

USING OF CARROT JUICE *DAUCUS CAROTA* FOR RECOVERING OF UTI IN PREGNANT WOMEN

Hussein K. Abdul-Sada¹

Rasha N. Jawad²

¹Department of Pharmacology and Clinical Lab. Sciences, College of Pharmacy, University of Basrah, Basrah, Iraq

²Department of Public Health, Technical Institute of Basrah, Basrah, Iraq

ABSTRACT

Fifty one pregnant women have urinary tract infection were tested to isolate the organisms and to test action of carrot juice in curing the infection. In this study *Escherichia coli* accounts for 54.9% of infections. Other gram-negative rods such as *Proteus* spp. and *Klebsiella pneumoniae* are also common. Gram-positive organisms such as group B streptococci and *Staphylococcus* spp. are less common causes of UTI. By drinking of carrot juice from the patients about 7 days (200ml three times daily), 78.43% of women have been recovered. The antibacterial study revealed the role of carrot juice in the inhibition growth of bacteria, 18mm inhibition zone has been reported against *E. coli*, 23 mm in case of *Proteus* spp., 12 mm in case of *K. pneumoniae* and group B streptococci, and less than that in case of *Staphylococcus* spp. These results may be reveal to more safety of using carrot juice during pregnancy from the using of any antibiotic that can not be use during primary stages of pregnancy. Because of the long list of chemical constituents and their activities, yet the active material of carrot against these bacteria can not be known.

Key words: Carrot antimicrobial activity, *Daucus carrota* antibacterial activity.

استخدام عصير الجزر لمعالجة التهابات المجاري البولية عند النساء الحوامل

حسين كاظم عبد السادة¹ رشا نوري جواد²

¹ فرع الأدوية والعلوم المخبرية السريرية، كلية الصيدلة، جامعة البصرة، البصرة، العراق

² قسم صحة المجتمع، المعهد التقني البصرة، البصرة، العراق

الخلاصة

فحصت إحدى وخمسون امرأة حامل مصابة بالتهاب المجاري البولية لعزل المسبب المرضي للإلتهاب وفحص تأثير عصير الجزر على شفاء المرضى من الإلتهاب. لاحظت الدراسة أن بكتريا *Escherichia coli* شكلت نسبة 54.9% من المسببات المرضية للإلتهاب، بينما كانت الأنواع الأخرى من العصويات السالبة لصبغة جرام مثل *Proteus spp.* و *Klebsiella pneumoniae* شائعة، في حين وجدت بعض الأنواع الموجبة لصبغة جرام مثل *group B streptococci* و *Staphylococcus spp.* نسبة أقل شيوعاً من المسببات المرضية لإلتهاب المجاري البولية. تم دراسة قدرة عصير الجزر على إزالة الإلتهاب بتناول 200 مليلتر منه لمدة 7 أيام وتبين بعد استخدامه من قبل النساء الحوامل أن 78% منهن شُفين من الإصابة. وأشارت الدراسة التضادية للجراثيم والتي أجريت على الأنواع البكتيرية المعزولة دور عصير الجزر في تثبيط نمو تلك الجراثيم إذ سجلت 18 مليمتر ضد بكتريا *E. coli* و *Proteus spp.* و 12 مليمتر في حالة كل من بكتريا *K. pneumoniae* و *group B streptococci* وأقل من ذلك في حالة بكتريا *Staphylococcus spp.* وتشير هذه النتائج إلى قدرة عصير الجزر على شفاء النساء الحوامل المصابات بالتهاب المجاري البولية واللاتي يحضرن عليهن استخدام العديد من المضادات الحيوية في المراحل الأولى من الحمل.

INTRODUCTION

Pregnant women are at increased risk for UTIs. Beginning in week 6 and peaking during weeks 22 to 24, approximately 90% of pregnant women develop ureteral dilatation(1), which will remain until delivery (hydronephrosis of pregnancy). Increased bladder volume and decreased bladder tone, along with decreased ureteral tone, contribute to increased urinary stasis and ureterovesical reflux(2). Additionally, the physiologic increase in plasma volume during pregnancy decreases urine concentration(3). In many cases, pregnant women with a urinary tract infection have no symptoms of a UTI asymptomatic(2). So that the American College of Obstetrics and Gynecology recommends that a urine culture be obtained at the first prenatal visit(4). A repeat urine culture should be obtained during the third trimester, because the urine of patients may not remain sterile for the entire pregnancy(4,5).

The organisms that cause UTIs during pregnancy could be similar to those found in nonpregnant patients. *Escherichia coli* accounts for 80 to 90% of infections. Other gram-negative rods such as *Proteus mirabilis* and *Klebsiella pneumoniae* are also common. Gram-positive organisms such as group B streptococcus and *Staphylococcus saprophyticus* are less common causes of UTI. Group B streptococcus has important implications in the management of pregnancy and will be discussed further. Less common organisms that may cause UTI include enterococci, *Gardnerella vaginalis* and *Ureaplasma ureolyticum*(1,4,5). Pregnant women should be treated when bacteriuria is identified and the choice of antibiotic should address the most common infecting organisms (i.e., gram-negative gastrointestinal organisms) and the antibiotic should also be safe for the mother and fetus(6,7). Historically, ampicillin has been the drug of choice, but in recent years *E. coli* has become increasingly resistant to ampicillin.⁸ Ampicillin resistance is found in 20 to 30% of *E. coli* cultured from urine in the outpatient setting(9). Nitrofurantoin (Macrochantin) is a good choice because of its high urinary concentration. Alternatively, cephalosporins are well tolerated and adequately treat the important organisms. Fosfomycin (Monurol) is a new antibiotic that is taken as a single dose. Sulfonamides can be taken during the first and second trimesters but, during the third trimester, the use of sulfonamides carries a risk that the infant will develop kernicterus, especially preterm infants. Other common antibiotics (e.g., fluoroquinolones and tetracyclines) should not be prescribed during pregnancy because of possible toxic effects on the fetus, and any other antibiotic may have one or more side effect either for mother or his fetus(10).

Some antibiotics are useful for severe cases, but the edible herbs are more safety to the pregnancy women patient, such the drinking of carrot juice that can give a patient long term relief for recurrent UTIs(11). *Daucus carota* (Carrot) is edible and have a medicinal benefits . It is used in the treatment of various complaints including digestive disorders, (soothes the digestive tract), kidney and bladder diseases and in the treatment of dropsy, it supports the liver, stimulates the flow of urine and the removal of waste by the kidneys (12,13).

The aim of the study is to isolate the causative agents of UTI in the urine of pregnant women were collected and to test the antimicrobial activity of carrot juice against bacteria causing UTIs were tested, the study was investigated the role of carrot juice in prevention of UTI in pregnant women.

MATERIALS AND METHODS

Fifty one pregnant women with UTI at different ages and pregnancy durations(2) show in Table (1) from Basrah province. Specimen of 15ml urine from each patient were taken (13,14). The specimens centrifuged and cultured on Nutrient agar, MacConkey agar, Blood agar and Mannitol salt agar(14).

Filter paper discs saturated in carrot juice(12).A volume of 200ml from carrot juice collected from carrot in dark field (special for research), 300g of carrot root squashed in juice machine and concentrated in water bath 50C for 60 min(12).

Table(1): The age of patients and their duration of pregnancy

Age of patients /years			Duration of pregnancy/week		
18-22	23-27	28-32	6 - 8	12-20	22-33
13	23	15	20	20	11

Study was done at laboratories of Pharmacy College, Basrah University.

1-Collection of urine specimens. uncontaminated urine is Clean-voided specimens was collected as following :

a-Separate labia. b- Carefully clean the vulva with a sponge soaked with a mild soap that dose not contain any antimicrobial compound. c- Collect a midstream specimen in a sterile container(15).

2- Aerobic culture was done for all samples after centrifuged in three type of media, Nutrient agar, MacConkey agar and Blood agar by streaking method and the cultures incubated aerobically at 37°C for 24 hrs(14).

3- Diagnostic methods for identification type of bacteria in culture media by direct slide, gram stain and biochemical tests according to diagnostic keys (17).

4-Sterile filter paper disks 5 mm in diameter embedded about 30 min in concentrated carrot juice (20ml), then dried by sterile filter paper, one disk falls in a place on the culture media of each species of bacteria. The plates Incubated upside down at 37°C(15).

RESULTS AND DISCUSSION

Isolation of bacteria

Urine is sterile normally. So when we were founded any bacterial colony in urine culture that mean there were inflammatory case called urinary tract infection. There were many kind of bacteria that consider the most common causative of this infection . This research explains that *E. coli* was the most common kind that distributed in urine specimen which were taken from pregnancy patients. Table(2) shows that *E. coli* appeared in 28 out of 51 tested samples ,that confirm 54.9% of the total appearance , *Proteus* recorded in 15 samples (29.4%), *Klebsiella* isolated in 20 samples (39.2%), while *Staph.* and Group B Streptococci found in 10(19.6%) and 8 (15.9%) respectively, either all treated results shown curing of UTI symptom after a week of treatment.

These results are correlate with many researches in this field, Patterson and Andriole (17). Adverted that the most common agent responsible for urinary tract infection in pregnant women is *E. coli* which accounts for 80% to 90% of UTIs(18). Other gram-

negative rods such as *Pr. mirabilis* and *K. pneumoniae* also are responsible for infection, and gram-positive organisms such as group B streptococci and *Staph. saprophyticus* are less common causes of UTI(4). Group B streptococci has important implications in the management of pregnancy. Less common organisms that may cause UTI included enterococci, *Gardnerella vaginalis* and *Ureaplasma ureolyticum*.(1,4,5). When we return to the results of this study, (*E. coli*; *Pr. mirabilis*; *K. pneumoniae*; group B streptococci; *Staph. aureus* were isolated from urine samples of pregnant women. Because of the relationship between the duration of pregnancy and type of bacteria was not found, therefore study was not divided the samples according to pregnancy duration and some research confirm this result (2).

The reasons of infection in pregnancy women described by many researcher (1,4,6,7) explained that up to 70% of pregnant women develop glycosuria, which encourages bacterial growth in the urine, either the increases in urinary progesterins and estrogens may lead to a decreased ability of the lower urinary tract to resist invading bacteria.(2,5). This decreased ability may be caused by decreased ureteral or possibly by allowing some strains of bacteria to selectively grow(18). The body health hygiene may consider as other reasons of this infection in pregnancy and non pregnancy women and men too(18). These factors may all contribute to the development of UTIs during pregnancy

Treatment with carrot

Table (2) showed the action of carrot in the curing of infection. In the initial samples , 28 isolates of *E. coli* were isolated, but after using carrot juice (200ml three times a day for 7 days), *E. coli* appeared 4 times only, other isolates observed in a little samples . So the appearance of isolates before treatment was 81, but after treatment was 11 isolates only.

To confirm the antimicrobial activity of carrot juice, Kirby-Baur test was done in three repeating times for all five isolates type. The results of antimicrobial activities are shown in Table(3). According to NCCLs cheat(16), the results referred to sensitivity of *Pr. mirabilis*; and *E. coli* for carrot juice ,and resistant to *Strepto.* and *Staph. aureus*, but *K. pneumoniae* showed intermediate resistance.

Table(2): Type and number of isolates before and after treatment

Type of bacteria	No. of isolates before treatment	No. of isolates after treatment
<i>E. coli</i>	28	4
<i>Pr. mirabilis</i> ,	15	1
<i>K. pneumoniae</i>	20	2
group B Streptococci	8	1
<i>Staph. aureus</i>	10	3
No. of isolates	81	11

The medical benefits of carrot was studied by several than researchers, carrot has a long list of chemical constituents(19). Carrots have many important vitamins and minerals. They are rich in antioxidants Beta carotene, Alpha carotene, phytochemicals

and glutathione, calcium and potassium, and vitamins A, B1, B2, B6, C, D and E, which are also considered antioxidants and immune system booster(20). Vitamins A and D have received particular attention in recent years as these vitamins have been shown to have an unexpected and crucial effect on the immune response the essential roles of vitamins in modulating a broad range of immune processes, such as lymphocyte activation and proliferation, T-helper-cell differentiation, tissue-specific lymphocyte homing, the production of specific antibody isotypes and regulation of the immune response(20). Other researches(21,22) observed the clinical potential of vitamin A and D metabolites for modulating tissue-specific immune responses and for preventing and treating inflammation ,so the antibacterial action of carrot in prevention of UTI may be due to Immunity action of their vitamins .

The antimicrobial study was done to confirm the action of carrot extraction against isolated bacteria. True extraction technique is very important in antimicrobial studies .Some research considered the purify of watery extracts of peeled and shredded carrots showed an antimicrobial effect against a range of food-borne microorganisms such as *Leuconostoc mesenteroides*; *Listeria monocytogenes*; *Staph. aureus*; *Pseudomonas fluorescens*, *Candida lambica*, *E. coli*(3), although the antimicrobial activity was present in fresh carrots at concentrations sufficient to inhibit spoilage bacteria(19). Elgayyar *et al.*(23) referred that the antimicrobial activity was not linked to phenolic compounds but was presumably due to a polar components. Free saturated fatty acid (dodecanoic acid) and methyl esters of saturated fatty acids (of dodecanoic and pentadecanoic acids) have a good ability to kill some of microorganisms. In similar to our study Smith and *et al.*(24) detected the inhibition zones against five types of bacteria, and recorded 30mm against *E. coli*, 35mm for *Klebsiella* and 40mm for *Proteus*, these results were obtained by using of ethanolic extraction of carrot, but our study tested watery extraction only.

Table (3): Inhibition zone and sensitivity of bacteria.

Type of bacteria	Inhibition zones /ml	Sensitivity*
<i>Pr. mirabilis</i>	23	S
<i>E. coli</i>	18	S
<i>K. pneumoniae</i>	12	I
<i>St. group B</i>	12	R
<i>Staph. aureus</i>	8	R

S = sensitive, R= resistance, I = intermediate.

Depending of standard cheat from NCCLS (17)

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