

Pharmaceutical evaluation of *Snuhi ksheera siddha taila* and a Pilot study on its efficacy in *Padavidarika* (cracks on heel)

Research Article

Nishigandha Jagtap¹, Nilima Wadnerwar^{2*}

1. PG Scholar, 2. Associate Professor, Department of Agadtantra, Mahatma Gandhi Ayurved College, Hospital & Research Centre, Salod (H), Datta Meghe Institute of Medical Sciences (DU), Wardha, Maharashtra, India.

Abstract

Background: *Padavidarika* is categorized in *kshudra roga* which causes pain and fissure in heels and breaches the beauty of the feet. It also causes difficulty in walking, which hampers routine activity of the person. To study the efficacy of *Snuhi-ksheera siddha taila* and to standardize the formulation, the study was undertaken. **Methodology:** *Snuhi-ksheera siddha taila* was prepared with latex of *Snuhi* (*Euphorbia nerifolia* Linn), *Tila taila* (Sesame oil) and *Saindhava lavana* (Rock salt). Its physicochemical analysis was conducted. An interventional study was conducted in 15 patients of *padavidarika* and they were assessed with number of cracks and pain associated with cracks on heel and photographs taken before and after the intervention. Statistical analysis was conducted using student's paired and unpaired "t" test at $p < 0.05$ as level of significance. **Result:** *Snuhi-ksheera siddha taila* significantly reduced number of cracks and pain associated with cracks on heel. **Conclusion:** *Snuhi-ksheera siddha taila* can be used safely in the management of *Padavidarika*.

Key Words: *Padavidarika*, *Kshudra roga*, *Snuhi*, *Euphorbia nerifolia*.

Introduction

Cracks on heel have no age limit and it can affect anyone for that matter irrespective of the sex, colour and origin. Most of the time, cracks are occupational like farming or those people whose job demands continuous standing. Age, excessive walking on uneven surface, prolonged standing on hard floors, uncomfortable, not so fitting or open back footwear, unhealthy diet, obesity, diabetes, psoriasis and other skin allergies, unhygienic condition of feet or high exposure of feet to dust, dirt, germs etc are common causes.

Cracked heels are commonly observed in females because of their household works performing without any precautions like working in unhygienic area with bare foot or in field workers and labourers. Patients of cracked heels are observed in all socioeconomic to higher groups in society. It also occurs recurrently due to seasonal variations.

Healthy skin is the primary requirement of the beauty as well as attractive personality. Any weakness or breach in beauty of skin leads to great handicap or social stigma. It may reduce confidence of the person.

Most of the remedies are available in the market for cracked heels which basically results in smoothening of the skin superficially, but pain due to cracked heels is not relieved or cracks are not repaired completely. To overcome this issue, *Snuhi* (*Euphorbia nerifolia* Linn), (1) a kind of mild irritant poison (1) is selected as according to Ayurveda, *Visha dravya* act quickly and its absorption in body is fast due to its *tikshna*, *sukshma*, *vyavayi*, *vikasi* and *ashukari* properties. Moreover, *Snuhi* (*Euphorbia nerifolia* Linn) is available easily and abundantly as it grows in any well drained soil in full sun. It needs no maintenance. It can be cultivated easily. Hence, for the present study, an oil based preparation *Snuhi-ksheera siddha taila* (2) is prepared with latex of *Snuhi* (*Euphorbia nerifolia* Linn), *Tila taila* (Sesame oil) and *Saindhava lavana* (Rock salt) to study its physicochemical properties and to study its efficacy in management of painful cracks in *padavidarika*. *Tila taila* and *Saindhava lavana* are easily available in the market. *Tila taila* helps in reducing dryness of skin, pain and increases tone of the skin. *Tila Taila* has the properties like penetrating deep into tissues and spreading throughout the body part.(3) *Saindhava lavana* (Rock salt) is cold in potency (4) and helps to burning pain and inflammation.

* Corresponding Author:

Nilima Wadnerwar

Associate Professor, Department of Agadtantra, Mahatma Gandhi Ayurved College, Hospital & Research Centre, Salod (H), Datta Meghe Institute of Medical Sciences (DU), Wardha, Maharashtra, India.
Email Id: dr.nilima_wadnerwar@rediffmail.com

Materials and methods

After getting IEC approval, ref. no. DMIMS (DU)/IEC/2017-18/3698 dated 30/03/2017, the study was started. Analytical and interventional pilot study was designed to observe the effect of the study drug.

Materials

Table No. 1: Materials required for *Snuhi ksheera siddha taila* (2)

Sr. No	Ingredient	Botanical Name	Part Used	Quantity
1	<i>Snuhi</i>	<i>Euphorbia nerifolia</i> (Linn)	<i>Ksheera</i>	500 ml
2	<i>Tila</i>	<i>Sesamum indicum</i> (Linn)	<i>Taila</i>	2000 ml
3	<i>Saindhava lavana</i>	Rock salt	-----	100 gm
4	Water	-----	-----	8000 ml

Fig 1: Ingredients of *Snuhi-Ksheera Siddha Taila*



of *Saindhav lavana* was mixed into it and it was allowed to cool. Then it was filtered through clean cotton cloth. Oil was packed in 50ml bottles for dispensing.

Fig. 2: Preparation of *Snuhi ksheera siddha taila*



Methods

Collection of drugs

Tila taila and *Saindhava lavana* was procured from local market and *Snuhi Ksheera* was collected from *Snuhi (Euphorbia nerifolia)* from herbal garden of Mahatma Gandhi Ayurved College Hospital & Research Centre, Salod (H) Wardha and nearby field in end of *shishira rutu* (5) as it yields very high amount of latex during this session. It is collected in early morning hours, when humidity is high and temperature is low.

Preparation of *Snuhi ksheera Siddha Taila*(6)

Tila taila was heated till it becomes free from froth. 500 ml *snuhi ksheera* and 2000ml water added into it. It was mixed well and boiled on moderate heat till *taila* becomes free from water. 100 gm fine powder

Analytical study(7)

The aim for analytical study of Ayurvedic drug is to know the particular chemical configuration and point out the physicochemical changes and effect of different processing. It also helps to see the probable role of media during the pharmaceutical processing. Analysis of *Snuhi ksheera siddha taila* was done by using parameter Color, Odour, Weight/ml, Refractive index, Iodine value, Saponification value and Acid value according to the methods adopted in Ayurvedic Pharmacopoeia of India for oil formulations.

Specific gravity / Weight per millilitre(7)

Procedure

50ml *Snuhi ksheera siddha taila* was taken. The *taila* was free from moisture and other impurities. Pyknometer or specific gravity bottle was washed and cleaned carefully and dried the interior with a current of dry air. Weight of the pyknometer or specific gravity bottle was taken and noted. Then the pyknometer was filled with distilled water and weight was recorded and the temperature was noted. The pyknometer was again cleaned and dried the interior with the current of dry air. Then the same pyknometer was filled with the *Snuhi ksheera siddha taila* and the weight was recorded. Then the temperature of *taila* was noted. Specific gravity was calculated by dividing the weight of the oil by the weight of the water.

$$\text{Specific gravity} = \frac{\text{Density of liquid sample (gm/ml)}}{\text{Density of water (1.00 gm/ml)}}$$

Refractive Index(7)

Procedure

The prism of Abbe type refractometer was opened and cleaned with soft cotton. A drop of *Snuhi-ksheera-siddha taila* which was free from moisture and any residual matter was placed on the lower part of the prism and closed the refractometer. It was observed through the eyepiece and the dispersion correction compensator knob was turned until the colored indistinct boundary seen between the light and dark field becomes a sharp line. The knurled knob was adjusted until the sharp line exactly intersects the midpoint of the cross wires in the image. The refractive index was read from the magnifier in the pointer and the reading was recorded.

The refractive index of *Snuhi-ksheera-siddha taila* was calculated as follows.

$$\mu = \frac{\text{velocity of light in substance}}{\text{velocity of light in air}}$$

Iodine Value(7)

Procedure: Iodine value was estimated by Monochloride method. Accurately weighed sample was placed in dry iodine flask. 10 ml of carbon tetrachloride was added and dissolved. Then 20 ml of iodine Monochloride solution was added and the stopper was inserted, which was previously moistened with solution of potassium iodine. It was allowed to stand in a dark place at temperature of about 17^o C for thirty minutes. 15 ml of solution of potassium iodide and 100 ml water was added in the *taila*. It was shaken and titrated with

0.1 N sodium thiosulphate using solution of starch as indicator. Required quantity of 0.1N sodium thiosulphate was noted (a). At the same time the operation was carried out in exactly the same manner but without the substance being tested. Required quantity of 0.1N sodium thiosulphate was noted (b). The iodine value was calculated from the formula:

$$\text{Iodine value} = \frac{(b-a) \times 0.01269 \times 100}{\text{weight of sample in gm}}$$

Acid value(7)

Procedure: About 10 gm of the oil was weighed accurately and poured into a 250 ml flask. 50 ml mixture of equal volumes of alcohol and solvent ether was added, which was neutralized after the addition of 1 ml of phenolphthalein solution. It was heated gently on laboratory water bath, until the substance was completely melted. It was titrated with 0.1N potassium hydroxide and shaken constantly until a pink color persists for 15 seconds. Required quantity of alkali was noted (a). The experiment was repeated without using the sample as blank. Required quantity of alkali was noted (b). Acid value of *Snuhi-ksheera-siddha taila* was calculated as follows.

$$\text{Acid value} = \frac{5.61 \times (b-a) \times \text{strength of alkali solution}}{\text{Weight of sample in gm}}$$

Saponification value(7)

Procedure: About 2 gm of the oil was weighed accurately and poured in a tarred 250 ml flask. 25 ml of the alcoholic potassium hydroxide solution was added. The reflux condenser was attached and boiled on a water bath for one hour. The flask was cooled by frequently rotating the contents. 1 ml of phenolphthalein solution was added as indicator to the refluxed contents. The excess of alkali was titrated with 0.5N hydrochloric acid. Required quantity of hydrochloric acid was noted (a). The experiment was repeated with same quantities of the same reagents in the manner omitting the substance. Required quantity of hydrochloric acid was noted (b). The saponification value was calculated by the formula:

$$\text{Saponification value} = \frac{(b-a) \times \text{Normality of hydrochloric acid} \times 56.10}{\text{Weight of sample in gm}}$$

Alcoholic potassium hydroxide solution: dissolved 35 – 40g of potassium hydroxide in 20 ml water, and sufficient alcohol was added to make 1000 ml. It was allowed to stand overnight and pour off the clear liquor.

Clinical study

Prepared *Snuhi ksheera siddha taila* after analysis was used in the management of *padavidarika*. Patients of *padavidarika* were screened and enrolled from skin OPD of Kayachikitsa, Mahatma Gandhi Ayurved College, Hospital and Research Centre, Salod (H), Wardha. Fifteen diagnosed patients of *padavidarika* with classical signs and symptoms like cracks /fissure in the feet, especially in the heel region of one or both feet, *Saruja* (associated with pain), *Rukshata* (roughness and dryness of the sole) were

Nishigandha Jagtap et al., Pharmaceutical and clinical evaluation of Snuhi ksheera siddha taila

selected including mild, moderate and severe cracks on feet from age group in between 20-60 years.

Patients under other treatment for *padavidarika*, patient having open wound, ulcer in feet, diabetic foot, infectious wound and patients with bleeding cracks were excluded from the study. The consent was taken after due consultation with patients and their relatives. Before proceeding for the treatment, sensitivity test was conducted by applying few drops of *taila* over right or left arm of patient. It was kept for 15min and observed for any rash, itching, burning and pain. Patients having no sensitivity reaction were included in the study.

Method of application of taila

Patients were asked to wash their feet thoroughly with lukewarm water and to wipe feet so that it would be moisture free. The *Snuhi ksheera siddha taila* was applied with an applicator on cracks once at bed time. Patients were asked to wash their feet in the morning with lukewarm water. The *taila* was applied for fifteen consecutive days and follow up was

taken on 8th and 15th day during treatment as well as on 30th day and 45th day after treatment to observe the recurrence of the disease.

Pathya

Patients undergoing study were advised to avoid bare foot walking, to clean their feet regularly and to avoid more exposure to dry and cold weather.

Assessment criteria

Patients were assessed on the basis parameters like number of cracks on feet, cracks associated with pain and photographs of the patient’s feet before and after treatment.

Statistical Analysis

Statistical analysis was done by using descriptive and inferential statistics using student pair t test and software used in the analysis was SPSS 22.0 version and $P \leq 0.05$ was considered as level of significance.

Observations and Results

Table No. 1: Organoleptic and physicochemical observations of *Snuhi ksheera siddha taila*

Sr. No.	Test Parameter	Test Result	<i>Tila taila</i> (8)
1	Color	Brown	Light golden
2	Odor	Characteristic	Pleasant
3	Weight/ml	0.904/ml	0.9160-0.9190
4	Refractive index	1.4889	1.4650 to 1.4665
5	Iodine value	119.920	Between 103 and 116
6	Saponification value	130.432	Between 188 and 195
7	Acid value	3.36	Not more than 2.0

Table No. 2: Microbial count Specifications

Sr. No	Specifications	Parameters as per CCRAS	Observations
1	Total viable count	Maximum 10^5 / gm	Absent
2	Enterobacteriaceae	10^3 / g	Absent
3	Total fungus count	Maximum 10^3 / gm	Absent
4	E-coli	Maximum 10 / gm	Absent
5	Salmonella	None	Absent
6	Staphylococcus aureus	Absent	Absent
7	Pseudomonas aeruginosa	Absent	Absent

Table No. 3: Number of patients enrolled in the study

Total number of patients screened	Number of patients enrolled	Number of patients completed	Lost to follow up patients	Number of patients with adverse reaction
20	20	15	5	0

Table No. 4: Distribution of patients according to their age (yrs)

Age Group (yrs)	No of patients	Percentage (%)
21-30 yrs	5	33.33
31-40 yrs	1	6.67
41-50 yrs	6	40
51-60 yrs	3	20
Total	15	100

Table No. 5: Distribution of patients according to their gender

Gender	No of patients	Percentage (%)
Male	5	33.33
Female	10	66.67
Total	15	100

Table No.6: Distribution of patients according to their Agni, Koshtha and bowel habits

<i>Agni</i>	<i>Sama</i>	<i>Vishama</i>	<i>Manda</i>	<i>Teekshna</i>
Number of patients	0	6	6	3
<i>Koshtha</i>	<i>Mrudu</i>	<i>Madhyama</i>	<i>Krura</i>	-
Number of patients	2	3	10	-
Bowel Habits	Normal	Loose	Constipated	-
Number of patients	8	1	6	-

Table No.7: Comparison of number of cracks before and after treatment

	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	Percentage changes in mean	t-value
Before t/t	15	8.93	2.08	0.53	5.86±1.76	5.86*100/8.93	12.85
After t/t	15	3.06	1.57	0.40		65.62%	p=0.0001 ***

Table No. 8: Comparison of Number of painful cracks before and after treatment:

	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	Percentage changes in mean	t-value
Before t/t	15	3.46	1.03	0.27	1.93±0.70	1.93*100/3.46	10.64
After t/t	15	1.53	0.74	0.19		55.78%	p=0.00 01***

Table No. 9: Observation on number of patients recovered in:

Number of Patients Recover in 7 th day	Number of Patients Recover in 14 th day	Number of Patients Recover in 30 th day	Number of Patients Recover in 45 th day
0	4	6	5

Discussion

The disease *padavidarika* has been explained under *Kshudra roga* by Sushruta, Bhavaprakasha and Yogaratnakara. No premonitory symptoms have explained for *Kshudra roga*, hence not even to *padavidarika*. Due to continuous indulgence due to *vatakara vihara* such as excessive walking, *vata* gets vitiated leading to *twaka* and *mamsa-darana* (fissure in skin and muscle) and *rasa-kshaya* manifesting the disease *padadari*. According to Ayurveda, dry skin is caused by *vata dosha*. When *vata dosha* increases in body, it makes skin dry and wrinkled. Thus the aggravated *vata* gives rise to peculiar painful cracks. When the feet become too dry, heel fissures can develop quite easily. The heel pad wants to expand outward, but the skin is not pliable enough to expand with it, so it cracks. As the skin cracks, it may begin to bleed. These deep heel fissures can allow bacteria and viruses to enter the body, leading to infection and illness.

Due to rapid lifestyle and wrong food habits as well as negligence towards *dinacharya* and *rutucharya*, proportion of *sneha* in the body reduces considerably, especially in workers, housewives and who have been working in domestic environment. All these lead to *padavidarika*, which causes pain and fissure in sole and disturbing the beauty of the feet. It also causes difficulty in walking, which hampers routine activity of the person. If it remains untreated due to less priority to feet problem, it causes bleeding and infection and condition may worsen in diabetic and immune compromised patients.

Snuhi (*Euphorbia nerifolia* Linn) the *Upavisha*, is classified under different categories by different Acharyas, according to therapeutic properties. Acharya Charak classified *Snuhi* in *tikshna Virechana dravya*, (9) Acharya Sushruta in *Shyamadi*

gana (10) and *Adhobhagahara dravya* (11) and Acharya Vagbhata in *Mushakadi gana*. (12) In most of the *Nighantu*, it is included in *Guduchyadi varga*.

The leaf of *Snuhi* is heated and tied over the affected area of pain and inflammation. The fresh juice from the leaf is poured inside the ears to treat ear ache. The milk latex of *Snuhi* is applied over warts as part of treatment. Oil processed from the leaf of *Snuhi* and sesame oil is used for external application to treat joint pain. The paste of the leaf of *Snuhi* is applied over the skin to treat skin diseases. Thread steeped in the above mentioned mixture is used in ligaturing external haemorrhoids. (9)

Snuhi can be easily cultivated in ample amount for therapeutic uses because it needs less water, space and efforts. *Snuhi* latex is used mostly for preparation of *Kshara sutra* in Ayurveda because it is easily available.

Acharya Charak advised collection of *Snuhi-Ksheera* towards the end of *Shishira rutu*. *Snuhi ksheera* is *Ushna veeryatmaka* and having *shoolaghna* properties. *Tila taila* is *sukshma*, *teekshna*, *vyavayi* property of penetration into the tissue and spreading through the body and cures the crack sole, it is retaining in the body for the longer duration. *Saindhava lavana* is cold in potency, so it prevents burning pain.

Snuhi ksheera siddha taila was subjected for physicochemical analysis and microbial count which were within normal limits. In comparison with standard parameters of plain *tila taila*, specific gravity and saponification value of *Snuhi ksheera siddha taila* is less and refractive index, iodine value and acid value is more.

In the present study, causes like excessive walking, working in water, soil, continuous contact

with detergent etc, were observed for *padavidarika*. It was observed that the disease *padavidarika* is more common in middle age. Females were more prone to *padadari*, because of *virudha vihara* like contact with dust, detergent, barefoot walk. *Vata-pitta prakriti* is mainly observed in patients. It can be inferred that vitiation of *Agni* is also responsible for *padavidarika*. It is inferred that *Krura koshta* was more prone in patients, due to *vata dosha* predominance.

Total 15 patients were participated in this study, out of them 5 patients were laborers, 3 patients were washer men, 3 were housewives and 4 were farmers. According to Ayurveda, this working pattern vitiates *vata* which causes, *rukshata* (dryness) in soles causing *padavidarika*. The effect of *Snuhi ksheera-siddha taila* in *padavidarika* was highly significant in decreasing number of cracks and painful cracks on heels in 15 days duration of therapy. Out of 15 patients, 4 patients were recovered in 14 days (27%), 6 patients were recovered after 30th day and 5 patients were recovered after 45th day (33%).

Probable mode of action of *Snuhi ksheera siddha taila*

Snuhi with its *katu-tikta rasa* and *Ushna guna* reduces the pain and inflammation in the cracks. With *laghu* and *tikshna guna*, it reaches the target organ quickly. The *vata* vitiated due to *vatakara vihara* is overcome by the external use of *tila taila* along with *Snuhi ksheera* at the cracks in heel, hence reducing the *rukshata* produced at the site of cracks. *Tila taila* is *sukshma* and *vyavayi*, hence it enters deep into the cracks very quickly. It is absorbed readily into the deep layers of the sole and it helps the *Snuhi ksheera* to reach at the deeper layers of the sole causing smoothening of the heels. *Saindhava lavana* with its *madhura vipaka* and *snigdha guna* overcome the *vata* reducing pain and inflammation. Thus, the *Snuhi ksheera*, *tila taila* and *saindhava lavana* altogether reduces the pain and inflammation at the site of heels and heals the cracks. *Snuhi* latex itself is known for its wound healing activity, (13) anti-inflammatory and analgesic activity.(14) Euphol present in *Snuhi* latex is responsible for its anti-inflammatory activity. (15)

Local toxic symptoms of *Snuhi ksheera* is *kandu*, redness at site of contact etc, but in present study adverse drugs reaction or any sensitivity reaction was not found in any of the patients. Hence it can be said that, *Snuhi ksheera siddha taila* is safe in the management of *padavidarika*. For the confirmation of the results, it is needed to conduct the study in large population. After the discontinuation of the treatment patients had cracks on heels again, which indicates recurring of nature of the disease but at this time in recurrence, cracks were not associated with pain and cracks were small in length. Hence, in the cold season when cracks are predominant, it is recommended to use *Snuhi-ksheera siddha taila* for 15 days and continued for further period with a washout period of 7 days with some additional preventive measures like, *Pathya-ahara*, *Pathya vihar*, *padabhyanga*, and use of socks, shoes and avoiding the causative factors.

Conclusion

Manifestation of *padavidarika* is irrespective of age, sex and *prakriti*, but predominantly seen in *madhyama vaya*, females and *Vata pitta prakriti* persons. *Kala* (season), *desha* (place) and *vihara* (working) plays an important role in manifestation of *Padavidarika*. *Snuhi ksheera siddha taila* is effective in the management of *Padavidarika* with highly significant result in reducing the number of cracks and pain. *Snuhi ksheera siddha taila* can be used safely in age ranging from 20-60 years, in all kinds *padavidarika* irrespective of the causative factors.

References

1. Prasad V. Text book of Agadatantra. Varanasi: Choukhamba sanskrita prakashana; 2013. 276p.
2. Vaidya B. Nighantu Adarsha. Varanasi: Choukhamba publication; 2009. 423p.
3. Shastri D. Charaka Samhita of Agnivesha. Delhi: Choukhamba Sanskrit Pratishthan; 2012, 468p.
4. Pandey G. Shodhala Nighantu of Shodhala. Varanasi: Choukhamba orientation; 2009. 236p.
5. Shukla V. Charaka Samhita. Delhi: Choukhamba publication; 2013. 847p.
6. Anonymous. Parameters for quality assessment of Ayurveda and Siddha drugs. Central council for research in Ayurveda and siddha, Department of AYUSH Ministry of Health and Family Welfare, Govt. of India, New Delhi; 2005.
7. Anonymous. Ayurvedic pharmacopeia of India. Part 1, Vol 6, 1st ed. 224-225p.
8. Tripathi.D. Charak Samhita of Agnivesha. Delhi: Choukhamba Sanskrit Pratishthan. 2012, 468p.
9. Sheikh.A, Sayyed N, Shaikh S, Patel MS, Chavada AB, Wahid. Euphorbia nerifolia Linn: a phytopharmacological review. Int. Res. J. Pharm. 2011; 2(5):41-48.
10. Shastri D. Charaka Samhita of Agnivesha. Delhi: Choukhamba Sanskrit Pratishthan; 2012, 468p.
11. Shastri A. Sushruta Samhita of Acharya Sushruta. Varanasi: Chaukhamba Sanskrit Sansthana; 2017, 185p.
12. Murthy KR. Ashtanga-Hridayam of Vagbhata. Delhi: Choukhamba krishnadasa academy; 2010, 546-547p.
13. Rasik.AM, Shukla A, Patnaik GK, Dhawan BN, Kulshrestha DK, Srivastava S. Wound healing activity of latex of euphorbia nerifolia Linn. Indian J. Pharmacol. 1996; 28:107-109.
14. Gaur K, Rana AC, Nema EK, Kori ML, Sharma CS. Anti-inflammatory and analgesic activity of hydro alcoholic leaves, extract of *Euphorbia nerifolia* Linn. Asian J. Pharm. Clin. Res. 2009; 2(1):26-30
15. Bigoniya P, Shukla A. Dermal irritation and sensitization study of *Euphorbia nerifolia* latex and its anti-inflammatory efficacy. Int. J. Phytomed. 2010; 2(3):240-254.

Images of patients

Fig.3: Images of patients showing effect of therapy



Before treatment



After treatment

Fig.4: Images of patients showing effect of therapy



Before treatment



After treatment

Fig.5: Images of patients showing effect of therapy



Before treatment



After treatment

Fig.6: Images of patients showing effect of therapy



Before treatment



After treatment
