

HISTORICAL PERSPECTIVE OF AMAVATHA- A REVIEW***¹Prathibha M., ²Ananta S. Desai, ³Dr. Ahalya S. and ⁴Basavaraj G. Saraganachari**^{*1}Ph D. Scholar, Department of Post Graduate and Ph D Studies In Panchakarma, GAMC, Bangalore.^{*1}Assistant Professor, Department of Panchakarma, SDM Institute of Ayurveda and Hospital, Bangalore.²Professor and Head, Department of Post Graduate and Phd Studies In Panchakarma, GAMC, Bangalore.³Professor and Head, Department of Post Graduate Studies In Shalya Tantra GAMC, Bangalore.⁴Professor and Head, Department Of Post Graduate Studies In Panchakarma, SDM Institute of Ayurveda And Hospital, Bangalore.***Corresponding Author: Prathibha M.**

Ph D Scholar, Department of Post Graduate and Phd Studies In Panchakarma, GAMC, Bangalore.

Article Received on 06/04/2022

Article Revised on 27/04/2022

Article Accepted on 17/05/2022

ABSTRACT

The historical review involves the careful study and analysis of past events. History is such an important subject and plays a very vital role when it comes to the shaping of society. History offers a storehouse of information about how people and societies behave. It is a critical investigation of events, their development, experiences of past. The purpose of historical review is to gain a clear understanding of the impact of past on the present and future events related to the life process. The verification of old fact guides us to find out the new fact in research work. Amavata is a conglomeration of Ama and aggravated Vata, traveling through Dhamanis and get lodged in various joints and manifested in the form of pricking type of pain, inflammation, and restricted movements, which can be similar to the symptoms of Rheumatoid Arthritis. Amavata (Rheumatoid Arthritis) is not mentioned in Brihatrayi (the greater trio of Ayurvedic literature) as a special chapter and introduced by Acharya Madhavakara, one of the authors of Laghutrayi, in the 7th century A.D. in his treatise 'Madhavanidana' (a treatise on ayurvedic diagnostics),. Hence, the present work focused on the historical review of Amavata as it reveals the evolution of the disease, which helps to a better understanding of the etiological factors that changed the lifestyle of that people drastically, thereby it helps in plan the treatment protocol in a more precise way.

KEYWORDS: *Amavatha, Ama, Rheumatoid arthritis, Vata.***INTRODUCTION**

The references of *Amavata* as a separate disease entity are not found in the *Brihatrayis* while it is explained elaborately in the *Laghutrayis*. When we analyze this, it can be concluded that *Amavata* was not so common before 7th century A.D. probably, during the *Samhita kala* people were following *Sadvrutta*, *Dinacharya*, and *Ritucharya* properly. But as they started indulging more in *Viruddha Ahara-Vihara* the disease became more common, so that *Madhavakara* had to include it as a separate disease entity.^[1] Therefore, it is necessary to look back at the work done by various scholars as well as that mentioned in classics to search the historical background of the disease.

Rheumatoid Arthritis (RA), according to modern medicine, and *Amavatha* according to *Ayurveda*, has an etiological and clinical relationship. *Amavatha* is disease complex of which RA is a part. A comparative study of the pathophysiology of the disease by both systems reveals that modern medicine has investigated the mechanism of inflammation and has developed an offense strategy to control it.

Amavata develops due to *dusti* (Vitiation) of *vata dosha*, and *Ama*. *Madhavanidana* explains *Amavata* as a separate disease where it is mentioned that *Mandagni* plays an important role in the manifestation of disease.

One of the oldest records of the disease is a brief description in the *Rigveda*, which roughly dates back to 1500 B.C. *Madhava* was the 1st Physician who describes the disease *amavatha*. It seems to be simple disease but its prognosis is not so good. Before the *Acharya Madhava* the concept of *Amavata* was vague. But it was not until 1800 that the disease, described by French physician Augustin Jacob Landre-Beauvais, was recognized in western world. In 1859 British Rheumatologist Alfred Baring Garrod, named the disease Rheumatoid arthritis.^[2]

Review of Amavatha- Historical Stand points

History of *Amavata* is scattered in Ayurvedic texts and being updated. Ayurveda has its own history that starts from Vedas; they are the methodical record of past events about Ayurveda the ancient system of medicine that are considered as the earliest available records.

This is discussed under the following time spaces.

- 1. Veda kala** is considered from 2500 BC - 1000 B.C during this time *Yagurved*, *Samveda*, *Rugveda*, *Atharvaveda*, four veda's are considered among them Ayurveda is considered as *upaveda* of *Atharvaveda*. There is no reference of this disease in Vedic literature. But scattered description of pathological factor Vata, Pitta, Balasa and Visha are mentioned. Some recent scholars tried to attribute the Visha mentioned in Vedic literature as Ama.^[3] there are some references saying that "I shall remove the Visha causing debility in majja and sandhis"^[4] Purana's there are collections of matters pertaining to sharer. Agni Purana narrates the total number of joints and explained the pathyas for Vatarogas concerned to joint.^[5] With these summarized review from vedas, we can conclude that there was exact reference of the disease Amavata but explains about some unexplained causative factor which causes the disease in sandhis.
- 2. Samhitakala** is considered from 1000 BC - 100 A.D. during these period many great sages has given their contribution in the manner of *Samhitas*. Brihatrayee constitute of Charakasamhitha, Sushruta samhita, and Astanga samgraha. In Charakasamhitha 1000 B.C, Amavata has been mention in 28th chapter while illustrating the Avranachikitsa, to denote the *Avarana* of *Vata* by *Ama*.^[6] So it can be consider first relation of ama and Vata, not as disease but as a situation described as independent disease by *Charaka*. In addition to this, a good deal of description regarding aetiology, pathology, clinical manifestation and effective treatment for *amapradosha* is found.^[7] The treatment of *Ama* explained in *Grahanichikitsa* is similar to *Amavatachikitsa* i.e. *Langhana*, *pachana* oral administration of *Pancakolakashaya*, *basti*, *virechana* as described by Bhavamishra.^[8] The term Amavata is included in some of the therapeutic indication of drug compounds, Kamsahareetaki^[9] of svayathuchikitsa and Vishaladiphanta of Pandu chikitsa^[10] are described to be effective in Amavata. In SushrutaSamhita (1000 B.C) only the description of ama is found. In AstangaSangraha (400 A.D) and AstangaHridaya (500 A.D) there is no description about Amavata but the description about ama is available.

The word *AmashayagataVata* is described by *Bhelasamhitha* (800-700 B.C) but Amavata is not found. And both of these entities are entirely different from each other.

Additional information is added by Haritha Samhitha: In *Brihatrayee* even though the aetiology, pathology and treatment aspect of Ama, ajeerna and avarana concepts are explained in detail, Amavatha is not explained as independent disease. The additional information is added by HaritaSamhita (800-700 B.C) an entire chapter is devoted to the *Amavataroga* regarding

aetiology, pathology, clinical manifestation, prognosis effective treatment, dietetics in detail. He explained "*angavaikalya*" as lakshana and "*khandashaka*" as Nidana and also done the classification which is not found in any other treatise.^[11] Point to be considered is that ancestry of Haritasamhitha is questionable in present era by many historians. The Angavaikalya the author mentioned might be compared with deformities which develop once the RA becomes chronic.

- 3. Sangraha kala (100 A.D - 800 A.D)** then came the important turning point when *Amavata* is specially described First time as disease in *MadhavaNidana* (800 A.D) by *Madhavakara*.^[12] The clear explanation of *Nidana*, *samprapti*, *roopa*, *upadrava* and *sadhyasadhata* is available. Later *Chakradatta* has done an outstanding work pertaining to the treatment and effective drug remedies in *Amavata*.^[13]
- 4. Nighantukala (800 A.D. - 1700 A.D)** *GadaniGraha* (1200 A.D) in this treatise "*Vikunchana*" is explained as clinical presentation of *Amavata* along with its treatment. *VangaSena* (1300 A.D) in this text specially mentioned that "*Bahumootra*" is lakshana in *Amavata* along with the treatment.^[14] *Vijayarakshita* (1300 A.D) in his *Madhukosha* commentary on *MadhavaNidana*, has mentioned *sankocha*, *khanjatwaet* as the upadravas of *Amavata*.

As the chronological age proceeds, the advancement in the exploring more and more apt pre-season behind manifestation of symptomatology has taken place. More and more evidence based explanation can be seen in *Nighantuand laghutrayee* than in *samhitha*.

The word *vikunchana* mentioned by *shodhala* in his *GadaniGraha* signifies the deformities and restriction in range of movements of joints can be considered. *Vijarakshitha* the commentator of *Madhavanidana*, lists *Sankocha*, *Khanjatvaas upadrava* (complication). The modern medical science also lists Swan neck deformity and Boutonniere deformities are possible joints deformities in Rheumatoid arthritis, when the disease becomes chronic. Author *Vangasena* mentions *Bahumutra* which is proved in modern science with evidences.

Rasa RatnaSammuchaya (1300 A.D) Author *Rasa Vagbhata* has mentioned different formulations for the treatment of *Amavata*.^[15]

In *Sarangadharasamhitha* (1300 A.D) description of *Amavata*^[16] is found along with its classification. *Basavarajeeya* (1400 A.D) Author has specially explained a totally different method of treatment i.e *Daivavyapashyayachikitsa Japa*, *homa*, *puja* in the treatment of *Amavata*.^[17] *Bhavaprakasha* (1500 A.D) Author *Bhavamishra* has described *Amavata* in detail with

its etiology, pathogenesis and treatment. In the treatment prescription of *Eradataila* is mentioned.^[18]

Yogaratakara (1600 A.D) in this text the complete description of *Amavata* is available. Many formulations along with multiple therapies and treatment protocols mentioned in this treatise.^[19]

BhaishajyaRatnavali (1800 A.D.) Author *Govindadasa* explained etiopathogenesis and elaborately discussed about varieties of treatment protocols.^[20]

5. Modern Medicine

Arthritis and diseases of the joints have been plaguing mankind since ancient times. In around 1500 BC the Ebers Papyrus described a condition that is similar to rheumatoid arthritis. This is probably the first reference to this disease. There is evidence of rheumatoid arthritis in the Egyptian mummies as found in several studies. G. Elliot in his studies found that rheumatoid arthritis was a prevalent disease among Egyptians. In the Indian literature, Charak Samhita (written in around 300 – 200 BC) also described a condition that describes pain, joint swelling and loss of joint mobility and function. Hippocrates described arthritis in general in 400 BC. He however did not describe specific types of arthritis. Galen between 129 and 216 AD introduced the term rheumatismus. Paracelsus (1493-1511) suggested that substances that could not be passed in urine got stored and collected in the body especially in the joints and this caused arthritis. Ayurveda in ancient Indian medicine also considered arthritis as one of the Vata. Practitioners attributed rheumatic disorders to humors (rheuma).

Thomas Sydenham first described a disabling form of chronic arthritis that was described later by Beauvais in 1880. Brodie went on to show the progressive nature of this disease and found how rheumatoid arthritis affected the tendon sheaths and sacs of synovium in the joints. He found how there was synovial inflammation or synovitis and cartilage damage associated with rheumatoid arthritis.^[21]

6. The history of clinical descriptions of rheumatoid arthritis

The first description of RA acknowledged by modern medicine is found in the dissertation of Augustin Jacob Landré-Beauvais from the year 1800. Landré-Beauvais was only 28 years old and a resident physician at the Salpêtrière asylum in France when he first noticed the symptoms and signs of what we now know to be RA. He examined and treated a handful of patients with severe joint pain that could not be explained by other known maladies at the time (such as “rheumatism” or osteoarthritis).^[21] Unlike gout, this condition mainly affected the poor, affected women more often than men, and had previously been ignored by other physicians who – concerned with earning acclaim and compensation for their work – usually chose to treat more affluent patients.^[22] He hypothesized that these patients were

suffering from a previously uncharacterized condition, which he named GoutteAsthénique Primitive, or “Primary Asthenic Gout.” Though Landré-Beauvais’ classification of RA as a relative of gout was inaccurate, his dissertation encouraged other researchers in the field of bone and joint disorders to further study this disease.

The next important contributor to the study of RA was Alfred Garrod, an English physician during the mid to late 19th century. Alfred Garrod was the first to distinguish gout from other arthritic conditions. He found an excess of uric acid in the blood of patients suffering from gout, but not in the blood of patients with other forms of arthritis^[23] in 1859, Alfred Garrod wrote his Treatise on Nature of Gout and Rheumatic Gout, wherein he describes these observations. This work differentiated arthritis from gout and also categorized RA as a distinct condition, which he referred to as “Rheumatic Gout.” Alfred Garrod’s discoveries laid the groundwork for research on the aetiology of RA (Rheumatic Gout). If this condition could be differentiated from both gout and other forms of arthritis, then a distinct aetiology must exist.^[24]

Archibald Garrod, the fourth son of Alfred Garrod, also conducted research on RA. In 1890 he authored the extensive Treatise on Rheumatism and Rheumatoid Arthritis. In this book he coined the term “Rheumatoid Arthritis” to refer to the disease first discovered by Landré Beauvais and later referred to as “Rheumatic Gout” by his father. In the ninety years that had passed since its discovery, more than a dozen terms had been used to describe the same disease. Archibald Garrod chose “Rheumatoid Arthritis” because it more accurately described the disease’s action on the human body. Furthermore, his treatise also delved into the history of RA.

Archibald Garrod wrote when some undifferentiated morbid condition is first described, the characters of which are so striking that it seems well-nigh impossible that they should have been long overlooked it is often suggested that the malady is one of recent development, a new disease which owes its origin to some alteration in the conditions of life...in the case of the disease now to be considered, there is no room for suggestions of this kind, for the evidence of its antiquity is derived, not from mere written descriptions, but from the impress which it has left upon the bones of its victims...

The bones he refers to are ancient skeletal findings from around the world. He discusses bones unearthed in the ruins of Pompeii, skeletons found in a graveyard in Pomerania (near the border of Poland and Germany), bones from ancient Egypt, and even the remains of a Norse Viking found inside his warship, all of which he claimed display skeletal damage indicative of RA. Unfortunately, Archibald Garrod’s book only mentions these claims and does not elaborate on the specific

supporting evidence. Based on his paleopathological claims, Archibald Garrod proposed that RA was not a disease of the modern era, but was present and problematic for our ancestors. His treatise serves as the backbone for the Ancient Origin school of thought regarding the aetiology of RA.^[26]

In the 20th century, the American physician Charles Short challenged Archibald Garrod's paleopathological claims and sought to discredit the Ancient Origin hypothesis as presented by Archibald Garrod in his Treatise. Upon examination of the original paleontological reports cited by Archibald Garrod's Treatise, Short noticed that diagnoses of ankylosing spondylitis, osteoarthritis, and gout had been all confirmed in the skeletal samples. On the other hand he could not find a definitive diagnosis of RA, but rather only claims of RA which he deemed to be unconvincing. Claiming that Archibald Garrod's ideas were spurious, Short hypothesized that, due to the lack of evidence demonstrating otherwise, RA was actually a disease of modern origins. Though others had made similar conjectures in the past, it was Short's work that is most often credited as the basis of the Recent Origins view of RA. The Ancient Origins vs. Recent Origins debate persists even today as both sides of the argument continue to develop evidence to support their claims.^[26]

7. Evidence from literature and art^[27]

Although Landré-Beauvais' dissertation is considered to be the first accepted medical report of RA, some researchers have suggested that earlier descriptions are available in ancient texts. The Greek philosopher Hippocrates wrote. *In the arthritis which generally shows itself about the age of thirty-five there is frequently no great interval between the affection of the hands and feet; both these becoming similar in nature, slender, with little flesh...For the most part their arthritis passeth from the feet to the hands, next the elbows and knees, after these the hip joint. It is incredible how fast the mischief spreads.*

It seems very possible that Hippocrates was describing a patient with RA. Similar descriptions can be found in the writings of the Greek physician Arataeus, Caesar's physician Scribonius, the Byzantine physician Soranus, Emperor Constantine IX's adviser Michael Psellus, and various other ancient physicians. Many experts consider these texts to be evidence of RA's existence in ancient times because the writings describe symptoms that closely resemble the signs and symptoms of RA. These researchers believe these ancient writings to be evidence in favor of the Ancient Origins view of RA aetiology. However, opponents claim that these texts offer insufficient support for the prevalence of RA because the vague descriptions do not meet the rigorous scientific standard for making such a claim. The role of ancient literature in the etiological puzzle generally remains anecdotal.

The most convincing case of RA in Renaissance is a depiction of the Temptation of St. Anthony by an anonymous painter (mid-15th to early 16th century) from the Flemish Dutch School, as reported by Dequeker and Rico in 1992.^[28] The picture of a beggar in the left hand corner of the painted portrait is the subject in question. That painting portrait explains about the deformity particularly, striking is the deformity of the beggar's right hand showing wrist luxation, ulnar deviation, and finger contractures. This pattern is very similar to that seen in many RA patients.

8. Paleopathological evidence^[29]

In addition to analyses of historical medical writings and paintings, post-mortem investigations provide a venue for gathering scientific data about a disease's historical prevalence. The lack of widely accepted ancient medical texts regarding RA has forced researchers to turn to paleopathological studies. Due to the nature of buried skeletal remains, which generally lack soft tissues, bone and joint diseases (including RA) are typically easy to study on post-mortem specimens.

Two preliminary paleopathological studies independently carried out by Professor Flinders Petrie and Sir Armand Ruffer in the late 19th and early 20th centuries discuss human remains from Egypt that demonstrate skeletal damage similar to RA. Ruffer was given skeletal samples from seven different burial sites in Egypt that included Egyptian, Greek, and Macedonian remains. Upon examination of the skeletons, he noticed severe lesions and eburnation of the joints that he concluded were suggestive of RA. Professor Petrie's discoveries utilized a similar approach and found comparable results. Unfortunately these pioneering studies were done before the development of modern paleopathological methods. Furthermore, it was not until the 1970s that RA and ankylosing spondylitis (AS) were conclusively differentiated through genetic studies. Close inspection of Ruffer's work reveals many potential cases of AS, but not one definitive case of RA. Ruffer and Petrie's works are generally not considered to be convincing evidence for RA in ancient times. However, their work demonstrated that evidence of rheumatic diseases could be identified in ancient human remains.

Nonetheless the development of rigorous scientific techniques within paleopathology (a medical anthropology specialty field) has uncovered samples from around the world that demonstrate skeletal damage that may be suggestive of RA. By taking into consideration the expertise of anthropologists, physicians can distinguish skeletal damage caused by diseases from that caused by the elements. This has greatly increased the validity of more recent studies. Still, there are some convincing cases from around the world to that demonstrate signs of RA preceding Landré-Beauvais' description of RA by several hundred years, thereby favouring the Ancient Origin view of RA aetiology.^[30]

DISCUSSION

Ayurveda is the oldest system of medical science; most of its knowledge is embedded in Brihatrayi and Laghutrayi. Brihatrayi, the greater trio of ayurvedic literature, composed of Charaka Samhita, Sushruta Samhita, Ashtangahridayam, which deals with the concepts of Ayurveda in a detailed manner. Laghutrayi, the lesser trio of ayurvedic literature, consists of Madhava Nidana, Sharangadhara Samhita, and Bhavaprakasha, which deals with the concepts of Ayurveda succinctly. The present disease Amavata has been described for the first time as a specific chapter by Acharya Madhavakara, in his treatise that is Madhava Nidana. In which the signs, symptoms, etiological factors, Samprapti (pathogenesis), types, complications, and prognosis in a systematic way. Earlier than Madhavakara, Amavata has been not focused. However, the detailed description of Ama formation, Lakshanas of Amadosha, Amavisha, its types and effects on the body along with management has been delineated lucidly in Charaka Samhita, Sushruta Samhita, Ashtangahridayam, Ashtangasamgraham, and Kashyasamhita too.

Acharya Madhavakara, son of Indukara, belongs to the 7th century A.D. and from Vangadesha, which is the Bengal region at present. Apart from Amavata, Madhavakara also described some diseases for the first time, such as Medoroga, Amlapitta, Annadravashoola, Parinamashula etc. These diseases have a similar etiological background like consumption of food in excess amount, intake of Guru, Snigdha Ahara, sedentary lifestyle etc. In Charaka Samhita, 80 exclusively Vataja Nanatmaja diseases have been enlisted, in which envelopes Stambha (stiffness), Sankocha (constriction), and Parva-asthi bheda (pain in the bones and joints) and they are the symptoms of the Nirama stage of Amavata. The etiological background of the above-said diseases is different from the etiology of Amavata as it is caused by the consumption of Guru (heavy), Snigdha Ahara (unctuous food), in excess amount. Before the 7th century A.D., the concept of Amavata was vague, and at the end of 6th century A.D. there were no such diseases known to be Amavata.

All the successive authors have followed the path of Madhavakara in comprehensively explaining the disease. While Madhavakara emphasized mainly on the etiology, pathogenesis, symptomatology, other acharyas like Vrindamadhava, Chakradutta, Rasa Vagbhata (author of Rasaratnasamucchaya), and Kaviraja Govindadas sen (author of Bhaishajya Ratnavali) have focused more on the treatment perspectives only. All the articulations revealed that Amavata is manifested from the conglomeration of Ama and aggravated Vata dosha, gets accumulated at joints. The treatment protocol involves Langhana (depletion therapy), Swedana (fomentation therapy), Tiktarasa dravya (pharmacologically having the function of bitter), Dipaniya dravya (appetizers), Katu rasa dravya (pharmacologically having the function of

pungent), Virechana (Purgation), Snehapana (Oleation therapy), and Administration of Vasti.

CONCLUSION

Finally, it can be concluded that the disease Amavata is not mentioned before Acharya Madhavakara. Even though there are extensive descriptions of Amadosha and aggravation of Vata in Brihatrayi, there is no particular chapter on Amavata as a single disease entity. For the first time, Acharya Madhavakara has described the etiology, pathogenesis, signs & symptoms, types, and the prognosis of Amavata has delineated lucidly, which have been followed by the other followers. Acharya Madhavakara's descriptions not only helped the other physicians to prescribe the line of treatment but also to enlist the wholesome diet and regimen to be followed in Amavata condition.

REFERENCES

1. Upadyaya Y.N., *MadhavaNidana of Madhavakara, AmavataNidana*, 25. Varanasi:ChaukambaSanskrit Series: 1970. Sanskrit commentary by Sri Vijayarakshitha and Sri kanthadatta and Vidyotini Hindi Commentry noted by Sri Sudarshana Shastri.
2. Basisht GK, Ram harsha Singh, Management of rheumatoid arthritis (Amavata) using symbiohealthcare system. AYU, 2012 Oct-Dec; 33(4): 466-474. (PMCID:PMC36651880, 12-01-2022. 7: 44.
3. VedmurtiPanditShri Ram Sharma acharya edited Atharvedakhanda 9 sutra 13/10, edition 2005, and pub: BhramVarchasya, Shantikunj, Haridwar, pg-31.
4. VedmurtiPanditShri Ram Sharma acharya edited Atharvedakhanda 9 sutra 13/18, 20, edition 2005, and publication: BhramVarchasya, ShantikunjHaridwar, pg32.
5. UpadhyayaBaladeva edited Agni Puranaadhyaya-275/2, edition 1998, Chaukhambha Sanskrit Bhawan, Varanasi, pg- 411.
6. BrahmanandaTripathi Edited Madhavanidanam - 25/4, edition 1998, and pub: Chaukhambha Sanskrit Samsthan, Varanasi pg- 571.
7. Dr.BrahmanandaTripathi Edited Madhavanidanam - 25/4, edition 1998, and pub: Chaukhambha Sanskrit Samsthan, Varanasi pg- 571.
8. VaidyaJadavajiTrikamjiacharya edited Charakasamhitachikitsasthana– 15/75,80, edition reprint 2009, and pub: ChowkhambaSurabharatiPrakashana Varanasi, pg- 518.
9. Vaidya Jadavaji Trikamjiacharya edited Charaka samhita chikitsasthana – 12/51-52, edition reprint 2009, and pub: ChowkhambaSurabharatiPrakashana Varanasi, Pg- 487.
10. VaidyaJadavajiTrikamjiacharya edited Charakasamhitachikitsasthana– 16/61-62, edition reprint 2009, and pub: ChowkhambaSurabharatiPrakashana Varanasi, Pg- 529.

11. VaidyaJadavaji Trikamjiacharya edited Charakasamhitachikitsasasthana– 16/61-62, edition reprint 2009, and pub: ChowkhambaSurabharatiPrakashana Varanasi, Pg-529.
12. Dr.BrahmanandaTripathi edited Madhavanidanam-25/4, edition 1998, and pub: Chaukambha Sanskrit Samsthan, Varanasi, pg- 571.
13. AcharyaPriyaVrat Sharma edited Cakradattasamhita chapter 25, edition 1998, and pub: Chaukambha Publishers, Varanasi, pg-227.
14. Dr.NirmalSaxena edited Vangasenasamhita vol.1 chapter 31/10, edition 2004, and pub: Chaukambha Sanskrit Series Office, Varanasi, pg- 479.
15. Dr.IndradevTripathi edited RasratnasamuchyaVatarogasamanyoupaya, edition 2003, and pub: Chaukambha Sanskrit Bhavan, Varanasi, pg- 283.
16. Dr.BrahmanandaTripathi edited Shadangdharsamhitapurvakhandadyaya 7/41, edition 1990, and pub: ChowkhambaSurabharatiPrakashana Varanasi, pg-97.
17. VaidyavarShriBasavraj edited Basavrajyam, adhyaya 24, edition 2005, and pub: Chaukambha Sanskrit Pratishthan, Delhi, pg-373.
18. BhishagratnaShriBhramshankarShastri edited BhavprakashaAmavatadhikara 26/50-51, edition 2037 (V.S), and pub: Chaukambha Sanskrit Samsthan, Varanasi, pg-286.
19. BhishagratnaShriBhramshankarShastri edited YogaratnakarapurvardhagatAmavatanidanaAdhyaya , edition 2005, and pub: Chaukambha Sanskrit Samsthan, Varanasi, pg-564.
20. Shri.AmbikadattaShastri edited BhaisajyaRatnavaliAmavatachikitsa prakrana21, edition 2005, and pub: Chaukambha Sanskrit Samsthan, Varanasi, pg-61.
21. URL-
www.ncbi.nlm.nih.gov/pmc/articles/PMC1639217/pdf/brmedj00509-0043.pdf
22. Landré-Beauvais AJ. The First Description of Rheumatoid Arthritis. Unabridged Text of the Doctoral Dissertation Presented in 1800. Joint Bone Spine. 2001; 68:130–142. [PubMed: 11324929]
23. Kahn MF, Landré-Beauvais AJ. Joint Bone Spine, 2001; 68: 143.
24. PouyaEntezami, BS, David A. Fox, MD, Philip J. Clapham, BS, and Kevin C. Chung, MD, Hand Clin. Historical Perspective on the Etiology of Rheumatoid Arthritis, 2011 February; 27(1): 1–10. doi:10.1016/j.hcl.2010.09.006.
25. Garrod, AE. A Treatise on Rheumatism and Rheumatoid Arthritis. London: Charles Griffin and Company, 1890.
26. PouyaEntezami, BS, David A. Fox, MD, Philip J. Clapham, BS, and Kevin C. Chung, MD, Hand Clin. Historical Perspective on the Etiology of Rheumatoid Arthritis, 2011 February; 27(1): 1–10. doi:10.1016/j.hcl.2010.09.006.
27. PouyaEntezami, BS, David A. Fox, MD, Philip J. Clapham, BS, and Kevin C. Chung, MD, Hand Clin. Historical Perspective on the Etiology of Rheumatoid Arthritis, 2011 February; 27(1): 1–10. doi:10.1016/j.hcl.2010.09.006.
28. Dequeker J, Rico H. Rheumatoid Arthritis-like Deformities in an Early 16th-Century Painting of the Flemish-Dutch School. JAMA, 1992; 268(2): 249–251. [PubMed: 1608144]
29. PouyaEntezami, BS, David A. Fox, MD, Philip J. Clapham, BS, and Kevin C. Chung, MD, Hand Clin. Historical Perspective on the Etiology of Rheumatoid Arthritis, 2011 February; 27(1): 1–10. doi:10.1016/j.hcl.2010.09.006.
30. Rogers J, Dieppe P. Skeletal Palaeopathology and the Rheumatic Diseases: Where are we now? Annals of the Rheumatic Diseases, 1990; 49: 885–886. [PubMed: 2256733]