ANATOMICAL EXPLANATION OF ABSORPTION OF SNEHA DRAVYA IN SIROBASTI KARMA

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ABSTRACT

Ancient scholars of Ayurveda have described head as a root of the body and explained the diseases related to Sira. According to Aacharya Sushruta in this region there are 37 Marmas (vital points), which indicate its importance. For the diseases of Sira many treatment modalities are explained like, Sirobasti, Sirodhara, Siroabhyang, Pichu and Nasya. Among them Sirobasti Karma is very effective in mental disorders and many scalp related problems but its mode of action and the route of oil absorption is not clearly explained in classics. The route for oil absorption can be explained scientifically by the knowledge of anatomy of scalp. The scalp is made up of five layers: skin, superficial fascia, aponeurosis, loose areolar tissue and pericranium. The oil used in Sirobasti is absorbed transversally into the scalp through the skin. The connective tissue layer of scalp is rich in blood vessels and nerves. In the loose areolar tissue of scalp, emissary veins are present, these veins are valve less and connects the superficial veins of the scalp with the diploic veins of the skull bones which drains into the intracranial sinuses. By the knowledge of this venous drainage system of Scalp we can explains the systemic effects of Sirobasti therapy thus Sirobasti therapy can be used effectively for various scalp related problems and mental disorders.

INTRODUCTION

In Ayurveda the human body is divided into six part and this concept is described as a Shadang Sharin. The head is called Uttamang by Aacharya Charaka. Uttama means best, which denote its importance.1 Aacharya has described head as a root of the body and very deeply explained the diseases related to Sira. According to Aacharya Sushruta in this region there are 37 Marmas (vital points) which indicate its importance.2 In treatment aspect of disease Aacharya has described Shodhana Chikitsa which is a purification processes of body. The body purification processes are called Panchakarma in Ayurveda.

Sirobasti is very important therapeutic measure of Ayurveda. It can be classified in Bahya-Snehan Karma which is a pre therapeutic measure of main Panchakarma. Aacharya Vagbhatta has classified Sirobasti in Murdha taila along with Sirodha, Siroa-bhayang and Pichu.3 The word "Basti" is used here to indicate, "to retain or to hold", thus in Sirobasti the oil is made to retain on the scalp for a prescribed time. This procedure is highly effective in combating diseases related to scalp, neurogenic diseases like dementia4 and also many lifestyle disorders just as, insomnia, attention-deficit hyperactivity disorders (ADHD), psychological disorders, mental stress etc. This technique is also very famous in Keralliyan Panchakarma. Sirobasti is very much effective therapy but anatomical basis of its mechanism is unexplained so here this attempt is done to explain it.

Procedure of Sirobasti

Sirobasti procedure can be described further under this headings.

Materials required for Sirobasti

- Rexene/ leather (Charmapatta) (75cm-20 cm) - 1
- Black Gram flour (Masha) - 200gm
- Taila - 1.5 litre
- Cotton ribbon (120cm-10 cm) -2strips
- Spoon -1, Vessel - 1
- Oil for Abhayanga - 100ml
- Soft towel -2
- Hot water bath - 1
- Armed chair of knee-height - 1
- Therapist - 2

Purva Karma (Pre-therapeutic measures): Cleanly shaved head is preferred to carry out this procedure to enhance absorption of medicine. Morning hour at the time of sunrise is the ideal time for Sirobasti but modification can be done according to requirement of diseases.

Sambhar Samgraha (Collection of instrument): It includes the preparation of the Charmapatta (leather strap) and Masha (black gram) pasted to the Charmapatta and 2 stripes of cloths. Now a day's some automatic gazettes are used on behalf of the Charmapatta.


**Pradhanaka Karma (Main procedure):** It includes; Bastiyastra Dharana, Taila Dharana, Observation of Samyaka Yoga Lakshana, Removal of Taila and Basti Yantra.

Patient is made to sit erect on a chair; one strip of cloth, smeared with Mashakalka is pasted around the head, above the ear. Then leather sheet of about 12 Angula, applied with Masakalka at the bottom of its inner surface of, is tied around the head, so that the lower part of the leather sheet is attached to the strip of the cloth. The two ends of the leather sheet are attached together by using Masha Kalka. Another strip of cloth pasted with Masha Kalka is wrapped on the leather sheet. Now the Basti Yantra is ready.

Then the suitable medicated oil, warmed by keeping in hot water is poured on the inner surface of leather cap slowly and carefully. The quantity of oil should be 2 Angula above the scalp. Care must be taken to keep the temperature of oil constant.

Time should be according to the predominance of Dosha or appearance of Samyak Snidhdha Lakshana such as Vaktrastrastra (watering in mouth), Nasakotklesh (moisture in nose), Karni Strava etc. Time according to Dosha is as follows.

In Vata predominance diseases 10,000 Matrakala, In Pitta predominance diseases 8,000 Matrakala, In Kapha predominance diseases 6,000 Matrakala, In Svastha 1,000 Matrakala of Sirobasti should be done.

After the prescribed time for Karma, the oil from the Bastiyastra with Bastiyastra should be removed.

**Pashchat Karma (Post-therapeutic measure)**

Mridu Abhayang is done over the head and Skandha Pradesha.

**Duration**

Maximum duration of Sirobasti is considered as one time in a day continue for seven consecutive days.

**Anatomy of Scalp**

The scalp consist of skin and subcutaneous tissue that cover neurocranium from the superior nuchal lines on the occipital bone to the supra-orbital margins of the frontal bone. Laterally the scalp extends over the temporal fascia to the zygomatic arches. The scalp consist of five layers that are firmly bound together:

1. **Skin:** It is thin except in the occipital region and contains many sweat and sebaceous glands and hair follicles. It has a abundant arterial supply and good venous and lymphatic drainage.

2. **Connective tissue:** It forms the thick, richly vascularised subcutaneous layer that is well supplied with cutaneous nerves.

3. **Epicranial aponeurosis:** The broad, strong, tendinous sheet that covers the calvaria and serves as the attachment for muscle bellies converging from the temporal bones on each side. Collectively, this structure consist the musculo-aponeurotic epicranicus.

4. **Loose connective tissue:** It is a sponge-like layer including potential spaces that may distend with fluid as a result of injury or infection. This layer allows free movement of the scalp proper, the first three layers, over the underlying calvaria.

**5. Pericranium:** A dens layer of connective tissue that forms the external periosteum of the neurocranium.

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*Fig. 1 Showing Layers of Scalp with its contents*

*Fig. 2 Showing Layers of Scalp with its contents*

**Routes of Transdermal Absorption**

There are three mechanism for transdermal delivery; the intracellular route, the intercellular route and the shunt route. In intracellular route molecules passes directly through the cells of stratum corneum. In intercellular route molecules passes between intercellular spaces. The shunt route is a cleaver bypass system in which molecules pass through structures that originate in the dermis and span the entire height of the epidermis, as sweat glands, sebaceous glands, and hair follicles. The area of scalp and face is a great location for absorption because these areas are plentiful in sweat glands, sebaceous glands and hair follicles.

**Factors affecting Transdermal Absorption**

The Factors affecting are surface area of the application, location of the skin application, exposure time, temperature, substances use for application and molecular size of absorbent.

Regarding location of the skin application, areas with the thinnest epidermal layers is prove to be the best areas of transderal absorption. These locations includes face, scalp, neck, and wrist.

So from these all facts we can understand that the skin of scalp area is the best area for the absorption.
Use of oil for Sirobasti

The layers of the skin are: Stratum Corneum, Stratum Lucidum, Stratum Granulosum, Malpighial layer, Papillary layer, Reticular layer, Subcutaneous tissue and Muscular layer. The first four forms the epidermal layer of skin and residual forms dermal layer. The keratinized nature of the epidermis is primarily designed to prevent desiccation thus, the skin is relatively lipophilic/hydrophobic barrier. Aacharyas know this fact very well and that’s why they use Sneha Dravya for Sirobasti.

Fatty acid substances are basically of two types, animal origin and vegetable origin. On the basis of their chain length fatty acids are of four type.

1. Short- chain fatty acids (SCFA)
2. Medium chain fatty acid (MCFA)
3. Long chain fatty acid (LCFA)
4. Very long chain fatty acids (VLFA)

The short and long chain fatty acids can absorb by skin easily because its molecules are smaller than the long and very long chain fatty acids so for the topical absorption this fatty acids are preferable. "Short chain and medium chain fatty acids are presents in ghee, milk and other natural oils"[16] this fact is known by Ayurvedic Aacharyas and that’s why they have selected natural oils, milk and ghee for Sirobasti procedure.

Rout of oil absorbance

In Sirobasti medicated oil is poured over the head. The oil used in Sirobasti is absorbed transversally into the scalp through the roots of hairs. The dense subcutaneous tissue containing the vessels and nerves of the scalp. In the loose areolar tissue of scalp, emissary veins are present. [17] These are valve less and connect the superficial veins of the scalp with the diploic veins of the skull bones and with the intracranial sinuses. This is a route of absorption of the Basti-Dravya.

Hair roots of the scalp

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Superficial veins

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Emissary veins

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Diploic veins

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Intracranial venous sinuses

Effect of Procedure

The Sukhosha Dravya usually used for Sirobasti which stimulates the efferent blood vessels and causes vasodilation. Pressure is produced on the head due to Basti Dravya which makes tranquillising effect and relaxes patient. Pressure improves blood circulation, increases fresh oxygen and glucose supply to the brain and relaxes muscles and nerve endings.

Effect of Abhayang after Sirobasti

Abhayang is the Pashchatkarma of the Sirobasti procedure in which massage is done from the top of the head to the shoulder region. By massage the lymph movement is possible and the lymph drainage is increased in the venous system. “The lymph contains large amount of tryptophan which is used by the pineal gland to secrets melatonin and serotonin[18] which helps to maintain equilibrium of thyroid, gonadal and adrenal activity as well as the secretion of the growth hormone. Deficiency of serotonin is responsible for irritability, depression schizophrenia, florid hallucination, paranoia, severe headache, anxiety etc. Melatonin responsible for sedation and pleasant feeling in the human being. So the manual draining of lymph by Abhayang may play a major role in the psychological disorders.”

Discussion and conclusion

The head is called Uttamang by Aacharya Charaka, and special importance is given to Siré by Aacharyas. The head is covered by the scalp and it is composed of five layers. The outer most layer of the scalp is skin. The skin of scalp is reach in arterial supply and venous and lymphatic drainage. It also contains abundant sweat glands, sebaceous gland and hair follicles and that's why it is a preferable site for good transdural absorption. Thickness of skin is a one factor which affect transdural absorption. Areas with the thinnest epidermal layers is prove to be the best areas of transdural absorption. These locations includes face, scalp, neck, and wrist. So from these all facts it is prove that the skin of scalp area is the best area for absorption and that’s why Acharya have preferred this site for Sirobasti.

The epidermis of the skin is lyophilise/hydrophobic barrier so use of lipid content is preferable for better transdural absorption. The small lipid molecules is preferable for better absorption, because the long chain fatty acids decreases the absorption rate so the small and medium chain fatty acids are more preferable. Aacharyas know all that fact about absorption and that’s why they indicate to use natural oils, milk and ghee for Sirobasti procedure which contain short and medium chain fatty acids.

In Sirobasti Karma used drug is absorbed by the venous system and treat many scalp related problems and mental disorders.

Thus the conclusion is that Sneha used in the Sirobasti is absorbed by hair roots of the scalp then from that to the superficial veins of the scalp with the diploic veins of the skull bones and with the intracranial sinuses and can treats various scalp related problems and mental disorders without any side effect, by minimal expanse in view of non availability of suitable treatment modalities in the modern system of medicine.

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