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Juvenile Idiopathic Arthritis (JIA) : Disease Review and Ayurvedic Management

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ABSTRACT

Juvenile idiopathic arthritis (JIA) is the most common disease and frequently found in childhood. JIA is the collective term to denote large group of conditions with variable manifestations. Acute and chronic inflammation of multiple target organs especially musculoskeletal system. During the course of a disease the number of involvement of joints, type of joints involved will decide the type of JIA according to ILAR classification. As the etiology of the disease is complex, it has involvement of genetic factor as well as auto immune pathology. Management of the disease requires a team work including medical therapy with anti-inflammatory drugs, psychological counseling, physiotherapy and rehabilitation. Ayurvedic management can improve quality of life of a patient. *Shodhana* therapy with *Snehan* with medicated oil, *Nadi Swedan, Valuka Pottali Swedan* and *Mridu Virechan* shows great improvement in the symptoms. It will also decrease the progression of disease. Immunomodulator drugs has great role in the treatment. *Rasayan* is indicated in *Samhitas* that helps in preventing deformities and support physical and mental strength of a child.

Key words: *Juvenile Idiopathic Arthritis, Ayurvedic Management, Immunomodulatory drugs, Rasayan drugs.*

INTRODUCTION

Juvenile Idiopathic Arthritis is also called Juvenile Rheumatic Arthritis. It is collective term to denote a large group of conditions with various manifestations but two common characteristics. One is inflammation of small or large joints and second is abnormal immune response e.g., auto immune etiology. In any case, non recognization of self-antigen by T-cells, leading to - (A) Recruitment of inflammatory cells (B) Immune complex formation (C) Compliment activation (D) Cytokine production. All leading to chronic inflammation and tissue damage.[1] JIA is heterogeneous group of chronic arthritis. It has intermittent exacerbation and residual deformities.

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Disease History

JIA is an umbrella term for several subtypes of JIA. JIA specialized center was created at the Canadian Red Cross Memorial Hospital in Berkshire. Originally this center was created to research and treat rheumatic fever which was prevalent in the years World War 2. Dr. Barbara Ansell was the first to recognize that different patients show different patterns regarding the development, progression of disease. Dr. Fredrick Still, a pediatrician at Great Ormond St Hospital, first described JIA in 1896.[2]

Etiology

JIA is complex and poorly understood. 1. An autoimmune reaction to the external triggering factors like viral infections or joint trauma. 2. An

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inherent immunological susceptibility. Pathologically tissue injury is characterized by hyperemia and edema of sub synovial tissues. A pannus is formed over articular cartilage. Pannus is abnormal layer of fibrovascular tissue or granulation tissues. Deformity of joints occur in late stages.

Clinical diagnostic criteria of disease

Age of onset: Less than 16 years.

Arthritis: More than 6 weeks with joint swelling or any two of following criteria:-

(1) Restricted active joint movements

(2) Painful movements

(3) Increased joint temperature

Pattern: Involvement of joints (in first 6 months)

Pauciarticular involving less than 5 joints

Polyarticular involving 5 or more than 5 joints.

Systemic with fever, rash and arthritis.

ILAR classification of JIA

- Systemic arthritis
- Polyarticular (Rheumatoid factor -ve)
- Polyarticular (Rheumatoid factor +ve)
- Oligoarthritis
- Enthesitis - related arthritis
- Psoriatic arthritis
- Undifferentiated arthritis

JIA has three important types: Oligoarthritis, Polyarticular and Systemic

Subtypes of JIA

	Oligoarthritis	Polyarticular		Systemic
		Rh -ve	Rh +ve	
Frequency	40 – 50 %	20 – 35 %	10 %	5 – 15 %
Age of onset	< 5 years	< 5 or > 10 years	> 10 years	< 5 years
No. of joints	Less than 5	More than 5	More than 5	Less than 5
Type of joints	Large	Small / Large	Small / Large	Large and small
Systemic signs	Uveitis (<25 %)	Rare	Nodules	Rath, others
Rh - factor	Very rare	Negative	Positive	Negative
Prognosis	Good	Good	Poor	Worst

Clinical Presentation: Arthritis in JIA

It has early morning stiffness, joint swelling, restricted movements. Chronic course of the disease has intermittent exacerbations and residual deformity. Postural abnormalities e.g., scoliosis.

Extra articular manifestations are more common in systemic and polyarticular arthritis

Anterior uveitis, with red eye, glaucoma, blindness, pericardial, pleural effusion, chronic renal disease

Oligoarticular JIA: It involve four or less than four joints within the first six months of disease. Mostly affecting large joints of lower limb, ankle and knee joints. Persistent type includes four or less than four joints even after six months. Extended type involves more than four joints after six months.

Polyarthritis JIA: Inflammation of 5 or more than five joints within six months of period. Rheumatic factor negative cases involve small as well as large joints. Rheumatic factor positive cases resemble with arthropathy of adult rheumatoid arthritis. Rheumatoid nodules may occur on extensor surfaces of elbow, spine and scalp in later stages.

Systemic JIA: Fever with daily spikes mostly in the evening, Typical rash on trunk, and late arthritis.

Laboratory Investigations

- CBC
- CRP
- ESR
- ANA and RH-Factor

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Elevated ESR, CRP, Leukocytosis indicates current status of disease. ANA and RH-factor have diagnostic and prognostic value. C- reactive protein is normal alpha globulin. It is elevated in patients having inflammatory conditions of infectious or non-infectious origin. Findings can be useful as simple index of disease status and response to the treatment.

R.A test: IgG antibody is produced during some infections of joints. Subsequently, antibody alters and against it second antibody (unknown IgM) is produced. This antibody is called as RF (rheumatoid factor) which is present in serum and reacts with IgG coated latex particle.

ASO - titre: Anti Streptolysin O test is important in investigating post streptococcal disease. It indicate recent Gr.A Streptococcal infection within last two months. Increasing titre is more significant.[3]

Anti-nuclear antibody is present in 60-70% cases of JRA. ANA titre is >1:40 is usually considered as positive

Management: Multi Disciplinary Management

Medical Therapy: Anti-inflammatory drugs or immunomodulator agents. Non steroid anti-inflammatory drugs like Ibuprofen, Naproxone, etc.

Naproxone: Owing to its strong anti-inflammatory activity and overall favorable toxicity profile, it is commonly used NSAID in juvenile idiopathic arthritis in a dose of 10 to 20mg/kg/day every 8 - 12 hours orally. Contra-indication: Peptic ulcer diseases, salicylate or NSAID allergy, and advanced renal diseases.[4]

Ibuprofen: It is antipyretic and analgesic. 5-10mg/kg/dose every 6-8 hours orally. It is one of the safest traditional NSAID with favorable efficacy profile.

Contra-Indication: Salicylate or NSAIDS allergy, peptic ulcer disease.

Role of Steriods: 1) Prednisolone is frequently used. Dose is 2mg/kg/day for every 12 hours for 2 – 6 weeks. Taper it over next 4-12 weeks. 2) Methylprednisolone.[5]

Corticosteroid joint injection can be given.

Disease Modifying Anti-Rheumatic Drugs (Dmard): It works to modify coarse of disease, suppressing immune system to prevent it from attacking joints.

1. Methotrexate 2. Sulfasalazine 3. Leflunomide

Biological Agents: They works directly on target specific molecule or protein that are involved in the disease.

Continuous use of NSAID's cause gastic irritation, acid peptic disease, allergy or renal diseases.

Physiotherapy: It is important exercise for joints to prevent deformities.

Orthopaedic and Rheumatologist: Splint and foot orthotics may be recommended.

Psychologist: To support the mental ability and to give moral support to the patient.

Opthalmologist consultation to prevent uveitis i.e., inflammation of the middle layer of the eye (uvea).

Nutritional Therapy: Calcium and Vitamin-D is advised in patient on corticosteroid. Ensure proper protein and calorie intake.

Ayurvedic Management

Selective *Shodhan* procedures, according to *Dosha, Dushya, Kal* and *Bal* (strength) of a child are useful in improving symptoms of the disease.[6]

***Snehan*:** Medicated oils like *Bala Tail, Vishgarbha Tail* are used for massage on joints. *Erand Tail* helpful in preventing permanent contracture and deformity.[7] Many research articles studies showed that massage by medicated oil could relax the tight junctions between tissues and joints. *Abhyang* causes release of growth hormone and melatonin which has calming effect on brain, ultimately relieving pain.[8] Symptomatic relief is achieved by *Snehan* and *Swedan*.

***Maha Visha Garbha Oil*:** It is a mixture of hebs *like Nirgundi, Erand, Punarnava, Shobhanjan, Macoi*

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(solanum nigrum), Lavanga, Haridra, Kantkari, Nimba, Bilva, Gambhari, Ashwagandha, Pippali, Deodaru etc. All herbs used are helping in natural cleansing action by excreting the toxins and support healthy joints. It is indicated in Bhaishajya Ratnavali in *Vatavyadhi Rogadhikar*.[9] Many other oils indicated in Charak Samhita in *Vatavyadhi Chikitsa* are as follows: *Sahachar Taila, Amrutadi Taila, Rasna Taila, Bala Taila, Shwadanshtradi Taila.*

Mrudu Virechan: After *Snehan* and *Swedan, Mrudu Virechan* is indicated in Charak Samhita. For this purpose, *Erand Tail* mixed in milk should be given to the child according to his *Koshtha*. It helps in *Vatanuloman* as well as removing toxins from the body. *Aargvadh Magaj* is best in children for purpose of *Virechan*. It is mild and do not cause any harm.[10]

Conditions where you can't give *Virechan, Niruh Basti* with *Tikta Ksheer Basti* is indicated after *Dipana* and *Pachana*.[11]

Valuka Pottali: *Swedan* should be given locally on joints. As *Upanah Swed* is indicated by Yogratnakar in *Aamvata Chikitsa.*

Shamana: *Dipana* and *Pachana* should be attained in patient with the help of *Shad Dharan Yoga*. It should be given with food or lukewarm water. *Dravya* used in this *Yoga* are 1) *Chitrak Mool* 2) *Indrajav* 3) *Patha* 4) *Kutki* 5) *Ativisha* 6) *Haritaki* should be taken in equal amount. As indicated in *Astanga Hridaya Chikitsasthana* by *Aacharya Vagbhata*.[12]

Sahcharadi Kwath: Decoction made by *Sahchar, Deodaru* and *Shunthi* in equal amount should be given twice a day with appropriate *Anupana*. It will help to regain power of walking in patients.[13]

Siddha Dugdh: Milk is boiled with *Gambhari* and *Mulethi Kwath* then add *Mishri* (sugar). This milk will help in relieving symptoms of *Daha* (inflammation).[14]

Rasna Saptak Kwath: *Dravyas* used in this *Kwatha* are *Vatahara*, and *Rasayan*. Selection of *Dravyas* in this *Kwath* are done cleverly by the *Acharya*. The research shows these drugs are immunomodulators in nature.[15]

SN	Dravya	Botanical name	Part used
1.	*Rasna*	*Pluchea lanceolata*	Root
2.	*Erandamoola*	*Ricinus cumminis*	Root
3.	*Gokshur*	*Tribulus terrestris*	Fruit
4.	*Devdaroo*	*Cedrus deodar*	Stems
5.	*Punarnava*	*Boerhaavia diffusa*	Whole plant
6.	*Amruta*	*Tinospora cordifolia*	Stems
7.	*Aragwadha*	*Cassia fistula*	Root

While doing study of these drugs, we studied many research articles which proves that these drugs are not only relieving the pain and inflammation but also working as immunomodulators.

***Rasna*:** Oral administration of this drug in mice at doses of 50-800mg/kg with introduction of antigen modifies both humoral and cell mediated immunity. It is evidenced by production of circulating antibody titre and delayed type of hypersensitivity reaction. It also decreases phagocytosis. P. Lanceolata causes immunomodulation by inhibiting Th1 cytokines. (IL-2 and IFN).[16]

***Ricinus Communis* Linn:** It is anti-inflammatory, antioxidant, antihistaminic, antiasthmatic, antiulcer, antidiabetic, hepatoprotective, central nervous system stimulant and immunomodulator. Immunomodulator action is by presence of tannin in the R. Communis and increases phagocytic function of human neutrophils.[17]

***Gokshur*:** It has anti-inflammatory action by root and fruit. Research has shown that Gokshur fruit and root decoction has anti-inflammatory action by inhibiting the enzyme cyclooxygenase leading to prostaglandin synthesis inhibition. Saponins isolated from fruits increases phagocytosis and stimulation of nonspecific immune response. Alcoholic extract of whole plant exhibit significant dose dependent increase in humoral antibody titre and delayed type hypersensitive response indicating increased specific immune response.[18]

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Devdaru: *C. Deodara* wood oil act as a potent inhibitor of inflammation by mast cell stabilizing activity and the inhibition of leukotriene synthesis. Aqueous extract of dried stem bark of the plants was screened for its anti-inflammatory and anti-arthritic activity. Volatile oil significantly inhibits neutrophil adhesion to nylon fibers and also inhibit type III hyper sensitivity reaction i.e., arthus reaction induced by bovine serum albumin. One of the chemical constituents Himachalol is reported to have anti-allergic property.[19]

Punarnava: Purified extract punarnavine 40 mg per kg. Result observed on immune system was enhanced WBC count, increase in bone marrow cellularity and enhanced bone marrow cells both in the presence and absence of specific mitogens. It has analgesic and hepato protective property. It is found that the extract of roots has anti-viral, anti-bactarial, and anti-fungal activity has been noted.[20]

Amruta: Pharmacological activity shown as follows; Anti-oxidant activity, Anti-cancer activity, Anti-inflammatory. Large variety of compounds which are responsible for immunomodulatory effect are 11-hydroxymuskatone, N-methyle-2-pyrrolidone, tinocordioside and syringing. These natural compounds have been reported to improve phagocytic activity of macrophages and stimulation of splenocytes.[21]

Aragvadha: Research study shown that aqueous extract of roots produced significant anti-inflammatory effect on albino rats. It has ultimate response on humoral and cell mediated immunity by activation of B and T lymphocytes. It has also, anti-pyretic anti biotic, anti-tumour activity.[22]

Rasayana are indicated in *Vatvyadhi* in *Charak Samhita*. As the disease has intermittent exacerbations and residual deformity *Rasayana Prayoga* should be given daily.

Chyawanprasha is indicated in *Vatvyadhi Chikitsa*.[23] *Ashwagandha* reported as anti-inflammatory, anti-arthritic, anti-stress properties.[24] According to Ayurveda it is *Balya* and *Rasayana*, so beneficial in children.

Suvarna: *Suvarna Prashana* should be promoted. As we know it has *Balya, Tridosha Shamak, Yogvahi, Netrya, Vish Nashaka* and *Medhya* properties. In many researches it is proved that it has immunomodulatory effect.[25]

Discussion

JIA is an umbrella term for chronic arthropathy in children. Unexplained fever, unexplained mascular tenderness, serositis, arthralgia and unexplained multisystem involvement are the symptoms generally seen in children. The exact etiology of the disease is not identified clearly. It has genetic susceptibility, may have alteration in host antigen due to some extraneous factor. Self-tolerance is lost in Rheumatic or Autoimmune disorders.

While treating this disease, multidisciplinary approach will be beneficial to the patient. As age group is small, they have to suffer this disease lifelong. The modern treatment has to give NSAIDs, Steroids and physiotherapy. Methotrexate- type of drug, known for Disease Modifying Anti Rheumatic Drug (DMARD) has major side effects such as hepatic, pulmonary, renal and bone marrow abnormalities. Long term use of steroids has impact on immunity. Child becomes susceptible for infections. The good management of the disease should be able to reduce the symptoms as well as should not hamper the growth and development of child. *Snehan* and *Nadi Swedan* will definitely reduce the joint pain. *Mrudu Virechan* will help to remove toxins from the body. Use of *Kaishor Guggul*, *Sinhanad Guggul* and *Rasna Saptak Kwath* will break the pathology of the disease. Surprisingly the drugs chosen by *Acharyas* when studied from modern point of view are immunomodulators in nature. Many research articles show that these drugs have anti-inflammatory as well as immunomodulatory effect.

Ayurvedic *Rasayan* like *Chayawanprash* and *Suvarnaprashan* will definitely help in this condition.

Conclusion

JIA is chronic inflammatory process in which children has lifelong impact. Self-dependency is affected. Their

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physical as well as mental development may get affected. For this purpose, Ayurveda has more scope. Many herbal drugs are anti-arthritic and immunomodulators in nature. They can be easily available, much cost effective, less side effects. *Snehan* and *Swedan* with *Valuka Pottali* can be easily done at home. Ayurveda can give better quality of life.

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