these is the sulphonamide or para-amino-phenyl-sulphonic radical, $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{SO}_2\cdot$. Of the 40 cases 16 were of this type. Two cases not included in this group, however, behaved in a peculiar manner. They were both eczemas, highly sensitive to small doses of sulphanilamide but not to small doses of other sulphonamides. Each of them reacted to other sulphonamides in heavy dosage, with mild eruptions only. This reaction included a selective flare-up of the sites of previously positive sulphanilamide skin tests, but not of the negative tests to other sulphonamides. Had they been allergic to the sulphonamide group they should have reacted to all these in roughly equal amounts (1 g. of sulphanilamide or sulphanilic acid is equivalent to about 1.5 g. of sulphapyridine or sulphathiazole). The marked difference suggests that a small quantity of sulphanilamide or closely related compound may be formed in the body from the other sulphonamide drugs.

Allergy to Other Drugs.—Rogers (1938) described a case in which the administration of sulphanilamide caused a flare-up of the sites of several previous reactions to procaine. Procaine has the formula $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{COO}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{N}(\text{C}_2\text{H}_5)_2$. It therefore has in common with the sulphonamides the amino-phenyl radical, $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot$. Skin tests with procaine were made on 14 of the above cases allergic to multiple sulphonamides. Seven gave positive reactions. Four of these were tested with full oral doses of phenazone, which carries the radical $\text{NH}\cdot\text{C}_6\text{H}_4\cdot$, but none gave any reaction.

A possible case of sensitivity common to both sulphathiazole and arspenamine, which also contains the amino-phenyl radical, has been reported by Weinstein and Domm (1941).

Summary

The specificity of the sensitivity in 40 cases allergic to sulphonamide drugs has been investigated.

In 60% the allergy was confined to one sulphonamide drug. In 40% it occurred to multiple sulphonamides and to sulphanilic acid.

In about half of the latter allergy was to the sulphonamide radical, $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{SO}_2\cdot$. In the other half it was to the amino-phenyl radical, $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot$, reactions also occurring to procaine.

No cases were seen in which the sensitization was to still smaller groups than these.

I wish to thank the Commanding Officer, 1 N.Z. General Hospital, and the staff of the hospital, for the facilities and assistance in carrying out this work; and the Director of Medical Services, 2 N.Z.E.F., for permission to publish this report.

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TREATMENT OF PULP INFECTION OF THE FINGERS IN THE FIELD

BY

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The following is based on observations made after three years in casualty clearing stations, during which time a large number of these cases have been treated. The main object of treatment was to avoid evacuation to the base, and to return the patient as soon as possible to his unit.

There is little need to labour the disability caused by a stiff and painful finger, especially if it be the index finger of the right hand. The finger may be merely useless or, as often happens, an actual hindrance, interfering with the use of the whole hand. It is not proposed to discuss the aetiology at length. Septic cuts, scratches, and unnoticed pricks are probably the chief precipitating causes. Contributory are the difficulties of ensuring asepsis by reason of water shortage,

dust, and the nature of the man's work; this is particularly so in the case of small parties.

Pathologically the lesion is at first a simple pulp infection, though lymphangitis, lymphadenitis, and general symptoms are not slow in supervening; untreated or inadequately treated bone necrosis follows with depressing frequency, with its consequent increase in the period of disability. The symptoms of the established case need little description. Severe and throbbing pain and complete loss of function are the salient features. General symptoms may be fairly severe, with headache and pyrexia; the finger is tense, red, and extremely tender. Here it may not be out of place to emphasize that the utmost gentleness in examination is essential. The patient will have to be re-educated in the use of the finger and hand: the more pain he suffers, the longer this is going to take.

Management of Cases in Detail

The successful management of these cases calls for attention to detail: a man may be off duty longer with a whitlow than after appendicectomy. In my experience, conservative methods are unavailing; the sulphonamide drugs are useful, but they will not cure the patient without surgical treatment. The primary stage in the treatment is the establishment of adequate relief of tension, and that as soon as possible. "Waiting for pus to form" is mentioned only to be condemned.

The operation is simplicity itself, and I have done many in field ambulance dressing stations with entirely satisfactory results. The anaesthetic of choice is pentothal sodium or some other intravenous barbiturate. If possible, this is preceded by morphine gr. 1/4 and hyoscine gr. 1/150. Adequate drainage is secured by laterally placed bilateral incisions, the pulp space is freely opened with fine Spencer Wells forceps, and a piece of glove rubber drain put across. The incision should not, and need not, traverse the flexure creases of the finger. For infections in the terminal phalangeal area it is, I think, not necessary to carry the incision in an acute case right across the tip of the finger. The drain is taken out after 48 hours; gauze and thick rubber drain are inferior to glove rubber in every way.

The incision of the whitlow is by no means the end of the case from a surgical standpoint. Morphine should, I consider, not be withheld for the first two nights, as a transient increase in the swelling may follow the incision. The incision is dressed once daily with hypertonic saline: Lieut.-Col. P. D. Johnson has suggested the use of sterile 12% sodium sulphate, and in my personal experience this is excellent. Every three hours warm sterile solution is poured over the dressing, which is undisturbed. Heat by means of a hot bottle or, if available, an electrically heated blanket is applied continuously for the first three or four days. I am not convinced that the sulphonamides greatly influence the condition, for after drainage the lymphatic and general conditions rapidly subside.

As soon as the incisions are clean, and swelling is subsiding, the encouragement of active movements should be begun. At no time should any attempt to force movement be made: it merely brings home to the patient that his finger is painful and useless. Progress is neither rapid nor spectacular. When incisions are healed the whole hand is placed in warm water and active movements persisted in. Passive movement is the worst form of interference. The man must be given to understand that further progress depends upon himself. This is the most difficult and trying part of all: it may take up to three months to secure full return of function. This time can be spent usually in the man's unit, supervised by his medical officer.

Summary

This paper on pulp infection of the fingers has been written largely from the military standpoint.

Emphasis has been laid on early, adequate, but not mutilating incisions to secure relief of tension.

Incisions are not to be made primarily to "find pus" but to prevent phalangeal necrosis by relieving pulp-space tension. Reliance should not be placed on the sulphonamide drugs as substitutes for incision.

Prolonged soaking of the finger should be avoided, and a method of avoiding this is suggested.

Active movements should be encouraged and all attempts at passive forcing should be avoided.

Extreme gentleness in handling is at all times necessary in order to avoid psychological trauma as well as physical discomfort. A case which has been dealt with at the field ambulance is more comfortably evacuated to the C.C.S. than the patient upon whom no operation has been performed. The equipment necessary is found in every field ambulance and C.C.S.

In the presence of general symptoms it is a wise precaution to take a blood film in malarial areas. It is illuminating to note how often an attack of malaria is initiated by the whitlow.

I wish to thank Lieut.-Col. P. D. Johnson, R.A.M.C., for permission to write these notes and also for help given and suggestions made.

EARLY OPERATION FOR VOLKMANN'S ISCHAEMIC CONTRACTURE

BY

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The recognition and adequate treatment of Volkmann's ischaemic contracture in its early stages will result in a good functional recovery in most cases. Failure to appreciate the significance of the early developing signs of this lesion is, unfortunately, the cause of much subsequent disability and, not seldom, of even gross crippling deformity.

In a recent standard textbook on orthopaedic surgery, in a paragraph dealing with the question of operations designed to relieve intrinsic pressure on the vessels in the developing stages of Volkmann's deformity, it is stated that "as a rule damage is already irreparable when the arm is observed, and for this reason the operation is seldom applicable." Too complete an acceptance of this ruling will result in many cases progressing to ischaemic deformity which would otherwise have been prevented had the benefits of early surgery been sought. I believe that operative exploration is indicated if arterial damage is suspected, or where gross swelling of the forearm is associated with beginning contracture of the fingers which has not responded to routine treatment. The case history given below demonstrates the good results which do follow surgery in the early stages:

Case History

While on Army manœuvres on Dec. 4, 1943, the patient, a well-developed man of 24, was hit accidentally by fragments from a ricocheting bullet. He felt an immediate burning sensation in the left forearm. A first-aid dressing was applied and the patient was admitted to an E.M.S. hospital.

When examined in the hospital four hours after the injury several small wounds were seen on the flexor aspect of the proximal third of the left forearm. There had been very little bleeding. Flexion and extension of the elbow were full and painless, but supination and pronation were reduced by 50% and were accompanied by pain. The fingers were slightly flexed, but could be extended at the metacarpo-phalangeal joints. There was no loss of sensation in the hand or forearm, and the radial pulse was easily palpable. Prophylactic doses of anti-gas-gangrene serum and antitetanic serum were given, and the administration of sulphapyridine was begun. The forearm was suspended from a Balkan frame to assist in venous return.

Three days after admission the range of movement of his fingers had increased, but there was a tendency to flex the wrist before full extension of the fingers was secured. Twelve days after admission to hospital four small pieces of metal were removed from the forearm under local anaesthesia. Following this minor procedure, the patient experienced an aggravation of pain in his arm and the degree of contracture of his fingers was found to have increased.

When seen on Dec. 24—20 days after injury—the muscles of the proximal part of the forearm were found to be hard, and the patient could not extend his fingers at the metacarpo-phalangeal joints without at the same time flexing the wrist fully. Volkmann's ischaemic contracture was diagnosed and surgical exploration decided upon. This was done through a linear incision on the volar aspect of the proximal third of the left forearm. The skin and fascia were incised, and superficial muscles which appeared normal were separated. When the insertion of the pronator radii teres was elevated and later partially incised, large blood clots welled up into the wound and profuse arterial bleeding occurred. This was found

to arise from a partially lacerated ulnar artery. No arterial spasm was present in either segment. Ligatures were applied above and below the laceration and the vessels divided. The deeper muscles were soft, dark red in colour, and failed to show any sign of contractility on stimulation even when a small section was removed from the flexor digitorum profundus for microscopical study. The divided structures were reunited, the wound closed in layers, and the wrist fixed in hyperextension on a dorsal plaster cast. A small rubber drain was left in for 24 hours.

The stitches were removed at the end of 12 days, when the wound was found to be well healed. There was still, however, slight flexion contracture of the distal phalanges of the index, middle, and ring fingers. Splinting in hyperextension was reapplied and physiotherapy by infra-red rays was begun. On Jan. 19, 1944 (26 days after operation) the patient had recovered full finger and wrist movement.

I am indebted to Col. W. F. Harvey for the following histological report: "The sections showed muscle fibres in various stages of degeneration or necrosis with loss of cross-striation in most cases. There was quite considerable longitudinal striation, although a large number of the muscle cells were amorphous and eosinophil. There was no fibrosis or inflammatory cell reaction. The appearances in these sections suggested the ischaemia analogous to Volkmann's ischaemia, possibly at an early stage before replacement reaction had taken place."

Comment

(1) In this case I believe a secondary haemorrhage occurred when the foreign bodies were removed. (2) The increasing tension within the forearm deep to the flexor digitorum sublimis caused mechanical contracture of the fingers. (3) Relief of tension with splinting of the fingers in full extension permitted recovery to occur. (4) Without surgical treatment, replacement fibrosis of the necrosed muscle fibres would have "fixed" the existing contracture, and as cicatrization occurred this existing deformity would have become more pronounced.

I have to thank the Medical Superintendent of the hospital for permission to publish this case.

Medical Memoranda

Locked Twins

Though not quite as rare as was previously thought, a case of locked twins seems of sufficient interest to merit publication.

CASE HISTORY

Mrs. A., a primipara aged 30, expected her first baby on Dec. 22, 1943. I saw her for the first time on Nov. 27, for obstructed labour. During the previous three weeks her pregnancy had been mildly toxæmic; there had been oedema of the legs and abdominal wall, a systolic blood pressure of 150 mm. Hg, but no albuminuria, headaches, or ocular symptoms. Her pelvic measurements were normal. Labour started naturally on Nov. 26, 36 hours before I saw her; six hours previously she had been found to be fully dilated, and for four hours she had been making strenuous efforts to deliver herself.

On examination she was found to be getting tired, though by no means exhausted. On palpating the abdomen one child was thought to be present lying in the left occipito-posterior position. Limbs were felt anteriorly, and one foetal heart only was heard—in the left flank. Palpation was made difficult by the oedema of the abdominal wall. An anaesthetic was then administered; vaginal examination after catheterization revealed that the membranes were intact: these were ruptured, and the hand introduced to confirm the diagnosis of persistent occipito-posterior position. The head, however, was found to be in an occipito-anterior position. To ascertain the cause of non-descent the hand was inserted further into the birth-canal, and it was then found that a second head was lying in the brim of the pelvis, wedged between the head and shoulders of the first child and completely preventing the birth of either. It was found possible to push up the head of the second child about an inch: forceps were then applied to the head of the first child, which was delivered with little difficulty. The second child was then delivered with forceps; it was also in an occipito-anterior position, and delivery was even easier than the first. Very little liquor amnii escaped. There were no lacerations, and a single placenta was expelled ten minutes later. Post-partum haemorrhage was normal in amount. The uniovular boy babies weighed 5 lb. 6 oz. and 5 lb. 2 oz. respectively.

The puerperium was normal, the mother feeding both babies at the breast; their weights on discharge from hospital were both 5 lb. 4 oz. The blood pressure returned to normal, and the oedema subsided during the first few days.

The frequency of locked twins is said to be 1 in 90,000 deliveries—i.e., once in about every 1,000 cases of twin birth. This statement was made by von Braun of Vienna, but in view of the number of cases recorded during the last ten years it seems