

THE SOLAR KERATOSES AND CUTANEOUS CANCER

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The face, neck and hands comprise but a small portion of the surface of the human body, yet, according to my personal observations, 49.6 per cent. of all cancers are cutaneous cancers of these parts. It may be admitted that cancer beginning at the mucocutaneous margin of the lip is due to a special class of causes — smoking, traumatism during shaving, eating, etc.; but if cancer of the lip be eliminated and considered as a special form of the disease, there still remains 37.7 per cent. situated on those regions exposed to solar light. Unna wrote of sailors' cancer, which manifestly occurs in men exposed to much direct and reflected insolation. Hyde asserted that light is productive of cancer of the face and included cancer of the mucocutaneous margin of the lips in the general classification. I believe with Dubreuilh that they should be classified and studied aside from those attributable to solar light.

CANCER OF THE LIP

My own statistics, while not founded on a great number of cases, are based on the clinical records of cancers coming into my hands in private practice; and from the beginning of my work with cancer I have made a persistent effort to determine the etiological factors of each case. From a study of the clinical histories of my patients, I have satisfied myself that cancers of the mucocutaneous margin of the lip, or cancers commencing at that point, are in no way due to solar light. Further, the lips near the margin seem, for some reason, to be immune to the development of keratoses. It may be that the lips are, by reason of their comparatively great blood supply, more resistant. This seems a poor explanation. Nevertheless, I have never seen a keratosis at or near the lip margin. I would also note the significant fact that while a large percentage of cutaneous cancers of keratotic origin are of the basal celled type, most cancers of the lip margin are of the cuboidal celled type. The great majority of these patients give a history of trauma, herpes, eczema of the lip, etc. A study of these clinical records, however, shows that cutaneous cancer of covered parts is quite rare and, when found, is nearly always traceable to traumatism, while 37.7 per cent. of all cancers, both deep seated and superficial, have occurred on the face (exclusive of the lip margins), the hands and neck, parts exposed to solar light; and that they have attacked

persons whose vocations or habits involved insolation to a considerable degree. Unna, Hyde and Dubreuilh have written on this question, and all believe that insolation produces keratoses and that these are the most frequent of precancerous lesions. I am convinced that this is true. I do not know of any dermatologist who takes the opposing view.

BASAL CELLED CANCER

The facts which I shall report and the arguments I shall present are based wholly on personal observations in private practice. The patients involved are not overwhelming in number, but my observations have the merit of having been made with personal care from the beginning of my study of cancer, in 1906, with a desire to add something even slightly illuminating to the etiology. I have, therefore, the record of every case I have seen, whether treated or not. Official vital statistics are deceptive in that (in case of cancer) only the deaths are reported. As great progress has been made in methods of treatment, and since many cases are cured, those statistics are not of great value for present purposes. The basal celled cancer is the type most frequently supervening on a keratosis; it is of comparatively slow growth, does not have as great a tendency to metastasis and yields more readily to roentgenotherapy than does any other growth.

KERATOSES IN THE AGED

Dubreuilh has made a profound study of this question and has published his conclusions in his admirable paper "Epithelioma of Solar Origin," based partly on a long experience in dermatology and partly on observations collected from the Faculty of Medicine of Bordeaux by Ferrer. His conclusions, which I believe quite logical, are that keratoses of the aged are caused by chronic insolation; that this is the required agent for their production almost regardless of the age of the patient; and that these keratoses certainly tend to a malignant transformation. He also concludes that since blond people react more vigorously to insolation, they are much more prone to the development of keratoses and consequently of cancer; that the brunet quickly acquires a coat of tan which increases with exposure and protects against dermatitis and, consequently, against formations of keratotic lesions, which protection is denied the blond; that the much talked of heredity consists merely in the heredity of a skin of non-resistant character, and not a heredity of cancer *per se*.

It has been facetiously said that anything can be proved by statistics. This is true only if the statistics be improperly or untruthfully used. In the abstract, it ought to be assumed that one who has labori-

ously compiled a series of observations has done so in an unprejudiced effort to benefit mankind. If the conclusions of Dubreuilh be accepted as correct, as I believe them to be, much interest is added to the study of cancer. My own observations are confirmatory of those of Dubreuilh. Age is certainly contributory to the development of keratoses, but is not an essential factor, for keratoses are observed in many people of middle age and in some of less than middle age, whose protected skin has the elasticity and other characteristics of youth.

AGENCIES IN THE PRODUCTION OF SUNBURN

There are certain agencies which contribute in a marked degree to the production of sunburn. Dubreuilh calls attention to the facility with which the reaction is produced by reflection of the light from water and the intense effect of that reflected light on the photographic plate. As he, himself, is a mountain climber, he has noted the intense insolation by reflection from glaciers and mountain snow fields. For both of these reasons he urges that insolation is caused not at all by the heat of the sun's rays, but by the chemical effect of the rays, chiefly the violet and ultraviolet rays. I recall that many visitors at the St. Louis exposition were badly sunburned entirely by reflected light, because the walks and drives were light in color, and because the surfaces of the buildings were covered with white stucco. Who has not experienced tenderness of the face and malaise while walking the streets of a city for a protracted length of time on bright summer days? The same result may be felt during automobile trips over white or gray stone roads, though sheltered by the top and protected by the wind shield.

During the Great War, some of the camps of the United States troops were situated on the peculiar white or so-called "crayfish" clay. I was in such a camp in the summer of 1918, and personally experienced and witnessed this sunburning by reflection from the light colored soil and heard of the same occurrence from another camp.

It is not always possible to secure a history of keratoses. Usually, these lesions are given little or no thought by the patient, and it is only after a malignant transformation has begun and has frequently become well advanced, that the patient takes notice of it and seeks treatment. A study of the occupation and environment of these patients is, however, possible and must be of interest. It is always possible to establish the age, vocation, habitat and environment of the patient, and it is likewise possible either to establish or to eliminate some of the possible causes of cancer as, for instance, a history of traumatism. If a man is cut by the barber's razor he will never forget

it. And I have been able to establish this form of trauma as the exciting cause of several cases of cancer at the lip margins. The barbers universally shave the lower lip with an upward stroke and exert considerable force, resulting in frequent small wounds. In considering occupation and consequent subjection to insolation, I find that 93.5 per cent. of the patients were farmers or farmers' wives, or other persons with known outdoor vocations. One patient was a physician who had always engaged in a country practice involving a great deal of driving and exposure of the hands. He developed a horny keratosis on the dorsal surface of his left hand which proceeded through a characteristic malignant change. I find another epithelioma in the same situation following a typical cornu cutaneum. The patient was a woman of 70, who for many years previously had led a sheltered life in retirement, but who, until her maturity and marriage, had worked in the fields, and without doubt had been subjected to much insolation after that time, for she and her husband led a semi-pioneer life on a farm.

A considerable proportion of the patients were veterans of the War of the Rebellion which sufficiently accounts for their insolation even if they had lived protected lives ever since. One was a veteran who had been a carpenter ever since. It must be noted that a carpenter in rural places, or in cities other than the largest, spends many days on the roofs of houses. This man's face was almost covered with keratoses in all stages of development, from the brown spot to the piled-up friable mass, and three had transformed themselves into epitheliomas.

PIGMENTATION AS A FACTOR IN KERATOSES

Dubreuilh asserts that blond people are more prone to the development of solar keratoses than dark skinned people. This is strikingly confirmed by my observations, for I find that 62 per cent. of my patients were blonds, 7 per cent. were dark-skinned persons, and 31 per cent. were chatains, or persons having dark hair but having a skin only slightly pigmented. This to me is not the least interesting phase of the question. The more I study it the more strongly I conclude that not only is Dubreuilh correct in his conclusions, but also that he has put the case too mildly. None of the dark-skinned races develop keratoses, though they, more than any others, are exposed to insolation. I have seen American Indians of great age with the skin of the face deeply furrowed and minutely wrinkled, but without the slightest trace of keratoses. I believe that race to be immune to keratotic changes. Though I have always had the American negro under observation, I have never seen either a keratosis or a cancer of the exposed skin in them.

Aside from an admixture of blood, dark-skinned persons are rare among Caucasians in the United States. The color of the face cannot be taken as a true guide in order to determine whether the owner shall be called blonde, or brunet or chatain. To be a true brunet and to be immune to insolation changes means that there must be dark eyes, hair and skin. And the skin of the face is deceptive, for the real brunet acquires a degree of tan with his first insolation and never loses it, but to the contrary adds to it with each succeeding exposure. I have in mind a man of advanced age whose face has deepened in color until it is but little lighter than that of an American Indian without a sign of keratoses. I have recently seen a woman with a much darkened face which is almost covered with keratoses in various stages; there were also several keratoses on her hands. I was astonished because she also had dark eyes and hair, seeming, in fact, a true brunette; but when she lowered her bodice to display a Paget's disease, I saw a white-skinned chest and a much freckled neck. On inquiry, I found that her mother had been a fair blonde; that the patient had had a fair skin in girlhood, and that she worked in the fields. Evidently this woman, despite a partial pigmentation, had inherited the non-resistant skin of her blonde mother and the dark eyes and hair of her father.

The albino acquires *no* pigmentation under insolation, and not even a freckle. He is almost blinded by the sun, suffers intensely from dermatitis and never acquires an immunity, although he is persistent in his efforts to minimize his exposure. After the albino, the color of the blond, chatain and brunette is relative. Some blonds react strongly to the sun, acquiring a dermatitis which is repeated with each exposure, still they are never tanned. Other blonds react less viciously and acquire many freckles and slight partial immunity. The chatain reacts strongly at the beginning of each summer, but quickly acquires a tan and partial immunity. This tan, however, is not permanent as with the true brunet, but will bleach out during the succeeding winter. Consequently, the chatain, if exposed, is the victim of solar dermatitis at the beginning of each sunny season, and this more than sufficient for the production of keratoses. A study of these cases with reference to their habitat reveals a strikingly interesting fact. Dubreuilh very ably shows that insolation of the face with consequent degenerative changes can occur with facility by light reflected from snow, ice and water. Of my patients, 60 per cent. came to me from regions in southern Indiana and Illinois, regions with a soil of very light color which can and does, as I know from personal experience, act efficiently as a reflector of light.

EFFECT OF SOLAR LIGHT AND VARIOUS KINDS OF SOIL ON
PATHOLOGICAL CHANGES

Professor Dubreuilh, in recent correspondence, informs me that a very high proportion of the patients suffering from solar keratoses and epitheliomas entered at the Faculty of Medicine at Bordeaux came from a certain region in southwest France, noted for its peculiar white, chalky soil. In my own work, I am able to compare a white clay district with another of similar extent, population and vocation of the people, but with a soil of reddish yellow clay, and I note that the latter district produces comparatively few facial cancers or keratoses. In this comparison, I wish to emphasize that all conditions are similar; both are rural districts, in which the great majority of the inhabitants spend their entire lives. People of the rural districts of the middle west have no nomadic tendencies, but as a rule live and die near their birthplaces. The only difference determinable by me is in the color of the soil.

Analysis of another group of patients who lived in a city located in a region of dark loam further proves my contention, for it reveals the following: thirteen had been farmers and had moved to the city late in life; one had spent most of his life on the farm and for several years previous to the development of the epithelioma had been a mussel dredger, spending his days in a small boat where he was exposed to insolation in two ways. Some of these people had formerly lived in a white clay region. With nearly all of the entire number of cases studied, it could be established that at least for a considerable portion of their lives they had pursued outdoor vocations and had been exposed to the effects of solar light for a time amply sufficient to produce pathological changes.

MORE ATTENTION GIVEN TO SUNBURN AND KERATOSES

Even in recent years the death rate from cancer of the face has been high. This was partly due to the contempt of the rural inhabitants for sunburn, and to their ignorance, as well as the ignorance of the medical profession, of its evil sequence and, in part, to vicious methods of treatment. To my personal knowledge many cases had no treatment at all, and many others were victimized by quacks. The death rate is still much higher than it ought to be, for the entire morbid ensemble is not only largely preventable, but it is also entirely or almost entirely remediable.

The older inhabitant of rural America was proud of his vocation and environment. He was ready to display a sun-tanned face and calloused hands as evidence that he was a farmer. In fact, he was inclined to hold in contempt, dwellers of the cities by reason of their

white faces and well cared for hands. A famous man was once defeated in his race for the office of governor of Indiana because it was charged he wore kid gloves by an opponent whose proud boast it was that he wore blue jeans clothing.

The conditions are changing, however. The younger man in rural life has no desire to have his visage blackened by sun and, likewise, he prefers to have his hands white and soft. I note that the average plowman now wears gloves. He no longer considers himself a yokel, but a man of affairs, and in this he is correct. His prospective better half has made great advances in refinement and education, and it behooves him to keep pace for the automobile has vastly increased the size of her world, and the young man has rivals.

Time was, and not long ago, when the average physician of rural America gave no attention to keratoses. He regarded them as wholly incidental to senility and referred to them as "old age spots." If consulted in regard to the keratoses he would scorn to give thought to anything so trivial, for he was a busy man, engaged with present emergencies instead of looking to the future. I have heard the advice, "Do not bother anything until it bothers you." Of course, it is unnecessary to argue that anything pathological is worthy of the attention of medicine and certainly this applies to a condition so surely remediable as are keratoses. The keratosis is an admitted precancerous lesion; therefore it should unfailingly be removed.