International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2019): 7.583

ASB in Postmenopausal Women with Type 2 Diabetes Mellitus

Vishnumoorthy[1], Smitha Bhat[2]

[1]Resident, Department of Medicine, Father Muller Medical College Mangaluru, India 575004
Email: *pvmaithal[at]gmail.com*

[2]Professor, Department of Medicine, Father Muller Medical College Mangaluru, India 575004

Abstract: ***Aim: The prevalence of diabetes mellitus DM in India is high & is increasing. Patients with diabetes have a higher risk of infection of the skin, soft tissue & genitourinary tract. ASB in patients with DM has poorer outcomes than in patients without. Since asymptomatic bacteriuria in diabetics can portend ominous complications, our study aimed to estimate the number of cases of ASB in post-menopausal women with DM. Methods Case records of 81 post-menopausal diabetic women from the hospital IP records were surveyed and analysed after obtaining institutional ethical committee clearance. Urine routine and urine culture sensitivity results along with demographic details including age, duration of diabetes, details of treatment, fasting sugars, Hb1ac were noted. Demographic details, sugar levels, duration of diabetes was compared with the positivity of urine culture. Results 49.4 % of diabetic postmenopausal women had ASB. ASB was most common in women above the age of 80 & in those with duration of diabetes less than 5 years. The most common organism isolated was E.coli (55 %), followed by Klebsiella pneumoniae (12.5 %). ASB was significantly associated with pyuria, glycosuria, and Hba1c. No significant correlation was found between age, duration of diabetes, treatment of diabetes, and ASB. Conclusion We found that ASB in post-menopausal women with type 2 DM was significantly associated with pyuria, glycosuria, and elevated HbA1C. Since ASB in patients with diabetes can have catastrophic consequences, active measures for prevention & control of ASB may be needed. Including patient education, perineal care & local estrogen cream.***

Keywords: ASB, postmenopausal women, diabetes mellitus, pyuria, Ecoli

1. Introduction

Urinary tract infection, both symptomatic and asymptomatic are important problemsin patients with diabetes mellitus.[(1)]Asymptomatic bacteriuria refers to isolation of bacteria in an appropriately collected urine specimen and isolation of a single organism in quantitative counts $\geq 10^5$ colony-forming units (CFU)/mL from an individual without symptoms of urinary tract infection.[(2)] Asymptomatic bacteriuria may be associated with increased morbidity in patients with diabetes.

In diabetics high urinary glucose allows microorganisms to colonise in the urinary tract. Immunological dysfunctions including reduced neutrophil function, impaired T cell mediated immune response, low levels of prostaglandins E, thromboxane B2 and leukotriene B4 also contribute to the genesis of UTI.[(3)] Diabetes increases the risk of asymptomatic UTI in women by 3-4 fold.[(4)] Diabetic patients are not only more prone to UTI; they have a higher risk of complicated UTI. Intra-renal abscess, acute pyelonephritis, renal carbuncle, emphysematous pyelonephritis are more common in patients with diabetes.[(5)]

2. Objectives of the study

To estimate the number of cases of ASB in post-menopausal women with diabetes.

3. Materials and Methods

Source of data: Case records of postmenopausal diabetic women.

Study design: observational descriptive chart based study.

Study population: 81 post-menopausal women with diabetes whose details were collected from the medical department of Father Muller Medical College Hospital after getting clearance from the institutional ethical committee.[(6)]

Selection Criteria

Inclusion criteria

1) Patients with type 2 diabetes mellitus as per ADA criteria[(7)]
2) Post-menopausal women in whom urine routine examination and urine culture reports were available.

Exclusion criteria

1) Patients with symptoms of urinary tract infection.
2) Prior bladder catheterisation and instrumentation or surgery of the urogenital tract
3) Individuals who have received antimicrobial drugs or non- steroidal inflammatory drugs or immunosuppressives in the last 14 days

Urine routine and urine culture sensitivity results along with demographic details including age, duration of diabetes, details of treatment, fasting sugars, Hb1ac were noted. Demographic details, sugar levels, duration of diabetes was compared with the positivity of urine culture.

Data analysis

The data was analysed by frequency, percentage, mean, standard deviation, chi-square test.

4. Results

Out of 81 postmenopausal women with diabetics 39.5% of the patients were in the age group of 50-60 yearsand mean age of the subjects was 66.25±10.38. We did not find any

significant correlation between age and ASB (p value 0.090).

Table 1 Age distribution

Age	Counts	Percentage
50-60	32	39.5%
61-70	22	27.2%
71-80	20	24.7%
Above 80	7	8.6%
Total	81	100%

39.5% of the patients had diabetes for 5-10 years. The average duration of diabetes in our subjects was 8.50±6.11 and duration was not significantly associated with ASB (p value 0.867).

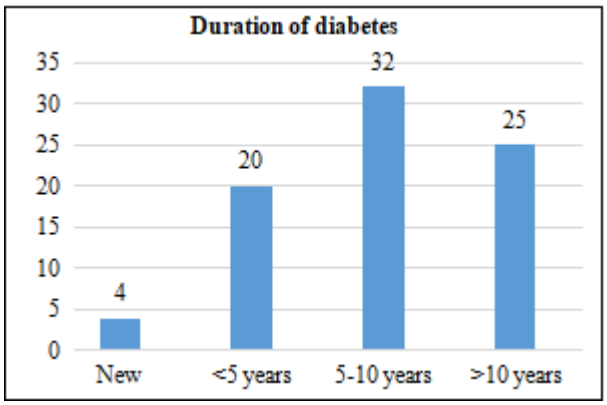

Figure 1: Distribution of subjects according to duration of diabetes

The mean Hba1c of our subjects was 8.55±2.52 and we found significant correlation between glycemic control and ASB (0.039).

Table2: Glycaemic levels of subjects

Hba1c	Urine C&S negative	Urine C&S positive	Total
≤5.6	0	1	1
5.6-7	18	8	26
>7	23	31	54
Total	41	40	81

Of the patients with positive urine culture, 53 were on OAD and 17 were on insulin.This difference was statistically not significant (p value- 0.187). We found a significant association between glycosuria, pyuria and ASB (p value 0.000 and p value 0.001)

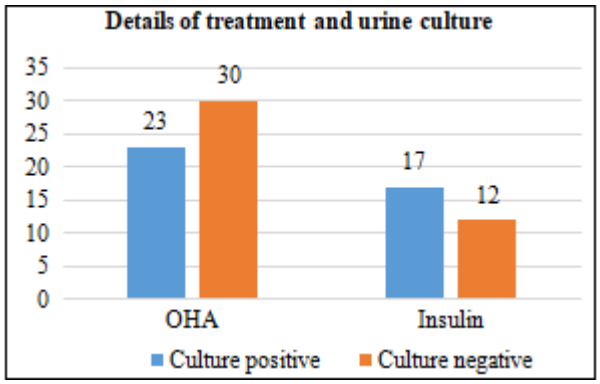

Figure 2: Details of treatment and urine culture

49.4% of diabetic postmenopausal women had ASB. The most common organism isolated was E.coli (55%), followed by Klebsiella pneumoniae (12.5%). Culture positivity increased with presence of glycosuria, pyuria & higher HbA1Cs.

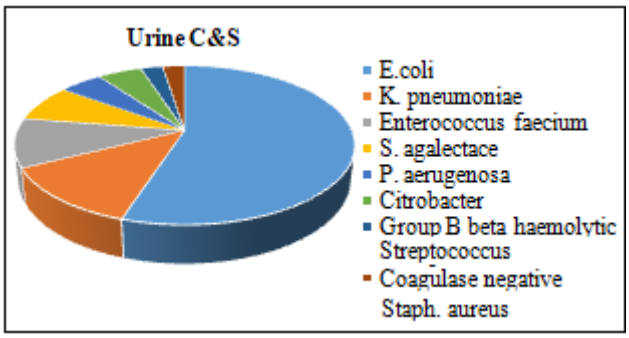

Figure 3: Organisms in the urine c&s

5. Discussion

In this study, we estimated the frequency of asymptomatic bacteriuria in post-menopausal women with type 2 diabetes mellitus. We found that 49.4% of diabetic postmenopausal women had ASB and the risk of ASB increased as the blood and urine sugar increased. In post-menopausal women, lack of estrogen leads to vaginal mucosal atrophy and decrease in the glycogen. This predisposes to colonisation by pathogenic bacteria.[8]

A Study done by Kasyan G et al.[6] showed that prevalence of ASB is 22.7%. The lower prevalence observed in this study was probably because patients with glycosuria and uncontrolled DM were excluded in the study. Risk factors for UTI in the elderly include immobilization,less frequent urination, incomplete bladder emptying, ineffective immune response, neuropathic diseases, increased incidence of renal/bladder calculi, bowel incontinence and prolapse of anterior vaginal wall.[9] However in our study there was no significant association found between age and ASB in contrast to other studies which showed that age has a significant role.[10]This is probably due to the smaller number of subjects in the age group more than 70 years in our study.

Research shows that patients with diabetes have a lower urinary cytokine and leukocyte concentration which leads to easy invasion of bacteria. Additionally E. coli expresses type 1 fimbriae (the virulence factor that plays an important role in the pathogenesis of UTIs) which adheres better to uroepithelial cells of women with DM compared to women without DM.[11] Studies showed that longer the duration of diabetes and higher the Hba1c, higher is the chance of ASB.[12]However in our study we found only uncontrolled glycaemia had higher risk of ASB. A study done by Srinivas A et al. showed there was significant correlation between UTI and Hba1c.[13]In contrast , studies done by Kasyan G et al.[6] and Ishay a et al.[14] No association was found between duration of DM and glycaemic control.Women who are taking insulin are at higher risk of ASB,possibly because of more severe diabetes, since the use of insulin may be a marker for disease severity.[15] However we did not find a significant association. In their research, Gurjar G et al.

showed that glycosuria is associated with ASB.[16]We observed a similar result. A study done by Kelestimer F et al. showed pyuria and ASB are associated significantly in patients with diabetes.[17]We observed a similar result in our study.We found that E.coli was the most common organism (55%) that was isolated in culture. A Similar result was observed in study done by Bonadio M et al.[18] which showed most the most common organism isolated was E.coli(47.6%) followed by Candida(33.3%) and Pseudomonas(9.5%) and Kasyan G et al. which showed 62.5% of E.coli, 12.5% of streptococci and 10% staphylococci.[6] In contrast, a study done by Bissong m et al. in diabetic males and females showed coagulase negative staph(33.3%), followed by candida spp.(16.7%).[19]

6. Conclusion

We found that ASB in post-menopausal women with type 2 DM was significantly associated with pyuria, glycosuria and elevated HbA1C. Since ASB in patients with diabetes can have catastrophic consequences, active measures for prevention & control of ASB may be needed. Including patient education, perineal care & local oestrogen cream.

Glossaries

ASB- Asymptomatic bacteriuria
DM- Type 2 diabetes mellitus
UTI- Urinary tract infection
OAD- Oral antidiabetics

References

[1] Joshi N, Caputo MG, Weitekamp M, Karchmer AW. Infections in patients with diabetes mellitus. N Engl J Med. 1999;341(25):1906–12.
[2] Nicolle LE, Gupta K, Bradley SF, Colgan R, Demuri GP, Drekonja D, et al. Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria : 2019 Update by the Infectious Diseases Society of America a. Clin Infect Dis. 2019;68:83–110.
[3] Prajapati AK. Urinary tract infection in Diabetics. 2018. 45–60 p.
[4] Zhanel GG, Nicolle LE, Harding GKM, Diabetic M. Prevalence of Asymptomatic Bacteriuria and Associated Host Factors in Women with Diabetes Mellitus. Clin Infect Dis. 1995;21:316–22.
[5] Patterson JE, Andriole VT. Bacterial urinary tract infections in diabetes. Infect Dis Clin north Am. 1997;11(3):735–50.
[6] Kasyan G, Berketova TY, Rogozin AK, Pushkar DY. Asymptomatic bacteriuria in postmenopausal women with diabetes mellitus. Cent Eur J Urol. 2013;66:320–6.
[7] American Diabetes Association. Standards of medical care in diabetes—2014. Diabetes care. 2014 Jan 1; 37(Supplement 1):S14-80.
[8] Jhang JF, Kuo HC. Recent advances in recurrent urinary tract infection from pathogenesis and biomarkers to prevention. Tzu Chi Med J. 2017;29(3):131–7.
[9] Nicolle LE. Asymptomatic bacteriuria in the elderly. Urin tract Infect. 1997;11(3):647–62.
[10] Stein G, Fünfstück R. Asymptomatische Bakteriurie [Asymptomatic bacteriuria]. *Med Klin (Munich)*. 2000;95(4):195-200.
[11] Geerlings SE, Meiland R, Hoepelman AIM. Pathogenesis of bacteriuria in women with diabetes mellitus. Int J Antimicrob Agents. 2002;19:539–45.
[12] Singhal S, Himanshu D, Vaish AK, Singh M, Rana H, Singh S. A Study of Asymptomatic Bacteriuria in North Indian Type 2 Diabetic Patients. J Diabetes Metab. 2015;6(11):10–2.
[13] Aswani SM, Chandrashekar UK, Shivashankara KN, Pruthvi BC. Clinical profile of urinary tract infections in diabetics and non-diabetics. AMJ 2014; 7(1) 29-34.
[14] Ishay A, Lavi I, Luboshitzky R. Prevalence and risk factors for asymptomatic bacteriuria in women with Type 2 diabetes mellitus. Diabet Med. 2005;23:185–8.
[15] Boyko EJ, Fihn SD, Scholes D, Abraham L, Monsey B. Risk of Urinary Tract Infection and Asymptomatic Bacteriuria among Diabetic and Nondiabetic Postmenopausal Women. Am J Epidemiol. 2005;161(6):557–64.
[16] Gurjar D, Mathur A, Sai R, Lakesar A, Saxena P. Asymptomatic bacteriuria and its associated factors in type II diabetes mellitus. 2017;4(6):1633–7.
[17] Kelestimur F, Unal A, Pasaoglu H, Basar E, Kilic H, Doganay M. Asymptomatic bacteriuria in patients with diabetes mellitus. *Mikrobiyol Bul*. 1990;24(2):126-32.
[18] Bonadio M, Boldrini E, Forotti G, Matteucci E, Vigna A, Mori S, et al. Asymptomatic Bacteriuria in Women with Diabetes : Influence of Metabolic Control. Clin Infect Dis. 2004;38(6):41–5.
[19] Bissong MEA, Fon PN, Tabe-besong FO, Akenji TN. Asymptomatic bacteriuria in diabetes mellitus patients in Southwest Cameroon. Afr Health Sci. 2013;13(3):661–6.