HEPATOPROTECTIVE POTENTIAL OF BILWADI AGADA – A REVIEW

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ABSTRACT

Bilwadi Agada is explained as one of the formulations in the context of Ayurvedic snake bite management. It is indicated in various conditions such as Bhujanga Visha (snake bite), Luta Visha (spider poison), Unduru Visha (rat bite), Vrischika Visha (scorpion sting), Visuchika (Cholera), Ajirna (indigestion), Gara Visha (artificial poison), Jwara (fever) & it has also got Bhutaghna properties (antimicrobial, antiviral). As per the western science, any toxic compound after entering biological system has to undergo 4 phases namely Absorption, Assimilation, Metabolism and Excretion. Majority of the compounds ingested enters into the portal vein supplying the liver with blood from G.I. tract. Thus, liver becomes the common target organ for the effect of toxic compounds due to – Its structure, role in intermediary and xenobiotic metabolism, position and function. Hepatocytes, make up the majority of liver

INTRODUCTION

Bilwadi Agada is explained as one of the formulations in the context of Ayurvedic snake bite management. BilwadiAgada is indicated in various conditions such as Bhujanga Visha (snake bite), Luta Visha (spider poison), Unduru Visha (rat bite), Vrischika Visha (scorpion sting), Visuchika (Cholera), Ajirna (indigestion), Gara Visha (artificial poison), Jwara (fever) & it has also got Bhutaghna properties (antimicrobial, antiviral).
structure are metabolically very active, and interference with such essential intermediary metabolic activity by exogenous chemicals may result in toxicity. Unsystematic uses of synthetic drugs like tetracycline, acetaminophen, anti-tubercular drugs, oral contraceptives of hormonal origin, food preservative and agrochemicals threaten the liver. Further addiction to alcohol and other drugs have aggravated the problem.³

**MATERIALS & METHODS**

The study being a literary review, the sources of data will have collected from all Brihat and Laghu Trayees also from all Contemporary Textbooks, Relevant Journals and Websites.

**Conceptual Review**

**Yakrut in Ayurveda**

Brihadaranyaka Upanishad mentions the anatomical site of the Yakrut below and right to the Hrudya, which is hard in texture. Arunadatta explains that Yakrut is considered as one of the Koshtanga and is a matruja avayava formed from samanavata, dehoshma and rakta. In Veda Yakrut is called as Takima or yakna.⁴ Shabda stoma mahanidhi clarifies that because it causes Sanyama (check or control) it is called as Yakrut.

According to Acharya Sushruta, the utpatti of yakrut and pleeha is by rakta⁵. Its functions are mainly ascribed towards rakta. It has been mentioned as moola of raktavaha sira/srotas and seat for raktdharakala, Ranjakagni and Pitta also. The rasa when reaches Yakrut and pleeha being acted upon by Ranjakagni forms sthularakta, malapitta and sukshma namsa.⁶

Yakrut and pleeha are considered as the moola of raktavahasrotas. From the above description, we can infer that yakrut and rakta have a (Samavaya) relation. Therefore, vitiation of Rakta will also result in derangement in the functions of Yakrut and vice versa.⁷

**Liver diseases - A modern approach⁸**

Liver plays a crucial role in regulation of physiological processes. It is involved in several vital functions such as metabolism, secretion and storage. Detoxification of a variety of drugs and xenobioticalso occur in liver. Liver diseases mainly occurs due to exposure to toxic chemical substances like, antibiotics, chemotherapeutics, aflatoxin, acetaminophen, carbon tetra chloride, chlorinated hydro carbons, varied infections, auto immune disorders and also due to chronic alcoholism. Most of the hepato toxic chemicals damages liver cells mainly by inducing lipid peroxidation and other oxidative damages takes place in liver.

**Toxic and Drug Induced Hepatitis⁹**

Drug induced hepatitis is the inflammation of the liver with symptoms similar to viral hepatitis, but one difference it is caused by medication not a virus.

Liver injury may follow the inhalation, ingestion, or parenteral administration of a number of pharmacologic and chemical agents. These include industrial toxins (eg. Carbon tetrachloride, Trichloro ethylene, and yellow phosphorous), the heat-stable toxic bicyclic octapeptides of certain species of Amanita and Galerina hepatotoxic mushroom poisoning and more commonly, pharmacologic agents used in medical therapy (acetaminophen).

As the major drug metabolizing and detoxifying organ in the body, the liver is subject to potential damage from an enormous array of therapeutic and environmental chemi-
cals. Injury may result (1) from direct toxicity (2) via hepatic conversion of xenobiotic to an active toxin. (3) Through immune mechanism, usually by the drug or a cellular protein in to immunogen.

**Table 1:** Showing principle alterations of Hepatic morphology produced by some commonly used drugs and chemicals.\(^{10}\)

<table>
<thead>
<tr>
<th>Principal Morphologic Change</th>
<th>Class of Agent</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholestasis</td>
<td>Anabolic steroid,</td>
<td>Methyl testosterone</td>
</tr>
<tr>
<td></td>
<td>Anti-inflammatory</td>
<td>Sulindac</td>
</tr>
<tr>
<td></td>
<td>Antibiotic</td>
<td>Erythromycin estolate, rifampcin</td>
</tr>
<tr>
<td></td>
<td>Oral contraceptive</td>
<td>Busulfan, tamoxifen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Norethynodrel with mestanol.</td>
</tr>
<tr>
<td>Fatty liver</td>
<td>Antibiotic</td>
<td>Tetracycline</td>
</tr>
<tr>
<td></td>
<td>Antiviral</td>
<td>Dideoxynucleosides</td>
</tr>
<tr>
<td></td>
<td>Oncotherapeutic</td>
<td>Asparaginase, methotrexate</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>Anticonvulsant</td>
<td>Phenytoin, carbamazine</td>
</tr>
<tr>
<td></td>
<td>Antihypertensive</td>
<td>Methyldopa, captopril</td>
</tr>
<tr>
<td></td>
<td>Anti-inflammatory</td>
<td>Indomethacin, Ibuprofen</td>
</tr>
<tr>
<td></td>
<td>Anti fungal</td>
<td>Fluconazole, Ketocanazole</td>
</tr>
<tr>
<td>Toxic (necrosis)</td>
<td>Metal</td>
<td>Yellow phosphorous</td>
</tr>
<tr>
<td></td>
<td>Hydrocarbon</td>
<td>Carbon tetrachloride</td>
</tr>
<tr>
<td></td>
<td>Analgesic</td>
<td>Acetaminophen</td>
</tr>
<tr>
<td>Granulomas</td>
<td>Anti-arrhythmic</td>
<td>Quinidine</td>
</tr>
<tr>
<td></td>
<td>Anti-biotic</td>
<td>Sulfonamides</td>
</tr>
</tbody>
</table>

**Classification of Hepatotoxic Agents**

Hepatotoxins can be classified into the following classes depending on the source of the toxin. They are,


2. Synthetic Origin –
   (a) Toxins of clinical significance eg. Sulfonamides, PAS, Rifampicin etc.
   (b) Toxins having pathologic significance eg. Chloroform, Tetrachlorethane etc.
   (c) Toxins used as a common lab models eg. Carbon tetrachloride, Galactosamine.\(^{11}\)

**Table 2:** Showing *Bilwadi Agada* and its Ingredients

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Drug</th>
<th>Scientific name</th>
<th>Family</th>
<th>Parts used</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Bilwa</em></td>
<td>Aegle marmelos corra</td>
<td>Rutaceae</td>
<td>Root</td>
<td>1 part</td>
</tr>
<tr>
<td>2</td>
<td><em>Surasa</em></td>
<td>Ocimum sanctum Linn</td>
<td>Lamiaceae</td>
<td>Flower</td>
<td>1 part</td>
</tr>
<tr>
<td>3</td>
<td><em>Karanja</em></td>
<td>Pongamia pinnata Linn</td>
<td>Fabaceae</td>
<td>Seed</td>
<td>1 part</td>
</tr>
<tr>
<td>4</td>
<td><em>Natam</em></td>
<td>Valeriana wallichi DC</td>
<td>Valeriacae</td>
<td>Root</td>
<td>1 part</td>
</tr>
<tr>
<td>5</td>
<td><em>Devadar</em></td>
<td>Cedrus deodara Roxb</td>
<td>Pinaceae</td>
<td>Heart wood</td>
<td>1 part</td>
</tr>
<tr>
<td>6</td>
<td><em>Hareetaki</em></td>
<td>Terminalia chebula Retz</td>
<td>Combrietaeae</td>
<td>Fruit</td>
<td>1 part</td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Scientific Name</td>
<td>Family</td>
<td>Part</td>
<td>Description</td>
</tr>
<tr>
<td>-----</td>
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<td>-----------------------</td>
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</tr>
<tr>
<td>7</td>
<td>Vibheetaki</td>
<td>Terminalia bellerica</td>
<td>Combretaceae</td>
<td>Fruit</td>
<td>1 part</td>
</tr>
<tr>
<td>8</td>
<td>Amalaki</td>
<td>Embica officinalis</td>
<td>Euphorbiaceae</td>
<td>Fruit</td>
<td>1 part</td>
</tr>
<tr>
<td>9</td>
<td>Shunti</td>
<td>Zingiber officinale</td>
<td>Zingiberaceae</td>
<td>Rhizome</td>
<td>1 part</td>
</tr>
<tr>
<td>10</td>
<td>Maricha</td>
<td>Piper longum Linn</td>
<td>Piperaceae</td>
<td>Fruit</td>
<td>1 part</td>
</tr>
<tr>
<td>11</td>
<td>Pippali</td>
<td>Piper niagrum Linn</td>
<td>Piperaceae</td>
<td>Fruit</td>
<td>1 part</td>
</tr>
<tr>
<td>12</td>
<td>Haridra</td>
<td>Curcuma longum Linn</td>
<td>Zingiberaceae</td>
<td>Rhizome</td>
<td>1 part</td>
</tr>
<tr>
<td>13</td>
<td>Daruwarida</td>
<td>Berberis aristata D</td>
<td>Berberidaceae</td>
<td>Stem</td>
<td>1 part</td>
</tr>
<tr>
<td>14</td>
<td>Aja Mootra</td>
<td></td>
<td></td>
<td></td>
<td>QS</td>
</tr>
</tbody>
</table>

Review of individual drugs of Bilwadi Agada is as follows:

1) **Bilwa (Mula)**
   - Rasa – Kashaya, Tikta (Mula: Madhura)
   - Guna – Laghu, Ruksha
   - Virya – Ushna Vipaka – Katu
   **Doshaghnata:** Kaphavatashamaka

**Recent Research Articles:**
1) The Hepatoprotective Effect of Bael Leaves (Aegle Marmelos) in Alcohol Induced Liver Injury in Albino Rats. 12
2) Antioxidant and Phytochemical Properties of Aegle Marmelos Fruit Pulp.13
3) Review-Aegle Marmelos (Linn.) Correa: A potential source of Phytomedicine. 14

2) **Surasa (Pushpa)**
   - Rasa – Katu, TiktaGuna – Laghu, Ruksha
   - Virya – UshnaVipaka – Katu
   **Doshaghnata:** Kaphavatashashamaka

**Recent Research Articles:**
1) Review Article the Science Behind Sacredness of Tulsi (Ocimum Sanctum Linn.). 15
2) Hepatoprotective Activity of Ocimum Sanctum Leaf Extract Against Paracetamol Induced Hepatic Damage In Rats. 16

3) **Karanja (Phala)**
   - Rasa – Tikta, Katu, KashayaGuna – Laghu, Tikshna
   - Virya – UshnaVipaka – Katu
   **Doshaghnata:** Kaphavatashashamaka

**Recent Research:**
1) Antihepatoprotective Potential of Livina, A Polyherbal Preparation On Paracetamol Induced Hepatotoxicity. 20
2) Acetaminophen-Induced Hepato and Nephrotoxicity and Amelioration by Silymarin and Terminalia Chebula in Rats. 21

4) **Nata**
   - Rasa – Tikta, Katu, KashayaGuna – Laghu, Snigdha
   - Virya – UshnaVipaka – Katu
   **Doshaghnata:** Kaphavatashamaka

5) **Surahwa**
   - Rasa – TiktaGuna – Laghu, Snigdha
   - Virya – UshnaVipaka – Katu
   **Doshaghnata:** Kaphavatashamaka.

**Recent Research Article:**
1) Herbs as liver savers- A review. 18
2) Pharmacology of medicinal plants and natural products.19

6) **Haritaki (Phala)**
   - Rasa – Kashaya, Tikta, Madhura, Katu, Am- laGuna – Laghu, Ruksha
   - Virya – UshnaVipaka – Madhura
   **Prabhava:** Tridoshashamaka
   **Doshaghnata:** Tridoshashamaka, especially Vatashamaka.

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**DISCUSSION**

As per classics Bilwadi Agada is indicated as Garavishahara, individual drugs having Vishaghna, Shothaghna, Krumighna.
Deepana, Pachana, Vranahara, Garanashaka, Bhutaghna and Yogavahi properties. Thus, Bilwadi Agada may act by virtue of its Vishaghna Guna.

Literature reveals that, various ingredients of Bilwadi Agada having Antioxidant, immunomodulatory, Anti-inflammatory, Anti ulcerative & Hepatoprotective actions. Bilwadi Agada may act by –

1. Prevent synthesis of prostaglandins, which may help as anti-inflammatory. 2. It may suppress CYP450, which play important role in producing toxic metabolite (NAPQI). 3. May be by increasing synthesis of Glutathione (GSH). 5. May help in regeneration and production of hepatocytes. Thus, above said actions of Bilwadi Agada may contribute towards its hepatoprotective activity.

CONCLUSION

Extensive research studies using models of experimental hepatic damage may help in establishing a definite rationale for the therapeutic use of Bilwadi Agada as a hepatoprotective drug in a laboratory setting and possibility of clinical studies should also be looked into.

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