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HEMIDESMUS INDICUS – A HERBAL TREATMENT FOR GOUTY ARTHRITIS: A REVIEW

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ABSTRACT

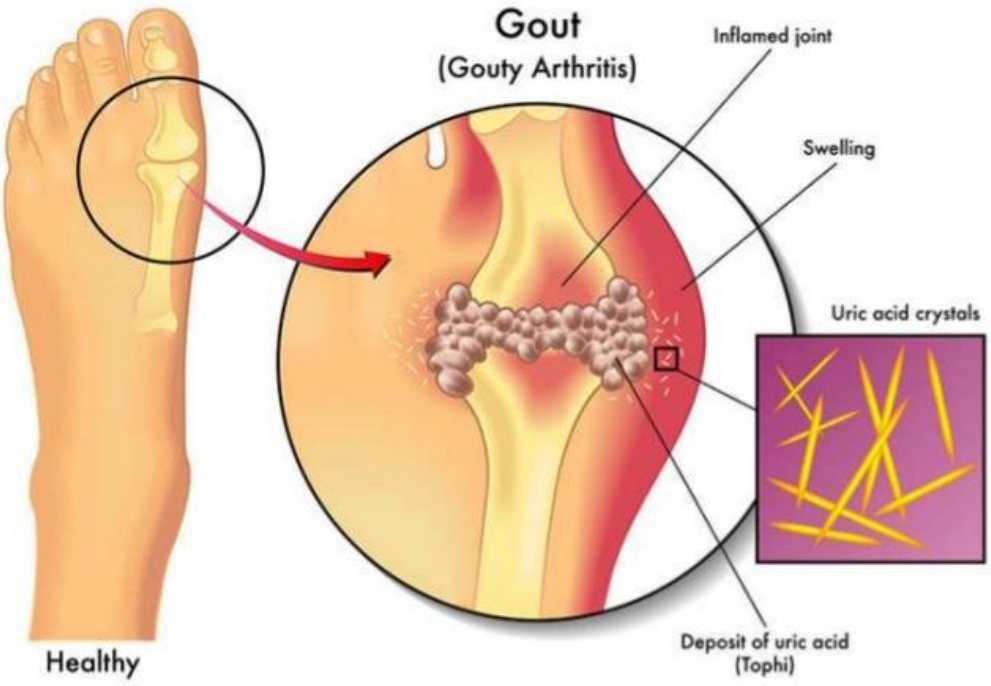
Gouty arthritis is a crystal-induced pain full inflammatory arthritis, the severity of which is increasing in the aged population. It is the pain full sudden attack of joint inflammation due to the over production and deposition of monosodium urate crystals tissues and blood. The deposition of uric acid in the form of needle like crystals in joint which cause sudden, severe episodes of pain, tenderness, redness, swelling, fever. The excess consumption of purine rich food, alcoholic drinks, obesity, drugs like aspirin, theophyllin etc are the risk factors that increases the chances for gouty arthritis. F conventional treatments for gouty arthritis includes treatment with NSAIDS, corticosteroids, allopurinol, colchicines. various herbal medicines are also used for treatment of gouty arthritis. *Hemidesmus indicus* is a potent anti inflammatory drug used for the treatment of gouty arthritis due to the presence of terpenes, saponns,tannins etc. The size reduced herbal formulation will give better action against gouty arthritis.

KEYWORDS: Gouty arthritis, *Hemidesmus indicus*, Hyperuricemia.

INTRODUCTION

Gouty arthritis is an inflammatory disease caused by the over production and deposition of monosodium urate (MSU) crystals in and around joints. Gout is an inflammatory arthritis in men above 40 years of age and in postmenopausal women more chances to develop gouty arthritis. Gouty arthritis occurs due to the an excessive consumption of purine rich foods which includes alcohol, meat, seafood etc. So it is known as the 'disease of kings'. Elevation of serum uric acid (SUA) levels (hyperuricemia) is the essential prerequisite for the

development of gouty arthritis. As a result of hyperuricemia, monosodium urate crystals (msu) precipitates in the joints, connective tissue, and parenchymal organs including the kidneys.[1,2,3] Based on its pathogenesis of gout, it could be treated by reducing serum UA and dissolving uric acid crystals. Allopurinol (AL) & non-steroidal anti-inflammatory drug is used to treat hyperuricemia. but allopurinol is ineffective for treating acute gout. Nonsteroidal anti-inflammatory drugs (NSAIDs) having anti-inflammatory and analgesic effects are used to reduce the level of cyclooxygenase. Natural products have become a source of novel pharmaceuticals due to their potent anti-inflammatory effect with fewer side effects, which relies on the containing of complex bioactive compounds.[4]



Primary risk factors[5]

1. Age and gender: The level of uric acid is more in men than women. women's levels of uric acid approach those of men after the menopause.

2. Genetics: A family history of gout increases the condition of development.

3. Lifestyle choices: Alcohol intake interferes with the removal of uric acid from the body. Eating a high-purine rich food also increases the amount of uric acid in the body.

4. Lead exposure: Chronic lead exposure has been connected to some cases of gout.

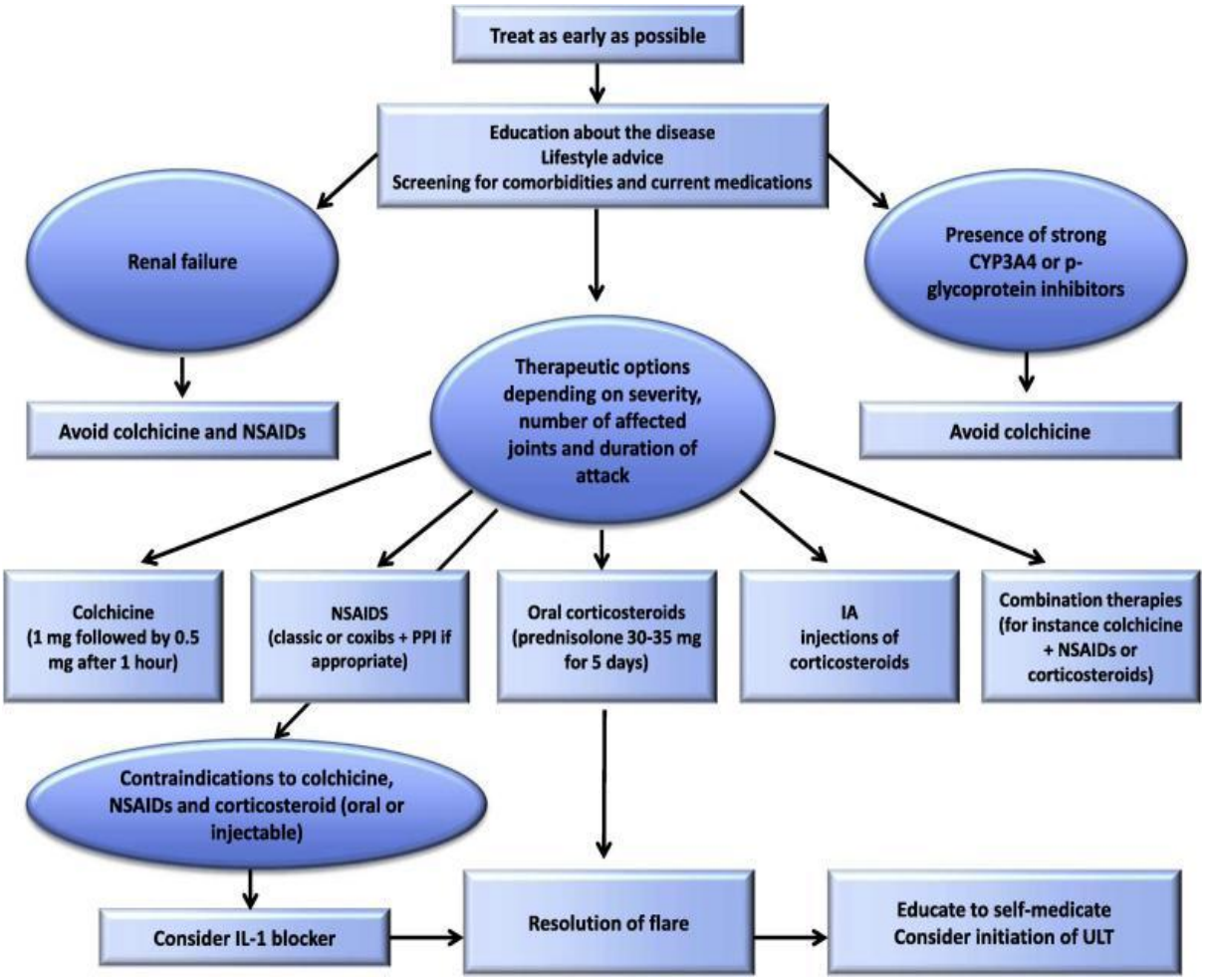
5. Medications: Certain drugs like diuretics and salicylate containing drugs can increase the levels of uric acid in the body.

6. Weight: Being obese increases the risk of gout as there is more turnover of body tissue. Higher levels of fat also increase levels of systemic inflammation because fat cells produce pro-inflammatory cytokines.

7. Other health problems: Renal insufficiency and other kidney problems can reduce the ability of body to remove waste products, leading to elevation of uric acid levels. Other conditions associated with gouty arthritis are high blood pressure, diabetes and an underactive thyroid gland.

Management of flares[6]

Gout medications include colchicine, allopurinol,Non-Steroidal anti-inflammatory Drugs (NSAIDs) and steroids these drugs can be taken together in severe cases and are most efficient when taken early after the flare onset.



Diagnosis

Synovial fluid examination[3]

The fluid in the joint is undergone physical, microscopical, visual and chemical examination. In physical and visual examination, volume, clarity and color of the fluid checked. Too much volume and less viscous fluid joint indicates the joint inflammation. Healthy joint fluid is colorless or straw colored.Abnormal fluid may appear cloudy. In microscopic analysis, the presence of uric acid crystal, white blood cell count, red blood cell count and microorganism is analyzed. If a large deviation from normal white blood cell counts especially neutrophils, indicate infectious gout. Presence of microorganism can be confirmed by microscope or culture study. The synovial fluid is chemically analyzed for the presence of uric acid, glucose, lactate dehydrogenase and protein levels to confirm gouty arthritis. The elevated levels of uric acid, LDH and protein indicate infectious gouty arthritis. When the glucose level will be less than that of normal is the indication of gouty arthritis.

Ultrasonography (US)[2]

Now a days,the progress in US technology (machines, transducers, techniques), encouraged its use by rheumatologists for the diagnosis and management of gout. In the excellent review of Nestrova and Foder, included the main indications for using US in crystal-induced arthritis. This technique includes detection of joint effusion and synovitis, differentiating between active and inactive synovitis, studying cartilage, describing bone contour for erosions and osteophytes, evaluation of tendons, evaluation of crystal deposition, execution of Ultrasonography-guided procedures (diagnostic and/or therapeutic), monitoring disease evolution as well as being helpful for the differential diagnosis with other arthritides.

Radiological diagnosis[7]

It is one of the most widely used method for detecting gouty arthritis in clinical practice, but in early stages of diseases it is not very helpful. In the early stages of gout, radiographic images are usually normal or may show asymmetric soft tissue swelling near the affected joints, but subtle early lesions such as small erosions and tophi are difficult to detect.

Dual-Energy CT (DECT)[8]

In this technique, It allows the differentiation of deposits based on their different X-ray spectra. Like CCT, this can detect damage but does not help in inflammation. It is superior to all other available imaging technologies in its ability to identify all urate deposition in the area imaged. This can be used to detect the presence of msu crystals in the joint even though

it is not accurately inflamed. This provides visualisation of urate deposits by analysis of the chemical composition of the scanned materials. It can be used for visualisation, characterization and quantification of monosodium urate crystal deposits.

Nuclear scintigraphy

Nuclear Scintigraphy is rarely used for evaluation of gouty arthritis. By this technique, Positive results are often found incidentally when a study is performed for other indications.

Hemidesmus Indicus[9]

Hemidesmus indicus is one of the important and widely used medicinal plants, belongs to the family Asclepiadaceae**,** which is derived from the word "Asklepios" – means "God of Medicine." The plant is a slender, twining, laticiferous semi-erect shrub, distributed in upper Gangetic plains and from Central to South India, growing under mesophytic to semi-dry conditions in the plains and an altitude of 600 m. Roots of *Hemidesmus indicus* contains the phytoconstituents such as steroids, terpenoids, flavonoids, saponins, phenolic compounds, tannins and lignins, cardiac glycosides, proteins, and carbohydrates. Roots and stem of the plant act as a laxative, diaphoretic, and diuretic and are also useful in the treatment of syphilis, cough, asthma, leukoderma, etc. It is commonly known as Indian Sarsaparilla, and in Sanskrit, it is known as "Anantmool," which means "endless root."

Taxonomical Classification

Kingdom: plantae

Division : magnoliophyta

Subdivision: spermatophytina

Order : Gentianales

Family : Asclepiadaceae

Genus : Hemidesmus

Species : indicus

Hemisemus indicus root

Hemidesmus indicus plant

Morphology[10]

Stem and branches: twin anticlockwise are profusely lactiferous,elongate,narrow, rigid at the nodes.

Leaves: simple, petioled, opposite, entire, apiculate, acute, dark green above but paler and sometimes pubescent below. Leaves of the basal parts of the shoots are found to be linear to lanceolate.

Flowers: color of the flower is greenish yellow to greenish purple outside, light yellow to light purplish inside, calyx deeply five lobed, corolla gamopetalous, about twice the calyx, Stamens are five, and inserted near the base of corolla with a thick coronal scale and with distinct filaments and small connate oblong anthers ending in inflexed appendages.

Fruit-Fruits are two straight slender narrowly cylindrical widely divergent follicles.

Seeds- seeds are many, flat, oblong, with a long tuft of white silky hairs.

Phytochemistry[11,12]

The plant is reported to contain significant amount of rutin in leaves, steroids in cultured tissues and mature plant. The plant is employed in traditional medicine for gastric ailments and mainly consists of essential oils and phytosterols like hemidesmol, hemidesterol and saponins. A new ester also identified as lupeol octacosanoate in addition to the known compounds viz., lupeol,-amyrin, lupeol acetate, -amyrin acetate and hexatriacontane. Coumarins, triterpenoid saponins,tannic acid essential oil, starch, triterpenoid saponins are also present.

Leaves: 2.5% tannins is present in leaves.

Stem: Two novel pregnane oligoglycosides demicunine andheminine from CHCl3: EtOH (3:2) soluble extract of dried.

stems: Desinine, Indicine, Hemidine, Indicusin, Hemidescine, Emidine, Medidesmine, Hemisine and Demicine.

Flowers: The flavanoid glycosides in flowers are hyperoside, isoquercitin and rutin.

Root: Essential oil and triterpenoids are present in roots. The phytochemical studies on the roots of Hemidesmus indicus resulted in the isolation of one each of acyclic triterpenic acid; acyclic diterpenic ester and monocyclic sesterterpene ester. On the basis of spectral and data analysis and chemical means,their structures have been established as 2; 6, 10, 14, 18, 22-hexamethyl tetracos-1 oic acid; n-octyl-2, 6, 10, 14-tetramethyl hexadec-7-ol-10-en-13-on-1-octanoate and n-non-2c-en-1c-yl, -13 (15, 19, 19- trimethyl-cyclohex-14, 16-dienyl) -2, 6, 10-trimethyltetradec- 6-ol-13-on-1-oate along with known Z-sitosteryl glucuronate and Z-

sitosterol. The aqueous-ethanolic root extract is reported to contain alkaloids, tannins, phenols and saponins. p-methoxy salicylic acid is present in aqueous extract of roots of H. indicus. The alcoholic extract of root is reported to contain triterpenes, flavonoids, tannins, coumarins and glycosides. Roots are reported to contain sitoserol. The quantitative analysis was done on roots of H. indicus for saponins and tannins and showed 0.6% and 3.0% respectively and the qualitative analysis showed presence of carbohydrates, saponins, phytosterols, phenols, flavonoids, terpenoids, tannins and phlobatannins. A small molecular weight aromatic compound, 2- hydroxy 4-methoxy benzoic acid (HMBA), reported as the bio-active principle of H. indicus.

Pharmacological activity[13,14,15,16,17]

Anti-inflammatory activity: Alcoholic extract of hemidemus indicus root possess potential anti-inflammatory activity and anti-pyretic activity.

Antiarthritic activity: *H. indicus* root has protective activity against arthritis and the arthritic activity is might be due to the presence of terpens, sterols and phenolic compounds in hydroalcoholic root extract, as well as in ethyl acetate fraction.

Anti – microbial activity: Aqueous extract of roots of *Hemidesmus indicus* exhibited bacteriostatic activity in mice infected with Mycobacterium leprae. P-methoxy salicylic aldehyde present in the extract was considered to be responsible for the antimicrobial activity. Essential oil present in H.indicus exhibited anantibacterial activity against both gram positive and gram negative bacteria even at concentration of 0.2%. Chloroform and ethanol (95%) extracts of H.indicus showed antifungal activity.

Diuretic: Aqueous extract of *H. indicus* root will cause an increase in urinary flow in rats. *H. indicus* along with aminoglycosides.

Anti-hyperglycemic effect: Upon treatment of the plant root extract to diabetic rats, reduced level of glycogen content in muscle tissues was significantly improved. In diabetes, the excess glucose present in the blood reacts with hemoglobin to form glycosylated haemoglobin(Hb). So blood glucose level is directly proportional to level of glycosylated Hb.

Vernacular names[18]

Malayalam : Nannari

English : Indian sarasaparilla

Hindi : Anantamul

Kannada : Ananthamula

Tamil : suganthi paala

Sanskrit : shariva

Significance of H.indicus in treatment of gouty arthritis

Size reduced herbal formulation will give better action against Gouty like arthritis when compared to other conventional dosage form. Gouty arthritis is an inflammatory disease characterized by severe pain, redness and tenderness in joints. In gouty arthritis, the Pain and inflammation occur when too much uric acid and deposits and crystalizes in the joints. If a person suffering from any sort of inflammatory issue, such as gout, arthritis or even aching muscle and joints, the active ingredients of sarasaparilla can help alleviate those pains.it contains various compounds such as terpenes, saponins, parillin and other flavanoids that can soothe these flare up with in the body and alleviate pain and discomfort. H. indicus for gouty arthritis works to reduce the pain and inflammation associated with the particular disease. It acts by penetrating to the deeper layers of subcutaneous tissue. The herb exert the anti inflammatory activity by inhibiting the inflammatory cell infiltration, lowering the exudates accumulation and there by correcting the edema and reduces the elevated leukocyte count as a result of inflammation.

CONCLUSION

Hemidesmus indicus is a medicinal plant belongs to the family Asclepiadaceae. It is commonly known as Indian sarasaparilla. The plant have various pharmacological activity include anti inflammatory, anti pytretic, analgesic, anti diabetic, anti hyperlipedemic,anti diuretic etc. The active constituent responsible for gouty arthritis might be attributed to presence of terpenoid in hydroalcoholic extract. Conventional formulation which is used for treatment of gouty arthritis can cause severe side effects. Size reduced herbal formulation will give better action against Gouty like arthritis when compared to other conventional dosage form. The herb exert their anti inflammatory activity and anti arthritic activity by inhibiting the inflammatory cell infiltration, lowering the exudate accumulation and there by correcting the edema and reduces the elevated leukocyte due to the inflammation.

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