

# The Effect Of Ramadan on Asymptomatic Bacteriuria, Urinary Tract Infections and Amniotic Fluid Index in Pregnancy

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## Abstract

**Objective:** To show the effect of 12 hours fasting in a day during Ramadan on asymptomatic bacteriuria, urinary tract infections and amniotic fluid index in pregnant patients.

**Methods:** This study was carried out in Obstetrics and Gynecology Department of Gaziantep University Hospital, between September 23th and October 23th in year 2006 (during Ramadan). Fourty-one consecutive healthy women with uncomplicated pregnancies of 20 weeks or more who were fasting during Ramadan were included in the study group (Group 1). The control group (Group 2) consisted of 31 healthy pregnant women who were not fasting during the study period. All of these patients evaluated with urinary dipstick test in the morning and at 5 pm. for urine osmolality, leucocyturia, and bacteriuria. After determined a positive dipstick urine culture was performed. Urinary osmolality was also measured by dipstick test. Doppler ultrasonography was performed in all subjects in the beginning and at the end of Ramadan for the following the change of amniotic fluid index.

**Results:** The mean of urinary osmolality was higher in the fasting group. There was no statistically difference between two groups for asymptomatic bacteriuria and urinary tract infections rate. Amniotic fluid index was similar in two groups.

**Conclusion:** Twelve hours fasting in a day during Ramadan causes hypohydration and leads an increase urinary osmolality but, it does not changes the rate of asymptomatic bacteriuria and urinary tract infections in pregnancy.

**Keywords:** Ramadan, pregnancy, asymptomatic bacteriuria, urinary tract infections, amniotic fluid index.

## *Gebelerde oruç tutmanın üriner sistem enfeksiyonu ve amniotik sıvı indeksi üzerine etkisi*

**Amaç:** Gebelerde oruç sırasında 12 saatlik açlığın üriner sistem enfeksiyonu ve amniotik sıvı indeksi üzerine etkisini göstermektir.

**Yöntem:** Bu çalışma Gaziantep Üniversitesi Tıp Fakültesi Hastanesi'nde, Kadın Hastalıkları ve Doğum Anabilim Dalı'nda 23 Eylül-23 Ekim 2006 tarihleri arasında (Ramazan ayı süresince) gerçekleştirildi. Ramazan ayında oruç tutan 41 tane sağlıklı, 20. ve daha büyük gebelik haftasındaki gebeler çalışmaya alındı (Grup 1). Kontrol grubuna 31 tane oruç tutmayan sağlıklı, 20. ve daha büyük gebelik haftasındaki gebeler alındı (Grup 2). Hastaların tamamı üriner dipsticklerle her sabah ve akşam 5'te (iftardan hemen önce) osmolalite, lökositüri ve bakteriyüri için değerlendirildi. Pozitif dipstick analiz sonrası tüm hastalardan idrar kültürü alındı. Ramazan ayının başında ve sonunda amniotik sıvının indeksi doppler ultrasonografi ile ölçülerek değişiklik olup olmadığına bakıldı.

**Bulgular:** Ortalama idrar osmolalitesi oruç tutan hastalarda daha fazla idi. Üriner sistem enfeksiyonlarının sıklığı açısından iki grup arasında istatistiksel olarak anlamlı bir fark yoktu. Amniyotik sıvı indeksi iki grup arasında benzer tespit edildi.

**Sonuç:** Gebelerde Ramazan ayı boyunca 12 saatlik açlık hipohidrasyona sebep olarak idrar osmolalitesinde artışa neden olmaktadır. Ayrıca üriner sistem enfeksiyonu sıklığını değiştirmemektedir.

**Anahtar Sözcükler:** Ramazan, gebelik, asemptomatik bakteriüri, idrar yolu enfeksiyonları, amniotik sıvı indeksi.

## Introduction

During the religious festival of Ramadan, practising Muslims refrain from eating, drinking, smoking and sexual relationships during the hours of daylight throughout the lunar month.<sup>1</sup> Generally, meal frequency is reduced during Ramadan fasting, which it has been found often leads to reduced energy intake and loss of body mass and body fat. Any loss in body mass index is usually relatively small and it may also be attributed to a decrease of glyco-gen-bound water stores, extracellular volume concentration secondary to a lower sodium intake, and a moderate degree of hypohydration with little loss of body tissue.<sup>2</sup> Hypohydration is a risk factory for asymptomatic bacteriuria and urinary tract infections in pregnancy. Pregnant women with asymptomatic bacteriuria have an increased risk of pyelonephritis and there is a strong association between asymptomatic bacteriuria and preterm and low birth weight delivery.<sup>3,4,5</sup>

Our aim was to evaluate the effect of Ramadan fasting on asymptomatic bacteriuria and urinary tract infections in pregnant women.

## Methods

This study was carried out in Obstetrics and Gynecology Department of Gaziantep University Hospital, between September 23th and October 23th in year 2006 (during Ramadan). Fourty-one consecutive healthy

women with uncomplicated pregnancies of 20 weeks or more who were fasting during Ramadan were included in the study group (Group 1). The control group (Group 2) consisted of 31 healthy pregnant women who were not fasting during the study period. For evaluating Ramadan's effect on asymptomatic bacteriuria and urinary tract infections in pregnant women, we evaluated all patients with dipstick urinalysis in the morning and just before breaking the fasting (at 5 pm).. Positive urinalysis was defined as a dipstick result that shows positive nitrites and/or more than 1+ leucocytes, blood or protein. Any patient who has a positive dipstick test evaluated with a midstream urine culture. A positive midstream urine specimen was defined as a pure growth >100 000 organisms in urine on laboratory culture. Asymptomatic bacteriuria was treated with oral cephalixin in all cases. Examinations by Doppler ultrasonography were performed once a week to all subjects for the moniterization of amniotic fluid index (AFI) during the Ramadan. High definition image (HDI; A 3.5 MHz convex transducer, Applio- Toshiba, Otamara, Japan) was used to obtain AFI. Amniotic fluid index was calculated by the sum of deepest vertical pocket in 4 uterine quadrants measured in sonography. Oligohydramnios is defined as amniotic fluid index of  $\leq 5$  cm.<sup>6</sup> To remove the effect of other factors causing oligohydramnios and polihydramnios, all cases with urinary or skeletal anomalies, intrauterine growth retardation,

**Table 1.** Comparison of the maternal data between fasting and non-fasting groups.

	Group 1 (n=41)	Group 2 (n=31) Control	P
Maternal age (years)	23.4 (22.6-25.9)	24.4 (22.5-26.0)	0.567
Parity	2.3 (1.8-2.7)	2.6 (2.5-3.0)	0.432
Gestational Age (weeks)	29 (20-38)	30 (25-39)	0.857
Oral fluid intake (l/day)	2.6 (2.0-2.8)	2.9 (2.5-3.3)	0.641
The change of BMI	0.43±0.12	0.39±1.2	0.389
Oral intake (hours)	9.3 (8.0-9.7)	2.1 (2.0-2.6)	0.001

multiple pregnancy, diaphragmatic hernia, diabetes, fetal hydrops and premature rupture of membrane were excluded from the study.

## Results

All comparisons between the groups were done by t-test or Mann Whitney Rank Sum test where it is appropriate. Sigma Stat 3.0 was used for statistical analysis. P value <0.05 was accepted as significant.

No significant difference was found between the two groups for maternal age, and pregnancy weeks. There was no statistically difference between two groups for asymptomatic bacteriuria (p=0.490). Ten patients in Group 1 ten patients (2.4%), in Group 2 eight patients (2.5%) had asymptomatic bacteriuria and treated by oral cephalosporin. In Group 1, there are only two patients had urinary tract infections (4.8%), in first case midstream urine culture was positive for E.Coli and treated successfully

with intravenous cephalosporin in 27th pregnancy weeks. In second patients, midstream urine culture was positive for , streptococcus, and treated with parenteral ampicillin-sulbactam. In Group 2, only one patient (3.2%) had urinary tract infection due to E.Coli and treated with parenteral cephalosporin in 25 th pregnancy weeks. There was no statistically difference between two groups for urinary tract infections (p=0.54).

AFI was did not change during the Ramadan and there was no difference between two groups (p=0.434). Urine osmolality was significantly increased in fasting group during the Ramadan (p=0.01).

## Discussion

During the daylight hours of Ramadan fasting, practising Muslims are undoubtedly dehydrating at a rate that is determined by the loss

**Table 2.** Comparison of the results between two groups.

	Leucocytes in urine	The mean of urine osmolality (mosm/kg)	Dysuria	Asymptomatic Bacteriuria	Urinary Tract Infections	AFI (mm)
Group 1 (Fasting n=41)	18	645 ± 0.3	3	10	2	12.9 (12.1-14.0)
Group 2 (non-fasting n=31)	15	523 ± 0.1	2	8	1	13.3 (12.5-14.6)

of body water minus the amount of metabolic water that is produced over this period.<sup>7</sup> No definitive evidence has been found to show that a susceptibility to urinary tract infection is influenced by fluid intake.<sup>8</sup> In three reports, urinary tract infections was associated with a low fluid intake or low urine output.<sup>9-11</sup> In two prospective studies in girls, recurrent urinary tract infections was associated with infrequent urine voiding and poor fluid intake. A study in adults with urinary catheters showed that low urine output was significantly related to urinary tract infections.<sup>11</sup> Water deprivation is functionally characterized by maximum urine concentration. In 20 Malaysian Muslims, urine was collected before, during and after Ramadan fasting each in the morning (0800-1200), afternoon (1200-1600) and overnight (1600-0800). The authors found that Ramadan fasting did not affect the overnight urine volume or osmolality (means: 649-781), indicating that the subjects were probably not subjected to severe water deprivation.<sup>12</sup> In another study, urinary osmolality was higher during Ramadan than either before or after Ramadan.<sup>7</sup> In our study, urinary osmolality was significantly higher just before breaking the fast (at 5 pm).

Urinary tract infections are a common complication of pregnancy. Symptomatic urinary tract infections occurs in 1% to 2% of pregnancies, while asymptomatic bacteriuria has been reported in 2% to 13% of pregnant women.<sup>3,4</sup> In this study, urinary osmolality was significantly higher just before breaking the fast (at 5 pm) but, there was not statistically difference between two groups for asymptomatic bacteriuria (2.4% versus 2.5%, and  $p=0.490$ ). Pregnant women with asymptomatic

bacteriuria have a 20-30 fold increased risk of developing pyelonephritis compared to women without bacteriuria.<sup>13,14</sup> Antimicrobial treatment of asymptomatic bacteriuria during pregnancy decreases the risk of subsequent pyelonephritis from 20-35% to 1-4%.<sup>14</sup> Therefore, we treated all of these patients to prevent the risk of pyelonephritis.

In our study, the urinary osmolality was higher than control group but urinary tract infections rate was similar in both groups (4.8 % versus 3.3%,  $p=0.54$ ). We also suggested to all patients in two groups to drink at least 2 liter water during the day. It could be prevent hypohydration and urinary tract infections.

## Conclusion

Ramadan changes urinary osmolality during the fasting hours, but does not affect the rate of asymptomatic bacteriuria and urinary tract infections in pregnancy.

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