Irrespective of the cause of the observed differences in serum creatinine concentrations between the study patients and controls, the serum creatinine concentration should clearly be interpreted with caution in patients with rheumatic diseases. Perhaps lower normal or reference values should be used in such patients and in other patients with atrophic muscles.

- ¹ Bröchner-Mortensen J. A simple method for the determination of glomerular filtration rate. *Scand J Clin Lab Invest* 1972;**30**:271-4.
- ² Fabiny DL, Ertinghausen G. Automated rate-reaction method for determination of serum creatinine with the Centri-Chem. *Clin Chem* 1971;**17**:696-700.
- ³ Granerus G, Aurell M. Reference values for ⁵¹Cr-EDTA clearance as a measure of glomerular filtration rate. *Scand J Clin Lab Invest* 1981;**41**:611-6.
- ⁴ Jungner I, Jungner G. Creatinine and creatine clearance in the acute stage of paralytic poliomyelitis. *Acta Med Scand* 1960;**166**:357-68.

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Toxic shock syndrome after orchidectomy

Since it was first described in 1978¹ the toxic shock syndrome has become a well recognised clinical entity, predominantly affecting healthy young women during menstruation, especially those who use tampons, and associated with strains of *Staphylococcus aureus* able to make a newly described toxin (staphylococcal enterotoxin F).² Only 25 cases of the toxic shock syndrome have been reported in Britain³; 24 were associated with menstruation, and one occurred in association with a postpartum breast abscess. We report on a man with a post-operative wound infection in whom the syndrome developed.

Case report

A man aged 26 was readmitted four days after uncomplicated orchidectomy for a testicular tumour complaining of sudden onset of fever, headache, vomiting, and diarrhoea. On examination his temperature was 40.2°C and he had a bright erythematous rash, mainly on the arms and trunk with a confluent macular area round the surgical wound. The wound, which was still sutured, was clean, dry, and not tender. In view of the scarlatiniform rash postoperative streptococcal infection was diagnosed and high dose antistreptococcal treatment started. Twenty four hours after admission his condition had not improved and his systolic blood pressure had fallen to 80 mm Hg. There was a neutrophil leucocytosis of $24 \times 10^9/l$ with a normal platelet count. Blood cultures showed considerable haemolysis, but no organisms could be shown.

Staphylococcal toxic shock syndrome was suspected, and intravenous fusidic acid was added to the treatment regimen. His condition improved immediately, with complete recovery in five days. During the recovery period appreciable oedema of the legs occurred on days 4 and 5; peeling of the face was seen beginning on day 5, and of the hands and feet from day 11; and transient electrocardiographic changes occurred (depression of T waves in the anterolateral leads). Abnormal laboratory findings included moderately raised liver enzyme concentrations, a serum albumin concentration of 27 g/l, and a serum calcium concentration of 1.77 mmol/l (7.1 mg/100 ml). Blood and urine cultures and wound, nose, and throat swabs taken on admission did not yield any pathogens. On day 3, however, material was expressed from the depths of the wound and from this a penicillin resistant *Staph aureus* phage type 52/77/85/81 was grown. This organism was later shown to produce enterotoxin F. We later learnt that the patient's wife had been treated for a postpartum infection with *Staph aureus* a few days before his readmission; when examined two months later, however, she was no longer carrying *Staph aureus*.

Comment

Our patient was surprised to learn that his generalised illness was a result of wound infection, since he himself had noticed nothing wrong with the wound. Absence of local signs was also a feature of seven of

eight cases of the toxic shock syndrome⁴ associated with wound infection, and of two postoperative cases associated respectively with male mastectomy and with submucous resection and rhinoplasty.⁵ In the latter case the nose was packed with sterile gauze and the analogy with the tampon occluded vagina is obvious. In our case, and in the case that occurred after simple mastectomy, toxin-producing *Staph aureus* probably grew freely in the blood filled space resulting from removal of the organ, in conditions again bearing some resemblance to the tampon occluded vagina.

Staphylococcal infection with a scarlatiniform rash, mimicking streptococcal infection, has been reported many times.¹ In our case the possibility of staphylococcal infection was not seriously considered until antistreptococcal treatment failed. It is to be hoped that the recent publicity given to the toxic shock syndrome, including cases not associated with menstruation, will lead both to faster recognition of the syndrome and to avoidance of conditions favouring its development.

We thank Mrs Maureen de Saxe of the staphylococcus reference laboratory, Central Public Health Laboratory, for testing our isolate for production of enterotoxin F.

- ¹ Todd J, Fishaut M, Kapral F, Welch T. Toxic shock syndrome associated with phage Gp I staphylococci. *Lancet* 1978;ii:1116-8.
- ² Bergdoll MS, Crass BA, Reiser FR, Robbins RN, Davis JP. A new staphylococcal enterotoxin, enterotoxin F, associated with toxic shock syndrome *Staphylococcus aureus* isolates. *Lancet* 1981;i:1017-21.
- ³ de Saxe MJ, Wieneke A, de Azevedo J, Arbuthnott JP. Toxic shock syndrome in Britain. *Br Med J* 1982;**284**:1641-2.
- ⁴ Reingold AL, Dan BB, Shands KN, Broome CV. Toxic shock syndrome not associated with menstruation. A review of 54 cases. *Lancet* 1982;i:1-4.
- ⁵ Thomas SW, Baird IM, Frazier RD. Toxic shock syndrome following submucous resection and rhinoplasty. *JAMA* 1982;**247**:2402-3.

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Effects of smoking on long term patency of arteriovenous fistulas

With the introduction of the Teflon-Silastic shunt by Quinton and Scribner¹ long term intermittent haemodialysis became a practical proposition for treating end stage renal failure. Because of the relatively high failure rate and complications associated with these shunts² the internal arteriovenous fistula, as described by Brescia *et al*³ has become the preferred form of vascular access, though long term patency may be a problem in some patients.

It was our impression that a high proportion of those patients requiring new or revised fistulas were cigarette smokers. We therefore investigated the smoking habits of 101 patients undergoing haemodialysis and related our findings to the long term patency of their arteriovenous fistulas.

Patients, methods, and results

All patients undergoing long term haemodialysis in south Wales were given a questionnaire concerning their smoking habits and the number of fistulas they had had constructed, refashioned, or renewed. The information given was checked by cross reference to patients' notes and the register of operations.

Primary fistulas were fashioned under local anaesthesia between the radial artery and a suitable wrist vein as described by Brescia *et al*.³ Further fistulas were refashioned more proximally on the forearm, at the contralateral wrist, by using a saphenous vein graft or, more recently, by constructing a brachial fistula. A fistula was regarded as being established after it had functioned for more than one week.

Questionnaires were sent to 101 patients (68 men, 33 women; age range 16-60 years, mean 40), all of whom replied. Of the 101 patients 33 were smokers, 32 ex-smokers, and 36 non-smokers. The sex, age distribution, renal disease, and presence of hypertension were similar in each group of patients. The mean periods on dialysis were similar, there being no significant difference between each group.

The mean number of cigarettes smoked by smokers was 14 a day (range 4-30). The ex-smokers were smoking 16 cigarettes a day (range 4-40) before giving up.

A total of 16 (14 men, 2 women) of the 33 smokers had had fistula failures compared to only two (one man, one woman) of the 32 ex-smokers and five (four men, one woman) of the 36 non-smokers. The incidence of fistula failure was significantly higher ($\chi^2=16.32$, $p<0.001$) in smokers than in ex-smokers and non-smokers combined. Of the seven fistula failures in non-smokers and ex-smokers three occurred immediately after operation. No similar association could be established with any fistula failure in smokers.

Comment

Brescia *et al* described the use of the arteriovenous fistula for chronic haemodialysis in 1966³ and since then its use has become well established. Several long term complications have been described, however, including thrombosis, local infection, septicaemia, pseudoaneurysms, aneurysmal dilatation, neurological complications, steal syndrome, ischaemic peripheries, pain, and cardiac failure.⁴ Thrombosis and infection are the most common.

Cigarette smoking is an aetiological factor in many diseases, particularly vasculo-occlusive disorders,⁵ so it is not surprising that late occlusion and thrombosis in arteriovenous fistulas occur more often in cigarette smokers than in non-smokers.

We have looked at a number of other factors that might influence the long term patency of fistulas but we have found no association between failure and age, sex, hypertension, length of time on dialysis, or renal disease.

We thus feel that all patients undergoing haemodialysis using an arteriovenous fistula should be strongly advised to refrain from cigarette smoking.

¹ Quinton WE, Dillard DH, Cole JJ, Scribner BH. Technique of long term cannulation of blood vessels. *Trans Am Soc Artif Intern Organs* 1961; 7:60.

² Wolin L. Arterio-venous shunts for prolonged intermittent haemodialysis. *JAMA* 1967;202:99.

³ Brescia MD, Cimino JE, Appel K, Hurwich BJ. Chronic haemodialysis using venipuncture and a surgically created arteriovenous fistula. *N Engl J Med* 1966;275:1089.

⁴ Kinnaert P, Geens M, Vereerstraeten P, *et al*. Experience with arteriovenous fistulas in chronic haemodialysis. *Am J Surg* 1971;122:104.

⁵ Royal College of Physicians of London. *Smoking or health*. Tunbridge Wells: Pitman Medical, 1977.

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Transient autonomic and sensory neuropathy in newly diagnosed insulin dependent diabetes mellitus

Insulin dependent diabetics may develop a peripheral sensory or motor neuropathy when first diagnosed. This may deteriorate for a short time when insulin treatment is started and then clears completely, being unrelated to any subsequent chronic neuropathy. Similarly transient reversible changes in the somatic nervous system may be found during periods of impaired diabetic control. We report a case of transient autonomic neuropathy affecting the bladder in a newly diagnosed insulin dependent diabetic.

Case report

A 44 year old woman was admitted as an emergency case on 2 January 1981 with a 48 hour history of anorexia, vomiting, drowsiness, and confusion. On admission she complained of shortness of breath, though direct inquiry elicited no other definite symptoms. Examination showed tachypnoea and ketosis. She was drowsy, though there were no other abnormal neurological

findings; optic fundi were normal. Investigations confirmed a diagnosis of diabetic ketoacidosis and she was treated with neutral soluble insulin, initially by continuous infusion. Further investigations showed evidence of septicaemia with *Escherichia coli* and vulvovaginitis due to *Candida albicans*; midstream urine culture also grew *C albicans*. She was treated with parenteral cephalosporins and local and oral nystatin; blood sugar values eventually stabilised on a 1000 kcal (4.2 MJ) diet in addition to Rapiard insulin 40 units in the morning and 24 units at night.

While in the ward she complained of urinary incontinence on standing and on walking. There was no incontinence on coughing, nor urgency or urge incontinence, and no symptoms of voiding difficulty. She denied urinary symptoms before admission.

When seen for urodynamic assessment on 28 January her symptoms had changed to those of impaired bladder sensation. She was having to strain to void in addition to having occasional postmicturition dribbling and incontinence on standing. She also complained of vague areas of impaired sensation over her back and face and of ageusia, which had been present since the start of insulin treatment. On examination the only notable findings were of impaired pinprick sensation affecting both legs to mid-calf. Facial and perineal sensation were normal and there were no retinal changes.

Dual channel subtracted cystometry performed by a rapid fill saline technique showed no evidence of either bladder sensation during filling or detrusor activity during voiding phases of the cystometrogram. Voiding was achieved to completion by abdominal straining (table). Despite this evidence of neuropathy there was no residual urine, the urine remained sterile, and there was nothing to suggest upper tract damage. No active intervention was therefore proposed.

Urodynamic findings at initial presentation and four months later

	28 January	15 May
Residual volume (ml):		
Before investigation	30	0
After investigation	0	0
First sensation of filling (ml)	None	450
Cystometric capacity (ml)	1250*	800
Pressure rise at:		
500 ml (cm H ₂ O)	15	6
Capacity (cm H ₂ O)	25	18
Maximum voiding pressure (cm H ₂ O)	(All strain)	30
Peak flow rate (ml/s)	12	19
Flow pattern	Strain	Normal

*Filling discontinued, though no sensation of filling or urge to void had occurred.

Four months later the diabetic control remained good and urinary symptoms were improved; urodynamic values showed a return towards normal (table). By nine months after presentation she was free from urinary symptoms, bladder sensation was normal, and she voided without straining.

Comment

While it is certainly possible that the transient autonomic neuropathy in our patient represented a plaque of demyelination, visual evoked responses were normal and we think that the weight of circumstantial evidence is very much in favour of a diabetic aetiology. Though it has been suggested that autonomic nerves may be less susceptible to metabolic damage than somatic fibres,¹ Hreidarsson² detected reversible changes in the pupillary responses of diabetics at times of poor control. Cystometry, like pupilligraphy, offers a good opportunity to study the state of the autonomic nervous system, and our patient showed that reversible changes in the system may occur analogous to the previously recognised reversible changes in the somatic nervous system.

¹ Campbell IW, Ewing DJ, Harrower ABD, *et al*. Peripheral and autonomic nerve function in diabetic ketoacidosis. *Lancet* 1976;ii:167-9.

² Hreidarsson AB. Acute, reversible autonomic nervous system abnormalities in juvenile insulin-dependent diabetes. *Diabetologia* 1981;20:475-81.

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