

HAND INFECTIONS AND THEIR TREATMENT

ESSAY

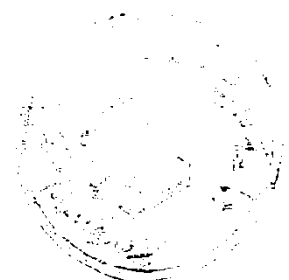
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INTRODUCTION AND AIM OF THE WORK

The vulnerability of the hand to frequent wounding makes it a common portal of entry for bacterial invasion.

This coupled with the superficial location of bone joints and the concentration of relatively avascular tendons, sets the stages for grave local infection.

The potential spaces of the bursa and moist synovial sheaths with constant massaging motion augment the problem (Schwartz *et al.*, 1994).

Hand infection is a fairly common condition in our country especially among manual workers and house wives.

It often starts with a trivial injury which may proceed to infection needing usually surgical intervention in conjunction with antibiotics.

Hand infections are responsible for loss of many work hours which affect our economy, so this subject is selected for study.

Aim of the Work :

In this study we are going to review the literature regarding.

- Surgical anatomy of the hand.

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- Pathology of hand infection
 - Bacteriology
 - Classification of hand infection.
 - Clinical presentation and diagnostic features
 - Differential diagnosis.
 - Investigations
 - Complication of hand infection
 - General lines of treatment

The Skin (Fig. 1, 2)

The dorsal skin is loose and pliable, whereas the volar skin is thick and tethered by the underlying fascia. The palmar creases are points of fixation by fascia to the underlying bone. It must be remembered that the point of maximum concentration of critical functional structures in the hand (nine flexor tendons, the median nerve, the motor branch of the ulnar nerve and two arterial arches) lies in an area in the center of the heel of the hand which can be covered by a 1.5 cm circle. The center of this hub is at the intersection of the central axis of the long finger ray and the volar border of the fully extended thumb (*Kilgore and Graham, 1979*).

Anatomy of the Skin :

The skin of the forearm and hand is, for the most part, untethered except in the palm and the palmar side of the digits. Although it is elastic, it can become a venous tourniquet in the presence of excessive swelling. Functionally it varies in the hand from the dorsal to the volar aspect.

Volar skin is tethered by an extensive network of fascial strands to stabilize it for efficiency of grasp and pinch. The concentration of these strands is greatest at the level of the palmar and digital creases and the lateral borders of the digits



Fig. (1) : Wrist and palm of the left hand of a 53-year-old man showing its surface landmarks.

(Kilgore and Graham, 1979)



Fig. (2): Dorsum of the wrist and hand of a 36-year-old woman
(*Kilgore and Graham, 1979*)

and palm. These become a problem when they restrict expansion and stretching of the skin to accommodate congestion. The tourniquet effect of the skin over the palmar fat pads is easily aggravated by injury or infection.

The palmar skin is also thick and has a rich concentration of sweat glands. This complements the skin lines in providing needed friction. Although thick, it is not particularly tough, but has the propensity for relatively rapid hypertrophy and the development of protective calluses. The sensory innervation gives the fingertips some of the most exquisite epicritic sensibility of any skin of the body. The disadvantage of this is appreciated when wounds give rise to sensitive scars or neuromata.

The dorsal skin is untethered and subject to much more excursion and stretching than the palmar skin. This is functionally necessary in order to allow the fist to close without restricting the transverse and longitudinal arches. In going from a flat hand to a tightly close fist, the adult stretches the dorsal skin at least 2 to 3 cm in the longitudinal and transverse planes.

Under to dorsal skin lies the predominant venous and lymphatic drainage of the hand, so that tightness here serves to compress and choke the circulation. The looseness of the skin

favors the sequestration of edema fluid beneath it.

In contrast to volar skin, two specialized appendages of the dorsal epidermis- the hairs and nails- can give rise to problems of infection (*Clemente, 1975*).

Anatomy of Fat

The fat of the hand is specialized and dose not regenerate. Therefore it must be respected and protected. Its prime function is to cushion the palm. It is maintained in position throughout the volar aspect by fascial strands. There are not true septal so isolated "compartment of fat" as such do not exist.

Palmar fat remains constant in amount and dose not fluctuate in response to changes in body weight. However, it does atrophy with sensory denervation. The fat of the forearm and dorsum of hand is similar to body fat elsewhere, and varies with obesity of the patient.

Clinically, the importance of fat is two fold in surgery of the hand: (1) It is invaluable as a medium for vascularizing tendons and establishing favorable adhesions for excursion of the tendons. (2) It is at times indispensable as a cushion around nerves, tendons, and bony prominences (*Goss, 1973*).

Fascia

The function of fascia are the stabilizing of structures, the maintenance of form and the restriction of motion. It accomplishes these by its composition of collagen and connective tissue with limited elasticity. It is identified by its white and relatively avascular appearance and is recognized at surgery by the fact that it can easily be placed under tension for orderly dissection.

It exists in many different forms - from relatively thin, even delicate strands or sheets to highly developed, tough structures such as collateral ligaments. The dictum of a traumatic surgery is to cut only the tissue that can be tightened with the retractors and flicked with a probe, namely, the fascia. (*Kilgore and Graham, 1979*).

Fascia of the Body of the Hand (Fig. 3)

In the dorsum of the hand, the fascia blends with the extensor retinaculum but is considerably thinner. It creates two spaces in the dorsum of the hand, the dorsal subcutaneous and subaponeurotic spaces. The plane between these two contains the digital extensors. Laterally this fascia fuses with the palmar fascia and fixes to the original metacarpals, especially at the level of the metacarpo-phalangeal joints. Over the web spaces

where this fascia thins, edema fluid and pus from the palm can gain access to the dorsum of the hand. The dorsal nerves and veins are superficial to this fascia. A deeper fascia covers the intrinsic muscles (interossei and adductor of the thumb).

Clinically this fascia forms three spatial levels. The two superficial spaces (subcutaneous and subaponeurotic) are frequent reservoirs for abscess formation which may require separate drainage. The fascia investing the intrinsic muscles must be split in the presence of congestion if ischemic fibrosis and secondary contractures are to be avoided (*Kilgore and Graham, 1979*).

Fascia of the Palm

The deep fascia of the palm is continuous proximally with the antebrachial fascia (fascia of the forearm) and at the borders of the palm with the fascia on the dorsum of the hand. The fascia is thin over the thenar and hypothenar eminences (thenar and hypothenar fascia). But it is thick in the palm where it forms the palmar aponeurosis and in the digits where it forms the fibrous digital sheaths (*Moore, 1992*).

The Palmar Aponeurosis :

This strong, well-defined triangular part of the deep fascia of