SKIN TESTS IN MEDICAL DIAGNOSIS WITH SPECIAL REFERENCE TO BRONCHIAL ASTHMA

THESIS

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of Master Degree of General Medicine

By

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1983

I ...

INTRODUCE ...

THIS WORK ...

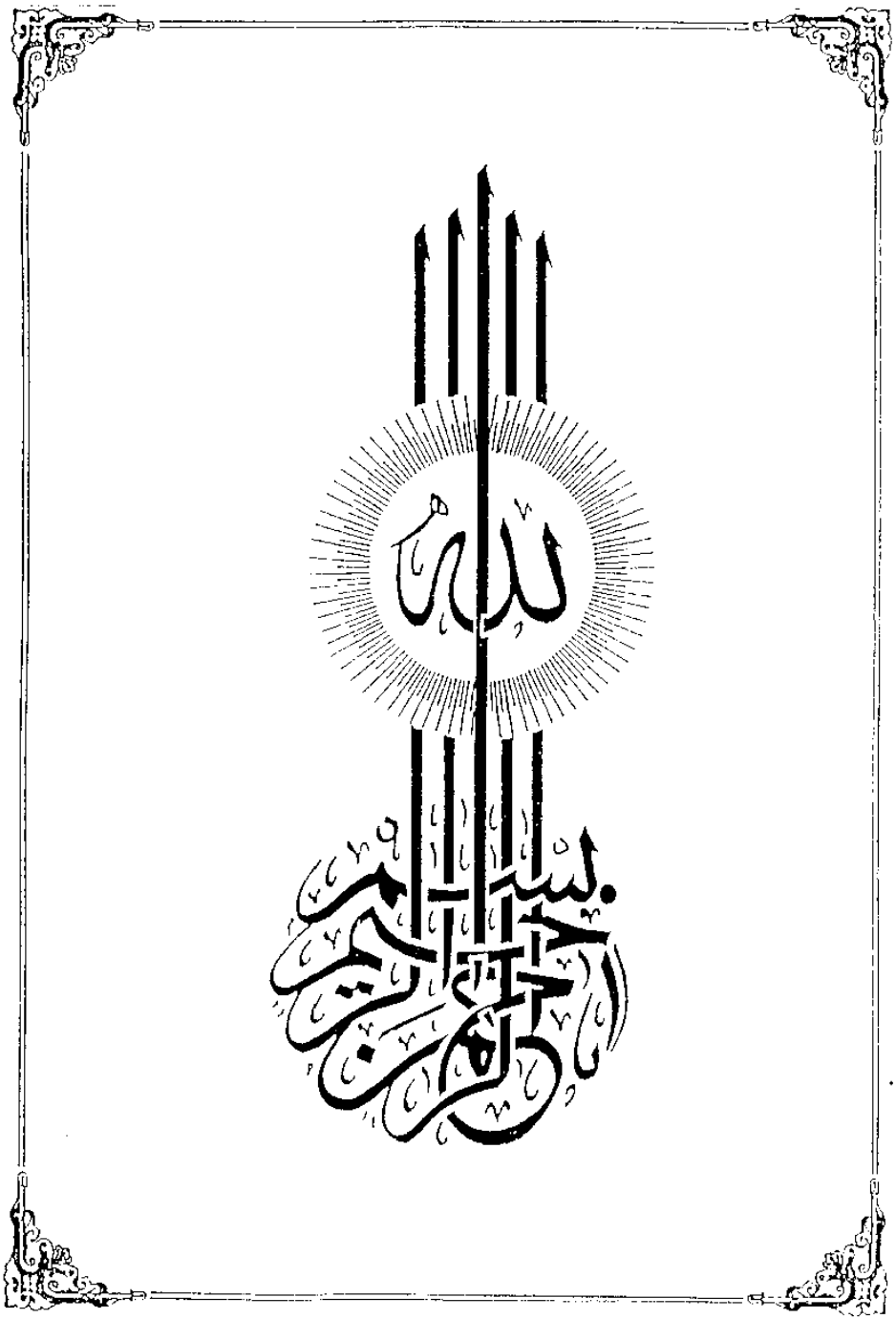
AS A GIFT ...

TO ...

MY PARENTS ...

AND ...

MY HUSBAND ...



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C O N T E N T S

INTRODUCTION & AIM OF WORK

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Skin tests whether intradermal, scratch, prick or patch tests, have great value in the diagnosis of various branches of medicine including immunological, protozoal and tropical diseases.

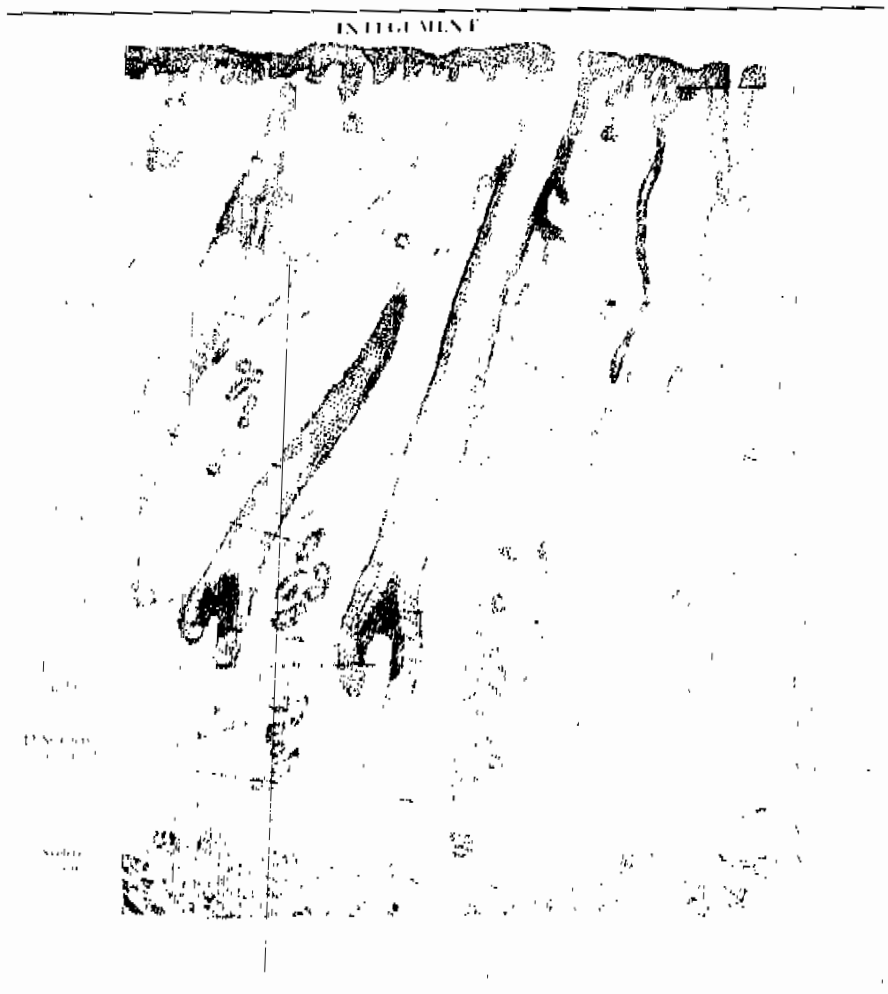
Skin tests have been and perhaps still one of the most misused devices in diagnosis and hence, when properly employed can be invaluable both to the physician and to the patient. (Milner, 1958)

It has long been accepted that in order to establish an allergic attack it is necessary that the patient first becomes sensitized and then be subjected to a certain minimum concentration of total allergen. The minimum, of course, varies from one person to the other and even varies in the same person from time to time (El-Mehairy, 1959). Three types of local responses can be observed following introduction of an antigen into the skin of a sensitized subject; immediate response (Type I), late reaction (Type III), and delayed hypersensitivity skin response (Type IV).

(Gilliland, 1980)

The aim of this work, is to clarify the value of skin tests in bronchial asthma compared with normal controls and to find out the most common allergens which induce positive reactions.

ANATOMY & HISTOLOGY OF THE SKIN



The Integument

(after Difiore M. Sh. : Atlas of Human Histology, 4th. ed., 1974. Leo & Febriger, p. 103).

ANATOMY AND HISTOLOGY OF THE SKIN

The skin covers the body and protects the deeper tissues. It consists principally of a layer of vascular connective tissue, named the corium, and an external covering of epithelium, termed the epidermis. On the surface of the corium there are sensitive and vascular papillae; within it, there are certain organs with special functions, the sweet and sebaceous glands, and the hair follicles.

I- The epidermis :

It is non vascular, and consists of stratified epithelium. It varies in thickness in different parts, as in the palms of the hands and soles of the feet, it is thick, hard and horny in texture.

Structure :

The epidermis consists of stratified squamous epithelium, which is arranged in two zones, the germinative zone and the horny zone.

1- Germinative zone :

Which is deeper and consists of two layers :

a- The basal cell layer (stratum basale) : It consists of a layer of columnar cells with oblong nuclei. The cells are placed perpendicularly on a basement membrane.

b- The prickle cell layer (stratum spinosum) : It is composed of several layers of polyhedral cells.

2- Horny layer :

Which is superficial and consists of three layers :

a- The granular layer (stratum granulosum) : It comprises two or three layers of fusiform cells.

b- The clear layer (stratum lucidum) : It appears in section as a homogenous striated layer, composed of closely packed cells in which traces of flattened nuclei may be found. It is best seen in region where the horny layer is thick.

c- The horny layer (stratum corneum) : It consists of several layers of horny, epithelial cells, in which no nuclei are discernible and their protoplasm has been converted into material known as keratin.

Pigmentation of the skin :

Even in white races most parts of the skin contain brown melanin pigment granules in the deepest layers of the germinative zone of the epidermis; in dark races they are more abundant and extend through the whole zone. The colour of the skin of different races is the resultant of at least five pigments, namely melenin, melanoid, carotene in the stratum corneum, oxyhaemoglobin and reduced haemoglobin in the blood vessels of the corium and subcutaneous tissues.

II- The corium :

It is tough, flexible, and highly elastic. It is very thick in the palms of the hands and soles of the feet;

thicker on the posterior than on the anterior aspect of the body, and on the lateral than on the medial sides of the limbs.

Structure :

The corium consists of connective tissue, with a varying number of elastic fibres and numerous blood vessels, lymphatic vessels, and nerves. The connective tissue is arranged in two layers: A deeper or reticular, and a superficial or papillary. Unstriped muscular fibres are found in the superficial layers of the corium wherever hairs are present; they are also present in the subcutaneous areolar tissue of the scrotum, penis, labia majora and nipples.

The arteries supplying the skin form a network in the subcutaneous tissue, and from this network branches are distributed to the sweat glands, the hair follicle, and the fat. Other branches unit in a plexus immediately beneath the corium, and from this plexus fine capillary vessels pass into the papillae. Arteriovenous anastomosis are present in the corium of certain regions of the skin; those in the skin of the palmar surfaces of the digits are known as glomera.

Function of the skin :

The skin is adapted to serve many different roles, since it is the main interface between the body and its

environment. It minimizes, within limits, the potentially injurious effects of mechanical, osmotic, chemical, thermal and photic environmental stresses; it provides a barrier to invasion by micro-organisms, and it limits and regulates the exchange of heat with the environment by special neurovascular mechanisms coupled with thermally insulating properties of certain layers of the skin; by sweating it excretes water and various waste products of catabolism, it the most extensive sense organ of the body for the reception of tactile, thermal and painful stimuli (Davies, 1967).

One of the functions of the skin which does not mentioned, is that the skin is a mirror of many internal diseases and so skin test can be a useful measure in diagnonosis of various diseases.

REVIEW OF LITERATURE

TYPES OF ALLERGIC REACTIONS

Allergic reactions have been classified into four types by Gell, et al., (1975), anaphylactic (Type I), cytotoxic (Type II), immune-complex-mediated (Type III) and cell-mediated reactions (Type IV). An additional mechanism with stimulating antibody reaction and is referred to as Type V, and antibody dependent cell-mediated cytotoxicity and is referred to as type VI.

Type I : Immediate, Skin-Test Allergic Reactions :

This reaction is characterized by the release of pharmacologically active substances from mast cells or basophils as a result of the binding of antigen to the IgE antibody attached to the surface of these cells.

Immediate responses can be demonstrated by wheal and flare occuring within 10 minutes after introduction of an antigen by the skin test. These immediate reactions are characteristic in atopic individuals using common environmental allergens, including pollens, moulds, house dust, animal danders and food.

Parish (1970), had shown that short-term sensitizing antibody (IgG) may also induce immediate skin reactions.

Examples of Type I reaction including allergic urticaria and angioedema, systemic anaphylaxis, hay fever, bronchial