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Research Article

STUDY OF *TWACHA SHARIR* WITH SPECIAL REFERENCE TO *CHARAKOKTA CHATURTHA STHARIYA* (FOURTH LAYER) *DADRU VYADHI*

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KEYWORDS: *Twacha*, Fourth layer *Dadru*, Tinea infection.

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ABSTRACT

Twacha (skin) is one of the important *Dnyanendriya* (sense organ) which covers all other *Indriyas* and whole body. There are many doubts and unknown things regarding *Ayurvedokta Twacha*. *Charaka* has described six layers and the corresponding diseases of that layer of the *Twacha*. Out of these, the fourth layer is the seat of manifestation of *Dadru Vyadhi*. Also signs and symptoms of *Dadru* shows similarities with the signs and symptoms of tinea infection according to modern science. Hence to simplify above described terminologies regarding *Twacha* present study was carried out.

30 patients having signs and symptoms of *Dadru* were selected to rule out whether there is any extent of *Dadru Vyadhi* other than fourth layer with the help of skin biopsy. Also to establish relation between *Dadru* and likewise disease tinea infection of fourth layer i.e. stratum and to study anatomico-physiological changes in skin layers in *Dadru Vyadhi* with the help of histopathological study. From the present work done it was observed that the anatomico-physiological changes were found upto the fourth layer of skin which *Charaka* has already stated. Most of the signs and symptoms of *Dadru* patients found similar to tinea corporis infection which demonstrate the relation between *Dadru* and tinea infection.

INTRODUCTION

Ayurveda is the ancient Indian medicinal science which deals with complete study of life from very basic fundamentals such as *Sharir* (body), *Indriya* (sense organ), *Atma* (soul) and *Mana* (mind) upto the greatest achievements in the field of medicines and surgery. Both *Charaka* and *Sushruta* states that the detail knowledge of human body is necessary for the well being of the body so that one is able to know about the factors which are useful to the body.

While going through Ayurvedic *Samhitas,* there are many aspects which cannot be proved practically i.e. on the basis of *Pratyaksha Pramana* like in numeration of bones, *Anguli pariman* etc. Beside these, there are also certain topics and terminologies like *Shata Twacha, Saptakala* which are difficult to understand in present days, so the elaborative work is necessary to clear this confusion.

Twacha is one of the important *Dnyanendriya* which occupies all other *Indriyas* and whole body[1]. There are many doubts and unknown things regarding this topic. *Charaka* has described six layers and the corresponding diseases of those layers of the *Twacha*. Out of these, the fourth layer is the seat of manifestation of *Dadru Vyadhi*[2]. Hypothetical analysis shows that signs and symptoms of *Dadru* shows similarities with the signs and symptoms of tinea infection according to modern science. Considering all these facts, with the help of available information, an attempt has been made to simplify various terminologies regarding

Twacha. 30 patients having signs and symptoms of *Dadru* were selected to rule out whether there is any extent of *Dadru Vyadhi* other than fourth layer with the help of skin biopsy. Also to establish relation between *Dadru* and likewise disease tinea infection of fourth layer i.e. stratum and to study anatomico-physiological changes in skin layers in *Dadru Vyadhi* histopathological study was done. From the present work, it was observed that the anatomico-physiological changes were found upto the fourth layer of skin which *Charaka* has already stated. Most of the signs and symptoms of *Dadru* patients found similar to tinea corporis infection which demonstrate the relation between *Dadru* and tinea infection.

AIMS AND OBJECTIVES

1. To study anatomico-physiological changes in skin layers in *Dadru Vyadhi* with the help of histopathological study.
2. To establish relation between *Dadru* and likewise disease- Ringworm i.e., Tinea infection of 4th layer i.e. stratum.
3. To rule out whether there is any extent of *Dadru Vyadhi* other than fourth layer.

MATERIALS AND METHODS

30 patients were selected fulfilling the inclusion criteria were selected randomly.

Inclusive criteria

1. The patients having signs and symptoms of *Dadru Vyadhi* of age group between 15 to 55 years.
2. Patients of both sexes were selected.
3. Patients from urban and rural areas were selected.

Exclusive Criteria

1. Age less than 15 years and more than 55 years
2. Patients who had received oral anti-fungal medicines or applied any topical creams.
3. Immuno compromised patient
4. E.g. AIDS, Tuberculosis, Malignancy, Leukemias etc.
5. Patients having major systemic illness.

Criteria of Diagnosis

Patients were selected on the basis of clinical findings and detailed clinical history with the help of proforma.

- Appropriate proforma was made on the basis of signs and symptoms of *Dadru Vyadhi*.
- As *Dadru* can be correlated with Tinea infection (Ringworm), for diagnostic confirmation KOH test was done.
- To see the anatomico physiological changes in skin layer in *Dadru Vyadhi*, biopsy of selected lesion was done.

Potassium Hydroxide (KOH) examination

A potassium hydroxide (KOH) preparation was performed on scaling skin lesions where fungal etiology was possible. The edge of such a lesion was scraped gently with a scalpel blade. Removed scale was collected on glass microscope slide and treated with 1 to 2 drops of a solution of 10% to 20% KOH which dissolves keratin and allows easier visualization of fungal elements. When the preparation viewed under the microscope, the refractile hyphae have been seen.

Skin Scraping for KOH Mounting

Periodic acid Schiff (PAS) stained smear showing septate branching hyphae-dermatophytes

Skin Biopsy

A skin biopsy is straight forward minor surgical procedure.

Instruments

1) Biopsy punch (disposable – 4mm)
2) Scissor
3) Forceps
4)10% Formaline for sample preservation
5) Plain bulb
6) Cotton
7) Xylocaine 2%
8) Syringe with needle

Site of biopsy

The lesion chosen for biopsy was of an early and untreated lesion which represents the skin disorder as a whole.

If lesions are present at all stages of evolution, it may be appropriate to biopsy more than one lesion.

Written consent was obtained from the patients and local anaesthesia with 1% or 2% lignocaine with or without adrenaline was injected around the biopsy site.

Techniques of skin biopsy

Various techniques are Elliptical surgical biopsy, punch biopsy, curettage or shave biopsy among these punch biopsy was used.

Punch biopsy technique

The biopsy punch of at least 4 to 5mm was required to obtain satisfactory specimen. The punch was pushed into the skin with a downward twisting movement and then removed. The tissue specimen was lifted and cut.

The wound may be left to heal without suturing. The biopsy specimen was put in 10% formalin solutions for histopathological studies.

It was properly labelled and sent to pathology department with full clinical details of the case.

Disposable Punch for Cutaneous biopsy

Biopsy Technique

Statistical analysis

Percentages, mean and standard deviation were calculated. The groups were compared by applying χ^2 (Chi square) test, Fisher exact test and Yates correction was applied wherever necessary. P values less than 0.05 were considered as statistically significant.

OBSERVATION AND RESULTS

Following observations were noted during study.

Table 1: Distribution of *Dadru* patients according to *Prakruti*

S. No.	*Prakruti*	No. of Patients		Sex			
				Male		Female	
		No	%	No	%	No	%
1	*Vata-Pittaja*	7	23.33%	4	57.14%	3	42.85%
2	*Pitta-Kaphaja*	14	46.66%	9	64.28%	5	35.71%
3	*Kapha – Vataja*	9	30%	4	44.44%	5	55.55%

Table 2: Signs and symptoms wise distribution of *Dadru* patients

S. No.	Signs and Symptoms of *Dadru*	No. of Patients obtained	Percentage
1	*Mandalakara*	19	63.33
2	*Kandu*	30	100
3	*Pidika*	16	53.33
4	*Vaivarnya*	25	83.33
5	*Daha*	11	36.66
6	*Rukshta*	16	53.33
7	*Strava*	6	20

Table 3: Distribution of *Dadru* Patient according to Tinea infection

S. No.	Type of Tinea	No. of patients	Percentage
1	*T. Corporis*	17	56.66
2	*T. Cruris*	6	20
3	*T. Corporis + T. Cruris*	3	10
4	*T. Pedis*	2	6.66
5	*T. Faciei*	1	3.33
6	*T. Barbae*	1	3.33
	Total	30	100

Table 4: Distribution of *Dadru* patients according to duration of illness

Sr. No.	Duration of illness	No. of patients	Percentage
1	Acute (Less than 1 month)	17	56.66
2	Acute or Chronic (More than 1 month below 1 yr.)	13	43.33
	Total	30	100

Table 5: Distribution of types of Tinea according to signs and symptoms)

Sr.No.	Signs & Symptoms	T. Corporis (n = 17)	T. Cruris (n = 6)	T.Corporis with T. Cruris (n = 3)	T. Faciei (n = 1) T. Barbae (n = 1) T. Pedis (n = 2)
1	*Mandalakar*	15 (88.23%)	-	2 (66.66%)	2 (50%)
2	*Kandu*	17 (100%)	6 (100%)	3 (100%)	4 (100%)
3	*Pidika*	10 (58.82%)	2 (33.33%)	2 (66.66%)	2 (50%)
4	*Vaivarnya*	15 (88.23%)	4 (66.66%)	3 (100%)	3 (75%)
5	*Daha*	7 (41.17%)	-	2 (66.66%)	3 (50%)
6	*Rukshata*	8 (47.05%)	4 (66.66%)	3 (100%)	1 (25%)
7	*Strava*	6 (35.29%)	-	-	1 (25%)

Table 6: Distribution of *Dadru* patients showing Histopathological (Anatomical) changes in Skin

Sr. No.	Histopathological Changes	No.of patients	Percentage
1	Hyperkeratosis	8	26.66
2	Parakeratosis	11	36.66
3	Mild acanthosis	24	80.00
4	Spongiosis	12	40.00
5	Exocytosis	9	30.00
6	Inflammatory changes in dermis	15	50.00

Table 7: Distribution of epidermal changes according to *Prakruti* among *Dadru* patients

S. No.	Epidermal Changes	*Dehaj Parkruti*					
		Vata-Pittaj		*Pitta - Kaphaj*		*Kapha –Vataj*	
		No.	%	No.	%	No.	%
1	Parakeratosis	4	57.14	4	28.57	3	33.33
2	Hyperkeratosis	2	28.57	5	35.17	1	11.11
3	Mild Acanthosis	7	100	12	85.71	5	55.55
4	Spongiosis	4	57.14	5	35.71	3	33.33
5	Exocytosis	3	42.85	3	21.42	3	33.33
6	Unremarkable	0	0	2	14.28	4	44.44

Table 8: Distribution of Histopathological changes according to Duration of illness among *Dadru* Patients

Sr. No.	Histopathological changes	Duration of illness				Statistical test
		Acute (Upto1 month)		Acute or chronic (From 1 month to 1 year)		Fisher exact test P Value
		No.	%	No.	%	
1	Parakeratosis	9	52.94	2	15.38	0.03**
2	Hyperkeratosis	3	17.64	5	38.46	0.19 *
3	Mild Acanthosis	14	82.35	9	69.23	0.34 *
4	Spongiosis	9	52.94	3	23.07	0.09 *
5	Exocytosis	8	47.05	2	15.38	0.07 *
6	Unremarkable	2	11.76	4	30.76	0.20 *
7	Inflammatory Changes in Dermis	9	52.94	6	46.15	0.35

DICUSSION

According to *Acharya Charaka, Udakadhara* is an outermost layer of *Twacha*.[2] As the name suggest it holds *Rasadhatu* and *Lasika* inside the body and prevents their loss from the body. Also in the modern science, the stratum corneum is a thick horny layer which protects body from fluid loss and holds lipids secreted by granular layer, so any injury to this layer will cause plasma to ooze out[8].

Asrukdhara is second layer[2], as this layer does not allow the blood to ooze out or prevents the blood flow outside the body.[8]

Charaka mentioned that the sixth layer when cut causes loss of consciousness and is the seat of the origin of boils being manifested as blackish red and deep rooted on joints[2]. Modern science has also mentioned that reticular layer is thicker layer and it plays a role in healing because granulation tissue is formed due to this layer[9].

Acharya Ghanekar has also compared *Twacha Sthar* (layers) with modern skin and commented that *Charaka's* view regarding number of *Twacha* layers is more appropriate[5]. Since we have compared *Udakdhara* with stratum corneum, *Asrukdhara* with stratum lucidum and also sixth layer mentioned by *Acharya Charaka* with reticular layer of skin of modern science, we can say that the skin layers mentioned by *Charaka* in succession are similar to that of modern science. This indicates that the *Chaturtha Twacha* mentioned by *Charakacharya* is stratum malpighi of modern science.

Dadru is a type of *Kushtha* occurs in fourth layer of skin. It is having predominance of *Pitta* and *Kapha*. It is characterized by raised, circular patches associated with itching, redness, pimples, having colour of an *Atasi* flower or of copper, found to be overspread with pustules, burning sensation and rarely discharge[4].

Acording to *Acharya Dalhana* there are two types of *Dadru kushtha.*[6]

1) *Sita* 2) *Asita*

Out of these, *Asita Dadru Kushtha* is difficult to cure as it shows association with other *Doshas* that is why *Acharya Sushruta* has mentioned this in *Mahakushtha*[6].

However *Charakacharya* has stated that, *Sita Dadru Kushtha* is not very difficult to cure, does not affect subsequent *Dhatus* and does not inflict pain. For all these reasons *Sita Dadru Kushtha* has been mentioned in *Kshudrakushtha*.

In modern science there are many types of *Tinea* infection. *Tinea* is nothing but superficial mycosis. According to the various sites of infections there are many types of *tinea* infection (Ringworm). It is observed in warm, humid climate, poor hygienic conditions etc. It is characterized by lesion is having annular border or polycyclic. Its borders are raised, erythematous and vesicular or scaly

whereas centre is clear. These are all the signs and symptoms of Tinea infection shows maximum similarity with *Dadru Vyadhi*'s signs and symptoms. The degree of inflammation varies depending on the species of the fungus, the immune status of host and being very roughly propotional to the extent of follicular invasion.[7]

In the present study based on clinical findings, 30 *Dadru* patients were registered.

Maximum male patients of age group 15 to 25 years belonging lower socioeconomic class were found.

Out 30 *Dadru* patients, 14 (46.66%) were having predominance of *Pitta-Kaphaj Prakruti.* Otherwise there is main role of *Pitta* and *Kapha Doshas* in *Samprapti* of *Dadru*.

Kandu was observed in 30 (100%) patients followed by *Vaiarnya* observed in 25 (83.33%) patients. *Mandalakar* sign was observed in 19 (63.33%) patients. Both *Pidika* and *Rukshata* were found in 16 (53.33%) patients. *Strava* was observed only in 6 (20%) of patients.

As *Dadru* co-relates with Tinea infection, distribution of *Dadru* patients was done according to type of Tinea infection. Out of 30 patients, according to type of tinea infection, maximum numbers of patients were of *T. corporis* i.e. 17 (56.66%) followed by *T. cruris* 6 (20%), both *T. corporis* with *T. cruris* 3 (10%), whereas least number of patients were of T. Pedis 2 (6.66%), *T.Faciei* 1 (3.33%) and *T. barbae* 1 (3.33%).

In modern science, for diagnostic confirmation of Tinea infection KOH test requires to be done. In the present study, Out of 30 patients, KOH test was found to be positive in 17 (56.66%) patients. Some patients were found to be KOH negative but were clinically similar to *Dadru Vyadhi*. These patients were also selected for further study. Sometimes KOH test may be negative due to some faulty techniques or carelessness on the part of technicians.

The maximum number of patients were having history of illness or disease since one month i.e.17 (56.66%), they were included in the acute group and those who had chronic illness (from 1 month to 1 year) they were included in acute on chronic group i.e. 13 (43.33%). Generally intensity of signs and symptoms of disease is more in acute condition, so the number of such cases would be found more in OPD patients.

Kandu was found in all types of tinea, *Mandalakar* sign was found in maximum patients i.e. 15 (88.23%) of T. corporis. *Vaivarnya* and *Rukshata* were found more in patients of T. corporis with T.cruris i.e.3 (100%). *Pidika* were found more in patients of T. corporis with T. cruris, i.e. 2 (66.66%).

Daha was found more in patients of T. corporis with T. cruris i.e. 2 (66.66%). *Strava* was found more in patients of T. corporis i.e. 6 (35.29%). *Kandu, Mandalakar, Pidika, Vaivarnya* were found in 1 patient of T. faciei. *Mandalakar, Kandu, Vaivarnya, Daha* and *Strava* were found in 1 patient of T.barbae *Kandu* was found in both the patients of T.pedis and *Pidika,Vaivarnya, Rukshata* and *Daha* signs were found in only 1 patient. The signs and symptoms of *Dadru Vyadhi* mentioned by various *Acharyas,* all were also found in maximum T. corporis patients.

According to distribution of *Dadru* patients showing histopathological changes in skin, it was found that; out of 30 patients, maximum were found histopathological (anatomical) change like mild acanthosis in 24 (80%). Inflammatory changes in dermis, spongiosis, parakeratosis, exocytosis and hyperkeratosis were found in 15 (50%), 12 (40%), 11 (36.66%), 9 (30%) and 8 (26.66%) patients respectively.

Here hyperkeratosis and parakeratosis is related to stratum corneum, acanthosis is related to stratum malpighi (includes stratum basale and stratum spinosum), exocytosis means migration of inflammatory cells from the dermis into the epidermis and spongiosis indicates edema between keratinocytes in stratum spinosum.

In the distribution of epidermal changes according to *Prakruti* among *Dadru* patients, it was observed that, most of mild acanthosis was found in patients of *Vata-Pittaj Prakruti*. i.e., 7 (100%) followed by *Pitta-Kaphaj Prakruti* 12 (85.71%) and *Kapha-Vataja Prakruti* 5 (55.55%).

Parakeratosis was found maximum in *Vata-Pittaj, Prakruti* patients 4 (57.14%). Hyperkeratosis was found maximum in *Pitta-Kaphaj Prakruti* patients i.e. 5 (35.17%). Spongiosis was found maximum in *Vata-Pittaj Prakruti* patients, i.e. 4 (57.14%).

Exocytosis was found maximum in *Vata-pittaj Prakruti* patients, i.e. 3 (42.85%). Unremarkable changes in epidermis was found maximum in *Kapha- Vataj Prakruti* patients i.e.4 (44.44%) The epidermal changes between *Vata-Pittaj, Kapha-Vataj* and *Pitta-Kaphaj Prakruti* were not found to be statistically significant.

Maximum inflammatory changes in dermis were found in *Kapha- Vataja Prakruti* patients, i.e.7 (77.77%). Normal dermis was found in *Pitta-Kaphaj Prakruti* patients, i.e. 9 (64.28%).

In *Pitta–Kaphaj Prakruti* patients, least inflammatory changes were found in Dermis. i.e. 5

(35.71%) patients and maximum normal dermis was found 9 (64.28%).

The inflammatory changes between *Vata – Pittaj, Pitta- Kaphaj* and *Kapha- Vataja Prakruti* was found to be statistically non significant.

In the distribution of *Dadru* patients according to duration of illness, in both Acute and Acute or chronic cases, Mild Acanthosis was found to be more.

Except Hyperkaratosis all the histopathological changes were more in acute condition as compare to acute on chronic cases. In acute cases, parakeratosis was found to be significantly more than acute on chronic cases. In rest of the epidermal changes, it was non-significant.

Maximum remarkable epidermal and inflammatory dermal changes were found in some acute on chronic patients. These patients may be included in *Mahakushta* or *Asita Kushthabheda* of *Dadru* as stated by Acharya Dalhana.

Patients who were showing histopathological changes in superficial layer of epidermis and not developed chronicity may be included in *Kshudrakushta* or *SitaDadru*.

Further research studies may add some more knowledge about causative micro-organism for causing *Dadru* and innovative studies are also needed to explore the histopathological changes in the deeper layer of skin.

The study of *Twacha Sharir* according to Ayurveda and modern science in detail reveals that the findings of the study are in agreement with *Charaka's* view regarding the number of *Twacha Sthara* (layer).

The histopathological study showed the following anatomico-physiological changes in skin layers in *Dadru Vyadhi* patients as 1. Parakeratosis, 2. Hyperkeratosis, 3. Mild acanthosis, 4. Spongiosis, 5. Exocytosis, 6. Inflammatory changes in dermis.

According to *Acharya Charaka*, there are six layers of *Twacha* and out of these *Dadru* occurs in fourth layer. Our anatomico-physiological changes in skin layers also indicate that *Dadru* lies upto fourth layer of skin and it may also extend into the deeper layers of skin if there is secondary infection or the severity of inflammation is greater.

CONCLUSION

The study also demonstrated the relation between *Dadru* and Tinea infection. As most of the signs and symptoms of *Dadru* patients are similar to T. corporis infection as compared to other types.

According to *Prakruti*, although maximum numbers of patients are of *Pitta-Kaphaj Prakruti,* the epidermal changes are found more in patients of *Vata-Pittaj Prakruti* and dermal changes are found more in patients of *Kapha-Vataj prakruti*.

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