clinic are required to check the equipment. Could these strict conditions possibly influence bony union? Introductory statements to review articles such as "At this time the weight of evidence gathered from both laboratory, animal, and clinical studies indicates that electrical forces can stimulate bone growth. The prime question thus becomes, how does it work?"[27] and "A double blind trial is impracticable"[28] suggested that this question is not always addressed.

Fortunately, such statements did not deter Barker *et al* from randomly allocating 16 patients with ununited tibial fractures of at least 12 months' duration to treatment with either an active or dummy pulsed magnetic field stimulator contained within a full non-weight-bearing plaster.[29] The two groups were reviewed after 24 weeks. The fractures in five of the nine patients with an active stimulator united compared with five of the seven of those in the control group. Finding no difference between the two groups, the authors argued the efficacy of conservative treatment. This preliminary communication was the first reported double blind trial of pulsed magnetic field therapy for tibial non-union in man. We and 11 000 patients world wide await the results of further double blind controlled trials.

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Antibiotics in hand infections

Antibiotics have brought respite for many patients suffering with severe infections, but their indiscriminate use may be damaging. Nowhere is this more true than in the hand. The old aphorism that there is "no such thing as a minor hand infection" remains true. Furthermore, hand infections which might be thought to be minor by both patient and doctor may be transformed into major problems if antibiotics are prescribed unwisely. While dogma may be dangerous, as a general rule the outpatient prescription of antibiotics alone has no place in treating hand infections. Where antibiotics are indicated—and they often are—is as an adjuvant to surgical treatment; or when surgical treatment is not indicated antibiotics may be required parenterally, together with splintage and elevation of the arm in hospital.[1-10]

The common hand infections are paronychia (whitlow), pulp space infection (felon), boils, and cellulitis; together they account for 90% of the total. Acute paronychia occurs in three stages of severity. Firstly, there may be pus between the reflected cuticle and the nail; secondly, a small amount of pus may have formed under the lateral part of the nail; and, thirdly, the so called "horseshoe" paronychia may have developed, with pus insinuated between the proximal nail and the nail germinal matrix. All three forms are best treated surgically, followed by daily dressings and splintage. Antibiotics are seldom necessary. Pulp space infections require incision and drainage, daily dressings, and splintage of the digit, and again antibiotics are seldom necessary. Only when the infection is seen late and a "collar stud" type of abscess has developed, possibly with secondary spread to the bone, are adjuvant antibiotics appropriate. Boils on the hand and wrist occur almost exclusively on the dorsal aspect, in hair bearing skin, and require incision and drainage followed by splintage. If there is surrounding erythema or pronounced swelling the hand should be elevated and antistaphylococcal antibiotics given parenterally.

Cellulitis is almost always the result of infection with β haemolytic streptococci, and treatment should consist of splintage of the hand in the safe position, elevation, and intravenous benzylpenicillin.

The less common but more serious infections are the abscesses that may form in the web space, the palmar space, or the thenar space. All these require incision and drainage under regional or general anaesthesia and a tourniquet. Antistaphylococcal antibiotics, given parenterally, should be given initially until organisms have been cultured and their sensitivities are obtained. Infection of the flexor tendon sheath requires incision, drainage, and irrigation of the tendon sheath, together with parenteral benzylpenicillin. Septic arthritis may occur after an injury initially thought to be trivial; it may also result from a punch in which the clenched fist strikes the incisor teeth. The required treatment is opening and irrigation of the joint and the administration of broad spectrum antibiotics to cover the wide range of organisms present in the mouth.

Pyogenic granulomas require curettage. Orf is a self limiting granulomatous condition, the result of inoculation of the skin with a virus that lives in the incisor teeth of sheep. Herpes simplex and, more recently, genital herpes may produce unusual patterns of infection around the nail. Tuberculosis may affect bones or joints, but in Britain the flexor tendon synovium is the commonest site of infection in the hand, producing the so called "compound palmar

ganglion." Treatment consists of synovectomy and antituberculous chemotherapy. Acute non-suppurative arthritis occurs only rarely in the hand. Gout may go unsuspected for some time.

If antibiotics are administered inappropriately the course of the infection is frequently modified to the patient's detriment. Chronic infection may result, with swelling, induration, and stiffness of the digit or hand. This may be difficult to resolve and may, indeed, result in persistent functional disability. Changes in the articular cartilage of infected joints progress rapidly and move toward secondary osteoarthrosis. Adhesions in the flexor tendon apparatus may produce severe limitation of the excursion of the flexor tendons and require tenolysis.

The prescription of antibiotics as the sole treatment of a hand infection must therefore be undertaken with circumspection. The penalty for errors is great. The result of a hand infection, or a hand injury, is almost always related to the quality of the primary treatment. Primary treatment cannot be instituted correctly unless the diagnosis is also correct. When there is doubt, therefore, the patient should be referred to a hand surgeon immediately.

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Regular Review

New hepatitis B vaccines

ARIE J ZUCKERMAN

Viral hepatitis is a major public health problem in all parts of the world. The infection may be caused by any of half a dozen viruses: hepatitis A, hepatitis B, hepatitis D (the delta agent, a defective virus), epidemic non-A hepatitis, and by at least two non-A, non-B viruses.

Hepatitis B (fig 1) affects every part of medical practice and its importance cannot be exaggerated. Infection may progress to chronic liver disease, including chronic persistent and chronic active hepatitis, cirrhosis, and hepatocellular carcinoma, one of the most common malignant tumours. Persistent infection is common, particularly if acquired early in life, and at a conservative estimate there are 200 million carriers of hepatitis B world wide.[1] Immunisation against hepatitis B is, therefore, required for groups at high risk of infection, as assessed by epidemiological patterns, socioeconomic factors, cultural and sexual practices, and the environment.[2]

The high rates of infection and perinatal transmission of hepatitis B in some regions dictate the urgency of protective immunisation of susceptible women of childbearing age and of infants—and particularly of infants born to carrier mothers—as the only practical way of interrupting transmission of the infection.[3] Immunisation must also be considered for people living in certain tropical and non-tropical areas where the prevalence of hepatitis B infection is high, where 10-20% or more of the population may be carriers, and where primary liver cancer is common.

The development, safety, and efficacy of hepatitis B vaccine consisting of the excess surface antigen protein coat of the virus purified from the plasma of asymptomatic carriers (fig 2) have been reviewed recently.[2] This article describes the rapid advances which are being made with polypeptide vaccines, hepatitis B vaccines produced by recombinant DNA technology, recombinant live hepatitis B vaccines, and chemically synthesised vaccines.

Hepatitis B polypeptide vaccines

There are two main polypeptides of purified hepatitis B surface antigen, one with a molecular weight of 22 000 to 25 000 or 26 000 (variations exist among the results of analyses of purified antigen from different sources) and the other, its glycosylated form, with a molecular weight of 28 000-30 000. These have been designated p25 and gp30. The polypeptide vaccines contain both p25 and gp30 and have been prepared and tested for safety, immunogenicity, and protective efficacy in susceptible chimpanzees.[4,5] When compared with the plasma vaccine these polypeptide vaccines are better defined chemically and have an added margin of