the *asthidhatu.* Cow milk is the best among all milks. The properties of cow milk are: *Madhura, sheeta, mridu, snigdha, bahala, slakshna, pichhila, guru, manda and prasanna*(7). Due to its *mridu, snigdha, slakshna* and *pichhila guna,* it counters the *rukshatva* and sclerosing effects on the bone thus increases the *sleshaka sleshma* in the joint and allows the joint to move freely without any restriction. Due to its *snigdha, guru, bahala gunas* it acts as *brimhana* and nourishes the *asthidhatu.* Due to *guru, sheeta, snigdha gunas ksheera* controls the *vata dosha* and helps for nourishment and growth of bone.

The chief proteins in the milk are caseinogens and lactalbumin. Caseinogen is a phosphoprotein and is associated with calcium as calcium caseinogenate, so it is rich source of calcium. Milk fat contains saturated as well as unsaturated fatty acids which are useful for the nourishment of asthidhatu. The carbohydrate of milk is lactose which is useful for calcium absorption. Milk contains several minerals like Ca, P, Na, K, Cl etc. , but mainly Ca (8).

In the disorders of *asthivaha srotas, tikta dravya siddhaksheera vasti* is very helpful. *Tikta rasa* has predominance of *akasha* and *vayu mahabhuta*. Hence, it can enter any part of the body specially that part which having the similar *mahabhuta* predominance like *asthidhatu.* So, the *vastidravya* prepared with *tikta dravya siddha ksheera* has capacity to reach the asthidhatu.

In this *tikta ksheera vasti, Amruta* and *Patola* are used as *tikta dravyas. Pancha tikta dravyas* are standard among all *tikta dravyas*. So, we can take these *dravyas* for *vasti*. But, it is mentioned in *Ashtangasangraha* that all *tikta dravyas* are *vataprakopaka* except *Amruta* and *Patola*. So, only *Amruta* and *Patola* were used as *tikta dravyas* in this *tikta ksheera vasti* (9).

Usually, *tikta rasa* aggravates *vata* but when processed with milk (*samskara),* its pharmacological activity is changed and it helps to promote *asthidhatu* formation from *medodhatu* by combination of properties like unctuousness (*snigdhatva),* dryness (*soshanatva)* and solidity (*kharatva),* which is described by Arunadatta (10).

Here, this therapeutic application creates the same atmosphere as in transformation of bone from fat i. e. *'snigdham soshanam kharatvam'*. When *medodhatu* is subjected to drying by *tikta rasa,* solidity and hardness are achieved. The drug having the properties like *snigdha, soshana* and *kharatvam* is useful for bone formation and the *ksheera vasti* prepared with *tikta dravyas (amruta and patola)* has same properties because *tikta rasa* has *shoshana* and *khara* property and *ksheera* has *snigdha* property (11).

As we are giving milk prepared with *tikta dravyas* which is nutritive and *vatashamaka,* so it subsides *vata* which is the main factor in *asthidhatu kshaya*. In this way, *tikta samyukta ksheera vasti* influences *asthivaha srotas* and its *ghatakas.* Some of the components of *ksheera* like *sneha* (phospholipids) used in this *vasti* help in the formation of *asthi* and *majja* dhatu, so it prevents bone degeneration and osteoporosis.

Vasti directly has its maximum effect on *pakwasaya* which is also considered as *purishadhara kala.* According to dalhana, *purishadhara kala* is nothing but *asthidhara kala* and there is definite relation in between these two *kalas* (12). So, it is observed that after giving *ksheeravasti* in *asthidhatu kshaya,* there is relief from symptoms like *shoola* etc

Like *vasti, pana prayoga* has no direct effect on *asthidhara kala* or*pakwashaya* which is main seat of *vata. Vasti* has shown good results in pacifying

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vata and thus controlling *asthidhatu kshaya* symptoms. Hence *amruta patola ksheeravasti* has more effective in *asthidhatu kshaya* than *pana prayoga.*

Asthidhatu kshaya arises due to deficiency of calcium, due to which bone density decreases and degeneration of bone occurs. Milk contains almost all minerals needed by the body such as Ca, P, Na, K, Cl, Mg etc. but particularly it is rich in calcium. So by administering *ksheera pana* and *vasti*, calcium level can be improved in the body, which in turn repairs the bone tissue.

More calcium absorption takes place in jejunum and ileum. Jejunum absorbs more calcium than ileum. In *pana prayoga* of *amruta patola ksheerapaka* calcium is absorbed more in comparision to *vasti prayoga* because it reaches directly to duodenum and jejunum which are near to oral cavity. Whereas in *vasti prayoga* only few amount of *vasti dravya* reaches to jejunum. So *pana prayoga* is beneficial for calcium improvement in the body. For the absorption of calcium content of *ksheera vasti*, it has to reach the jejunum and ileum.

According to Ayurveda, *vasti* not only reaches the *pakwasaya* but may also reach *grahani*, where the active ingredients of *vasti* may be absorbed. The microparticles of *ksheera vasti* may pass through the ileocaecal valve like *snehana dravyas* and thus reaches to *grahani* from where they usually get absorbed and give *poshana* to *asthidhatu*. Modern physiologists also admit that material introduced by enema can pass through the intestinal wall and may reach duodenum and sometimes stomach also. Charaka has also strongly suggested that *vasti* should be given in left lateral position, so that it can reach *grahani* easily (13). *Sneha* has qualities like *sookshma* and *anupravana bhava* by which it smears the wall of *pakwasaya* and passes beyond ileocaecal valve and thus reaches to *grahani*. So, calcium absorption also takes place in *vasti prayoga* to some extent. Some evidences also suggest that Calcium absorption also takes place in the colon to some extent (14).

Conclusion

- *Asthidhatu kshaya* is a condition caused by improper nourishment of *Asthi dhatu*. It is also due to *vikruta medovriddhi*. *Majjakshaya* also leads to *asthidhatu kshaya* because *Majja* gives strength to the *Asthi* by its *swakarma i. e., Asthi purana.*
- The manifestation of the disease is in *Asthi.* The condition *Asthidhatu kshaya* may be correlated with Osteoporosis of Contemporary science.
- The incidence of *Asthidhatu kshaya* is more in females than males, the ratio being 4:1. The risk even increases with the onset of menopause which is a physiological transition period of hormonal imbalance.
- *Asthidhatu kshaya* is more prevalent in the persons with *vata* predominant *prakruti*, because *vata* is the prime factor for *dhatu kshaya* in general and in specific to *Asthidhatu kshaya.*
- The *lakshanas* of *Asthidhatu kshaya* are due to *prakupita vata*. The common *lakshanas* observed in *Asthidhatu kshaya* were *asthishoola, sandhi shaithilya, srama, sparshasahatwa. kesha-loma- shashru prapatana and danta-nakha bhanga & roukshya* symptoms were not found commonly.
- The *chiktisa* mentioned in our classics stress upon the use of *tikta dravya siddha ksheera vasti* for *asthyashrita vyadhi.* There are significant results in the subjective and objective parameters in Group-A whereas in Group-B there are highly significant results in subjective parameters and significant results inobjective parameters.

- *Amruta patola siddha ksheeravasti* was more effective than *amruta patola siddha ksheerapana* in *asthidhatu kshaya*. So, in this study *vasti prayoga* was more useful than *pana prayoga.*
- The *chikitsa sutra* mentioned by our Acharyas thousands of years ago i. e., the use of*tikta dravya siddha ksheera vasti* is effective even today.

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