Incidence of Infections in a Haemodialysis Programme using an Internal Arteriovenous Fistula

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Fifteen percent of the deaths recorded in European renal dialysis treatment centres during 1969 were due to infection, the main cause of mortality being heart failure (Drukker et al, 1969). We report in this paper the infections observed in the haemodialysis programme conducted in this hospital, which included 17 patients. Treatment extends from February 1967 to January 1970 giving an overall experience of 16.2 patient years, and in all cases an internal arteriovenous shunt was employed. Bacteriological surveillance was maintained to complete the clinical data. In order to exclude the complication of immunosuppressive therapy we have only considered the pre-transplant period.

RESULTS

Death by infection

There have been no cases of infection causing the patients to die.

Fever during or immediately after haemodialysis

Moderately high temperatures occurred relatively frequently and this was probably due to the re-use of coils. The fever did not cause any serious problems, however, and all patients responded favourably to anti-pyretic treatment. Blood culture was negative 13 times in 6 patients.

Urinary infections

Urinary culture was carried out before commencing treatment and periodically during treatment and also if a urinary infection was suspected. Of 50 cultures examined only 4 were positive and of these only 1 case had clinical symptoms of a urinary infection. The most commonly found organism in the urine was the Enterococcus followed by Escherichia Coli, Coagulase-negative staphylococcus, Coagulase-positive staphylococcus, Proteus, Diptheroids, Alkali-
genes and Paracolon bacilli. In 1 patient Coagulase-positive Staphylococcus was isolated from the urine, blood and fistula exudate.

Skin infections

Two cases of furunculosis, one of dacryocystitis and one of perichondritis of the ear. Proteus infection of a laparotomy incision was observed in 1 patient.

Cannula and fistula

The only shunt implanted in our Unit was in a patient admitted in acute renal failure and who later was found to have cortical necrosis. Shunt infection and thrombosis occurred after six months and an internal fistula was inserted in the other arm. Inflammation rarely occurred at the site of venopuncture and this was usually reversed by changing the situation. Phlebitis occurred in a diabetic patient, but was treated successfully with conservative measures only.

Mycotic aneurysm and septic pulmonary metastases

One patient who was hypertensive and in a debilitated state of health developed a dilatation in the venous side of the fistula after 8 months of dialysis. Surgical resection with reconstruction of a new proximal fistula was carried out in the same arm. Although there was no sign of infection a Staphylococcus was isolated from the aneurysmal tissue. A month later the patient developed a high temperature and inflammation of the forearm with swelling and ulceration around the fistula with a purulent exudate. Staphylococcus Albus (Haemolytic Coagulase-positive) was isolated simultaneously from the blood, urine, and fistula exudate. A few days later a new fistula was made in the other arm after removal of the infected second fistula. Sepsis continued for a further month and the patient complained of thoracic pain and dyspnoea. Lactic dehydrogenase rose to 725 Wacker units and circular opacities were noted in the chest films; these persisted for two months and then disappeared.

Hepatitis

No cases of hepatitis were reported despite the fact that much blood was used in the department and no special prophylactic measures were taken.

DISCUSSION

The only important infection observed throughout our programme under discussion was associated with the development of a mycotic aneurysm in the fistula followed by septic metastases to the lung, so that the incidence of major infection has been 1 per 194.4 patient-months. This is a better figure than that obtained by other authors employing this shunt method, which varied between 1 infection per 3.7 patient-months (Martin et al, 1967) and 1 infection
per 35 patient-months (Curtis et al, 1969). The incidence of pulmonary septic metastases with isolated or recurrent cases has also been recorded in patients with shunts (Pendras & Erikson, 1965; Hampers & Schupak, 1967; Goodwin et al, 1969).

In our opinion two factors governed the occurrence of fistula infections:

1. Inadequate dialysis treatment in debilitated patients suffering from pruritus where lesions caused by scratching allow entry of cutaneous Staphylococci.

2. The anatomical condition of the fistula, its wideness, working time and blood pressure levels. It is common to see aneurysmal venous enlargements which may be potentially a source of infection.

CONCLUSIONS

1. The incidence of infections with internal arteriovenous fistulae is practically nil.

2. Aneurysmal venous dilatations can be a source of infection and give poor results in the long-run.

REFERENCES


Pendras, J. P. and Erickson, R. V. (1965) Transactions. American Society for Artificial Internal Organs, 11, 238