SHORT REPORTS

Colovesical fistula diagnosed by unconventional procedure

Fistulous connection between the colon and the urinary tract is associated with diverticulitis and other inflammatory bowel diseases, and is managed by surgical correction of the anatomical abnormality.¹⁻³ Many patients, however, may present with associated symptoms to physicians and nephrologists, and diagnosis depends on a high index of suspicion as well as on the results of laboratory and radiological investigations. We describe a patient who presented to the renal service with recurrent urinary tract infections and in whom an unconventional procedure confirmed the diagnosis.

Case report

A 63-year-old white man was referred with a six-month history of increasing left-sided flank pain, an intermittent "hiss" on micturition, suprapubic tenderness, a single episode of passing dark granular ("meaty") material per urethra, and culture-positive urinary tract infection. Six months before referral the blood urea nitrogen concentration was 5 mmol/l (14 mg/100 ml), and serum creatinine concentration 108 μ mol/l (1.2 mg/100 ml). He had no history of diabetes mellitus or renal stones. Urine cultures were positive for

X-ray film of aliquot of urine showing traces of barium.

Escherichia coli. On admission blood urea nitrogen concentration was 9 mmol/l (25 mg/100 ml) and serum creatinine concentration 243 μ mol/l (2.7 mg/100 ml). Findings on renal echo, cystoscopy, and retrograde pyelogram were normal. The intravenous urogram was remarkable only for a delay in appearance of the nephrogram phase on the left side, in association with minimal left-sided caliectasis and hydroureter. He was discharged taking antibiotics. Results of tests using purified protein derivative (intermediate strength) were negative. Repeat urinalysis, after treatment with antibiotics, showed sterile pyuria.

We readmitted the patient because of subsequent recurrence of a urinary tract infection. Diverticulosis was diagnosed on the results of a barium enema examination. The day after this procedure the patient noted "white material" in his urine, an x-ray examination of an aliquot of urine showed barium (figure). Although no fistulous tract could be shown, our suspicion prompted us to perform an exploratory laparotomy, revealing a fistula between sigmoid colon and the bladder dome. The fistulous tract and the adjacent colon were excised. Subsequently all symptoms of urinary tract infections abated and his renal function has returned to normal (blood urea nitrogen concentration was 3 mmol/l (8.4 mg/100 ml) and serum creatinine concentration was 126 μ mol/l (1.4 mg/100 ml)).

Comment

Except for the rare occurrence of a urinary tract infection with gas-forming bacteria, as with diabetes mellitus, the history of pneumaturia and fecaluria is pathognomonic for an enterourinary tract fistula.¹⁻⁴ The two common causes for such fistulae are diverticular disease of the large bowel and carcinoma of the large bowel. Less commonly, fistulae have been reported with ulcerative colitis, Crohn's disease, tuberculosis, typhoid, actinomycosis, appendicitis, and in association with congenital lesions or secondary to trauma.

The incidence of the development of fistulous tracts in patients with diverticulitis ranges from 2% to 22%.^{1 2 4 5} The incidence is higher in men than in women (3:1), which may be due to the protective interpositioning of the uterus and adnexal structures.⁴ This is supported by the observation that the incidence of the development of such tracts in women after the menopause or after hysterectomy is equal to that of men. The techniques for confirming the diagnosis of an enterourinary tract fistula include cystoscopy, intravenous urography, barium enema x-ray examinations, proctoscopy, installation of radiocontrast materials into either the bladder or rectum, and retrieval of barium enema. To our knowledge this is the first case confirming the diagnosis by obtaining a radiograph of the urine showing barium. In patients with pneumaturia the diagnosis may be confirmed by having the patient micturate in the bath, when pneumaturia will present as bubbles.

We suggest that when barium enema x-ray examinations fail to show an enterovesical fistula the patient's urine should be collected for 24 hours and examined for the presence of barium in the urine. Alternatively, less viscous agents—such as Gastrografin—that may flow more readily into the fistula's tract may also be used.

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³ Morse FP, Dretler SP. Diagnosis and treatment of colovesical fistula. *J Urol* 1974;**111**:22-4.

⁴ Shatila AH, Ackerman NB. Diagnosis and management of colovesical fistulas. *Surg Gynecol Obstet* 1976;**143**:71-4.

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Simple technique for measuring serum or plasma viscosity with disposable apparatus

The measurement of serum viscosity has long been recognised to be important in assessing multiple myeloma and related dysproteinaemias. Measurement of viscosity has been finding increasing application in other diseases, particularly peripheral vascular disease, diabetes, and malignant blood diseases. Some idea of the viscosity of blood can be gauged from the packed cell volume and erythrocyte sedimentation rate. The laboratory apparatus for measuring viscosity, however, is not widely available and an assessment of viscosity may be needed urgently, particularly in patients with a paraproteinaemia. A simple system of measuring serum viscosity is described which is more valuable as a rapid ward test than the previously described quick method using the red cell pipette.¹

Methods and results

A series of serum samples were taken from 49 blood donors and used to assess the reliability of the disposable system against a standard Ostwald

viscometer. The disposable system consists of a standard 2 ml plastic syringe (BD Plastipak), internal diameter 0.8 cm, and a 19-G serum needle. The Ostwald apparatus was used in the standard fashion, with a water bath to maintain constant temperature. The barrel of the syringe in the disposable system was filled by drawing up undiluted serum through the needle, starting with the plunger at the 1 ml mark. Taken in this fashion, the serum level is just over the 2 ml mark at the moment that the plunger is withdrawn completely from the barrel of the syringe. With the syringe hand held or clamped in a vertical position, the run-through time is started when the bottom of the meniscus passes the 2 ml mark of the barrel and the timing stopped when the meniscus reaches the zero mark on the barrel. Care is taken to ensure that the vertical position of the barrel is maintained, though in practice there is not a significant difference between the measurements obtained by free hand holding of the barrel and those obtained by clamping in the rigid apparatus. Before comparing the syringe needle system against the Ostwald apparatus it was confirmed that different combinations of needles and syringes on single serum samples produced similar results. Measurements were made at three standard temperatures—namely, 37°C (incubation room), 20.5°C (ambient room temperature), and 4°C (cold room). In some instances there was insufficient serum to fill the Ostwald apparatus so that there were more measurements taken with the disposable system at all temperatures. The relative viscosity (RV) of a sample at any given temperature was derived by dividing the run-through time for the serum against that of distilled water at the same temperature.

There was a significant increment in the relative viscosity of normal serum as temperature fell and the scatter of individual values for any given temperature was similar using the two methods of measuring viscosity (see figure).

Relative viscosity of normal serum using Ostwald viscometer (open circles) and disposable system (closed circles). Results compared at three different temperatures.

Comment

The relative viscosity of control serum at the three temperatures using both apparatuses shows that the disposable apparatus produces similar results to the Ostwald apparatus. The needle syringe system has the advantages of being disposable, using smaller volumes of serum, and having a slower run-through time, which almost certainly reduces observer error in timing. Moreover, it is known that the disposable system used at ambient room temperature can be valuable in assessing the viscosity of serum from patients with myeloma.² In a larger study on polymerised IgA paraproteinaemias Chandy *et al*³ have shown that occasionally individuals may show a large increase in viscosity at the lower temperature. Thus measuring the relative viscosity of serum from patients with myeloma at ambient ward temperatures is a valuable procedure and may be carried out using standard disposable ward equipment.

The system may also be of value in various conditions associated with raised plasma protein values and small vessel disease. Data (unpublished) from 30 patients with insulin-dependent diabetes has shown an increase in serum viscosity similar to that observed using absolute values on more advanced apparatus.⁴ Increased blood viscosity, due in part to increases in plasma protein values, is probably

a major contributor to diabetic microangiopathy.^{4,5} Hyperfibrinogenemia is probably an important element,⁵ so that the system should be evaluated using plasma from diabetic patients. The system described is clearly feasible as an outpatient test and thus may be of value in assessing risk factors for the vascular complications of diabetes.

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Nephrogenic diabetes insipidus associated with Dyazide (triamterene-hydrochlorothiazide)

We report a case of nephrogenic diabetes insipidus in an elderly man after two months' treatment with the combination diuretic Dyazide (triamterene 50 mg and hydrochlorothiazide 25 mg).

Case report

A 68-year-old man was admitted complaining of anginal chest pain associated with dyspnoea and secondary complaints of apathy and weight loss. His history included a myocardial infarction eight years before. He smoked 10 cigarettes a day, drank little alcohol, and was not taking drugs. On admission there was clinical and radiological evidence of pulmonary oedema. Electrocardiography showed atrial fibrillation with no recent evidence of myocardial infarction. Plasma urea and electrolyte concentrations, serial cardiac enzyme activities, and thyroid function values were normal. Erythrocyte sedimentation rate was 70 mm in the first hour. He was treated with digoxin, frusemide (40 mg/day), and potassium supplements (600 mg thrice daily) with good response. Before his discharge six days later Dyazide one tablet daily was substituted for the frusemide and potassium supplements. At the time plasma urea and electrolyte concentrations were normal.

At review after one month the patient complained of exertional dyspnoea and bouts of irregular palpitations (presumed to indicate paroxysmal atrial fibrillation). Dyazide was increased to two tablets daily and warfarin instituted, which maintained his prothrombin time ratio between 2.0 and 2.5. One month later he complained of polyuria and polydipsia, anorexia, and symptoms of postural hypotension. He looked dehydrated. He was in sinus rhythm and free of cardiac failure. Investigations showed plasma urea concentration 15 mmol/l (90 mg/100 ml), sodium concentration 133 mmol(mEq)/l, potassium concentration 2.8 mmol(mEq)/l, total CO₂ concentration 27 mmol(mEq)/l, and creatinine concentration 214 μmol/l (2.4 mg/100 ml). Plasma calcium, phosphate, glucose, and urate concentrations, liver function values, and immunoglobulins were all normal with no abnormal bands on plasma protein electrophoresis. Full blood count was normal but the erythrocyte sedimentation rate was 108 mm in the first hour. Plasma digoxin concentration was satisfactory at 1.9 nmol/l (1.5 ng/100 ml). Urine analysis was negative for protein, blood, and glucose with absence of Bence Jones protein. Midstream urine specimen was sterile. An intravenous pyelogram was normal. Urinary volumes were on average 3.5 l/24 h, with an average intake of 2 l/24 h. A 12-hour water-deprivation test showed failure of urinary concentration at 12 hours with a urinary osmolality of 337 mmol(mosmol)/kg and a plasma osmolality of 298 mmol(mosmol)/kg and loss of 2 kg over the period (3.6% of body weight). There was no improvement in urinary osmolality (305 mmol/kg) after 5 μg desmopressin given