ANTI – INFLAMMATORY POTENTIAL OF BALARISHTA AND DHANVANTARA GUTIKA IN ALBINO RATS

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ABSTRACT: Balarishta and Dhanvantara gutika are ayurvedic medicines prescribed in different diseases including rheumatism. These medicines were screened for anti-inflammatory activity against cotton pellet induced granuloma in albino rats. There was significant reduction in cotton pellet weight by both the tested drugs. Dhanvantara gutika significantly reduced the ascorbic acid in adrenal. Acid phosphatase, GPT and GOT activities were significantly reduced by Balarishta, Dhanvantara gutika and phenyl butazone in liver. In the serum acid phosphatase activity was significantly reduced by both the tested drugs and phenyl butazone while GPT activity was lowered by Balarishta alone and GOT activity was reduced by Balarishta and Dhanvantara gutika. Phenyl butazone reduced the activity of GPT.

INTRODUCTION

Balarishta and Dhanvantara gutika are two Ayurvedic medicines which are prescribed in the treatment of rheumatism. Balarishta is a drug of asavas and arishtas group while Dhanvantara gutika is a medicine of gutika/vati group. Balarishta is indicated in Agnimandya, daurbalya and vataja roga (1). Dhanvantara gutika is used in cases of kasa, swasa, hydroga, vata and kapha diseases (1).

Experiments were carried out to screen balarishta and Dhanvantara gutika for their anti-inflammatory activity against cotton pellet induced granuloma in albino rats.

MATERIALS AND METHODS

The raw drugs were purchased from the local drug traders, identified and used for preparing Balarishta and Dhanvantara gutika (Tables 1 & 2) as per the procedures detailed in the Ayurvedic Formulary, Part I (1). Phenylbutazone was bought from the local medical shop and was used as reference drug.

Antiinflammatory effect

Albino rats of Wistar strain of either sex weighing 100-150g from the Institutes animal colon were used for the study (2). There were 5 groups of 8 animals each. Pellets of surgical cotton weighing 10 ± 1 mg were sterilized in hot air oven at 120°C for 3 hours and implanted subcutaneously each in both the axaillae and grains of the animals under light anaesthesia. The first group served as normal control and second group as inflammatory control. The third, fourth and fifty groups were administered phenylbutazone, Balarishta and Dhanvantara gutika respectively for seven days. Dhanvantara gutika and phenylbutazone were suspended in 0.5% carboxy methyl cellulose (CMC) and administered orally at 100mg/kg body weight. Balarishta was administered orally at a dose of 0.5ml/rat/day. The rats were
maintained on Hindustan Lever rat feed, Bengal gram and cabbage. Water was allowed ad libitum.

On the 8th day all the animals were sacrificed and the pellets were dissected out, cleaned from extraneous tissues and dried overnight at 70°C. The weight of each pellet was recorded. Thymus, spleen and adrenals were dissected out, blotted between folds of filter paper and weighed. Blood was drawn through a glass syringe by puncturing the heart.

Biochemical parameters

Serum was separated from the blood and 1% liver homogenate was prepared in cold double distilled water. The serum and liver homogenate were used to assay the activity of acid phosphatase (3) glutamate pyruvate transaminase (GPT) (4) and glutamate oxaloacetate transaminase (GOT) (4). Adrenal ascorbic acid (5), serum and liver protein (6) were also determined. The results were analysed using Student’s “t” test.

RESULTS

There was a significant increase in the weight of thymus in the groups treated with Balarishta, Dhanvantara gutika and phenylbutazone increased the weight of spleen significantly (Table 3). There was no effect on the weight of adrenals but ascorbic acid content was significantly reduced by Dhanvantara gutika (Table 3). Both the drug tested groups and phenylbutazone group showed significant reduction in the weight of cotton pellets (Table 3).

In the liver Acid phosphatase, GPT and GOT activities were significantly reduced by Balarishta, Dhanvantara gutika and phenylbutazone without any effect on the protein content (Table 4).

Acid phosphatase activity was significantly reduced in serum by the tested drugs and phenylbutazone. GPT activity was lowered by Balarishta and phenylbutazone while GOT activity was reduced by Balarishta and Dhanvantara gutika (Table 5). Serum protein was significantly lowered by Balarishta alone (Table 5).

DISCUSSION

Dhanvantara gutika significantly reduced the level of adrenal ascorbic acid which is indicative of enzyme like Got and GPT could influence the continuous formation of bradykinin like polypeptides during inflammatory process (7). Phenylbutazone, the reference drug did not affect the liver GOT and GPT in normal animals but significantly reduced the activity in inflammatory conditions. Acid phosphatase was inhibited by all the three drugs indicating the stabilization of lysosomal membrane (8, 9). Acid phosphatase is frequently employed as a marker enzyme to assess the lysosomal change both in vivo and in vitro because it is localized exclusively in the particles and its release parallels that of lysosomal hydrolases (10).

The study reveals that Balarishta and Dhanvantara gutika possess anti-inflammatory activity thereby proving the claim made in the ayurvedic text 5.
### Table No.1
**Raw drugs involved in preparation of Balarishta**

| Sl.No | Raw Drug | Botanical name                  | Anatomical part used | Quantity (g)       |
|-------|----------|---------------------------------|----------------------|-------------------|
| 1     | Bala     | Sida cordifolia Linn            | Root                 | 4800              |
| 2     | Asvagandha | Withania somnifera Dunal         | Root                 | 4800              |
| 3     | Water for decoction Reduced to | Saccharum officinarum Lin      |                      | 49.152 L 12.288 L |
| 4     | Guda     | Woodfordia fruticosa Kurz       | Flower               | 768               |
| 5     | Payasa   | Fritillaria voylei H.OK         | Root                 | 96                |
| 6     | Pancangula | Ricinus communis Linn.          | Root                 | 96                |
| 7     | Rasna    | Pluchea lanceolata Oliver-Hiern | Root                 | 48                |
| 8     | Ela      | Elettaria cardamom Maton        | Seed                 | 48                |
| 9     | Prasaran | Paederia foetida Linn           | Leaf                 | 48                |
| 10    | Devapusa | Syzygium aromaticum Merr & L.M. Perry. | Flower bud | 48                |
| 11    | Usira    | Vetiveria zizaniodes Linn       | Root                 | 48                |
| 12    | Svadamstra | Tribulus terrestris Linn       | Fruit                | 48                |

### Table No.2
**Raw drugs involved in preparation of Dhanvantara gutika**

| Sl.No | Raw Drug | Botanical name                  | Anatomical part (part) | Quantity |
|-------|----------|---------------------------------|------------------------|----------|
| 1     | Ela      | Elettaria cardamom Maton        | Seed                   | 1        |
| 2     | Visva    | Zingibar officinale Rosc        | Rhizome                | 1        |
| 3     | Abhaya   | Terminalia chebula Retz.        | Fruit                  | 1        |
| 4     | Jati     | Jasminum officinale Linn. Var. gradiflorum Bailay | Seed | 1 |
|   | 5 | Brhati | Solanum indicum Linn | Root | 1 |
|---|---|-------|----------------------|------|---|
| 6 | Arya | Swertia chirata Buch Ham | Plant | 1 |
| 7 | Jiraka | Cuminum cyminum Linn | Fruit | 1 |
| 8 | Cinsona | Piper cubeba Linn.f. | Seed | 1 |
| 9 | Bhunimba | Swertia chirata Buch. Ham. | Plant | 1 |
| 10 | Rudraksa | Elaeocarpus ganitrus Roxb. | Seed | 1 |
| 11 | Suradaru | Cedrus deodara Roxb. | Heart Wood | 1 |
| 12 | Karpura | Cinnamomum camphora Linn | | 1 |
| 13 | Karigutha | Excreta of new-born elephant | -- | 1 |
| 14 | Mrgaretasa | Civent | -- | 1 |
| 15 | Jiraka Kvatha | Cuminum cyminum Linn | Fruit | Q.S for bhavana |
| 16 | Himambasa | Rosa centifolia Linn. | Rose Water | Q.S for bhavana |
Table No. 3
Effect of Balarishta, Dhanvantara gutika and phenylbutasone on organ weights, pellet weight and adrenal ascorbic acid (Values are mean ± SD)

| Status            | Organ weights (g/100g body weight) | Pellet weight (mg) | % reduction in pellet weight | Adrenal ascorbic acid (mg/g) |
|-------------------|-----------------------------------|-------------------|-----------------------------|-----------------------------|
|                   | Spleen   | Thymus   | Adrenals   |                          |                             |
| Normal control    | 0.166 ± 0.0076 | 0.0110 ± 0.0026 | 0.0090 ± 0.00097 | --                         | 1.267 ± 0.134              |
| Inflammatory control | 0.169 ± 0.016 | 0.0138 ± 0.0023 | 0.0102 ± 0.00150 | 44.50 ± 9.30               | --                         | 1.945 ± 0.220              |
| Phenylbutazone    | 0.229 ± 0.027 | 0.0206b ± 0.0040 | 0.0101 ± 0.00093 | 28.48a ± 3.30              | 36                         | 1.935 ± 0.332              |
| Balarishta        | 0.193 ± 0.026 | 0.0206b ± 0.0030 | 0.0102 ± 0.00160 | 31.26a ± 3.57              | 29.75                      | 2.365 ± 0.389              |
| Dhanvantara gutika | 0.0240 ± 0.036 | 0.015b ± 0.0036 | 0.0113 ± 0.00090 | 36.23a ± 5.20              | 18.4                       | 0.928 ± 0.174a             |

Values are significant when p<0.05 P values a P<0.001, p<0.01

Table No. 4
Effect of Balarishta, Dhanvantara gutika and phenylbutazone on Liver Biochemical parameters (Values are mean ± SD)

| Status            | Protein mg/g | Acid phosphatase mg phenol liberated /mg protein in 60 min at 37°C | GPT Mg pyruvate liberated/mg protein in 30 min at 37°C | GOT mg pyruvate liberated/mg protein in 60 min at 37°C |
|-------------------|--------------|---------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| Normal control    | 106.6 ± 7.33 | 0.0562 ± 0.0138                                               | 0.6131 ± 0.0674                                      | 0.2495 ± 0.0259                                      |
| Inflammatory control | 92.5 ± 6.39 | 0.1106 ± 0.016                                               | 0.7723 ± 0.0688                                      | 0.6795 ± 0.0678                                      |
| Phenylbutazone    | 115.6 ± 3.57 | 0.0542 ± 0.0062a                                             | 0.5360 ± 0.0318a                                     | 0.3016 ± 0.0529a                                     |
| Balarishta        | 123.6 ± 3.57 | 0.0575 ± 0.0090a                                             | 0.4288 ± 0.0488a                                     | 0.2807 ± 0.0311a                                     |
| Dhanvantara gutika | 131.7 ± 6.87 | 0.0508 ± 0.0103a                                             | 0.4365 ± 0.0496a                                     | 0.1848 ± 0.0260a                                     |