

Treatment should probably be initiated as soon as the doctor is satisfied that there is no serious impairment of conduction and no immediate prospect of congestive failure. This will usually be between a few days and a month after the infarct. No firm recommendations for routine prophylaxis can be made for patients with inferior infarction, though patients may require treatment for symptomatic relief of angina or hypertension.

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Requests for reprints should be sent to: Dr. K. G. Green, Clinical Research Department, I.C.I. Ltd., Pharmaceuticals Division, Mereside, Alderley Park, Macclesfield, Cheshire SK10 4TG.

Addendum

A few physicians had not finally reviewed all patients by the cut-off date of 1 April 1975. Statistical appraisal, however, concluded that possession of the outstanding information would be extremely unlikely to alter the results and conclusions. A further analysis of the final information will be carried out in the near future.

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Treatment of Wounds from Animals Suspected of Carrying Neurotropic Viruses

L. KLENERMAN, C. R. COID, F. Y. AOKI

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Summary

The methods used at the Clinical Research Centre, Northwick Park Hospital, to treat wounds potentially infected with neurotropic viruses are outlined. Emphasis is laid on first aid and on surgical attention. Patients should remain under medical supervision for at least four weeks after the injury, the need for specific post-exposure treatment depending on the nature of the exposure.

Introduction

The treatment of wounds made by animals suspected of carrying a neurotropic virus in the saliva is a vexing problem.¹ In the

United Kingdom, so far as the general population is concerned wounds of this kind are rare. Nevertheless, staff in biomedical institutes are sometimes exposed to the risk of being bitten by laboratory animals, such as monkeys, potentially infected with rabies virus or *Herpesvirus simiae* (B virus), and thus methods of treatment need to be formulated. The local treatment of wounds should be regarded as an adjunct to prophylaxis by immunization if suitable vaccines are available and personnel are at special risk.*

We outline the methods adopted in this hospital to treat wounds potentially infected with such viruses in the hope that it may be of value to those who advise and treat patients with this kind of injury.

Methods of Treatment

All wounds, whether superficial or deep, should immediately be scrubbed clean with copious supplies of soap and water and made to

*Advice on the use of rabies vaccine and antiserum may be obtained from the following laboratories of the Public Health Laboratory Service, where stocks of these prophylactics are held: the Central Public Health Laboratory at Colindale, London NW9 5EQ and at Liverpool (Fazakerley Hospital, Liverpool L9 7AL), Newcastle upon Tyne (General Hospital, Newcastle upon Tyne NE4 6BE), and Cardiff (University Hospital of Wales, Cardiff CF4 4XW). (See also ref.²).

The Central Public Health Laboratory at Colindale, London (Tel. 01-205 7041), will advise on the diagnosis of suspected neurotropic virus diseases and on the follow-up treatment of patients.

Northwick Park Hospital, Middlesex HA1 3UJ

L. KLENERMAN, CH.M., F.R.C.S., Consultant Orthopaedic Surgeon

Clinical Research Centre, Middlesex HA1 3UJ

C. R. COID, PH.D., M.R.C.V.S., Head of Animal Division

F. Y. AOKI, M.D., F.R.C.P.(C), Visiting Worker

bleed. Further cleaning should be carried out in the accident department, where a local antiseptic such as iodine or 0.1% quaternary ammonium compounds such as cetrimide *B.P.* should be applied. A deep wound should be cleaned surgically under local or general anaesthesia. As is customary with all contaminated wounds, routine surgical excision should be carried out to ensure the removal of all damaged tissue. Small wounds need not be sutured but delayed primary closure is indicated for more extensive injuries.

The need for specific post-exposure treatment for rabies depends on the nature of the exposure.^{3,4} Antirabies serum and vaccine are indicated when a person is bitten or licked on an open wound or mucous membranes by a rabid animal, and also when it is not possible to establish a firm diagnosis though there is a strong possibility that the animal could be infected with rabies virus.

As soon as possible after local treatment, and before the administration of serum or immunoglobulin, a blood sample should be taken and stored as a reference for serological tests, which may need to be carried out later for diagnostic purposes.

The nearer the wound is to the head the greater the danger. If an antirabies vaccine and a heterologous antiserum are indicated the patient's sensitivity to serum must be determined. In the future, human antirabies immunoglobulin may replace antirabies serum prepared in animals.

Careful medical supervision of the patient is necessary for at least four weeks. The incubation period for *H. simiae* is thought to be 10-20 days,⁵ but it may be longer. The appearance of vesicles around the wound is a sign of B virus infection, though these do not invariably occur. If the patient shows any signs of an influenza-like illness, paraesthesiae, or muscular weakness he should be admitted to an infectious diseases unit. Antiserum and human immunoglobulin are not yet available for the treatment of patients bitten by animals suspected of having B virus infection.

In addition to the treatment of suspected infection with neurotropic viruses it should be remembered that biting animals may transmit other local or systemic infections due to bacteria, including tetanus, and such infections also need to be treated appropriately.

Examination of Biting Animals

The kind of post-exposure treatment will depend on the likelihood of the biting animal having been infected with a neurotropic virus. A veterinary surgeon should therefore establish the state of health of the biting animal and provide the physician with the information with all possible haste. If the animal is ill a diagnosis of the cause of the illness should be made.

In Great Britain imported animals are held for a statutory period of six months in quarantine premises authorized by the Minister of Agriculture, Fisheries and Food.⁶ Cases of suspected rabies and injury to personnel during the quarantine period must be reported to the veterinary or medical supervisor appointed. Animals bred in Great Britain and those that have undergone quarantine are not likely to be infected with rabies virus. When a person is bitten by an animal during the quarantine period, however, the degree of risk is less easy to assess and several factors must be considered—for example, the type of exposure, the animal species involved, the regional epidemiology of rabies, and the circumstances of the exposure.⁴

When an injury is caused by a non-human primate the animal should be immediately examined under anaesthesia for mouth lesions of

*H. simiae*⁷ and a blood sample examined for serological evidence of the virus infection.

Discussion

Despite some equivocal results, experiments on the rabies-infected wounds of guinea-pigs have shown the beneficial effects of repeated swabbing and flushing with 20% green soap or 2% benzalkonium chloride,¹ but repeated flushing alone, unaccompanied by swabbing, failed to show any significant effects. The success of the procedure was thought to relate to the mechanical effects of the swabbing rather than to the nature of the compounds used. The value of prompt first aid was also emphasized.

Dean *et al.*⁸ showed in guinea-pigs that the protection of antirabies serum given within six hours at the site of injury was better than that obtained when the antiserum was given by the intramuscular route. Possibly, therefore, a satisfactory response may follow the use of specific antisera against other neurotropic viruses such as *H. simiae*, and studies on the usefulness of antiserum against this virus should be encouraged.

The value of surgical excision of the wound has not been carefully assessed and investigations into this form of treatment would be of much interest. Theoretically, prompt excision of the infected tissue before the virus spreads further may be of value, provided that the anatomy of the site permits this to be done. In anatomically complex regions such as the hand removal of the specialized tissue is justifiable only when there is extensive damage.

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