

International Journal of Ayurveda and Pharmaceutical Chemistry

Volume 7 Issue 2 2017

www.ijapc.com



Pathogenesis of Anterior Uveitis: An Integrated Approach of Ayurveda and Biomedical Science

Neha Bernwal^{1*} and B. Mukhopadhyay²

^{1,2}Department of ShalakyaTantra, IMS, BHU India

ABSTRACT

Anterior uveitis is one of the common blindness causing disease in world. The current approach for treatment of anterior uveitis is, to reduce the inflammation with the help of corticosteroids and other NSAIDs either locally or systemically. Even the concept of immunosuppression and immunomodulation has been introduced for the management purpose of uveitis. But, yet it is a riddle to overcome the side effects of these drugs and also these drugs are not promising about the consequences and recurrence of diseases. So it is rational to adopt a integrated system of medicine which is having same effects on disease entity but producing less side effects to the patients. Ayurveda can play an important role in integrated system of medicine for the management of diseases and it's consequences and recurrences. The objective of this paper is, to develop a conceptual understanding of pathogenesis of Anterior Uveitis in ayurvedic perspective as well as in biomedical perspective to build up a integrated concept, which can provide a base, to discover the integrated systems for the treatment of uveitis.

KEYWORDS

Uveitis, Corticosteroids Immunosuppression, Immunomodulation, Ayurveda



Greentree Group

Received 03/08/17 Accepted 24/08/17 Published 10/09/17



INTRODUCTION

Eye is the most highly specialized sense organ, serving the most vital function of providing sight to living creature. Vision is unarguably the most important senses. Hence it is stated in ayurvedic literature that “All the sincere efforts should be made by men to protect the eyes throughout period of life; for the man, who is blind, this world is useless and the day and night are the same even though he may have wealth.”

Uveitis is an important ocular disease, includes the inflammation of uveal tissue i.e the middle coat of eye. Uveitis is considered as a rare disease. In spite of being so rare, the disease is very common cause of legally-recognized visual impairment. Among the different forms of uveitis, anterior uveitis is counted most common followed by panuveitis, posterior uveitis and intermediate uveitis respectively. The impairment in visual function of patients are resulted either because of damaged uveal tract tissue or due to the affected neighboring tissues, like complicated cataract formation, secondary glaucoma and macular oedema.

Though Modern ophthalmology has made tremendous progress and advances in the diagnosis and treatment strategy of anterior uveitis in the recent times but it's recurrence

and complications, are the ophthalmic riddle yet to be solved. Modern medicine has evolved a number of drugs for the treatment of uveitis, although initially they respond well to disease entity to cure but most of them, are not promising about the recurrence of disease and it's complications. On the other hand, these drugs also develop their own complications.

Research by reviewing *Ayurvedic* classics, can provide new precedence, pharmacologically as well as non-pharmacologically. The conceptual studies which correlate basic concepts of *Ayurveda* and Modern Medicine will form the basis for further research. The aim of this paper is to explore the possible areas of research in the field of Anterior Uveitis by integration of ancient knowledge with modern developments.

ANTERIOR UVEITIS^{1,2}

The inflammatory process of the uvea is called uveitis and may cause sight threatening damage to the eye. The origin of this inflammatory process can be of *endogenous origin* (by forming part of a systemic disease or mainly an eye syndrome) or *exogenous origin* (related to infectious factors that affect the eyeball in an isolated fashion or take place in multiple systemic infections).



Uveitis is, anatomically, classified according to the location of inflammation, which can be *anterior* (anterior chamber), *intermediate* (vitreous), *posterior* (choroid and retina), and *panuveitis* (anterior chamber, vitreous, choroid, and retina). Uveitis may also be classified clinically as *infectious* (bacteria, viral, fungal, parasitic, etc.), *noninfectious* (known or unknown systemic association), and *masquerade* (group of eye diseases that mimic chronic intraocular inflammation).

Anterior uveitis is the most frequent form of uveitis for all populations and ages. Posterior uveitis and panuveitis possess second and third most frequent locations respectively. Finally and globally, intermediate uveitis is doubtlessly the least frequent location.

Despite of lower incidence, appearance of anterior uveitis shows serious consequences in patients as it appears in the 20–60 year-old age group (working age group) in 70%–90% of cases. Being a common cause of blindness, uveitis considerably affects productivity and quality of life.

ETIO-PATHOGENESIS OF ANTERIOR UVEITIS³

Eyes are gifted with certain immune regulatory mechanisms which allow them to maintain a low level of immunity and also to maintain tissue integrity against undesirable

changes, which may result in malfunctioning of visual process irreversibly. This is, what we know as, “*Immune privilege*”. Presence of certain mechanical structures, such as ocular blood barriers and absence of lymphatic drainage and several molecular mechanisms like secretion of soluble immunosuppressive factors by eye cells, such as β -TGF, Fas ligand (FasL) or the low expression of MHC class II molecules in antigen-presenting cells, help to inactivate the immune response within the eye, resulting in Immune privileged status of eyes.

From the Ayurvedic point of view, the condition which is mentioned above, is recognized as *Samya-awastha* or *Prakritawastha*, where all the *doshas* are in equilibrium and produce *Aarogya*.

When there is accumulation of certain triggering factors (like genetic make-up, environmental factors such as trauma and microbial infections) in the eye, these factors induce several mechanisms to promote the development of pathogenic process and produce the inflammation.

GENETIC BACKGROUND

The possible involvement of genetic factors in the pathogenesis of uveitis, has been established with twins, familial aggregation and in particular by the association between



several uveitic conditions, and certain HLA alleles.

In the Ayurvedic classics, this predetermined genetic constitution responsible for disease is described under the description of etiological factors of *vyadhi*, i.e. *Aadi-balapravritta vyadhi*⁴.

TRAUMA

Damaged uveal tissue followed by trauma leads to sequestered antigens release from the “Uvea” and “Lens” resulting in specific autoimmune response that selectively affect the tissues. Sometimes, not the release of sequestered antigen itself, but the microbial contamination accompanied by trauma and accumulation of necrotic products at the site, promote the immuno-pathogenicity.

This important reason of the pathogenesis is also described in Ayurveda, under the umbrella of Classification of *Vyadhies* as *Sanghat-balapravritta vyadhies* and *Agantuka vyadhies*⁵.

MICROBIAL INFECTIONS

They trigger the pathogenic autoimmunity process by two different mechanisms, i.e. Molecular mimicry (similarity between short streaks of sequences of uveitogenic antigens, such as Arrestin and certain microbial products) and non-antigenic specific stimulation of the immune response.

The concepts of Microbial infections are also well known to ancient scholars. They described these infections under the term *Daiva-balapravritavyadhies* by the term *Pishachadi-kritavyadhi*⁶. Also there are several places, where the concept is described under the term *Krimi*, which become the cause of Disease. These *Krimis* are described as *Bahya* and *Abhyantara krimi*^{7,8,9}, which resembles the concept of infection i.e. exogenous or endogenous in nature.

Except these triggering causes, existing infective diseases in body, may lead to anterior uveitis. This is known as *Aupsargika vyadhies*¹⁰.

MECHANISM OF PATHOLOGY³

Onset of Anterior uveitis can broadly be described as a failure of the ocular immune system and the disease results from inflammation and tissue destruction.

Defense mechanism in eye is mediated by two systems: the “Innate immunity” system and antigen specific “Adaptive immunity”. The two systems consist of both cellular and humoral components. The cellular components comprises several population of phagocytes, natural killer (NK) cells and NKT cells. The molecules that participate in innate immunity, includes components of



complement cascade, the acute phase response proteins, and numerous cytokines and chemokines.

The “Adaptive immunity”, being antigen specific, includes memory component. Cellular components of this system i.e Families of B and T lymphocytes responds by producing antibodies and by acting as effector cells and produce cytokines respectively.

When any or all the causes mentioned above present in body, the homeostatic conditions can be upset and auto-reactive T cells allowed to proliferate and migrate to the eye. These cells in the eyes, release several inflammatory cytokines, which results in certain inflammatory changes in the form of vascular changes and cellular changes. Blood vessels of Uveal tissues dilate and blood ocular barrier becomes broken, resulting in collection of inflammatory cells in anterior and posterior chamber. The types of cells collected depends upon nature of cause, as polymorphs in infectious uveitis, lymphocytes in allergic uveitis and mononuclear cells in granulomatous uveitis. These inflammatory cells sometimes become adhered to cornea, resulting in formation of KPs. Sometimes these may be collected as Hypopyon in anterior chamber.

Iris becomes edematous due to water logging in active phase, and gives Muddy appearance .While in chronic phase, atrophic changes occurs. Due to inflammatory changes, nodules named Koepe’s and Bussaca are formed on Iris.

Because of fibrin rich exudates in anterior or posterior chamber, adhesions of Iris to lens or cornea occurs i.e. formation of synechiae, resulting in irregular shaped pupil (Festooned pupil) . Synechiae may further lead to the secondary glaucoma. Sometimes synechiae and fibrinous exudates leads to the formation of complicated cataract and cyclitic membrane.

Due to inflammatory changes, papillitis , disc edema, retinitis and choroiditis may also occurs.

Because of this pathological process in eye of patient, symptoms like *eyache, headache, photophobia, redness, tearing, blurred vision* and *floaters* develop.

In Ayurveda, the description of any disease is based on clinical signs and symptoms in the absence of devices to conduct investigations. By exploring the *Ayurvedic literature*, it was found that Diseases i.e. *Pittaja* and *Raktaja Adhimantha* as told by ancients is very near to the clinical picture of uveitis.



The complex phenomenon of the pathogenesis of *Pittaja* and *Raktaja Adhimantha* can be understood in the *Ayurvedic* terms very easily by

understanding the concept of *Shad-Kriya-Kala* in *Shushruta Sutra sthana*¹¹, as described below-

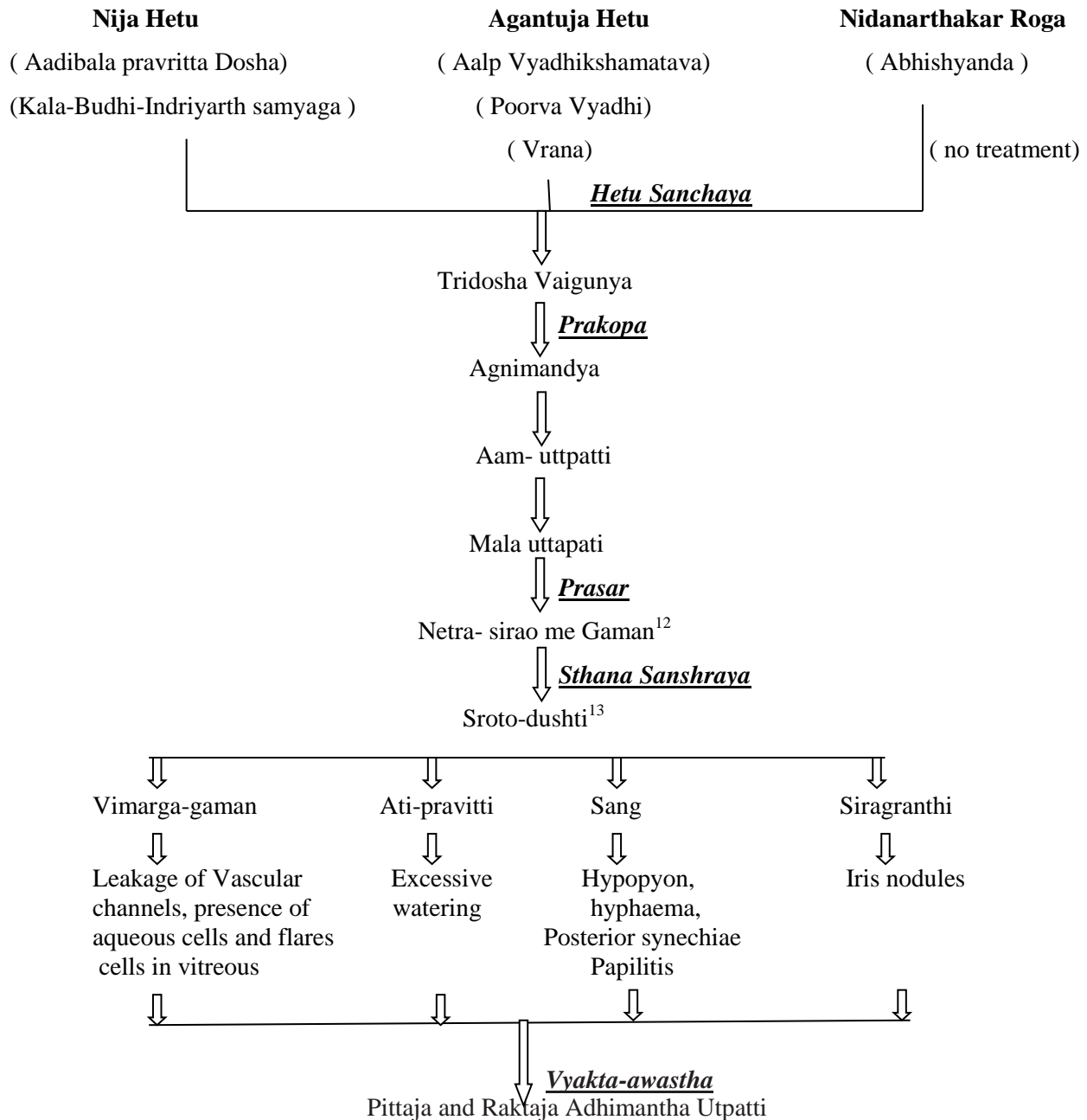


Chart showing the pathogenesis of Pittaja and Raktaja adhimantha in special reference to Anterior Uveitis

Clinical Features

Pittaja Adhimantha¹⁴- Symptoms of *pittaja adhimantha* due to Vitiated *pitta*

dosha includes burning sensations(*Vahninev avdahyate* and *Ksharenksatamam eva*), congestion (*Raktarajichitam*), discharge (



Sasvedam), inflammation visual haloes (pitta darshana) headache and unconsciousness (*Moorcha-shiro-Daah yutam*).

Raktaja Adhimantha¹⁵ - *Raktaja adhimantha* includes more aggravated form of *pittaja adhimantha*. Symptoms are severe congestion (*Bandhujeeva pratikasham*), Pain on touch (*Sparsh-akshamam*), haemorrhage (*Rakta srava*), pricking pains (*nistoda*), visual halos (*Pashyati Agninibhadish*) and ciliary congestion (*Raktanimagnaarishta vat krishnabhaga*), burning sensation (*Yat deeptam Rakta paryantam*).

Clinical features of Pittaja and Raktaja adhimantha in special reference to Anterior Uveitis

Ocular Signs in Pittaja and Raktaja Adhimantha	Ocular Signs in Uveitis
Raktarajichitam, Bandhujeeva - sankasham	Circumciliary congestion
Prapakva Shoona Vartmantam	Lid oedema
Raktamagna- arishtavacaah Krishna- bhagash	Hyphaema in anterior chamber
Ocular symptoms in Pittaja and Raktaja Adhimantha	Ocular symptoms in Uveitis
Sravi	Excessive watering
Vahninev-avdahyate,	Burning sensation like pain
Ksharenaktiva kshatam	Burning sensation like pain
Sparsh-akshamam, Sanistodam	Excessive pain
Complication in Pittaja and Raktaja Adhimantha ¹⁶	Complication in Uveitis
Hathadhimantha	Secondary glaucoma leading to pthisis bulbi

CONCLUSION

The etiological factors regarding to the anterior uveitis, are considered are genetic constitution (*Daiva Karana*), trauma (*Agantujakarana*) and microbial infections (*Krimi*, that may be *Agantuja* or *Sahaja*). All these factors lead to the *doshic imbalance* in body as well as in eyes, leading to *Aama* production, followed by its aggravation and *Sroto-dushti* and ultimately resulting in disease Anterior Uveitis.

The disease is a major cause of blindness in all-around the world. An integrated approach dealing with all risk factors of anterior uveitis is more rational. The correlations proposed in this paper regarding the pathogenesis by integrating the concepts of modern medicine and ancient ayurveda, can lead to a perspective, which can make a base for interdisciplinary study and treatment of disease.



REFERENCES –

1. Khurana A K, Comprehensive Ophthalmology, 5th edition, New Age International (P) Ltd, New Delhi, 2012, pp-180.
2. Parsons' Diseases of the Eye, Edited by Ramanjit Sihota & Radhika Tandon , 22nd edition, Reed Elsevier India Private Limited, New Delhi, 2015, pp-235-241.
3. Myron Yanoff, MD and Jay S. Duker, MD. Ophthalmology, 4th Edition ISBN : 9781455739844 : Publication Date : 16-12-2013: page 690-92
4. Susruta Samhitha of Susruta, Sutra Sthana 24/6, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol I, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-130.
5. Susruta Samhitha of Susruta, Sutra Sthana 24/7, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol I, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-130.
6. Susruta Samhitha of Susruta, Sutra Sthana 24/8, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol I, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-131.
7. Susruta Samhitha of Susruta, Uttara Tantra 54, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol II, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-509-2.
8. Madhav Nidanam of Madhavakara , 7/1 , with Madhukosha sanskrita commentary and Vidyotini hindi commentary and Notes by Sri Sudarshan Shashtri, edited by Prof. Yadunandan Upadhyay, Chukhambha Prakashan, Varanasi, pp-238
9. Charaka Samhita, Vimanasthana 7/10 , with elaborated Vidyotini hindi commentary by Pt. Kashinath shashtri and Dr. Gorakhnath Chaturvedi , Vol I, published by Chaukhambha Bharti Academy, Varanasi, pp- 726.
10. Susruta Samhitha of Susruta, Uttara Tantra 6/10, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol II, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-35.
11. Susruta Samhitha of Susruta, Sutra Sthana 21/18-34, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol I, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-117-121.
12. Susruta Samhitha of Susruta, Uttara Tantra 1/20, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol II, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-13.
13. Charaka Samhita, Vimanasthana 5/24 , with elaborated Vidyotini hindi commentary by Pt. Kashinath shashtri and Dr. Gorakhnath Chaturvedi , Vol I, published by Chaukhambha Bharti Academy, Varanasi, pp- 714.
14. Susruta Samhitha of Susruta, Uttara Tantra 6/14-15, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol II, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-35-36.



15.Susruta Samhitha of Susruta, Uttara Tantra 6/18-19, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol II, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-36.

16.Susruta Samhitha of Susruta, Uttara Tantra 6/23-24, edited with Ayurveda Tattva Sandeepika Hindi Commentery by Kaviraja Ambika Dutta Shastri , Vol II, Chaukhambha Sanskrit sansthan , Varanasi, 2010, pp-38.