

The effects of acute administration of Chinese aphrodisiacs sold in Blantyre City on sperm characteristics and fertility profile in guinea pigs

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ABSTRACT

Background

Chinese aphrodisiacs have become popular remedy for sexual dysfunction and improvement of libido in men in Malawi. However, selling of these drugs seems not to be well regulated. Probably the aphrodisiacs that are currently on the market have unknown efficacy, potency and safety profiles. The aim of this study was to assess the efficacy of imported Chinese aphrodisiacs using guinea pigs as a model.

Materials and Methods

Two types of drugs were purchased from vendors in Blantyre City. Tonic tea, which was purported to improve erectile function and libido, and sperm multiplier tablets which were claimed to increase the sperm count. The tonic tea was prepared by soaking one tea bag in 100ml boiling water. The tea was cooled and administered to eight male experimental animals in varying doses. Each animal was introduced into a separate cage with a female guinea pig. Sexual behaviour such as mounting, sniffing behind the female were observed and recorded.

Each sperm multiplier tablet was dissolved in distilled water and administered to the experimental animals in the morning and evening for seven days. At the end of the treatment, the experimental and control animals were sacrificed, their semen collected and analysed sperm motility, concentration and morphology.

Results

For the tonic tea, there were no statistical differences between the experimental and the control animals in terms of the number of mountings and sniffing behind the female. The sperm multiplier drug showed statistically significant differences between the experimental and the control animals in terms of the sperm motility (78.24 ± 1.35 vs. 86.54 ± 1.88 , $p < 0.05$), and concentration (54.28 ± 1.24 vs. 67.59 ± 2.12 , $p < 0.05$).

Conclusion

The tonic tea did not show any efficacy in improving erection and libido. The sperm multiplier tablets, purported to increase sperm production, significantly increased the sperm motility, sperm concentration in the treated animals.

Introduction

For many centuries, aphrodisiacs have been used to increase libido, promote sexual pleasures and arousal especially in individuals with sexual problems. Herbs such as ginseng, rehmannia, Epimedium, Cordyceps, maca, muira puama, damiana, ginkgo, tribulus terrestris and yohimbine have been used as aphrodisiacs and the majority of these are Chinese herbs^{1,2}.

Currently, prescribed drugs such as Sildenafil, Prostaglandins, L-arginine, and other hormone replacement therapy are used world wide to increase sexual desire. These drugs are associated with some side effects such as tremor, blurred vision, irregular heart beat and headaches³.

In Malawi local aphrodisiacs are also used. One of the few local aphrodisiac that has been scientifically studied is *Mondia whytei*, locally known as *gondolosi*. *Mondia whytei* has been reported to increase sexual desire, effectiveness of erection, and also sperm vitality⁴. The aim of this study was to assess the efficacy of imported Chinese aphrodisiacs, tonic tea and sperm multiplier tablets, using guinea pigs as a model. This is important in order to verify whether the drugs perform the functions they are purported to perform.

Materials and Methods

Experimental animals

Ethical clearance was granted by the College of Medicine Research and ethics committee before conducting this study. Fourteen mature guinea pigs of similar age were bought from farmers around Blantyre City comprising of 4 females and 10 males. The animals were housed in standard cages and maintained under standard conditions (12 h light/dark cycle; $25 \pm 3^\circ\text{C}$ temperature; 35-60 relative humidity), provided with a standard laboratory chow and water ad libitum. The animals were kept for 3 days to acclimatize before commencement of the study.

The control animals

In the sexual behaviour studies with tonic tea, each male animal acted as its own control. Eight males were randomly selected for the sexual behavioural observation with females. Each male was housed in a cage with a female guinea pig for an hour. The sexual behaviours of the male towards the female i.e. mounting, and sniffing behind the female were observed and recorded. The observations were carried out twice a day.

Treatment of the animals with tonique tea

The tonic tea was prepared by soaking one tea bag weighing 2g in 100ml boiling water. The tea was cooled and administered to eight male experimental animals via oral intubation in varying doses of 1ml, 3ml and 5ml. The animals were allowed to stay for 30 minutes before being introduced into separate cages with a female guinea pig. Sexual behaviour characteristics such as mounting, and sniffing behind the female were observed for 1 hour and recorded. The treatment was done in the morning and evening each day.

Treatment with sperm multiplier tablets and analysis of the semen

After the tonic tea experiments, the animals were rested for three days as a wash away period to clear the previous drug. The ten male guinea pigs were randomly divided into two groups of experimental and control each comprising of five animals. A sperm multiplier tablet containing 127 mg was dissolved in 4 ml of distilled water. 2 ml were administered to each experimental animal via oral intubation, whereas the experimental animals were administered with 2 ml of saline each. Treatment was done in the morning and evening for seven days.

At the end of treatment, both treated and control animals were sacrificed under phenobarbitone anaesthesia by intraperitoneal injection at 0.4mL/kg body weight.

Immediately thereafter, the testes and epididymis were excised. The cauda epididymis was separated and minced using a pair of small scissors, to release the sperm into 3ml of warmed physiological saline. The sperm suspension was then placed in an incubator at 37°C for 10 minutes prior to motility assessment. A 20 µl drop of the sperm was placed on Makler counting chamber and motile sperm were then counted under a light microscope (x400).

Assessment of the morphology

Smears were made on clean slides and air dried after which they were stained with hemacolor (Merck, Darmstadt, Germany). Morphology was analyzed by oil immersion light microscopy. At least 200 cells on each slide were assessed. Sperm with cytoplasmic droplets, abnormal shaped heads, and more than one tail were regarded as morphologically abnormal.

Statistical analysis

The results were analyzed on the Prism 4 statistical program (GraphPad, San Diego, CA, USA). All data are expressed as mean ± SEM. Data were tested for normality with the Kolmogorov–Smirnov test. Students’ t-test and One-way ANOVA (with Bonferroni post hoc test if P < 0.05) was used for statistical analysis. Differences were regarded statistically significant if P < 0.05.

Results

Behavioural studies

We observed no statistically significant differences in the number of times males mounted females between males treated with 1, 3, and 5ml of tonique tea when compared with the control group. Similarly, no statistically significant differences in numbers of times males sniffed behind the females were observed between the treated groups and the control (Table 1, p > 0.05).

Table 1: The effect of tonique tea treatment on guinea pig sexual behaviour

| Group | Sexual behaviour observed | Sexual behaviour observed |
|---------------|------------------------------------------|-------------------------------------------------|
| Control | Number of times mounted the female (n=8) | Number of times sniffed behind the female (n=8) |
| Control | 0.50 ± 0.32 | 3.87 ± 1.34 |
| 1ml treatment | 0.37 ± 0.27 | 3.75 ± 0.95 |
| 3ml treatment | 1.75 ± 1.48 | 9.50 ± 3.33 |
| 5ml treatment | 0.12 ± 0.11 | 6.00 ± 2.70 |

Spermatogenesis studies

Guinea pig sperm motility and concentration were significantly increased in the sperm multiplier tablet treated group when compared to the control. Similarly, the percentage of morphologically normal spermatozoa was significantly increased in the treated group when compared to the control (Table 2, p < 0.05).

Discussion

We have shown that the Chinese tonic tea which is purported to increase sexual libido did not demonstrate any efficacy in a guinea pig animal model. It is possible that the tonic tea could have been made from a mixture of different herbs

but this was not mentioned on the package. We observed a tendency of increase in mounting and sniffing behind the female when the animals were treated with 3ml of the tea extract though the increase was not statistically significant (Table 1). Perhaps, increasing the sample size or using a different animal model could yield different results. To our knowledge, this is the first study to be conducted to assess the efficacy of the Chinese tonic tea using guinea pigs as an animal model.

On the other hand, the sperm multiplier tablets increased the guinea pig sperm motility, morphology, and sperm concentration (Table 2). Recently there has been a huge body of scientific evidence pointing to the efficacy of herbal aphrodisiacs in improving male fertility parameters in both human and animal studies^{4,5}. The findings of this study on the sperm multiplier tablets are however, not certifying that this drug can be used as a male aphrodisiac since its toxicity effects are not yet assessed.

Table 2: The effect of sperm multiplier tablets treatment on guinea pig spermatozoa parameters

| | Control Group | Sperm multiplier tablets treated group | p value |
|----------------------------|---------------|----------------------------------------|---------|
| Motility (%) | 78.24 ± 1.35 | 86.54 ± 1.88 | 0.042 |
| Concentration (million/mL) | 54.28 ± 1.24 | 67.59 ± 2.12 | 0.034 |
| Normal morphology (%) | 49.90 ± 1.87 | 69.25 ± 2.32 | 0.021 |

Conclusion

It is very important that before any medicines are put on the market they should be assessed for their efficacy and safety to use^{6,7}. In our study we have demonstrated that the Chinese tonique tea does not improve sexual libido in male guinea pigs whereas the sperm multiplier tablets does improve fertility parameters.

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