



Review article

Clinical Consequences of Microbial Infections in *Charaka Samhita*

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Abstract

The diseases in *Ayurveda* are categorized into endogenous and exogenous. Infections exercise a major part among the exogenous categories. A vivid description of infectious diseases, their pathogenesis and treatment have been documented in Ayurvedic treatises. Microbes are responsible factor for infection. So to combat the microbes and their newly developing strains is a great challenge. Though, the term microbes or microbial activity have not been clearly described in Ayurvedic texts but similar concept, their functional activities and remedies have been depicted. *Charaka Samhita*, on the basis of its own underline philosophy and the then prevailing thoughts, has described almost all possible aspects of microbial infections in rational consequential way. The present article deals with the ancient approach of microbial infections and its clinical consequences in *Charaka Samhita*.

Key words: Microbes, Microbial infection, *Ayurveda*, *Charaka Samhita*

Background:

The diseases are the outcome of the etiological factors and subsequently the complex phenomena of the substantial pathogenesis. The quality of the disease is specified in-terms of its etiological factors. The qualitative etiology is responsible for the production of the respective disease and therefore the analysis of the etiology in the very specific disease is essential. The fundamental aim of the treatment or diagnosis is to detect the responsible etiological factors. In the ancient era

basically the etiology was categorized in the purview of incompatible diet and conduct but apart from those the rudimentary view of different segmental etiology were sequenced in causation of disease. Some invisible factors were also specified for producing the disease. But with the advent of era, those rudimentary views in respect to etiology are explored and now a day it seems that infective diseases caused due to microbial organism are very dreadful entity. The concepts of microbes were incorporated in the terms *bhuta*. Narrating the quality of the sign and symptom of different diseases mentioned in the ancient text, the essence of infection can be revealed. The identical views of microbes for pathology are similarised. The conceptual study is hereby presented maintaining the chronological

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chapters of the diseases mentioned in the *Chikitsa sthana* of *Charaka Samhita*.

The Conceptual study:

The concepts of microbes were also highlighted in *Charaka Samhita* and as such the significance is justified in the etiologies, signs and symptoms of different diseases. The relevancies of microbial infections are almost seen in every disease and therefore in the succeeding paragraphs the consequences of the microbial infections are analyzed to magnify the said perspective in different dimensions.

The affection of *abhighata* (trauma) and *abhishanga* are external causes for *jvara* (1). *Bhuta* (external invisible aetiologies disrupt body homeostasis) is also included under *abhishanga* variety. From the views of pathogenesis of *jvara*, the aggravation of *doshas* are also considered like *vayu* and *vayu* or *pitta* in case of *abhighata* or *abhishanga jvara* respectively, but here sudden onset of cardinal features, i.e., *santapa* is manifested before aggravating features of *doshas* (2). Some external etiologies are also mentioned as the cause of *doshaja jvara* (3). The vitiated *doshas* are located in *rasa*, *rakta*, etc. *dhatus*, sign and symptoms like vomiting, diarrhoea, both diarrhoea and emesis, discolouration of body, pain abdomen etc. are manifested and associated with high rise of temperature (4). When the vitiated *doshas* in aggravated *srota* afflict the deeper *dhatu* like *asthi*, *majja*, then that condition is difficult to cure, and in case of afflicted *shukra* it is incurable (5). In case of virulent organisms, it may be difficult to cure or incurable when the multi-systems are involved.

Daruvaha is microbial invasion which spreads all over the body through circulating media and activates fever in acute or delayed basis (6). Vitiating of *vata* in both *abhighataja* and *vataja jvara* is due to cold affliction (7). Puncture wounds are

particularly vulnerable as they favour the growth of the anaerobic bacillus (8).

Transformation represents the various changes that accompany the conversion of a normal cell into a malignant cell (9). These phenomena may also produce *granthi* (10) & *arbuda* (11). The detail etiologies of *kushtha* (12) are very important illustration for microbial contamination or culture and growth (13). Intake of uncooked food material, performance of physical exercise in excessive heat and cold are one of causative factor for microbial invasion. Variations of temperature are very much important factors for microbial growth (both bacteria and virus) (14). Bacteria vary in their requirement of temperature for growth.

The affected *dhatus* like skin, blood, muscle, and body fluid, lymph (15) show the trans-migratory pathway of the microbes. It is already evident and mentioned in the context of leprotic infection early in Vedic period in India and from Biblical times in Middle East (16).

Kushtha is regarded as chronic disease developed gradually (17). Superficial infections comprise the various types of tinea or ring worm affecting skin, hair and nails are having very mild and chronic in nature (18). The features of *vata*, *pitta* and *kapha* predominance in skin disease (*kushtha*) are roughness, dryness, coarseness, etc. caused by *vayu*; burning sensation, redness, itching, exudation, suppuration, foul smell, stickiness are caused by *pitta*; white colouration, itching, localization, elevation, maggot formation, etc. are caused by *kapha*. These are common signs and symptoms caused by bacterial and fungal infection on skin.

The history of infection by *yakshma* (19) from outside into immunocompromised '*Chandra*' due to excessive sexual intercourse directly refers the existence of microbes. The source of infection is usually an open case of pulmonary tuberculosis. The



mode of infection is by direct inhalation of aerosolized bacilli contained in droplet nuclei of expectorated sputum, the majority of inhaled bacilli are arrested by the natural defenses of the upper respiratory tract. Concept of *sosha* and or *rajayakshma* is also documented the immunocompromised state referring the concept of AIDS due to HIV infection. The pathogenesis of *dhatukshaya* in either *pratiloma* or *anuloma* route denote the transmission through body fluids (like *rasa*, *rakta*, *shukra*, etc.). In both ways it affects at first *rakta* and other deep tissue later (20).

The aetiologies like *viruddha-dushta-ashuchi* diet (21) of *unmada roga* denote the microbial infection of psycho-neurology. Here the *viruddha-dushta-ashuchi* is incompatible, contaminated, and impure food substances respectively (22) which are common growth places of pathogenic microorganisms. Description of eight types of *bhutagraha* for the manifestation of *agantuka unmada* (23) is caused by abuse or contamination of any type, either by improper present habit or past deeds (genetic spread) (24).

Clinical features of *kshata* and *kshina* are the chest pain and haemoptysis; cough and haematuria, pain in flanks and back respectively (25) refer the inflammatory sign due to respiratory infection or urinary tract infection. The strong evidence of transmission of organism by the cited aetiology mentioned as excessive intercourse. It can also be mentioned that *kshatakshina* is less severe than *rajayakshma* and prognostically it can be turned into *rajayakshma* if not treated properly (26). If the superficial skin is affected by the trauma or infected materials, that results an exogenous type of oedema (27) and it is manifested with hyperpyrexia, burning in the eyes and the dilatation of the affected vessels (28) in the premonitory sign

and symptoms of the *svayathu roga*, the infected cellulites.

Parasitic invasion causes painful abscess in the sites of anal orifice and the abscess if get suppurated and burst, the condition is known as infected *vagandara* (29). The *pitta* predominant aggravated dosas cause serious type of migratory swelling associated with high fever and morbid thirst afflicting the blood results suppuration, known as *jalagardhava* (30). This condition is result of bacteria. All the exogenous swelling are caused due to aggravated *vata* along with vitiated blood which in terms causes localized reddish swelling and infected swelling is required antimicrobial therapy (31).

The ingestion of the contaminated food aggravates the *doshas* and obstructs the channels resulting indigestion as the manifestation of *udara* (32) and in *paittik udara*, the *pitta* gets immediate accumulated because of ingestion of same, aggravating *vata* and *pitta* subsequently, obstructs the channels later and moving upwards it suppresses digestive power and metabolism with the severe manifestation of burning fever, thirst, fainting, diarrhoea, and giddiness (33). The complication of *udakodara* (34) itself signifies the manifestation of the bacterial infection.

Arsha is a disease characterized by the morbid growth by muscle tissue (35) and the characteristics of the *paittika* type of the *arsha* is excessive sweating, sticky discharge, foul smell, suppuration (36) which signifies the direct involvement of the secondary infection. The discharge from the piles mass is large quantity and continuous and this discharge is white, red in colour and associated with severe itching seen in *kaphaja arsha* (37) may be associate with secondary infection (either fungal or bacteria).

The vectors or the micro-organism in the form of dust, smoke and wind enter into



the lungs and produced *shvasa roga* specifically if the breathlessness is associated with fever and faintness and termed as *pratamaka shvasa*, the significant disease of the affliction of micro-organism (38).

The obstruction in the movement of *vayu* causes *paittika kasa* and manifested with morbid thrust, burning sensation, and spit phlegm associated with *pitta* and continuous *kasa* (39). In *kasa* spitting is a generalized feature (40) in *vataja*, *pittaja* and *kaphaja kasa* respectively. Apart from those *kshataja kasa* and *kshayaja kasa* are the outcome of microbacterial infection like tuberculosis and manifested with blood mixed phlegm, fever, morbid thirst (41) and different colour phlegm fever etc. (42) respectively.

The aggravated *pitta* on account of its liquidity suppress the power of *agni* and disintegrate the stool in colon because of its heat liquidity and morbidity and liquidity causes *paittika* type of *atisara*. It is presented with various coloured liquid defecation. The stool is mixed with blood, foul smell, morbid thirst, burning sensation and suppuration of the anus. The extensively aggravated *pitta* along with instantaneous vitiation of *rakta* leads to morbid thirst, colic pain, burning sensation and suppuration of the anus, termed as *raktatisara* (43). It also denotes secondary infection. *Vata*, *pitta* and *kapha* gets aggravated due to invasion of microorganism in the site of *amadosh*a and cause vomiting through the circulation of those organisms and presented with pain, burning sensation morbid thirst, and vomitus substances are mixed with blood (44), the categorical indication of infection.

The intense state of *chardi* is manifested with vomited material associated with blood, pus, and frothing is also indicative of infection (45).

The manifestations of two verities of *visarpa* (*Agni* and *Kardamaka*) reveal

involvement of the micro-organism or state of the secondary infection and likewise the *sannipatika visarpa* where all the *dhatus* are pervaded specially *rakta* with the instantaneously spreading ailments (46) suggestive of microorganism infiltration. In this condition the exposure to polluted air is strictly contraindicated (47).

The micro-organisms responsible for fever, urinary infection, tuberculosis and asthma are accountable in the production of *aupsargika trishna* (48).

The exogenous ulcer is caused due to exposure to micro organism, fire etc.(49) and the *snayu kleda* is the specific characteristics the indicative of the microbial infection and the site of the manifestation of the ulcer are skin, vessel, muscle tissue, ligaments, vital organ and the viscera.(50)

The discharge of pus, blood and the different coloured materials (51) clarify the involvement of the micro organisms which also supported by the manifested complication of the ulcer like, convulsion, morbid thirst, dyspnea etc.(52). The virulence of the micro organism are also analyzed though the manifestation of *snayu kleda*, *sira kleda*, *gambhira*, *krimi bhakshana* (appearance of maggots) (53) and the ulcer which is affected by the micro organism, if excessively secreted with foul odour is incurable in nature. The deep routed ulcer is affected by the different types of aerobic and anaerobic micro organism, therefore it is presented with differ type of discharges.

One of the causative factor of the dysuria is the trauma in the uro-genital tract and is called *raktaja mutrakrichchhra*, because of the excessive vitiation of the blood, it may be due to the invasion of the micro organism after traumatic injury, and may be as a result of excessive sexual intercourse (54). In the *paittika* type of dysuria, the pain, burning sensation and



urine mixed with blood is the indicative of primary infection (55). The heart diseases caused by micro-organism infestation get acute pricking pain and itching (56) and therefore in *krimija hridroga* antimicrobial treatment is indicated (57).

The seasonal variations, excessive exposure to the dust are the favorable factors for viruses and these vulnerable viruses inflamed the nasal mucosa causing the aggravation of *vayu* with the production of rhinitis. This condition of rhinitis is exposed to bacteria that results purulent and sanguineous rhinitis, fever, suppurative rhinitis etc. (58) and termed as *dushtya pratishyaya*. Supportive rhinitis is also caused by acute infection of *rakta* and *pitta* and characterized by burning sensation, redness, suppuration of nose etc.(59) and the secondary infection leads to the production of *puyarakta* (60).

Krimija shiroroga is manifested with severe headache (61) and may be the result of meningitis, encephalitis, tuberculoma, and neurocystisercosis. *Sannipatika karnaroga* is manifested with putrid discharge of different colour (62) and results of micro-organism. *Pattika* type of eye disease is characterized by burning sensation, excessive pain, redness, discharge of sticky material of yellow and extremely hot lacrimation (63) resembling with infective conjunction.

The heat of the body in association with *vata* and other *doshas* scorches of the hair root causing instantaneous rise to alopecia (64), a fungal infection. In *ardita*, *vayu* gets aggravated and the facial nerves are affected by the viruses with the affliction of blood (65). The aggravated *vata* located in the back side of the neck, causes the constrictions of nerves resulting the bending of the body like a bow (66) resembles with tetanus.

On account of the simultaneous aggravation of *vata* and *rakta*, the necrosed

tissue is characterized by redness, suppuration and bursting pain in pita predominant *vatarakta* (67). If it is associated with secretion of exudates (68) then it is suggestive of micro-organic infestation. The suppurated *vatarakta*, the excessive vitiation of *pitta* and *rakta* lead to bursting open of the wound associated with the discharge of putrid blood and pus (69), the classical indication of secondary pyogenic infection.

The genital tract of the female subject gets infected by the microorganism and causes excessive offensive menstruation associated with suppuration, burning sensation, fever etc. (70) and menstrual discharges with itching etc. (71), signify the affliction of primary micro-organism. The unhygienic condition of the genital tract causes the growth of microbes and is attended with severe itching termed as *acharana-yoni-roga* (72). the aggravated *vayu* associated with *kapha* affect the female genital organ and is characterized with mucous discharge and pain (73), and likewise the bluish and yellowish menstruation is caused due to aggravated *vayu* associated with *pitta* in *paripluta* may be caused by sexual intercourse (74).

The vitiated semen is characterized by frothy, thin, unctuous, discoloured, putrid smell, slimy, and or mixed with other tissue elements (75) suggestive of micro-organism infestation. Sexual intercourse with woman suffering from chronic diseases or with quadruped animals or trauma to the phallus, excessive infection etc are the causative factor for *dhvajabhangaja klaivya* and this is characterized by ulceration and suppuration of the phallus, exudation, high rise of temperature, appearance of maggots of the phallus etc.(76). This is the resemblance of the features of sexually transmitted infection.

The menstrual discharge resembling like the juice of *kinshuka*, the bluish,



yellowish and reddish menstrual discharge associated with burning sensation, fever etc, and dense menstrual discharge are the manifestation of *vatika pradara* (77), *paittika pradara* (78), and *kaphaja pradara* (79), may be caused due to the microbial infection. The breast milk if affected by *vayu* makes it a mass of frothy substances (80), the breast milk becomes discoloured, blue and yellow due to affliction of aggravated *Pitta* (81), and the breast milk becomes unctuous due to aggravation of afflicted *Kapha* (82), Intake of this contaminated breast milk causes the baby unhealthy (83). This state is found in the ingestion of infected or contaminated food by the baby.

Discussion:

The principle and basic mechanism of microbial infection is summarized incorporating the important steps that occurred during the pathogenesis of the infection. The microbes are entered with the different modes of transmission and get attached with the epithelial cell resulting *dosha vridhhi*, *dosha prakopa* and *srota vaigunya* respectively. These lead to the luminal infection and tissue invasion for which cell injury takes pace and causes *dhatu avarana* and *dhatu kshaya*, with the production of the diseases. Right from the entry of the pathogen into the host up to the *srotadushti* and the *dhatu pradushana* the pathogens may remain dormant and requires the favourable factors for the manifestation of the disease process, this period is known as incubation period. And the process which takes pace from the tissue injury upto the production of the disease is termed as (pathogenesis) *samprapti*. *Abhigataja* and *abhishanga jvara*, *santata* variety of *vishama jvara*, *sannipatika jvara* due to external cause, *nichaya gulma*, *kushtha*, *rajayakshma*, *bhutagraha*, *agantuja unmada*, *kshatakshina*, *sthanika shotha*,

kanthashaluka, *vidalika*, *vidradhi* (*bahya & abhyantara*), *upakusha*, *danta vidradhi*, *alaji*, *sirashotha*, *vidarika*, *kaksha*, *romantika*, *masurika*, *unmargi bhagandara*, *jalagardhava*, *paittika udara*, *sannipatika udara*, *chidrodara*, *baddhagudodara*, *udakodara*, *kaphaja arsha*, *pittaja arsha*, *vatika grahani*, *paittika pandu*, *mrit-bhakshanaja pandu*, *kamala*, *shvasa*, *pratamaka shvasa*, *kasa*, *atisara*, *raktatisara*, *amaja chardi*, *agni visarpa*, *kardamaka visarpa*, *aupasargika trisna*, *vrana*, *raktaja & pittaja mutrakrichchhra*, *krimija hridroga*, *dushta pratishyaya*, *krimija shiroroga*, *sannipatika karnaroga*, *paittika chakshu roga*, *darunaka*, *ardita*, *vahirayama*, *vatarakta*, *acharana*, *paripluta*, *stanyadosha*, *shukradosha*, *dhvajabhangaja klaibya*, *pradara* etc. are caused due to the microbial infection.

Summary and conclusion:

On the basis of that it may be concluded that the term *bhuta* is significant to compare with microbes. In almost all the diseases mentioned in *Charaka Samhita*, the microbial infections are well detected in respect to etiology and its signs and symptoms. The severe burning sensation, pus secretion, suppuration, inflammation, necrosis, gangrene and excruciating pain are the well define characteristic of microbial infection which are specified in diseases.

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