Antiasthmatic Activity of Marketed Ayurvedic Polyherbal Formulation


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ABSTRACT

Ayurveda, practiced in India since time immemorial. Besides being cheap and easily available, Ayurvedic drugs are considered as safe. In Ayurvedic system of medicine, Polyherbal formulations were frequently used to enhance the activity or counteract the toxic effect of compounds, from other plants, but may also act synergistically with other constituents from the same plants. Present study was aimed to evaluate the antiasthmatic activity of Ayurvedic polyherbal formulation (PHF) using invitro animal model, isolated goat tracheal chain. Study was carried out using dose of 2% and 4% v/v PHF. Dose of 4% v/v produced statistical significant relaxant effect on histamine-induced contraction. Antiasthmatic mechanism was found using propranolol, which antagonized relaxant effect of PHF on histamine induced contraction, showed PHF activity through goat tracheal β receptor activation. Thus proving antiasthmatic potential of PHF.

Keywords: Bronchial asthma, Goat trachea, histamine, propranolol

INTRODUCTION

Bronchial asthma, common chronic disease can impede breathing [1]. Bronchial asthma, an airway inflammatory disease, characterized as bronchial hyper responsiveness, intermittent and reversible airway obstruction which leads to recurrent episodes of cough, wheezing, shortness of breath and chest tightness. Globally 10% adults and 20% children are affected by asthma [2]. The etiology of bronchial asthma appears to have genetic and environmental components [3].

In managing bronchial asthma, exposure to allergens and non-specific exacerbating factors such as cigarette smoke, cold air, vigorous exercise and sensitizing agents is avoided [4]. For management of bronchial asthma smooth muscle contraction inhibitor and anti-inflammatory agents are currently available drugs. Despite availability of wide range of drugs, the relief offered is mainly symptomatic, not curative, and short lived associated with side effects. Thus, pharmacologist’s view is to develop more effective and safe pharmacological agents that could interfere with the pathogenesis of bronchial asthma. Hence a continuous search is on going to identify effective and safe remedies to treat bronchial asthma. Traditionally used plants and polyherbal formulations are potential source of therapeutic agents. PHF, containing Kiratatikta (Swertia chirata), Nimba (Azadirachata indica), Haritaki (Terminalia chebula), Bibhitaka (Terminalia belerica), Amalki (Embelica officinalis), Patol (Trichosanthes cucumerina), Vasa (Adhatoda vasica), Guduci (Tinospora cordifolia), Parpata (Fumaria parviflora), Bhrngaraja (Eclipta alba.) each 731 mg. The PHF was subjected to preliminary phytochemical screening which indicated the presence of alkaloids, glycosides, flavonoids, tannins, phenolic substances and saponin.

Goat tracheal chain preparation

Goat trachea was cut into individual ring and tied together in series to form a chain, which was suspended in air supplied, thermo-regulated organ bath, containing 50 ml Kreb’s solution (Concentration in m Moles/L as NaCl, 118; KCl, 4.7; CaCl$_2$, 2.5; MgSO$_4$, 1.2; NaHCO$_3$, 25.0; KH$_2$PO$_4$, 1.2; Glucose, 11.1) maintained at 37°C ± 1°C. At organ bath base tracheal chain end was attached to a tissue holder, other end to a recording device. Suspended tracheal chain was allowed to equilibrate for 45 minute under load of 400 mg [5]. During every 15 minutes equilibration, fresh Kreb’s solution was supplied to organ bath [6]. For 0.02-0.64 µg/ml molar concentrations, cumulative concentration-responses curve (CCRC) of histamine was recorded. After obtaining CCRC of histamine on goat trachea, PHF (2 and 4% v/v) was added to organ bath and same doses of histamine were repeated. Formulation’s goat tracheal bronchodilator mechanism was studied; adding propranolol (2µg/ml) to organ bath followed by PHF (2 and 4% v/v). CCRC of

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Histamine, height responses on goat trachea was recorded. Percent histamine responses were calculated by considering higher molar concentration, average height for PHF along with propranolol and PHF alone.

Statistical Analysis
One-way ANOVA followed by Dunnett’s test was used for analysis of data. All the values (n=5) were expressed as MEAN ± SEM.

RESULTS
Effect of formulation on isolated goat tracheal chain
Isolated goat tracheal chain showed notable histamine contraction in molar concentrations 0.02-0.64 µg/ml. For histamine induced contraction response at 0.64 µg/ml, average height 3.8 cm (n=5) was taken as 100% as shown in Table 1. PHF antagonized histamine induced contraction responses (P<0.05). Significant relaxation observed at a dose of 4% v/v as shown in Fig 1. Histamine CCRC recorded in presence of propranolol with PHF, antagonized relaxant effect of PHF was observed.

DISCUSSION
Histamine contracts the tracheobronchial muscle of dog, horse, guinea pig and man [7]. Goat tracheal chain is sensitive tissue for studying the effect of histamine Sensitivity of goat trachea to various drugs / agents has been studied. Goat tracheal chain dose dependent contraction was demonstrated by spasmogens such as histamine (0.1-102.4 µg), acetylcholine (0.1-12.8 µg), and barium chloride (0.1-51.2 µg). Mepyramine maleate antihistaminic effect (H₁-antagonism) on goat tracheal chain has been studied [9]. Concentrations of agonists, acetylcholine, histamine, 5-hydroxytryptamine and bradykinin, necessary to produce goat tracheal chain contractile responses were less than guinea pig tracheal chain. This study suggests suitability of goat trachea to study agonist action on bronchial muscles. Present study was planned to investigate antiasthmatic potential of PHF. Goat tracheal chain histamine induced contractions was significantly relaxed in presence of PHF. In this study propranolol, non selective β blocker, used to study possible mechanism behind relaxation effect of PHF. Propranolol incubation followed by PHF exhibited goat tracheal chain contractive response for histamine. This reveals that previous relaxant activity of PHF was prevented by β blocking effect of propranolol; this justifies mechanism of action through activation of β receptors present on goat tracheal chain. PHF label claimed antiasthmatic activity proved significantly.

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REFERENCES

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