

Concept of *koshta shakha vikriti* in *kha vaigunya* in tuberculosis by exploring different x-rays

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Abstract:

Kha-vaigunya is the condition of the *srotas* which is susceptible for pathological changes or favourable movement to produce a disease. *Koshtha* means hollow organs and cavernous spaces or cavities of body. *Shakha* means *Shariradhatu* or body tissues excluding the *rasa dhatu* or plasma and including the *twak* or skin. *Doshas* are functional entities of body and they are constantly moving from one place of body to other. When *Doshas* have unidirectional movement from *Koshta* to *Shakha*, *Doshas* do not come back to visceral spaces therefore normal function of visceral organs are hampered. The *Doshas* gets stagnated and damage the tissue causing disease. Tuberculosis is chronic granulomatous inflammation of lung tissue. In Disease progression stage Tubercle forms, which contains a semi-solid or “cheesy” consistency. It’s manifestation is either cavitation or calcification. Hence understanding the pathogenesis by evaluating X-rays is an

attempt made to understand *Koshta shakha vikriti* as *kha vaigunya*.

KEY WORDS: *Koshta*, *Shakha*, *Kha-vaigunya*, Tuberculosis, Tubercle, Calcification, X-Ray

INTRODUCTION

SROTO VAIGUNYA:

खोतान्ति खलु
परिणाममापद्यमानानां धातूनामभिवर्हीनि
भवन्त्यायनार्थेन। (च.वि ५/३)

It comprises of 2 words: *Kha- akasha*, *indriya*, *pura*, *kshetra*, *khaga*¹, *Srotas* and *Vaigunya* means *Vigunata/Vikruti*. Altogether *Srotovaigunya* means that condition of *Srotas* which is susceptible for pathological changes or favourable movement to produce a disease. Four varieties of *sroto dusti lakshana* are observed namely - *Atipravrutti*, *Sanga*, *Siragranthi*, and *Vimargagamana*. *Sroto dusti lakshanas* represent the physiopathological vitiation. Disease may manifest either single or in

combination of symptoms in a gradual manner. Acharya Sushruta explains as “कुपितानां हि दोशानाम् शरिरेपरिधावतम् यत्र सन्ना खवैगुन्यत् व्यधिहि तत्र उपजयते।”² (सु सू २१/२२)

For which *Dalhana* comments that *prakupita doshas* will be moving in the body, produces disease after lodging in *Srotovaigunya* and *Dosha Dushya Sammurchana*. “*Khavaigunyatiti Sroto Vaigunyatitiartaha*”. Acharya Charaka explains

“व्यानेन रसधातुर्हि विक्षेपोचितकर्मणा। युगपत् सर्वतो अजस्रम् देहे विक्षिप्यते सदा॥”^३

Srotovaigunya stands for some inherent weakness or lack of natural immunity to some particular type of disease or Susceptibility to disease formation process and loss of resistance to disease producing factor. *Srotovaigunya* need not necessarily produce any disease until there is *Dosha- Dushya Sammurchana*. Here *Dosha-Dushya Samurchana* is in the form of either *Srotodushti Lakshana* or *Koshta Shakha Vikriti* or *Aama samurchana* or *Dhatu kshyaya* or *Dhatu Vigunata* etc. For the manifestation of disease *Srotovaigunya* is a must factor, thus it can't be ignored.

CONCEPT OF KOSHTA

The Ayurvedic principles are formulated based upon some concepts, which are structurally as well as functionally specific and their interpretation which could help in generalization as the matter, such concept is the concept of *koshtha*.

Koshtha is derived from root *Kush+Than*.⁴ *Koshtha* is a cavity formed from *Avarana* (wall) which is consisting of *Dhatus* (solid structure). *Koshtha* is known as *Mahastrotasa* (the great channel) which is from mouth to the anus i.e. complete digestive system and as *Abhyantara Roga Marga* (internal pathway of diseases).⁵ *Charaka* states that *Koshtha* is the cavity containing fifteen organs - umbilicus, heart, pancreas, liver, spleen, kidneys, bladder, lungs, stomach, small intestine, large intestine, rectum, anus, *Pakwashaya* (large intestine including pelvic colon), *Purishadhara* (the cecum).⁶ *Sushruta* states that *Koshtha* is a cavity containing heart, lungs, stomach, intestine, rectum, pancreas and urinary bladder.⁷

Concept of Shakha

Shakha is derived from root *Shakh+Ach+Tap*.⁸ *Shakha* mean *Dhatus* (branches of solid structures) that form *Avarana* (wall) of cavity. *Shakha* includes the *Raktadi* (blood cells) *Dhatu* and *Twaka* (skin).⁹ Term *Shakha* means branches of a tree. In body, this relates to the peripheral system comprising blood, tissues, skin which is spread throughout the body like branches of a tree.¹⁰

Koshta Shakha Gaman Of Dosha

In *Ayurveda*, the transfer of nutrients, the exchange of body fluids is fascinated by the mechanism of *koshtha- shakha* interaction. *Vata* play a key role in this interaction. *Acharya Charaka* defines *ulbana anila*.¹¹ *Doshas* are constantly moving from one place of body to other. The movement of *Doshas* from *Koshtha* to *Shakha* occurs in *Prasara* stage of *Shatkriyakala* (*Sushruta*)¹² So

Symptoms observed during *Koshtha* to *Shakhagati* will be same as that of *Prasara* stage. *Koshtha* to *Shakha Gati* occurs in *Prakopa* stage of *Rutu Kriyakala (Vagbhata)*¹³ So symptoms during *Koshtha* to *Shakhagati* are same as that of *Prakopa* stage of *Rutu Kriyakala*. when *Doshas* have unidirectional movement from *koshta* to *Shakha*, *doshas* do not come back to visceral spaces therefore normal function of visceral organ are hampered. The stagnated *Doshas* damage the tissue and cause disease. In *Koshthagata Doshagati Chikitsa principles are advised to moves Dosh* from *Shakha* to *Koshtha*.

Etiological factors of *Koshtha* to *Shakha Doshagati*¹⁴.

1. *Vyayamat* -Excessive exercise leads to vitiation of *Vata* and increase in body heat which helps in dislodgement of the *Doshas* from their place.

2. *Usmanah Taikshnyat* -In pathological condition, these qualities are intensified. These are responsible for liquefaction of *Doshas* and dilatation of channels leading to *Prakopa* or *Prasara* stage of *pitta* and *kapha doshas* in which *Dosha* travels from *Koshtha* to *Shakha*.

3. *Ahitacharanat* -It refers to intake of excess of unwholesome food leads to vitiation of *Doshas* resulting in increase in quantity and overflow like flood.

4. *Marutasya Drutatva* -The vitiated *Doshas* deviated from normal direction by the force of *Vata*, moves from *Koshtha* to *Shakha*.

Tuberculosis: Tuberculosis is an infection caused by the Organism *Mycobacterium tuberculosis*. In Stage 1

Droplet nuclei Once inhaled, the bacteria are non-specifically taken up by alveolar macrophages. The macrophages will not be activated, therefore unable to destroy the intracellular organism. Disease onset when droplet nuclei reaches the alveoli. Disease Progression- Stage 2 TB multiplies within the inactivated macrophages until macrophages burst. Disease Progression- Stage 3 Tubercle forms, which contains a semi-solid or “cheesy” consistency in an isolated section of lung. There is preparation for a sudden necrotizing reaction sufficient to produce a cavity. Further evolution of necrotic caseation the fate is either cavitation or calcification. Means it is either coughed out to form a cavity or becomes surrounded by epithelioid cells and fibrosis. This can be easily demonstrated on X-Ray Findings.

X RAY

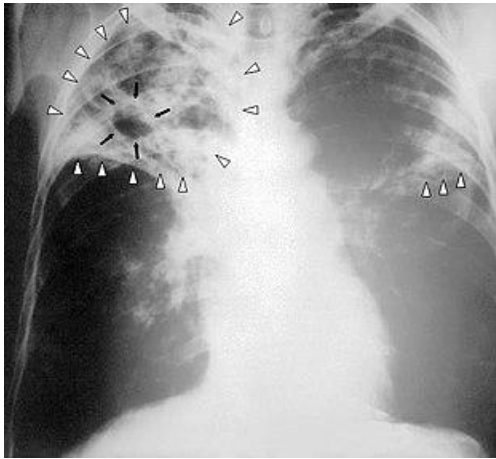
X-rays are electromagnetic radiation Used in the diagnosis of tuberculosis. Chest X-ray- A posterior (PA) chest X-ray is standard view used in Tuberculosis.

Abnormal X-Ray findings in Tuberculosis

1. Chest x-ray of Ghon's complex of active tuberculosis/ Tubercle Formation

Any cavitory lesion - Lucency (darkened area) within the lung parenchyma, with or without irregular margins that might be surrounded by an area of airspace consolidation or infiltrates, or by nodular or fibrotic (reticular) densities, or both. The walls surrounding the lucent area can be thick or thin. Calcification can exist around a cavity occurs mostly in second lobe Tuberculosis creates cavities visible in

X-rays like this one in the patients right upper lobe.¹⁵



Chest X-ray of a person with advanced tuberculosis: Infection in both lungs is marked by white arrow-heads, and the formation of a cavity is marked by black arrows.

2. Infiltrate or consolidation/ Caseation Necrosis

Opacification of airspaces within the lung parenchyma.

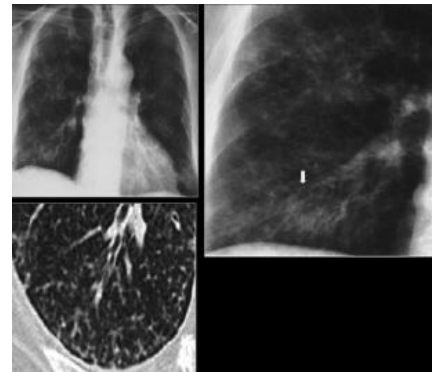
Consolidation or infiltrate can be dense or patchy and might have irregular ill-defined, or hazy borders.¹⁵



3. Repair of Ghon's complex

Nodule with poorly defined margins - Round density within the lung parenchyma, also called a tuberculoma. Nodules included in this category are those with margins that are indistinct or poorly defined (**tree-in-bud sign**^[3]). The surrounding haziness can be either subtle

or readily apparent and suggests coexisting airspace consolidation



Chest x-ray showing nodule with margins that are indistinct or poorly defined (tree-in-bud sign) in post-primary pulmonary TB.¹⁵

4. Cavity Formation

Tuberculosis creates cavities visible in X-rays like this one in the patients right upper lobe.



Chest X-ray of a person with advanced tuberculosis: Infection in both lungs is marked by white arrow-heads, and the formation of a cavity is marked by black arrows.¹⁵

5. Calcification

The main chest X-ray findings that can suggest inactive TB are 1. Discrete fibrotic scar or linear opacity—Discrete linear or reticular densities within the lung. The edges of these densities should be distinct and there should be no suggestion of

airspace opacification or haziness between or surrounding these densities. Calcification can be present within the lesion and then the lesion is called a “fibrocalcific” scar.



Chest x-ray showing fibrocalcific scar after secondary tuberculosis as air-space opacification or haziness between or surrounding these densities.¹⁵

Discussion: *Koshtha* and *Shakhas* are two things related with each other. These term *koshtha* and *shakhas* are used in different meaning according to the situation in Pathogenesis exploring *Kha vaigunya*. There are several *koshta* and *shakha* body but they can also be taken as a single *shakha* when a systemic pathogenesis is considered. According to *Ayurveda* lungs are *sthana* of *Avalambak Kapha* and *sanchar sthana* of *Prana* and *udan vayu* so it is considered as *koshta*. When due to *hetu sevans Avalambak Kapha* is vitiated by *Snigdha guna*, *Stanatwa* in *Avalambak kapha* by *Prana udan Avarantwam* is responsible for Nodules in lungs. When *vata Dosha* in lung vitiated by its *Sukshma, Laghu, Ruksha gunas* either cavitation or calcification is formed in lungs. When *Pitta dosha* in lung vitiated by *Ushna, tikshna guna*, *doshas* undergo process of *paka* and form Caseation Necrosis. Here we can say whenever there is association of *kapha* and *vayu* and

formation of either cavitation or calcification is a sort of *Koshtha* or *Shakha vikriti* respectively.

Conclusion: *Srotovaigunya* is basic pathogenesis present in all diseases whose existence can be clearly understood only after manifestation of the disease. *Srotovaigunya* is the stage prior to *Dosha dushya sammurchana*. The lesion formation in pathogenesis is *dosha dushya samurchana*. By exploring x-rays in tuberculosis we can describe type of lesion. So by understanding x-rays in any diseases we can confirm the *dosha dushya samurchana* where *koshta shakha vikriti* is important. So X-rays Can be a tool to diagnose *Koshtha Shakha Vikriti*.

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