Inhibitory Effects of *Musanga cecropioides* on Noradrenaline and Potassium-Induced Contractions in Rat Thoracic Aorta

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Received: July, 2004
Accepted: October, 2004

The pharmacological effects of *Musanga cecropioides* on rat thoracic aorta were examined in high K + medium (55mM), Ca ++ 3mM) induced vasoconstriction was inhibited by *Musanga cecropioides* in a concentration-dependent manner. The tonic contractions elicited by KCl 55mM were relaxed by Musanga and were more marked in 0.45mM Ca ++ than 1.8mM Ca ++ medium. NA -induced responses were antagonized non competitively by Musanga. NA- sustained contraction was relaxed, the relaxing effect of Musanga was not antagonized by indomethacin or methylene blue. It is concluded that Musanga relaxation of the rat aorta does not involve cyclo-oxygenase, nor cAMP pathway, but unique, unlike those of known classical vasodilators.

Keywords: *Musanga cecropioides*, contraction, inhibition, Potassium, thoracic aorta

INTRODUCTION

Medicinal plants have been used as traditional remedies in Africa. In our previous studies, we reported that *Musanga cecropioides* did not affect ach -induced contractile response but produced significant inhibition of the movement of the rat and rabbit gut smooth muscles, Aziba et al (2000). It is also reported to have a blood pressure lowering effect and it is used to procure painless childbirth, Adjanohoun et al (1989). These actions prompted us to investigate in the present study, the effects of the aqueous extract of the leaves on the rat aorta on contractions — induced NA on receptor and voltage mediated responses respectively.

MATERIALS AND METHODS

Male Wistar rats(200 -350g) were killed by a blow on the head. The thoracic aorta was located, while excess fat and connective tissue was removed. The vessels were cut into strips according to Furchgott and Bhadrakom (1953). The contractile responses were recorded isometrically using a force displacement transducer(FT-03,Grass) and the signals amplified with a polygraph (Grass, model 7D).the preparations were equilibrated for 1hr in the organ bath containing 10ml modified Krebs solution of the following composition (mM): NaCl 118, KCl 1.2, CaCl2 1.8, MgCl2 1.2, KH2PO4 1.2, NaHCO3 25,and glucose 11 .7.the tissue bath solution was bubbled with a 95% O2, 5% CO2 gas mixture which maintained the solution at pH of between 7.2-7.4. in some preparation, K Krebs solution was prepared by replacing NaCl with KCl. The Krebs solution with high potassium concentration was prepared by mixing the K krebs. The calcium free Krebs solution was prepared by deleting Ca2 during preparation of the Krebs solution. Drugs used were Noradrenaline hydrochloride (Sigma,st. Louis,MO USA) methylene blue (laboratory HBL reagent.

Animals

The adult albino rat (>6 weeks old, Sprague Dawley strain) used in the experiment were supplied by the National institute of Medical Research, Yaba, Lagos, Nigeria. The animals were maintained in the Preclinical House in a well ventilated condition, under' constant temperature (30°C) and humidity 50% and exposed to 12hr light-dark cycle for 2 weeks before use. The animals were fed on
standard livestock pellets (Pfizer, Nigeria Ltd), with free access to water and were treated ethically according to the guidelines for the treatment of experimental animal as determined by the animal council.

Statistical Analysis
The data obtained from this experiment were expressed as the mean (S.E.M) for nobservation. The value obtained in different groups were compared using test and probabilities of less than 5% (P<0.05) were considered to indicate a significant difference.

RESULTS

Effect of M. Cecropioides on K+ Induced Contractions
In high K+ (55mM) Ca2+ free medium. The cumulative addition of Ca2+ >3mM to the aortic strip caused increase in contractile force. The maximum contraction>3mM was 1.2 ± 0.25g (n = 10). After incubating the strip in musanga (10 - 1000mg/ml) for 10 minutes, inhibited contraction in a concentration dependent manner (fig IA), the IC50 value was calculated to be 15. increasing the incubation time did not cause any pronounced inhibitory action of Musanga.(fig 1B) low doses inhibited the high K+ induced Ca2+ dependent contraction, suggesting action on voltage operated Ca2+ channel effect.

DISCUSSION
Rat aorta pre-treated with Musanga cecropioides in this study inhibited contractile responses to Noradrenaline and high Ca2+ (55mM), it also caused the relaxation of the blood vessel when Musanga was added to NA induced sustained contractions. Contraction of Vascular smooth muscle requires increase in free cytosolic Ca2+ (Karaki and Weis 1979), the actions of Musanga was more enhanced in low medium Ca2+ 0.45mM, then high Ca2+ medium 1.8mM in this study. The K+ induced contraction of the smooth muscle arise from increased Ca2+ influx through voltage dependent Ca2+ channels (Karaki and Weis 1979). Bay K 8044, a derivative of Nifedipine, a known Ca2+entry facilitator did not affect this action of Musanga. The inhibitory effect of musanga was much reduced in high Ca2+ medium 1.8mM. The tonic tension in response to Noradrenaline results from Ca2+ entry through receptor operated calcium channel (Bolton 1979). The inability of musanga to inhibit the actions of indomethacin and methyelene blue, rules out, the possibility of the plant action involving cyclo-oxygenasse nor cyclic AMP pathways. The totality of this result indicated that the inhibitory effects of Musanga cecropioides on the contractile responses caused by high K+ or NA- are not due to increase in cyclic...
nucleotid. Yang-Chong et al (1993) Musanga relaxes the rat aorta in a unique manner different from the known vasodilators and its actions on receptor is not specific since on receptor mediated responses, it suppressed maximum contractile response induced by Noradrenaline and high K\(^+\) in a non competitive manner.

REFERENCES:


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