CLINICAL RESEARCH

Genital oedema in patients treated by continuous ambulatory peritoneal dialysis: an unusual presentation of inguinal hernia

J C COOPER, A J NICHOLLS, J M SIMMS, M M PLATTS, C B BROWN, A G JOHNSON

Abstract

Four patients receiving continuous ambulatory peritoneal dialysis presented with scrotal or labial oedema but no detectable cough impulse. Two of the patients later developed clinical evidence of inguinal hernia, and in the other two inguinal hernias were found at operation.

These cases suggest that genital oedema occurring in a patient receiving continuous ambulatory peritoneal dialysis is a sign of a small inguinal hernia which may not be detectable clinically.

Introduction

Abdominal hernias are a well recognised and predictable complication of continuous ambulatory peritoneal dialysis owing to increased intra-abdominal pressure.¹⁻³ We describe four patients receiving this treatment who developed unexplained scrotal or labial oedema in the absence of a clinically detectable inguinal hernia. Two patients subsequently developed frank hernias, while in the other two the hernias were discovered only at operation.

Case histories

Case 1—A 67 year old man with end stage renal disease of unknown cause began continuous ambulatory peritoneal dialysis in February

1981. Two days after insertion of a Tenckhoff catheter he developed scrotal oedema. Peritoneal dialysis was temporarily discontinued and the oedema settled. Some days later dialysis was reinstituted but further troublesome scrotal oedema developed. The dialysis catheter was removed and the patient transferred to haemodialysis. A second catheter inserted in April failed and had to be removed owing to leakage and recurrent peritonitis. A third catheter was inserted in October 1981 and dialysis successfully instituted. Within two months, however, the patient began developing recurrent scrotal oedema, which settled on temporary disconnection of peritoneal dialysis. Despite its problems, the patient chose to continue with ambulatory treatment. Within a further month a definite cough impulse was detectable in the right inguinal region for the first time. While undergoing temporary haemodialysis before surgery the patient sustained a fatal myocardial infarction. Postmortem findings confirmed the presence of a small empty indirect inguinal hernia.

Case 2—A 60 year old man with end stage renal disease secondary to polycystic kidneys was changed from haemodialysis to continuous ambulatory peritoneal dialysis in January 1982. The day after insertion of a Tenckhoff catheter he developed right sided scrotal oedema, which persisted until peritoneal dialysis was stopped after four days. The oedema settled and treatment was restarted a week later. Within 12 hours scrotal oedema returned and dialysis was stopped. There was no clinical evidence of an inguinal hernia. After a further month of haemodialysis we decided to restart ambulatory treatment, but by that time a definite cough impulse was detectable in the right inguinal region. At surgery the patient was found to have an empty indirect hernial sac and herniorrhaphy was performed. One year later he remained well, was continuing with ambulatory dialysis, and had no scrotal oedema and a sound herniorrhaphy.

Case 3—A 36 year old woman with end stage renal disease of unknown aetiology began continuous ambulatory peritoneal dialysis uneventfully in May 1982. Four months later she developed recurrent left sided labial oedema related to peritoneal dialysis. No hernia was evident clinically, but in view of the two previous cases the left inguinal region was explored. An empty indirect sac was found and herniorrhaphy performed. Five months later she remained well, was continuing with ambulatory dialysis, and had had no recurrence of the labial swelling.

Case 4—A 64 year old man with end stage renal disease presented in January 1983 with massive penile and (predominantly) left sided scrotal oedema after 15 months of trouble free continuous ambulatory peritoneal dialysis. There was no clinical evidence of overhydration or inguinal hernia. Peritoneal dialysis was temporarily replaced by haemodialysis to allow the oedema to settle. At operation one week

University Department of Surgery and Department of Renal Medicine, Royal Hallamshire Hospital, Sheffield S10 2JF

J C COOPER, MB, FRCS, registrar in surgery
A J NICHOLLS, MB, MRCP, senior registrar in nephrology
J M SIMMS, MB, FRCS, lecturer in surgery
M M PLATTS, MD, FRCP, consultant nephrologist
C B BROWN, MB, MRCP, consultant nephrologist
A G JOHNSON, MChir, FRCS, professor of surgery

Correspondence to: Professor A G Johnson.

later a left sided empty direct inguinal hernia was found and repaired. The patient was returned to ambulatory treatment uneventfully.

Discussion

Although inguinal hernia during continuous ambulatory peritoneal dialysis is a recognised complication,¹⁻³ a patient presenting with scrotal or labial oedema and no detectable cough impulse has not been described. Continuous ambulatory peritoneal dialysis is associated with intermittent abdominal distension and increased intra-abdominal pressure. In our patients presumably a small hernial sac was already present or formed as a result of increased pressure. During dialysis fluid entered the sac and then leaked out into surrounding tissues to form oedema as a result of increased hydrostatic pressure

exceeding the osmotic pressure of the dialysate. Once dialysis stopped the oedema was rapidly reabsorbed.

Our experience suggests that scrotal or labial oedema is a sign of a small inguinal hernia which may not be clinically apparent and is an indication for early herniorrhaphy.

References

- ¹ Francis DMA, Scholfield I, Veitch PS. Abdominal hernias in patients treated with CAPD. *Br J Surg* 1980;**69**:409.
- ² Chan MK, Baillod RA. Abdominal hernias in patients receiving continuous ambulatory peritoneal dialysis. *Br Med J* 1981;**283**:826.
- ³ Digenis GE, Vibanna R, Mathews R, Oreopoulos DG. Abdominal hernias in patients undergoing CAPD. *Peritoneal Dialysis Bulletin* 1982;**2**:115-7.

(Accepted 29 March 1983)

Cold pressor test in diagnosis of coronary artery disease: echophonocardiographic method

BASIL I B SENEVIRATNE, IAN LINTON, ROGER WILKINSON, WILLIAM ROWE, MARY SPICE

Abstract

The cold pressor test was used to induce myocardial ischaemia in patients with coronary artery disease and the rise in left ventricular filling pressure used as the index of myocardial ischaemia. Left ventricular filling pressure was derived from a non-invasive echophonocardiographic method. A study group of 19 consecutive patients with chest pain underwent the cold pressor test before coronary angiography. Eighteen responded with a rise in filling pressure exceeding 30% and, of these, 17 had serious coronary artery disease (three single vessel, one two vessel, and 13 triple vessel disease; one had coronary artery spasm only). The remaining patient, who showed no rise in filling pressure, did not have coronary artery disease. None of 15 normal controls showed a rise greater than 5% (patients with coronary artery disease versus normal controls $p < 0.001$).

The cold pressor test would be suitable for patients who cannot or should not exercise and may be combined with exercise electrocardiograms to improve the information content, as it uses a different marker of myocardial ischaemia.

Introduction

The cold pressor test, a reflex sympathetic alpha adrenergic receptor stimulus, increases coronary vascular resistance and reduces coronary blood flow in patients with coronary artery disease, presumably by coronary vasoconstriction. Simul-

taneously it increases myocardial demands for oxygen by an increase in arterial blood pressure and heart rate and induces myocardial ischaemia in patients with coronary artery disease. In normal people, however, coronary blood flow is appropriately increased by the coronary vasodilatory reserve overriding the vasoconstrictor stimulus^{1,2} and myocardial ischaemia is not induced. Hence this simple stress test has been successfully used in the diagnosis of coronary artery disease by employing non-invasive methods designed to detect the responses of the ischaemic myocardium such as reduction of left ventricular ejection fraction³ and induction of abnormalities in wall motion.⁴

Increase of the left ventricular filling pressure is one of the earliest and most sensitive responses of the ischaemic myocardium and is observed before the onset of electrocardiographic ST depression or chest pain in stressed patients.⁵ We employed an echophonocardiographic method^{6,7} to assess the expected rise in filling pressure after cold stimulation. This method has been validated by our own work (B I B Seneviratne, A Morton, I Linton, paper read at third ASEAN congress of cardiology, 1980) and later work by others.^{8,9} Employing this method, we found that of our patients who subsequently underwent angiography, those with proved coronary artery disease invariably showed at least a 30% rise in filling pressure during the test. In contrast, none of our normal controls showed a rise of more than 5%.

Subjects and methods

Controls—Fifteen healthy volunteers (mean age 40.9 years, range 17-60) were subjected to the cold pressor test. None had clinical evidence of coronary artery disease and all were normotensive and had normal echocardiograms.

Study group—Nineteen consecutive patients (mean age 58.8 years, range 34-70) being investigated for chest pain were subjected to the test in the week preceding angiography (see table II). Seventeen were subsequently shown to have serious lesions (50% reduction of lumen diameter)—three with single vessel disease, one with double vessel disease, and 13 with triple vessel disease—and two to be free of coronary artery disease. One of these two patients had evidence of coronary artery spasm induced by intravenous ergonovine (ergometrine). Three patients had angiographic evidence of impaired left ventricular function at rest as assessed by two dimensional echo-

Repatriation General Hospital, Greenslopes, Queensland 4120, Australia

BASIL I B SENEVIRATNE, FRACP, FRCP, director of medicine
IAN LINTON, MB, BS (QLD), cardiology registrar
ROGER WILKINSON, FRACP, FACRM, visiting cardiologist
WILLIAM ROWE, MB, FRACP, visiting cardiologist
MARY SPICE, senior echocardiography technician

Correspondence to: Dr Basil I B Seneviratne.