

Commentary

The prevalence and complications of urinary tract infections in women with gestational diabetes mellitus: Facts and fantasies.

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Introduction

The prevalence of symptomatic urinary tract infections [UTI] and/or asymptomatic bacteriuria in female diabetic patients has been reported as increased¹⁻⁶ or unchanged^{2,7,8} compared to non-diabetic subjects. Suggested mechanisms for the greater susceptibility of the diabetic urinary tract to infection include decreased antibacterial activity of the urine as a result of dilution of inhibitory substances such as urea, defects in polymorphonuclear leukocyte function or cellular immunity as a result of hyperglycaemia and increased adhesive capacity of bladder epithelium.^{2,6} The infection rate is not influenced by duration or type of diabetes mellitus nor by the quality of diabetic control in non-pregnant patients.^{2,4,6}

Gestational diabetes mellitus [GDM] complicates up to 5% of pregnancies and has been associated with an increased risk of both fetal and maternal morbidity. GDM, however, has not been as well studied as in non-pregnant

women with diabetes mellitus and lacks appropriate comparison data from non-diabetic pregnancies. In a review of the literature in the period 1965-1985, the prevalence of acute pyelonephritis in women with GDM was 4%⁹ which is higher than the overall figure of approximately 2 % reported in normal pregnancy.^{11,12} In another recent study, the prevalence of UTI was significantly increased in women with GDM as compared to non-diabetic pregnant women.¹⁰ In a further large population-based case-control survey, GDM was not a risk factor for postpartum UTI because there was no significant difference in the incidence of the disease between women who had had GDM and those who did not.¹³ 20-40% of pregnant bacteriuric women, whether diabetic or not, ultimately develop acute pyelonephritis during pregnancy if treatment is not provided.^{4,12,14} Dilatation of the ureters and renal pelvis that normally occurs in pregnancy allows bacteria in the bladder to reach the upper tract and produce this complication. It is traditionally believed that pregnant women with pyelonephritis have an excess risk of morbidity,

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preterm labour and later evidence of defects in renal structure and function. There is also an association between asymptomatic bacteriuria of pregnancy and preterm labour, fetal growth retardation, hypertension and anaemia.^{14,15} However, most recent studies have questioned this association.^{4,11,12}

United Arab Emirates [UAE] is a pro-natal society with an estimated mean number of children per woman of 5.9.¹⁶ There is a high tendency to develop diabetes mellitus among the female population probably as a result of both genetic and dietary factors. A high prevalence of GDM is, therefore, expected in UAE women but the experience of obstetricians here, is that UTI is rarely detected during pregnancy. It is pertinent to find an explanation for this observation. Furthermore, there has not been any published work from the UAE about the prevalence and complications of UTI in patients with GDM. This epidemiological study is important for projecting the need for health services as well as therapeutic intervention.

A prospective cohort study was, therefore, conducted at Al-Ain Hospital, Al-Ain, UAE in 1999 and the main findings are briefly reported.¹⁶ The study objectives were to: 1) determine the prevalence of UTI in a randomly selected sample of women with GDM, 2) compare the prevalence of this disorder in patients with GDM and normal pregnant women, and 3) ascertain if there are any associations between the presence of UTI and obstetric complications in both groups. Microbiologic evidence of urinary tract infections was, therefore, studied in 447 pregnant women with (n=149) or without (control group, n=298) gestational diabetes mellitus after mid-

pregnancy. Standard recommendations of the Fourth International Workshop on GDM were used for the diagnosis of GDM defined as carbohydrate intolerance of varying degrees of severity with onset or first recognition during the present pregnancy.¹⁷ Women diagnosed with diabetes mellitus prior to pregnancy were therefore not included in the GDM group. The laboratory criteria for diagnosis of GDM were venous plasma glucose levels of ≥ 5.3 mmol/l after fasting and/or ≥ 8.6 mmol/l 2 hours after an oral 75g glucose load.¹⁷ Laboratory investigations included chemical analysis, microscopic examination and culture of a clean mid-stream voided urine specimen. UTI was defined as the presence of more than (or equal to) 10^5 colonies of a single bacterial pathogen per ml of a clean MSU with (symptomatic UTI) or without (asymptomatic bacteriuria) symptoms and signs of UTI such as loin pain or tenderness, fever, frequency, urgency and dysuria. We believe that this was the first study addressing the relationship between UTI and GDM where measurement of exposure by microbiologic analysis was performed prospectively and on all women under investigation unlike some previous epidemiological studies.¹⁴⁻¹⁶

Nineteen women (4.2%) had asymptomatic bacteriuria (7 study, 12 control, p=0.7). Of these, 7 (38%) developed symptomatic infection despite treatment with antibiotics (2 study, 5 control, p=0.7) and 6 (31%) had recurrent bacteriuria later in pregnancy (3 study, 3 control, p=0.3). Twelve more women (2.6%) had symptomatic infection (5 study, 7 control, p=0.5), 7 had acute cystitis (3 study, 4 control, p=0.5) and 5 had acute pyelonephritis (2 study, 3 control, p=0.7). *Escherichia coli* was the commonest pathogen accounting for 22 (71%) infection episodes. All the

31 patients with UTI responded favourably to antimicrobial therapy and none required additional intervention. There were no life-threatening infections, whether early or late, in either group of patients or major adverse effects, whether maternal or neonatal, that could be attributed to UTI or treatment by antibiotics. There was no significant difference between the study and control group in maternal and perinatal morbidity or mortality.

In this hospital-based series of 447 pregnant women, the prevalence of UTI in patients with GDM was 7.9%. This was not significantly different from that found in non-diabetic pregnant women (6.3%). Furthermore, UTI was not more protracted nor had a more serious outcome in diabetics than in non-diabetics as seen in other studies.² Most authorities believe that routine screening for asymptomatic bacteriuria in pregnancy is indicated if the rate of infection was >5%.^{4,11,12,14,15} The decision to adopt this policy, therefore, depends on the underlying frequency of asymptomatic bacteriuria in pregnancy in the population studied. When this is high enough, routine screening is effective in reducing the incidence and morbidity of symptomatic UTI especially acute pyelonephritis and the expense of hospitalization. The prevalence of asymptomatic bacteriuria in our series was 4.2% that is less than the threshold recommended for routine screening during pregnancy and is similar or lower than the figures reported from other institutions.^{4,9-12,14,15} Those few symptomatic infections that did occur without antecedent bacteriuria were furthermore relatively mild and responded to antibiotic therapy without recurrence or the need for additional surgical intervention. Yet, to prevent the 7 extra cases of cystitis and of pyelonephritis that occurred in

bacteriuric women, we performed expensive laboratory investigations on 447 women to detect asymptomatic bacteriuria. In fact, the savings in cost accrued by effective prophylaxis against symptomatic UTI and decreased postoperative morbidity and hospital stay are also less in a patient population with a low baseline frequency of UTI such as our own than in patients with a high infection rate.¹¹

In conclusion, the prevalence and complications of UTI in patients with GDM remain uncertain because the number of patients studied has been relatively small, the information for comparison with non-diabetic pregnant controls is very limited and the microbiologic work-up is inadequate. Our study clearly showed that GDM was not associated with increased risk of UTI or of maternal and perinatal morbidity as a result of infection. Such information should aid those physicians interested in improving the clinical outcome and the evidence-based and cost-effective management of GDM.¹⁸

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