Medical Memoranda

Septicaemia due to Gram-negative Organisms Complicating Vaginal Repair

The problem of the prevention and treatment of urinary infection after vaginal operations has received considerable interest in recent publications (Paterson *et al.*, 1960; Barr and Paterson, 1962; Donald *et al.*, 1962). However, no reference has been made to the potentially fatal condition of septicaemia, due to Gram-negative organisms, which may follow repeated catheterization or continuous drainage of the bladder post-operatively.

CASE REPORT

A housewife aged 63 was admitted to hospital on August 16, 1962, for repair of her stress incontinence. On examination the only other abnormality detected was a hypertension of 200/100 mm. Hg. Pelvic examination disclosed a moderate cystocele with gross stress incontinence. Previous investigation of the urinary tract, including excretion urography and cystoscopy, had revealed no abnormality; in particular, urine specimens at that time, on admission, and on the day of operation were normal on examination and sterile on culture.

A Pacey-type repair operation was performed, and in keeping with the policy of this unit the bladder was not drained post-operatively, to minimize the risk of infection. On the third morning after operation she developed acute urinary retention. A self-retaining catheter was inserted, 700 ml. of urine withdrawn, and a sample sent for examination.

On the seventh post-operative day the patient felt faint on rising and was found to have a tachycardia of 120/min. and a systolic blood-pressure of 60 mm. Hg. Despite the profound fall in blood-pressure she remained alert and was not distressed or in pain. There was striking venous dilatation of the face and upper limbs, which were flushed and warm, yet her temperature was only 97° F. (36.1° C.). Examination of the heart and lungs revealed no abnormality.

A provisional diagnosis of pulmonary embolism or myocardial infarction was made; an electrocardiogram, however, proved normal. In view of the possibility of septicaemia blood culture was set up; a white-cell count and serum transaminase were ordered and further urine was sent for culture. In spite of repeated doses of metaraminol difficulty was experienced in maintaining a systolic blood-pressure of 90 mm. Hg. The white-cell count of 22,800/c.mm. was in keeping with the diagnosis of septicaemia, and full treatment was therefore begun immediately.

Chloramphenicol 1 g. and hydrocortisone 100 mg. were given intravenously and treatment was continued with chloramphenicol 500 mg. and hydrocortisone 100 mg. every six hours. After 24 hours dramatic improvement had taken place and all drugs were then given orally—chloramphenicol in reduced dosage for 10 days, and hydrocortisone being replaced by prednisone in diminishing doses for 18 days. The initial subnormal temperature rose to 101° F. (38.3° C.) for three days and the blood-pressure rose gradually to previous levels. Subsequent recovery was uneventful.

Results of Investigations (seventh post-operative day, during hypotensive episode).—Haemoglobin 11 g./100 ml. White-cell count 22,800/c.mm. (polymorphonuclear leucocytes 89%).

Sensitivity of *E. coli* from Vaginal Swab, Urine, and Blood Culture

Antibiotic	High Vaginal Swab	Urine	Blood Culture
Streptomycin ..	Sensitive	Sensitive	Sensitive
Tetracycline ..	Moderately sensitive	Resistant	Resistant
Erythromycin ..	Resistant	Sensitive	Sensitive
Chloramphenicol	Moderately sensitive	Sensitive	Sensitive
Sulphonamide ..	Resistant	..	Moderately sensitive

Blood urea 87 mg./100 ml. (pre-operative 19 mg./100 ml.). Serum glutamic oxalic transaminase 25 units (normal). Urine, catheter specimen: very numerous pus cells and organisms seen and a predominant growth of a coliform organism obtained. Blood culture: a coliform organism was isolated. These two organisms showed a sensitivity pattern similar to that of a coliform isolated from the high vaginal swab taken the day before operation, and it may be that the three organisms were identical (see Table).

COMMENT

Transient bacteraemia is not uncommon after urethral instrumentation and particularly after the removal of an indwelling catheter (Scott, 1929; Slade, 1958). Occasionally a true septicaemia ensues, the commonest causative organisms being *Proteus vulgaris* and *Escherichia coli*, which are often found in the introitus or within the urethra itself. The clinical picture in this case was classical. The peripheral vasodilatation gives rise to a deceptive appearance of well-being in spite of the extreme gravity of the condition, which can prove fatal in over 60% of cases (Aldridge, 1960). The cause of the hypotension is obscure, but the effect of endotoxins produced by *P. vulgaris* and *E. coli* (Ezzo and Knight, 1957) or of adrenal damage has been suggested. Talbot (1962), in a series of 20 urological cases, found hypotension most commonly in those cases due to *P. vulgaris* infection and showed chloramphenicol and kanamycin to be the drugs of choice. The diagnosis of Gram-negative septicaemia must be considered in obscure post-operative hypotension. The urgency is great, since death or complete recovery depends on the adequacy of treatment in the first 24 hours. In every suspected case a blood culture should be taken and full dosage of the chosen antibiotic given intravenously without delay.

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Myocardial Infarction after Burns

Venous thrombosis is a complication of burns, trauma, and debility in the older age-groups (Sevitt and Gallagher, 1961). In these conditions arterial thrombosis, particularly of the coronary system, though less common, occurs in older patients, especially when associated with shock (Blumgart *et al.*, 1941).

Coronary thrombosis occurring in the young after burns would, however, appear to be a rarity; only one such case has been encountered in recent literature (Folli *et al.*, 1955). In view of this the present case is thought worthy of attention.

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CASE REPORT

A woman aged 31 was burned in a fire on September 19, 1962. On admission to hospital it was found that the skin area involved was 30% of the body area, half of which was full-skin-thickness burn.

She was treated initially with intravenous infusions of blood, plasma, and saline, and subsequently her fluid intake was regulated by her serum electrolyte and P.C.V. values. Her blood urea on admission was 79 mg./100 ml. and had risen to 265 mg. pre-terminally. At no time was her blood-pressure recorded as lower than 100/60 mm. Hg, and her urinary output was satisfactory except for the 24 hours after admission, when it was 300 ml. Six hours after admission she suffered an isolated episode of severe generalized abdominal pain which lasted for two to three hours before passing off spontaneously. On September 22 she had an attack of asthma (there was a history of mild asthma) and she was unable to rid her chest of secretions. On September 24 a tracheostomy was performed, but her condition deteriorated and she suffered respiratory collapse and died on September 26.

At necropsy the extent of the burns was confirmed. The heart weighed 340 g. and showed a recent myocardial infarction which involved the antero-lateral wall of the left ventricle, the apex, and the interventricular septum adjacent to the apex. The left ventricle was dilated but the valves were normal. The anterior interventricular branch of the left coronary artery from its junction with the parent stem down to the smallest visible branches was completely occluded by recent thrombus. The lungs were oedematous and the bronchial tree contained a little tenacious mucus. On the posterior wall of the duodenum there were four superficial ulcers, the largest measuring 1.5 by 1 cm.; none of them appeared to have bled significantly. Both kidneys were diffusely enlarged, but no other abnormality was noted.

Microscopy.—Several of the organs, including the heart, showed varying degrees of capillary thrombosis. The cardiac infarction was confirmed; it was separated from the healthy myocardium by a narrow zone of early granulation tissue. The occluded artery showed focal intimal thickening due to atheroma (see Fig.). The thrombus extended throughout the whole length of the anterior interventricular artery into its capillary branches, and showed signs of early organization. In the lungs many of the alveoli were distended with pulmonary oedema, and the bronchioles showed the characteristic features of bronchial asthma. The kidneys showed widespread focal tubular necrosis affecting the proximal and distal convoluted segments of many of the nephrons, and occasional distal tubules contained pigment casts. The glomeruli were normal apart from some proteinous fluid in the capsular spaces.

Anterior interventricular artery showing thrombosis and atheroma. (Haematoxylin and eosin. $\times 12.5$.)

COMMENT

It is unlikely that this woman would have suffered a coronary artery occlusion had she not been burned. Underdahl and Smith (1947) reported only seven definite and two questionable myocardial infarcts among 95,000 women patients under the age of 40. However, some of the factors generally regarded as predisposing to coronary thrombosis were present in this case. The coronary-artery blood flow was probably reduced by oligæmia; and although the observed blood-pressure did not fall significantly it might have done so before admission. Taken in conjunction with the focal atheroma these factors might account for the occlusion.

Other features relating to burning are, however, of interest. Widespread capillary thrombosis, as a recognized complication in some cases, was previously regarded as responsible for most of the visceral lesions seen in burns; but current opinion casts doubt on its significance in this role (Sevitt, 1957). It might be argued, however, that retrograde extension of the capillary thrombosis into the larger arterial branches might have occurred in this case. Sludging of blood in burned animals and men was described by Brooks *et al.* (1950) as a condition in which erythrocytes clumped together in masses and lodged in the smaller vessels. It is possible that such a conglutination of the red cells led to a secondary thrombosis which extended back along the whole length of the anterior interventricular artery.

Prendergast *et al.* (1952) reported an increase in plasma fibrinogen levels in burned patients. Wolff *et al.* (1940) and Levenson *et al.* (1946) found hypoprothrombinaemia, and Brown (1945) reported no gross change in the numbers of circulating platelets after extensive burns. From the existing reports it would seem unlikely that there is a generalized significant alteration in the coagulability of the blood after burning, although changes in individual clotting factors might occur.

It is suggested that this important complication should be considered in the differential diagnosis of obscure circulatory collapse not only in the older but also in the young burned patient.

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