Coconut water for urinary tract pathogens treatment

ASSIGN BUSTER

INTRODUCTION

Urinary tract infection (UTI) is the common term for the heterogenous group of conditions in which there is growth of bacteria in the urinary tract. 1 UTIs occur in 3-5% of girls and 1% of boys. After the first UTI, 60-80% of girls will develop a second UTI within 18 mo. In boys, most UTIs occur during the 1st yr of life. UTIs are much more common in uncircumcised boys. The prevalence of UTIs varies with age. During the 1st yr of life, the male : female ratio is 2. 8-5. 4 : 1. Beyond 1-2 yr, there is a striking female preponderance, with a male : female ratio of 1 : 10. 2

According to the National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, UTI accounted for nearly 7 million office visits and 1 million emergency department visits each year. 3 UTIs are caused mainly by colonic bacteria. In females, 75-90% of all infections are caused by Escherichia coli, followed by Klebsiella spp. and Proteus spp. Some series report that in males older than 1 yr of age, Proteus is as common a cause as E. coli. 2 UTI can cause significant morbidity if not properly identified and treated. Therefore early recognition and prompt treatment is important to prevent late sequelae, such as renal scarring, hypertension, and renal failure. 4

Coconuts, which are native in our country, play an important role in the society. Not only do they provide shelter and livelihood for mankind but they are also the source of important physiologically functional components. Nowadays, coconut has been gaining too much popularity because of its potential antimicrobial benefits. 5

Coconut water is incredibly healthy and one of the best drinks to hydrate the body. Besides helping to remove toxins from the body and aiding digestion, coconuts have amazing anti-viral, anti-fungal and anti-microbial properties that help to cure the disease. 6 It contains high levels of lauric acid, a substance responsible for these properties. 7 However, no study has been done to document or confirm its antimicrobial properties against urinary tract pathogens, thus, this study was conceptualized.

Thus, it is the aim of this study to explore adjunctive treatment for urinary tract infection.

REVIEW OF RELATED LITERATURE

Coconut water contains monolaurin, an antiviral, antibacterial and antiprozoal monoglyceride that is used to kill lipid-coated viruses such as HIV, Herpes, cytomegalovirus, flu and various pathogenic bacteria. 8

Lauric acid which is found in high quantity in Virgin coconut oil was proven to have antibacterial activity against various viruses, protozoal and bacterial pathogens. However, one study conducted here in Davao City dated September 2004 showed that commercially available virgin coconut oil has no antibacterial activity against the urinary tract pathogens, E. coli and K. pneumoniae. 5

SIGNIFICANCE OF THE STUDY

Urinary tract infection is a serious health problem affecting millions of people each year. It is treated with various antibacterial drugs which are readily available in the market. However due to the increasing cost of these drugs,

many people cannot afford them and sort to self medication with natural remedies. The result of this study will aid the community on using an adjunctive medicine that is readily available for the treatment of one of the common diseases in children.

OBJECTIVES

General Objective:

To determine the antibacterial activity of coconut water using the zone of inhibition on Escherichia coli, Klebsiella pneumoniae and Proteus mirabilis (most common causes of UTI).

Specific Objectives:

To determine the zone of inhibition of coconut water on E. coli, K. pneumoniae and P. mirabilis

To determine which among the bacterial pathogens in UTI is the most sensitive to coconut water.

DEFINITION OF TERMS

Zone of inhibition – this is the clear area formed around the filter paper disc after 24 hours incubation of the petri dishes.

Control disc – impregnated disc with Amikacin and Cotrimoxazole used as standards for comparing the zone of inhibitions of coconut water against common urinary tract pathogens.

Coconut water – is the clear liquid inside young coconuts

METHODOLOGY

Study design

In-Vitro Experimental Study Design

Time and Place of Study

The study will be conducted in a school microbiology laboratory wherein the preparations of the materials and the interpretation of the results will be done.

Preparation of Coconut water

The young coconut fruit will be freshly obtained from the tree and then the water will be separated from its pulp. The water will then be stored in an autoclaved sterile container.

Preparation of Colony

The test organisms, E. coli, K. pneumoniae and P. mirabilis will be obtained from positive cultures isolated from urine cultures of both pediatric and adult patients. Sensitivity testing for each organism will be performed to determine the type of antibiotic that will be used as control for the study.

Preparation of Culture Medium and Inoculation of Test Organisms

The Mueller-Hinton Agar will be used as the medium for the susceptibility testing. This will be prepared by mixing 38g agar to 1000 mL of distilled water in an Erlenmayer flask. The flask will be placed on a boiling water until the mixture becomes clear and homogenous.

The Schieler and Schull filter paper will be used to prepare 6mm disc using a puncher. The materials that will be used in the experiment proper will be sterilized in the autoclaved at 15psi for 15 minutes. After sterilization, the agar will be dispensed in the sterilized petri dishes with a depth of 5mm and allowed to solidify.

Three trials with 9 cultures of each bacterial strain will be tested using the Kirby-Bauer Disc Diffusion Method. Each bacterial strain will be made into a broth suspension and streaked evenly onto the surface of the medium using a sterile cotton swab. The sterile filter paper disc will be dipped into the coconut water. The prepared discs will then be allowed to dry for 3-5 minutes after which, they will be on the agar using a sterile forceps and gently pressed down to ensure contact. For the control, commercially impregnated discs with Amikacin and Cotrimoxazole will be used. The plates will be incubated at 37oC for 24 hours and will be investigated for antibacterial activity using the zone of inhibition. The zones of inhibition will be determined in millimeters using a digital caliper. The measured zones of inhibition will be classified as follows:

BUDGET PROPOSAL

Pcs. Price Total

Petri dish 27 200 each 5400

Nutrient agar 2 1000 each 2000

Amikacin disc 54 200/pack 300

Cotrimoxazole 54 200/pack 300

Laboratory rental 1000 1000

P9000