Urinary symptoms in diabetes

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Physicians have been studying urine for thousands of years. We still look at it but thankfully no longer have to taste it! Urinary symptoms may include changes in urine colour, clarity or frothiness; in volume (polyuria, anuria); frequency of urination; ease or otherwise of passing urine (for example retention); control of urination (for example incontinence); and sensations such as dysuria or awareness (or lack of it) of the need to urinate. All these aspects are relevant in diabetes.

Polyuria

‘My symptom started about 5 weeks ago... Constant thirst and needing to go to bathroom every hour. I am 60 and thought this was just another of the wonderful joys of aging. But as time went on I realized that my urine was smelling very sweet.’

‘I have high blood glucose... I’m urinating loads especially at night. I have terrible urge incontinence, I leak quite a bit... I’m only 40 so quite embarrassing.’

Dry mouth, sweet or funny taste, thirst, need to urinate, not feeling right, and weakness are regarded as osmotic hyperglycaemic symptoms.

Polyuria is the passage of large volumes of urine, usually at frequent intervals. It has been suggested that both the high volumes of urine and the high urine glucose content may cause long-term damage.

Hyperglycaemia may not be the only reason for polyuria in people with diabetes. People with Wolfram’s syndrome can have both diabetes mellitus and diabetes insipidus, as can others without this syndrome. Hypercalcaemia and diabetes may co-exist. The prevalence of diabetes mellitus in primary hyperparathyroidism is approximately 8% and that of primary hyperparathyroidism in diabetic patients is approximately 1%. Both values are about three-fold higher than the respective expected prevalences in general populations.

SGLT2 inhibitors induce glycosuria and hence both polyuria and increased urinary frequency. Other drugs, such as diuretics, also increase urine output.

Urinary tract infections

‘So, I’m on my 4th urine infection in 4 months... I also think that this one *might* have spread to my kidneys, based on the fact that I have pain there, nausea, and my temperature is up and down.’

Bacteriuria is more common among women with diabetes than in those without diabetes, so researchers incubated uroepithelial cells from each group with *Escherichia coli*. They found that ‘Type 1-fimbriated *E. coli* adhere more to diabetic than to control uroepithelial cells.’

Cloudy urine, with or without symptoms, should be investigated, as should malodorous urine. Urinary infection can be present without these signs. Among people with diabetes, urinary infections may be due to, or be associated with, multi-resistant or unusual organisms including fungi.

Haematuria and bladder cancer

‘Last week whilst at my diabetic clinic appointment I gave a urine sample and had my period at the time. Blood was present in my sample and doctor... asked if it was monthly period. Yesterday I get letter from clinic saying they have traced protein in my urine and want me back for second test... petrified that maybe I have start of kidney disease and am going to die before I get to 43!!!’

Please don’t send urine samples from menstruating patients for microalbumin or other protein analysis.

Refer anyone aged ≥45 years with ‘unexplained visible haematuria without urinary tract infection or visible haematuria that persists or recurs after successful treatment of urinary tract infection... using a suspected cancer pathway referral (for an appointment within 2 weeks) for bladder cancer.’

People with diabetes may be slightly more at risk of bladder cancer than those without diabetes – a meta-analysis found an overall relative risk of 1.24, 95% CI 1.08–1.42 compared with people without diabetes.

Various studies have suggested that pioglitazone use is associated with an increased risk of bladder cancer. Other studies did not confirm a link. The UK’s MHRA advises avoiding pioglitazone in patients with past or present bladder cancer, and in people at higher risk of this. The American FDA concludes: pioglitazone ‘may be linked to an increased risk of bladder cancer’. Patients should contact their health care professionals if they experience any of the following signs or symptoms after starting pioglitazone, as these may be due to bladder cancer: blood or a red color in the urine; new or worsening urge to urinate; pain when urinating.

Frothy urine

Kidney disease is very common among people with diabetes. The National Diabetes Audit found that 64.8% of people with type 1 diabetes and 79.1% of those with type 2 diabetes had some evidence of chronic kidney disease.

Protein in the urine reduces the surface tension and, if present in large amounts, for example in nephrotic syndrome, can cause frothy or foamy urine.

Diabetic cystopathy

Diabetic cystopathy is a common complication of diabetes that gets little publicity. Symptoms are variable and many patients are asymptomatic or assume symptoms are just ‘because of the sugar’. Symptoms include hesitancy, poor stream, dribbling, nocturia, a feeling of incomplete bladder emptying, reduced awareness of the need to urinate, leaking with increased abdominal pressure such as coughing, or more general urinary incontinence, infrequent urination, and urinary retention. Exclude other causes such as urinary tract infection or prostatic disease.
A Japanese study found that 40% of people with diabetes without urinary symptoms had voiding problems on questioning. Cystometrograms showed high bladder volume at first desire to void and maximal capacity, with reduced detrusor contractility; and higher residual volume in people with diabetes compared with non-diabetic controls.\(^1\)

In Taiwan, 22.5% of patients reported an overactive bladder on asking, among whom 48.0% had incontinence.\(^2\) Women with type 2 diabetes without other causes of urinary symptoms were more likely to have nocturia, and had weaker urinary streams, and voided smaller volumes than those without diabetes. Among women with diabetes, 13.9% had significant residual volume post voiding compared with 1.8% of controls. Reduced bladder emptying efficiency was associated with the presence of neuropathy.\(^3\)

Although ‘diabetic cystopathy’ is usually understood to mean neuropathic bladder disease, the cause is likely to be multifactorial including nerve damage within the bladder and its exit, microvascular disease, and the effects of high glucose and microorganisms. Treatment depends on the problem, but reducing hyperglycaemia will reduce polyuria and reduce progression of neuropathy. Voiding every 2 hours can prevent excessive bladder volumes. Some patients with neurogenic bladder may need to learn how to exert lower abdominal pressure to help emptying. Others may need to self-catheterise or have an indwelling urethral catheter. Nowadays, most catheterised patients can use catheter valves, avoiding embarrassing, weighty leg bags, although most such patients use a night bag.

NICE guidance on the management of urinary incontinence and other symptoms states that such patients should have specialist assessment.\(^4-6\)

**Summary**

Urinary symptoms are common among people with diabetes who may not mention them unless asked. Don’t assume that they are all due to hyperglycaemic polyuria. Many will not be. Any urinary symptoms are, at best, a nuisance or, at worst, a torment. Seek them. Treat them.

Don’t assume that all polyuria is due to glycosuria, especially in people who have near-normal glucose control.

Do control hyperglycaemia as glycosuria will exacerbate urinary problems, in addition to the other hazards of hyperglycaemia.

Treat urinary tract infections promptly having clarified the causative organism. Beware multi-resistant bacteria and fungi.

Don’t test urine for protein during menstruation but do take non-menstrual haematuria seriously. Refer via suspected cancer channels anyone aged ≥45 years with ‘unexplained visible haematuria without urinary tract infection or visible haematuria that persists or recurs after successful treatment of urinary tract infection’.\(^1\)

Remember diabetic cystopathy. ‘Evaluation of bladder function should be performed for individuals with diabetes who have recurrent urinary tract
infections, pyelonephritis, incontinence, or a palpable bladder. The medical history should include simple questions to unveil symptoms of lower urinary tract symptoms.\(^\text{27}\)

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References