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MICROBIAL CONCEPTS IN AYURVEDA: REVISITING CHARAKA SAMHITA AND ITS CLINICAL RELEVANCE

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ABSTRACT

Ayurveda divides illnesses into two categories: endogenous and extrinsic. Among the exogenous groups, infections play a significant role. Ayurvedic treatises provide a detailed account of infectious disorders, including their pathogenesis and management. One of the causes of infection is microbes. So, combating bacteria and their new strains is a huge problem. Though the phrase "microbes" or "microbial activity" is not specifically defined in Ayurvedic scriptures, analogous concepts, functional activities, and cures are depicted. Charaka Samhita has covered practically all potential elements of microbial illnesses in a reasonable and consequential manner, based on its own underlying philosophy and the dominant ideas of the time. The current article discusses the ancient approach to microbial diseases and its clinical effects in Charaka Samhita.

INTRODUCTION

The etiological variables and the intricate phenomena of the substantial pathogenesis are the causes of the diseases. The etiological elements of the disease are used to specify its quality. Since the qualitative aetiology is what causes the corresponding sickness, it is crucial to analyse the aetiology of the particular disease. The primary goal of the diagnosis or treatment is to identify the causative variables. In the past, the aetiology was mostly classified under the heading of incompatible diet and behaviour, but aside from that, the basic understanding of several segmental aetiologies was sequenced in the pathogenesis of disease.

Additionally, a few invisible elements were identified as contributing to the condition. However, as time went on, those early theories of causation were investigated, and it now appears that infectious diseases brought on by microorganisms are a really terrible thing.

The terms "bhuta" were modified to include the ideas of microorganisms. The essence of infection can be discovered by narrating the characteristics of the signs and symptoms of many diseases that are recorded in the ancient text.

Similar perspectives are held about bacteria in relation to pathology. Here, the conceptual examination is offered while preserving the chronological chapters of the illnesses listed in the Charaka Samhita's Chikitsa sthana.

The Conceptual Study

Since the Charaka Samhita also emphasized the concepts of microorganisms, their importance is supported by the indications, symptoms, and aetiologies of various diseases. In the following paragraphs, the effects of microbial infections are examined to amplify the aforementioned viewpoint in many ways because the relevance of microbial infections is nearly evident in all diseases.

Jwara is caused by extrinsic factors such as abhishanga and the affection of abhigata (trauma) (1). Under the abhishanga variation, Bhuta (external unseen aetiologies disrupt body homeostasis) is also included. From the perspective of jvara pathogenesis, the aggravating doshas are similarly regarded as vayu and pitta in the case of abhigata or abhishanga jvara, respectively. However, in this scenario, the abrupt beginning of cardinal traits, i.e., santapa, occurs prior to the aggravating dosha features (2).

Doshaja jvara is also attributed to a few exogenous aetiologies (3). In rasa, rakta, etc., the vitiated doshas are found. When the body temperature rises, dhatus, signs and symptoms, such as vomiting, diarrhoea, both diarrhoea and emesis, body discoloration, abdominal discomfort, etc., appear (4). If the deeper dhatu, such as majja or asthi, is

affected by the vitiated doshas in severe srota, it is difficult to treat; if the shukra is affected, it is incurable (5). When multiple systems are implicated, pathogenic organisms may be incurable or difficult to cure.

Daruvaha is a microbial invasion that causes fever to occur either acutely or gradually and spreads throughout the body by circulating media (6). Cold suffering is the cause of vata vitiation in both abhigata and vataja jvara (7).

Because puncture wounds encourage the growth of the anaerobic bacillus, they are more susceptible (8). The term "transformation" refers to the several alterations that occur when a healthy cell turns into a cancerous one (9). Granthi (10) and Arbuda (11) may also result from these occurrences.

The specific causes of kushtha (12) serve as crucial examples of microbial contamination or development and culture (13). One of the causes of microbial invasion is the consumption of raw food materials and engaging in physical activity in extremes of temperature.

Temperature variations are crucial for the proliferation of microorganisms, including viruses and bacteria (14). Different bacteria have different growth requirements for temperature. Skin, blood, muscle, and bodily fluids, including lymph, are among the damaged tissues that exhibit the microorganisms' trans-migratory route (15). It was already clear and discussed in relation to leprotic illness as early as the Vedic era in India and as early as the Biblical era in the Middle East (16).

Kushtha is considered a chronic illness that progresses over time (17). The several forms of tinea or ringworm that affect the skin, hair, and nails are considered superficial infections, and they are typically moderate and persistent (18). In kushtha, the predominant characteristics of vata, pitta, and kapha are as follows: vayu causes roughness, dryness, coarseness, etc.; pitta causes burning sensation, redness, itching, exudation, suppuration, foul smell, stickiness, etc.; and kapha causes white coloration, itching, localization, elevation, maggot formation, etc. These are typical symptoms brought on by fungal and bacterial skin infections.

Microbes are directly mentioned in the history of Yakshma's (19) external infection of immunocompromised Chandra as a result of excessive sexual activity. Usually, an open case of pulmonary tuberculosis is the cause of the infection.

Direct inhalation of aerosolized bacilli seen in expectorated sputum droplet nuclei is the route of infection; most inhaled bacilli are stopped by the upper respiratory tract's natural defences. The concept of AIDS due to HIV infection is also documented in relation to the immunocompromised state of sosha and/or rajayakshma.

The transmission of bodily fluids (such as rasa, rakta, shukra, etc.) is indicated by the pathophysiology of dhatukshaya in either the pratiloma or anuloma pathway. Rakta is initially impacted in both ways, followed by additional deep tissue (20).

The microbial infection of psycho-neurology is indicated by the aetiologies such as the viruddha-dushta-ashuchi diet (21) of unmada roga. Pathogenic bacteria frequently thrive in the incompatible, tainted, and impure food items, respectively, that make up the viruddha, dushta, and ashuchi in this context (22). Abuse or contamination of any kind, whether due to bad present habits or past deeds (genetic spread), is the source of the eight varieties of bhutagraha described for the emergence of agantuka unmada (23) (24).

Chest discomfort and hemoptysis are clinical signs of kshata and kshina, while cough and haematuria, as well as back and flank pain, respectively, are signs of inflammation brought on by a respiratory or urinary tract infection (25). The cited aetiology of excessive sexual contact provides significant evidence of organism transfer.

Additionally, it should be noted that kshatakshina is less severe than rajayakshma and that, if left untreated, it can develop into rajayakshma (26). The premonitory signs and symptoms of the svayathu roga, the infected cellulites, include hyperpyrexia, burning in the eyes, and dilatation of the affected vessels (28) as well as an exogenous type of oedema (27) if the superficial skin is impacted by trauma or infected materials.

Anal orifice locations experience painful abscesses due to parasitic invasion; if the abscess becomes suppurated and ruptures, it is referred to as infected vagandara (29). Jalagardhava (30), a severe kind of migratory swelling accompanied by a high fever and severe thirst that affects the blood, is caused by pitta-dominant exacerbated dosas.

The cause of this illness is bacteria. All exogenous swelling results from vitiated blood and exacerbated vata, which in turn generates localized reddish swelling. Antimicrobial medication is necessary for infected swelling (31).

Consuming tainted food aggravates the doshas and blocks the channels, which leads to indigestion as an udara manifestation (32). In paittik udara, the pitta is immediately accumulated due to ingestion, which further aggravates vata and pitta. Later, it blocks the channels, and as it moves upward, it suppresses digestion and metabolism with the severe manifestations of burning fever, thirst, fainting, diarrhea, and giddiness (33). The bacterial infection's presentation is indicated by the udakodara (34) problem itself.

Muscle tissue growth is one of the disease's hallmarks (35) and the paittika form of arsha is characterized by profuse perspiration, sticky discharge, bad odour, and suppuration (36) that indicate the direct involvement of a secondary infection.

The massive, continuous discharge from the piles mass is white and red in colour, and it is linked to the intense itching that is observed in kaphaja arsha (37) and may be related to a secondary infection (either bacterial or fungal).

Dust, smoke, and wind are vectors of microorganisms that enter the lungs and cause shvasa roga, especially if the dyspnoea is accompanied by fever and fainting. This condition is known as pratamaka shvasa, which is a serious illness caused by a microorganism (38).

Morbid push, burning sensation, and spit phlegm linked to pitta and continuous kasa are symptoms of paittika kasa, which is caused by an obstruction in vayu movement (39).

Spitting is a common characteristic of vataja, pittaja, and kaphaja kasa, respectively (40). In addition to them, kshataja kasa and kshayaja kasa are caused by bacterial infections such as tuberculosis and present with fever, morbid thirst, blood mixed phlegm, and various coloured phlegm fever, among other symptoms (41).

Because of its heat, fluidity, and morbidity, the aggravated pitta suppresses the strength of agni and disintegrates the stool in the colon, resulting in a paittika form of atisara. Different coloured liquid faces is seen.

Blood, a bad odour, excessive thirst, a burning feeling, and anus suppuration are all present in the stool. When pitta is severely exacerbated and rakta is immediately vitiated, it causes raktatisara, which is characterized by anus suppuration, burning, colic pain, and morbid thirst (43).

It indicates secondary infection as well. The invasion of microorganisms in the site of amadosha aggravates vata, pitta, and kapha. These organisms cause vomiting through their circulation, which manifests as pain, burning sensations, morbid thirst, and vomitus substances mixed with blood (44), which is a categorical indication of infection.

Vomited material with blood, pus, and froth is another sign of infection in the severe form of chardi (45).

Similar to the sannipatika visarpa, in which all the dhatus are infected, particularly rakta with the rapidly spreading ailments (46) suggestive of microorganism infiltration, the manifestations of the two types of visarpa (Agni and Kardamaka) reveal involvement of the microorganism or state of secondary infection. Exposure to contaminated air is strongly prohibited in this condition (47).

Aupsargika trishna is produced by microorganisms that cause fever, urinary tract infections, TB, and asthma (48).

The snayu kleda is the unique characteristics that indicate a microbial infection, and the place of the ulcer's manifestation is the skin, vascular, muscle tissue, ligaments, vital organ, and viscera. Exogenous ulcers are caused by exposure to microorganisms, fire, etc. (49). (50)

The flow of blood, pus, and various coloured materials (51) makes clear the participation of microorganisms, which are further confirmed by ulcer complications such as convulsions, dyspnoea, and morbid thirst (52). The manifestation of snayu kleda, sira kleda, gambhira, krimi bhakshana (maggot appearance) (53) and the ulcer that is impacted by the microorganism—which, if excessively secreted with an unpleasant odour, is incurable in nature—are also used to examine the virulence of the microorganism.

The deep-seated ulcer exhibits a variety of discharges because it is impacted by several aerobic and anaerobic microorganisms. One of the causes of dysuria is uro-genital tract trauma, also known as raktaja mutrakrichchhra. This condition is caused by excessive blood vitiation, which can be brought on by a microorganism invading the body following traumatic injury or by excessive sexual activity (54). The symptoms of a primary infection in paittika type dysuria include pain, burning, and bloody urine (55). Antimicrobial therapy is recommended in Krimija hridroga because cardiac disorders brought on by microbial infestations experience severe pricking pain and itching (56,57).

Seasonal changes and prolonged dust exposure are conducive to the growth of viruses, and these susceptible viruses irritated the nasal mucosa, exacerbating vayu and resulting in rhinitis.

Known as dushtya pratishyaya, this rhinitis disorder is caused

by bacteria that can cause purulent and sanguineous rhinitis, fever, suppurative rhinitis, and other symptoms (58). The secondary infection results in the generation of puyarakta (60). Acute infection of rakta and pitta also causes supportive rhinitis, which is characterized by burning, redness, and suppuration of the nose, among other symptoms (59). Krimija shiroroga, which can be caused by meningitis, encephalitis, tuberculoma, or neurocystisercosis, is characterized by a strong headache (61). The symptoms of Sannipatika Karnaroga include a foul discharge of various colours (62) and microorganisms. The symptoms of the Pattika kind of eye disease include burning, excruciating pain, redness, and the discharge of yellow, sticky substance and highly hot lacrimation (63) that resemble infectious conjunctivitis.

An immediate rise in alopecia (64), a fungal infection, is caused by the body's heat in combination with vata and other doshas scorching the hair root. In arditā, the viruses that cause blood affliction worsen vayu and damage the facial nerves (65). Similar to tetanus, the exacerbated vata in the back of the neck creates nerve constrictions that cause the body to bend like a bow (66). Redness, suppuration, and bursting pain in pita predominate vatarakta are characteristics of necroed tissue due to the concurrent aggravation of vata and rakta (67). A microorganism infestation is suggested if it is linked to exudate secretion (68).

Suppurated vatarakta, which is a characteristic sign of secondary pyogenic infection, is caused by excessive pitta and rakta vitiation, which causes the wound to break open and release pus and rotten blood (69). A major microbe is the cause of the female subject's genital tract infection, which results in excessively offensive menstruation with suppuration, burning sensation, fever, etc. (70) and monthly discharges with itching, etc. (71). The vaginal tract's unsanitary state leads to the proliferation of microorganisms and is accompanied by intense itching, known as acharanayoni-roga (72). The female genital organ is affected by the exacerbated vayu connected with kapha, which is characterized by pain and mucous discharge (73). Similarly, the bluish and yellowish menstruation is produced by the aggravated vayu linked with pitta in paripluta, which may be brought on by sexual activity (74).

The characteristics of vitiated semen include frothy, thin, unctuous, discoloured, slimy, and/or combined with other tissue elements (75), which are symptomatic of an infestation of microorganisms. Dhvajabhangaja klaivya, which is characterized by phallus ulceration and suppuration, exudation, a high rise in temperature, the appearance of phallus maggots, etc., is caused by sexual contact with women who have chronic illnesses, with quadrupedal animals, or with trauma to the phallus, excessive infection, etc. (76). This is how the characteristics of sexually transmitted infections resemble each other.

The symptoms of vatika pradara (77), paittika pradara (78), and kaphaja pradara (79) include menstrual discharge that resembles the juice of kinshuka, bluish yellowish and reddish menstrual discharge that is accompanied by burning sensations, fever, etc., and dense menstrual discharge. These symptoms may be brought on by a microbial infection. When vayu affects breast milk, it turns into a mass of frothy substances (80), when aggravated Pitta afflicts it, it turns blue and yellow, and when afflicted Kapha aggravates it, it becomes unctuous (82). When a baby consumes this tainted breast milk, they become ill (83). This condition occurs when a baby consumes tainted or infected food.

DISCUSSION

The key events that took place throughout the infection's pathogenesis are included in the summary of the fundamental idea and mechanism of microbial infection. Different mechanisms of transmission allow the bacteria to enter and

attach themselves to the epithelial cells, resulting in dosha vridhhi, dosha prakopa, and srota vaigunya, respectively. These result in tissue invasion and luminal infection, which accelerate cell damage and produce diseases like dhatu avarana and dhatu kshaya. The incubation period is the time between the pathogen's admission into the host and the srotadushti and dhatu pradushana, during which it may remain latent and need favorable conditions to display the disease process. Pathogenesis is the term used to describe the process that occurs from tissue damage to the development of the illness.

Nichaya gulma, kushtha, rajayakshma, bhutagraha, agantuja unmada, abhigataja and abhishanga jvara, santata variety of vishama jvara, sannipatika jvara due to external cause, kshatakshina, sthanika shotha kanthashaluka, vidalika, vidradhi (bahya & abhyantara), upakusha, danta vidradhi, masurika, unmargi bhagandara, jalagardhava, paittika udara, sannipatika udara, alaji, sirashotha, vidarika, kaksha, romantika chidrodara, baddhagudodara, udakodara, kaphaja arsha, pittaja arsha, vatika grahani, paittika pandu, mrut-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, arditā, vahirayama, vatarakta, acharana, paripluta, stanyadosha, shukradosha, dhvajabhangaja klaivya, pradara are brought on by the microbiological illness.

SUMMARY AND CONCLUSION

It can be inferred from this that the term "bhuta" is important when comparing microorganisms. The origin and symptoms of microbial infections are well-established in nearly every disease included in the Charaka Samhita. The well-defined features of microbial infections that are specific to diseases include terrible pain, gangrene, inflammation, suppuration, pus secretion, and a violent burning sensation.

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