Comparative study of efficacy of Gunja Beeja lepa and Shunthi Churna lepa in Inflammatory Conditions of Arthritis - A Randomized Controlled Single Blinded Clinical Study

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Abstract

Background: Life style disorders are an emerging problem in India where various types of arthritis are hampering the routine activities of people due to severe pain and inflammation. In such circumstances, everybody wants quick relief with the symptoms. *Visha dravya* used in Ayurveda are known for their quick action. *Gunja* (*Abrus precatorius* Linn) is a *visha* indicated in various diseases for internal and external use. Objectives: A randomized clinical study was conducted to assess the efficacy of *Gunja beeja lepa* to manage the local inflammatory conditions of Arthritis in comparison with a standard anti-inflammatory Ayurvedic drug *Shunthi* (*Zingiber officinalis* Linn) to provide a potent anti-inflammatory drug for the purpose of clinical practice. Material and methods: Patients suffering from transient mono or bi-arthropathies of knee were applied *Gunja beeja lepa* in comparison with local application of standard anti-inflammatory Ayurvedic drug *Shunthi*. Assessment was done with the help of Disease Activity Score (DAS-28-3) including three variables viz; tender joint score (Range 0-28), Swollen Joint Count (Range 0-28) and Erythrocyte sedimentation rate. Statistical comparisons were performed by both paired, unpaired student’s t test by using Sigma stat software (version 3.1) for both the experimental the groups at *p*<0.05 (level of significance). Result: Intervention with *Gunja beeja lepa* was statistically significant (*p*=0.003) in comparison with the intervention with *Shunthi churna lepa*. Conclusion: *Gunja Beeja lepa* is effective in comparison with standard anti-inflammatory Ayurvedic drug *Shunthi* in inflammatory conditions of Arthritis.

Key Words: Gunja Beeja lepa, Arthritis, Life style disorders, Shunthi, Disease Activity Score.

Introduction

Arthritis is a joint disorder featuring inflammation which is frequently accompanied by joint pain. Now a day, it is a very common condition due to today’s modern life style and early ageing process. Because of it many people suffer from number of joint diseases which even hamper their routine activities.

Symptoms of common arthritis include swelling, pain, stiffness in joints and decreased range of motion. Symptoms may be intermittent or continuous. They can be mild, moderate or severe even. The condition may remain same for years, or it may progress or get worsen over time span. Arthritis can cause permanent joint changes resulting in chronic pain, inability to do daily activities and make it difficult to walk or climb the stairs.

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There are more than 100 different types of arthritis and related conditions. People of all ages, gender and races can have arthritis and it is the leading cause of disability. More than 50 million adults and 300,000 children have some or the other type of arthritis. It is the most common among women and occurs more frequently as people gets older. (1)

The focus of treatment for arthritis is limited to control pain, minimize joint damage and improve or maintain the function and quality of life. Treatment includes analgesics, non-pharmacologic therapies, physical or occupational therapies, splints or joint assistive measures, patient education and support, weight loss, joint replacement and ultimately joint surgery.

In Ayurveda, arthritis is described as *sandhivata* and enlisted under *Vata* diseases. Various formulations and treatment modalities are used to cure *sandhivata*. Apart from the above listed measures, various toxic herbal drugs are also mentioned to have good medicinal values in this disease. Though the poison is harmful, dangerous and life threatening, they are vividly used therapeutically as they have quick distributing action (2). Hence, they are useful in acute conditions like joint pain.
**Gunja (Abras precatorius), a Vayu Spastic Visha**

(3) is described and classified as Upavisha. (4) In India, it is commonly known as Ratti or Gunchi. Ratti is referred to as a single Ratti (120mg) seed. This seed was used to measure gold and 1 Tola (11.66gm) = 1 Masha; (1 Masha=8 Ratti). It is called as Kudri mani in Tamil and Guru ginja in Telugu. It has been used even in Siddha medicine for centuries. The seeds are much valued in native jewelry for their bright coloration.

Two types, red and white Gunja are beneficial for many viz. cures diseases due to vitiation of Vata and Pitta, fever, dryness of mouth, giddiness, difficulty in breathing, thirst, excitement, diseases of eyes, improve sex vigor and bodily strength and is useful in pruritus, ulcer treatment, destruction of worms and similar parasites, nourishes hair and removes alopecia and other skin diseases (5) as well as rakshograhavisha. (6) It is indicated in atrophied ear lobule, dandruff, sciatica, erysepalous and few other dermatoses, blindness, diseases of head, dental caries, etc. (7) It is very much beneficial as anti-inflammatory, anti-microbial, anti-fertility, anti-tumor etc. A paste of Gunja seeds can be used as rubraficient in Sciatica, stiff shoulders, paralysis and other nervous and arthritic conditions. (8) In patients of arthritis, either steroids or non steroidal anti-inflammatory drugs (NSAID) are commonly used for quick relief. As the disease is a chronic, patients have to consume medicine for long term. Long term use of steroids is known to produce liver toxicity. Hence, a non compound fractures and pregnant and lactating women were excluded from the study.

Group A was treated with standard anti-inflammatory drug Shunthi (Zingiber officinalis Linn) churna lepa and Group B was treated with Trial drug Gunja (Abras precatorius Linn) churna lepa.

**Method of Preparation of study drug**

Red coloured variety of Gunja (Abras precatorius) seed was procured from local market and authenticated from HOD, Dravyaguna, M.G.A.C.H & R.C. Salod (H), Wardha. Physical impurities were separated and fully developed, undamaged seeds were selected. The seed coat was removed after partial grinding and the seed was powdered till it becomes fine required for paste preparing. Fine powder of Shunthi was prepared simultaneously by grinding.

In physical examination, all the tender and swollen joints were examined and counted. Local temperature at joints was assessed with surface temperature measuring card. Circumference of joints was measured with metal tape. Range of movement and stiffness was measured with Goniometry and pain was assessed with Universal pain assessment Scale.

**Complete blood count, Erythrocyte Sedimentation Rate, Random Blood Sugar, C-Reactive Protein and Rheumatoid Arthritis test was conducted for each patient. Modified Disease activity score (DAS with 28 joints and three variables viz. tenderness, swelling and ESR) was calculated after physical and pathological examination as follows:**

\[
\text{DAS 28-3= [0.56 x } \sqrt{(\text{TJC28})} +0.28 x \sqrt{(\text{SJC28})}+0.70 x \ln(\text{ESR})]\times 1.08+0.16
\]

Where, TJC28 -Tender Joint Count (Range 0-28), SJC28 -Swollen Joint Count (Range 0-28), ESR-Erythrocyte sedimentation rate

On the basis of score obtained, the condition of the patients was categorized as follows:

**Level of Disease Activity:**

- **DAS 28 ≤ 3.2 – Low disease activity**
- **3.2 > DAS 28 ≤ 5.1 – Moderate disease activity**
- **DAS 28 > 5.1 – High disease activity**
- **DAS 28 < 2.6 – Remission**
Application of trial drug

A freshly prepared *Gunja beeja lepa* in water was applied with applicator on lower part of the leg of the patient and was kept for ten minutes to observe any sensitivity reaction. Once there was no sensitivity reaction, the lepa was applied gently and evenly over affected area only. It was then freely allowed to dry neither in sunlight nor in air from fan. After getting dried and becoming stiff, the *lepa* applied was allowed to wash with Luke warm water. The same procedure was adopted for both the groups (A and B) twice a day under supervision in IPD. The drug application period was 3 or 5 or 7 days on the basis of pain or swelling condition. If pain or swelling was not reduced after three days, *Lepa* application was continued for two more days. If pain or swelling was not reduced even after fifth day, the application was continued for two more days. After seventh day, even though remains same the application was discontinued and listed as “No Response”. Thus, sets of 3, 5 and 7 days were observed, where the pain/swelling was the criteria to continue the drug application for both groups.

Statistical analysis

The results are presented as Mean± Standard Error of means (SEM) in each group. Statistical comparisons were performed by both paired, unpaired student’s t test by using Sigma stat software (version 3.1) for both the experimental groups at p<0.05 (level of significance).

### Observation and Results

#### Table No.1: Total Number of Patients in study

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total patients enrolled</td>
<td>30</td>
<td>34</td>
</tr>
<tr>
<td>Adverse drug reaction</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Table No.2: Distribution of Patients according to age and sex

<table>
<thead>
<tr>
<th>Age group (yrs)</th>
<th>Male Group A</th>
<th>Female Group A</th>
<th>Male Group B</th>
<th>Female Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-30</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>31-40</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>41-50</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>50-60</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>61-70</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>13 (43.33%)</td>
<td>17 (56.66%)</td>
<td>10 (33.33%)</td>
<td>20 (66.66%)</td>
</tr>
</tbody>
</table>

#### Table No.3: Effect of *Shunthi Churna lepa* on Disease Activity Score (DAS) in Group A

<table>
<thead>
<tr>
<th>DAS</th>
<th>Mean</th>
<th>SD</th>
<th>SEM</th>
<th>Mean difference</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before treatment</td>
<td>4.335</td>
<td>0.732</td>
<td>0.134</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After treatment</td>
<td>3.500</td>
<td>0.780</td>
<td>0.142</td>
<td>0.835</td>
<td>8.382</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

#### Table No.4: Effect of *Gunja beeja lepa* on Disease Activity Score (DAS) in Group B

<table>
<thead>
<tr>
<th>DAS</th>
<th>Mean</th>
<th>SD</th>
<th>SEM</th>
<th>Mean difference</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before treatment</td>
<td>4.339</td>
<td>0.850</td>
<td>0.155</td>
<td>1.510</td>
<td>13.437</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>After treatment</td>
<td>2.829</td>
<td>0.880</td>
<td>0.161</td>
<td>0.671</td>
<td>3.127</td>
<td>0.003*</td>
</tr>
</tbody>
</table>

#### Table No.5: Comparison of Effect on Disease Activity Score (DAS) between both groups

<table>
<thead>
<tr>
<th>DAS</th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>SEM</th>
<th>Mean difference</th>
<th>t-value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before treatment</td>
<td>A</td>
<td>4.335</td>
<td>0.732</td>
<td>0.134</td>
<td>-0.00390</td>
<td>-0.0190</td>
<td>0.985</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>4.339</td>
<td>0.850</td>
<td>0.155</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After treatment</td>
<td>A</td>
<td>3.500</td>
<td>0.780</td>
<td>0.142</td>
<td>0.671</td>
<td>3.127</td>
<td>0.003*</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>2.829</td>
<td>0.880</td>
<td>0.161</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Table No.6: Overall effect of treatment in both groups

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th></th>
<th>Group B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low DAS (&lt;3.2)</td>
<td>Before Treatment</td>
<td>2</td>
<td>After Treatment</td>
<td>6</td>
</tr>
<tr>
<td>Moderate DAS (&lt;5.1)</td>
<td>24</td>
<td>19</td>
<td>63.33</td>
<td>23</td>
</tr>
<tr>
<td>High DAS (&gt;5.1)</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Remission (DAS &lt;2.6)</td>
<td>0</td>
<td>5</td>
<td>16.67</td>
<td>0</td>
</tr>
</tbody>
</table>
Discussion

Gunja (Abrus precatorius Linn) is an irritant vegetative poison. All the parts of Gunja are poisonous. But seeds are more poisonous which contain a variety of poisonous proteins. The most important one is Abrin, (9) which is highly toxic thermo labile protein (toxalbumin LD 50= 0.029 mg/kg body weight of mice) (10) present to the extent of 0.15 % in the seed. (11) Seeds are also used as Vranaropana, vedanasthapana, keshavardhana, etc. (12)

Pharmacological properties of Gunja are katu, tikta, kashaya rasa; katu vipaka and ushna virya. It also possesses antitumor, anticancer, antispermatogenic, antifertility, CNS depressant and analgesic activity in rat. (13)

Externally, the seed extract is used in the treatment of ulcers and skin affections, anti-diarrheal and anti-helminthic activities. (14) 43 formulations are used as external applications for kustha (skin diseases), krimi (parasitic disease), kandu (itching), arsha (piles), kasa (cough), indralupta (alopecia), apavahuka (pain in arms), griddrasi, nasya, timiraroga (eye disease), nadivrana (sinus ulcers), shiroraga (disease of the head), gandamala (chain of swelling), karnapalivindhara, andhatya (blindness), visarpa (erysepelas), dadru (skin disease), vicharchika (one type of skin disease), kapajha galagandha (goitre), etc. (15) It can cause redness with rash on skin as symptoms of local toxicity. If extract is administered in the skin, it may cause symptoms like viper snake bite and death within 24 hours. Internal consumption of Gunja seeds leads to symptoms like vishuchika (cholera). (16) Tanduliyaka swarasa (Amaranthus spinosus Linn) was applied to the affected area and 10 ml BD given internally with sugar. Then the patients had relieved from these adverse effects within two days. Thereafter, they were withdrawn from the study. The reason found was the long term contact with the drug. Inspite of proper instructions these patients had not washed the applied area after drying. In the present study, the adverse effects were manageable. Red variety of Gunja seeds was used without any shodhana as shodhana was not expected for external use. Shodhita Gunja beeja may not cause any adverse effect. Hence, a similar study can be conducted with red variety of Gunja with shodhana and white variety of Gunja with and without shodhana to avoid adverse effects.

During the intervention, most of the patients experienced some dragging sensation along the nerve root of the area of application. Then they were feeling better after each setting. Ushna virya property of Gunja may have reduced pain and swelling at the affected joint. Visha dravya have laghu, ushna, tiksha, sookshma, ashukari and vyavayi properties (18) with which they are readily absorbed in the body, spread quickly and show immediate effect causing decrease in inflammation and pain at the affected joint.

At the end of the 19th century, the extract of Gunja seeds was used therapeutically for its inflammatory properties, to treat various eye complaints including trachoma. But some cases of Abrin poisoning were also noted with local use. (19) It is observed from the reported cases that Gunja reduces inflammation in therapeutic dose and on the contrary in higher dose it causes inflammation.

Conclusion

Gunja Beeja lepa has been proved to be effective in comparison with standard anti-inflammatory Ayurvedic drug Shunthi in inflammatory conditions of either mono or bi Arthritis. But the local application should be restricted for limited time only to avoid adverse drug reaction. Similar study can be conducted with red variety of Gunja with shodhana and white variety of Gunja with and without shodhana to assess their efficacy without any adverse effects. As Gunja has been proved efficacious for external application in reducing pain and inflammation, the liniments or spray with the ingredients of Gunja may open new dimensions in sports medicine to relieve the pain and swelling instantly.
References