REFRESHER COURSE FOR GENERAL PRACTITIONERS**TREATMENT OF COMMON ACUTE INFECTIONS
OF THE FINGERS AND HAND**

BY

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This article starts from the premise that general practitioners treat and will continue to treat acute infections of the fingers and hand. Antibiotics have so simplified the treatment of these infections that it is now seldom necessary, although it may be convenient, for a practitioner to refer such cases to hospital, and whatever contrary opinion may be held it is likely that the general practitioner will continue to have the best opportunity of starting treatment early and thereby avoiding operation.

The methods here described have been devised for the practitioner working single-handed. No claim is made for their superiority to other methods, but their efficiency and safety have been proved by trial in thousands of cases in a hospital clinic. The three principles underlying the treatment are:

(1) Control of infection by antibiotics, in particular the prevention of local spread, lymphangitis, and septicaemia.

(2) The limitation of surgery to small incisions for the evacuation of pus and slough.

(3) The use of rest during the diffuse stage of infection only.

The margin of safety provided by antibiotics does not justify any complacency about treatment, and there is still scope for the saving of time in healing and restoration of function, though the old dangers to life and limb have been largely eliminated. This generalization is valid only for the common infections due to penicillin-sensitive Gram-positive cocci. The risk of serious complication still exists in the occasional case in which the infection is resistant to antibiotics, and such cases should be referred for special investigation as quickly as possible.

Most infections of the hand and fingers involve only the skin and subcutaneous tissue, and are due to *Staphylococcus aureus* usually inoculated by minor trauma. Infections of tendon sheaths and joints have become less common as complications of subcutaneous infection, but they still occur, especially if these structures are involved in the initiating trauma. The joints are particularly at risk in knuckle injuries and the tendon sheaths in pricks of the volar flexion creases. The treatment of these complications is not described here and is best carried out in hospital.

Sites of Infection

The cutaneous and subcutaneous infections comprise the following: (1) paronychia; (2) pulp infection of the terminal segment; (3) volar infection of the proximal and middle segments; (4) interdigital web infection; and (5) carbuncles of the back of the fingers and hand.

Infection is diffuse at first, but under treatment, and sometimes without treatment, it will localize and form an abscess. In some cases, particularly if antibiotics are given early, resolution may occur without abscess formation. This should be the aim of treatment with antibiotics, but success can be expected only if treatment

is begun within twenty-four hours of the onset of pain, and at present most patients wait longer than this before seeking treatment.

The depth at which infection occurs has a most important bearing on treatment, but in only one group—paronychia—can one be reasonably sure of the depth when the patient is first seen. Paronychia is a subcuticular infection and pus forms under the horny layer of the deep aspect of the lateral or basal folds of skin over the edge of the nail. From here it may spread under the nail itself or on to the superficial aspect of the folds. Pus is usually present when the patient first seeks treatment even if none is visible, and its early release from the nail fold can prevent its spread beneath the nail.

Infection in any of the other groups may have as one of its manifestations subcuticular pus, and this is the only site in which pus can be recognized with certainty and ease by inspection. The subcuticular purulent blister is obvious, but it may be connected by a hole in the skin with a subcutaneous abscess, and a careful search must always be made for this when a purulent blister is opened. It has been suggested that no harm results from waiting in all cases until visible pus forms in the subcuticular layer; while this may be true if antibiotic cover is given, time may be saved by anticipating its formation, particularly in paronychia. In individuals with a soft skin and a thin horny layer escape of pus into this layer easily decompresses a subcutaneous abscess, and pain is thereby relieved. If, however, the horny layer is hard and thick it does not yield readily, and it may retain pus under tension, with corresponding prolongation of pain. The commonest cause of delay in healing after an abscess is opened is the presence of adherent slough, and it seems that slough separates more readily when it is bathed in pus. However, when an abscess is seen there is no means of telling whether it contains adherent slough. The question can be answered only by opening and inspecting it.

Always Use an Antibiotic

At whatever stage the infection is seen antibiotics should be the first part of treatment. No exception to this rule is allowed even if the abscess is ripe. Operation should not be done until the patient has an antibiotic in his circulation. At present penicillin is the most useful agent, and if used in one of the slow-acting preparations a daily dose of 300,000 units is adequate in most cases (see below). If operation is intended at the first visit 250,000 units of a watery solution of penicillin may be injected for a rapid effect half an hour before the operation. It is better to delay the operation for a few hours than to operate without antibiotic cover.

In cases of spreading infection with lymphangitis and severe constitutional signs larger doses of penicillin should be given at more frequent intervals—for example,

500,000 units four-hourly—and when the infection is localizing the daily 300,000 units of slow-acting penicillin can be substituted. For such cases rest is also necessary, and the best way to ensure it is a plaster splint moulded to the hand and forearm on the aspect opposite to the lesion. If fever, tachycardia, and malaise are present the patient should rest in bed until the antibiotic takes effect. If there is much swelling of the hand it should be elevated on pillows, or suspended if there is anything convenient, such as a picture rail, to which to hitch it. Penicillin should be continued until local as well as general signs of infection have subsided, but splint and sling can be discarded when the infection is well localized.

Pain is a conspicuous feature of all hand infections, particularly those of the pulp of the distal segment. Although some relief may be given by the antibiotic, anodynes should be prescribed, particularly when operation is deferred. Tab. codein. co. in doses of 10–15 gr. (0.65–1g.) are adequate for most cases, but repeated doses may be needed.

Operation should not be undertaken until the infection is localized, the hand being rested until this occurs. Pus may be manifested by a subcuticular purulent blister or, when subcutaneous, by localized tenderness persisting after the diffuse reaction has subsided. An apparent exception is paronychia, when pus, though not visible, may be expected at the first inspection. In paronychia the infection is superficial, a diffuse reaction is rare, and there is no objection to early intervention.

Local Analgesia

For simplicity and single-handed work local analgesia is recommended for all cases. Its superiority over general anaesthesia is merely a matter of convenience, and no objection is offered to general anaesthesia if preferred by patient or doctor, provided that it is of adequate duration. Operations under nitrous oxide are often associated with haste and this must be avoided. The digital nerves are easily blocked with local analgesics at the base of the finger, but for palmar infections nerve block at the wrist is required. Both blocks are easy, but many practitioners may prefer to use general anaesthesia instead of the wrist block, which requires more time and care than the digital nerve block.

All operations should be done in a bloodless field. For the fingers a piece of rubber tube clipped with a haemostat round the base of the finger is adequate, and this is applied before the nerves are blocked. For a digital nerve block a subcutaneous injection of 1 ml. of 2% procaine *without adrenaline* is made on each side of the digit distal to the tourniquet. Analgesia takes 10 minutes to develop. For the wrist block 2 ml. of procaine is injected round the median nerve, 2 ml. round the ulnar nerve, and 2 ml. across the dorsum of the wrist for the branches of the radial nerve. A sphygmomanometer cuff on the arm makes an efficient tourniquet for all lesions proximal to the digits. Some patients find this very uncomfortable, and if adrenaline is added to the procaine the tourniquet need not be applied until analgesia has developed in the hand, but adrenaline must never be used for digital nerve block because of the risk of gangrene resulting from the prolonged ischaemia.

If operations are done under local analgesia it is convenient for the patient and practitioner to sit on adjacent sides of a small table, the patient facing the practitioner. It is advisable to have a couch available for the

occasional patient who "comes over queer." If the operations are done under general anaesthesia more elaborate arrangements are necessary.

The nature of the operation will vary a little with the site of the infection, but its aim should be the evacuation of pus and slough with minimal trauma. There are no standard incisions for abscesses in the fingers and hand. Incision should be made over the abscess, and if made through the full thickness of the skin it should follow Lange's lines and should never cross flexion creases. Drains of either rubber or gauze are not necessary. If incision is made through the full thickness of skin its edges should be pared off for a width of 1–3 mm. so that the opening is slightly "saucerized." This is particularly valuable when the skin is very thick and horny. It not only improves drainage but helps to prevent the persistence of a rigid cavity after the separation of slough (see below). All of the following treatments can be carried out under nerve blocks, but whatever anaesthesia is used a bloodless field must be obtained, and for general anaesthesia the simplest tourniquet is a sphygmomanometer cuff on the arm.

Equipment and Technique

The following instruments and materials are needed: syringes and needles for penicillin injections and nerve blocks; scalpel with small blade (Bard-Parker No. 11 is suitable); nail scissors; fine pointed scissors; fine dissecting forceps, toothed and untoothed; probe (a Watson Cheyne dissector is adequate and is useful for raising nail folds); artery forceps for clipping finger tourniquet; fine rubber tubing for tourniquet; heavy dissecting forceps for handling sterile instruments; dry gauze dressings; finger bandages; 3-in. (7.6-cm.) plaster-of-Paris bandages; slings; procaine, 2% solution in ampoules; penicillin, aqueous solution; penicillin, slow-acting preparation; penicillin lactose powder (2,000 units of calcium penicillin per gramme of sterile lactose); cetrimide.

If the practitioner sees enough cases to make it worth while, instruments can be sterilized by boiling at the beginning of the day and kept ready for use in a dry sterile box with a lid. If the operation is done with dry washed hands and the instruments are carefully handled it is possible to maintain a "no touch" technique and sterile rubber gloves are not necessary. However, it is advisable for the operator to wear gloves to prevent the contamination of his own hands, as the victim of a hand infection is likely to be a skin carrier of *Staph. aureus*. Gloves used for this protection need not be sterile. They can be put on dry and then washed with soap and water or with cetrimide and dried.

Treatment

Paronychia.—As has been stated, pus is usually present when the patient is first seen, and it is subcuticular. Unless he is seen within twenty-four hours of the onset of pain paronychia should be explored at the first visit. To find the pus the nail fold is separated by blunt dissection from the nail, a start being made at the site of maximum tenderness. This manoeuvre will release the pus and after this has been mopped away the nail must be carefully examined to see if pus has tracked beneath it. If it has, the undermined area of nail is excised but adherent healthy nail is left. An incision into the nail fold is not necessary. Any cuticle that has been elevated by pus is carefully snipped away. Subsequently the nail folds must be carefully inspected daily and care

taken to prevent premature adherence to the nail, which may cause pocketing of pus and result in further spread under the nail. Occasionally a lateral pulp infection produces a subcuticular component beside the nail. Careful inspection of the abscess in paronychia will reveal the track to the deep component when it is present.

Pulp Infection.—(a) *Subcuticular purulent blister*: The blister is completely unroofed by snipping away the raised cuticle. The floor is mopped dry and inspected for a track into the pulp. If found, its extent and direction are measured by probing, and the opening is then enlarged in the appropriate direction. Probing should include a deliberate search for bare bone. (b) *No subcuticular blister but pus diagnosed by localized tenderness*: Incision is made over the site of maximum tenderness and when pus is found it is mopped away and the abscess explored with a probe. The incision is then enlarged, if necessary, in the appropriate direction and, as in the previous case, a search is made for bare bone. The abscess is also inspected for the presence of slough, which must be removed if loose, but its excision is not recommended.

Volar Infection of Proximal and Middle Segments.—These are dealt with as pulp infections. It must be remembered that in the flexion creases there is little fat, and the skin approximates closely to the tendon sheath.

Web Infection.—In the early stage this is manifest by swelling of the adjacent fingers and of the back of the hand and also some separation of the fingers. As in other parts of the hand abscess may be detected by the formation of a subcuticular purulent blister or localized tenderness after the diffuse infection has begun to subside. Incisions are made carefully through skin only and enlarged according to the direction of spread as shown by probing. The most generally useful incision for these infections is one in the overlying flexion crease at the base of the finger.

Carbuncles.—Subcuticular purulent blisters, usually multiple, are a feature of carbuncle, but the chief cause of trouble in these infections is slough. There need be no hurry to open the blisters, as little good will be done until the slough is loose and can be removed. Incisions are not necessary in most cases, but sometimes a large slough can be extracted only after enlarging the spontaneous opening in the skin.

Dressings and Aftercare

Dry gauze dressings are recommended for all cases, and the patient is instructed not to remove the dressing or to get it wet. The dressing is changed daily until the wound is healing. In paronychia it has been found useful to introduce a little penicillin lactose powder under the elevated nail folds, and in pulp infection with bare bone a little of the powder is packed into the depth of the wound. Paronychia after the formation of pus has ceased requires no dressing unless the nail has been removed, and for early cases without removal of any nail frequent washing with soap and water is recommended after operation.

Persistence of much swelling is an indication for continued splinting and elevation of the limb. Troublesome swelling is commonest in web infections and carbuncles, the swelling being mainly on the back of the hand and fingers. As soon as the signs of infection have subsided, particularly pain and swelling, movement and use of the finger are to be encouraged. If the patient is having antibiotic treatment there appears to be no risk of recurrence of the diffuse stage of the infec-

tion. In most cases healing is rapid after pus has been evacuated and slough removed. The commonest cause of delay in healing is the persistence of adherent slough. At the daily dressing the wound must be inspected for slough, which is pulled out when loose. Other possible causes are bone infection, joint infection, and the presence of foreign bodies. Delay in healing also occurs in cases in which a large slough has separated slowly, leaving a cavity which has had time to become somewhat rigid. If there is any doubt about the cause of delay the finger can be x-rayed for bone changes or opaque foreign body. But a careful exploration of the wound under ring block and tourniquet is more likely to provide the answer.

A film entitled *The Treatment of Infections of the Hand*, which was made at the Hand Clinic of University College Hospital, is included in the B.M.A. Film Library and is available on request.

A LIST OF MEDICAL MUSEUMS OF GREAT BRITAIN (1949-50)

BY

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At the annual general meeting of the British Section of the International Association of Medical Museums in London on December 30, 1948, with Professor Matthew J. Stewart in the chair, it was proposed that a survey of medical museums of Great Britain should be initiated. Copies of a questionnaire were circulated to members of the association in February, 1949. Additional copies were more widely distributed later in that year, and attempts were made to get further replies in 1950. Returns were obtained from 41 museums in London, 23 in the Provinces, 20 in Scotland, 2 in Wales, and 4 in Ireland. Of these, 5 in London and 4 in the Provinces were either under construction or were exclusively for the use of students of the parent organization, and no details were submitted. There were thus returns from 81 museums for study. Although considerable efforts were made to communicate with all medical museums by inquiry from directors of museums returning the completed questionnaires and by reference to directories, it is not certain that all museums were approached. It would be appreciated if the directors of any such museums would write to the Secretary of the British Section of the International Association of Medical Museums, at 183, Euston Road, London, N.W.1.

The present attempt could provide only a list of the medical museums of Great Britain. There is need for a more complete survey of such museums as indicated by Hackett (1949) comparable to that made by Markham (1938) of the smaller museums and art galleries of the British Isles. This could best be done by one individual visiting each museum.

The questionnaire was headed by this paragraph: "Purpose of Survey: The preparation of a list of medical museums to facilitate visits and interchange of ideas by students and workers in medical museums." Inquiries were made in 20 sections on the following points: Name and address of museum, director and staff; type of museum; type of user for whom museum was planned; size and general scheme of museum;