SPINDLE-CELL EPIDERMOID CARCINOMA

HAYES E. MARTIN, M.D., AND FRED W. STEWART, M.D.

(From Memorial Hospital, New York City)

INTRODUCTION

For several years the authors have been interested in certain peculiar tumors of the skin and mucous membranes which have been designated as spindle-cell epidermoid carcinomas. Most of these lesions have occurred in the zone including and surrounding the lip, and this particular group has been especially selected for the present study, although tumors of somewhat similar histology have been noted in other regions, namely the larynx, esophagus, lung, cervix, bladder, and urethra. We prefer not to include with them the peculiar sarcomatoid metaplasias observed in certain tumors of glandular organs, especially of the salivary glands, breast, and thyroid. These latter tumors are well known and are represented by numerous case reports in the literature. They have been variously interpreted as carcinomas with spindle-cell metaplasia, carcinosarcomas in the sense of true mixed tumors ab initio, carcinomas in which the epithelial proliferation supposedly excites a sarcomatous stromal growth.

The concept of spindle-cell metaplasia in various types of epidermoid carcinoma is far from new. Such changes in structure were clearly recognized by Krompecher (1) as early as 1900. Krompecher spoke of tumors which "aus länglichen spindeligen Zellen bestehen, welche einen intensiv färbbaren Kern aufweisen, demnach dunkel gefärbt erscheinen und sofort als gewucherte Cylinderzellen des Stratum Malpighii erkannt werden können." Moreover, he states that "diese spindelartigen Zellen bilden oft Stränge, welche sich in den verschiedenartigsten Richtungen durchkreuzen, und so entstehen mitunter Bilder, die vollkommen einem Spindelzellensarkom gleichen" (italics ours).

Krompecher, while listing 29 cases, furnished details of but 21. In reviewing his descriptions it becomes apparent that few of his cases were of the exact type the present authors are describing. The majority represented peculiar changes in the structure of basal-cell epithelioma, as indeed Krompecher admits. He endeavored to explain the spindle-cell character by stating that only the cylindrical-cell layer of the stratum malpighii and its downward continuation about hair follicles and cutaneous glands proliferated.

In a later paper Krompecher (2) described the transformation of parenchyma (epithelium) into stroma, a gradual metamorphosis of spindle-shaped basal cells into connective-tissue cells and fibrous tissue, and showed illustrations of the process in basal-cell epithelioma. He found analogies between the development of the spindle-cell "stroma"
of basal-cell carcinoma and relations of epithelium, endothelium, and connective tissue in lower vertebrates. Maurer (3) as early as 1895 had observed the development of epithelial mesenchyme. Krauss (4) described the development of connective tissue from the rete malpighii in Sauropsida, and Kromayer (5) observed the same process in certain human epitheliomas. G. W. Nicholson (6), in discussing the histogenesis of one of his tumors, describes the "dripping," like drops of water, of single cells and groups of epithelial cells which "remind us of the formation by budding of the mesenchyme from all the primary germinal layers of the young embryo (not the mesoderm alone, as often stated in pathological writings)."

The purely epithelial origin of the tumor cells in these spindle-cell epidermoid carcinomas has been well recognized in European literature but tends to escape such recognition here. Thus Wail (7) illustrates a sarcomatoid spindle-cell metastasis to a lymph node from a squamous carcinoma of the lip, very similar to Fig. 1 taken from a lung metastasis from one of our own lip tumors which we regard as spindle-cell epidermoid carcinoma. Furthermore, he pictures the downgrowth of the basal cells of a mucous membrane as long spindle cells, much as those shown in Figs. 2 and 3, one from a spindle-cell epidermoid carcinoma of the skin of the shoulder (Case 8) and another from the base of a cutaneous horn of the skin of the upper lip in an infant. Moulonguet and Léroux-Robert (8) and Baker and Lambert (9) describe sarcomatoid epitheliomas of the larynx and fully recognize the epithelial nature of these tumors. We ourselves have observed similar cases and in one fortunate instance were able to trace the spindle cells directly to cells split off from the basal epithelial layer (Fig. 4).

It seems probable that these spindle-cell carcinomas have been de-
FIG. 2. SPINDLE-CELL EPIDERMOID CARCINOMA OF SKIN OF SHOULDER (CASE 8) SHOWING DIRECT CONTINUITY OF SPINDLE CELLS WITH EPITHELIUM

FIG. 3. SPINDLE-CELL EPITHELIAL DOWNGROWTH FROM THE BASE OF A CUTANEOUS HORN IN AN INFANT

275
scribed in American literature under different names. Kaplan (10) discusses what we believe may have been a tumor similar to those we are describing. His patient had had prolonged x-ray treatment for hypertrichosis; the significance of this fact will appear later in the paper. A recent report from De Cholnoky (11) discusses sarcomas of the lip. Although one cannot, of course, be certain, it seems possible to us that certain of De Cholnoky’s tumors were of the type we call spindle-cell epithelioma. His second case was definitely associated with epidermoid carcinoma; his illustration of Case III resembles cancer, and the clinical photograph of Case IV similarly suggests carcinoma despite its microscopic structure. Interestingly enough one of De Cholnoky’s patients had lupus and another had had roentgen therapy. Nishi (12) has just described a tumor which may be similar to what we designate as spindle-cell cancer as a lipofibrosarcoma. It arose in a patient with lupus. Of our own tumors, two were carried for a long period with a pathological diagnosis of sarcoma, and it was not until intermediate stages of the development of the process began to appear in additional cases that we were forced to a reconsideration of the entire group.

The importance of roentgen therapy or other form of radiation in the genesis of these tumors is apparent from our own cases and from the literature. In a recent article Roffo (13) has described and illustrated a series of tumors developing in rats after prolonged irradiation by invisible spectral rays (1800–3400 A.U.). In addition to epidermoid carcinomas he found a number of spindle-cell sarcomas. Judging from his illustrations, the lesions resemble what we are calling spindle-cell carcinomas, and it is interesting to note from his protocols that all of the sarcomas were associated with various combinations of multiple keratoses, papillomas, and epidermoid cancers.

Among the early case reports of roentgen carcinoma summarized by Hesse (14) we find these curious tumors. His Case 4 was studied by Unna and accepted as fibrosarcoma. Yet the statement is made that “es lässt sich nicht leugnen dass auch dieses Sarkom in Form und Anordnung der Zellen weitgehende Ähnlichkeit mit einem Karzinom hat.” Hesse quotes the discrepancies in diagnoses rendered in some of Porter’s early cases. Thus, in one, Wolbach and Wright disagreed, Wolbach regarding the tumor as sarcoma and Wright as carcinoma. In another Wright rendered a diagnosis of fibrosarcoma while Mallory considered it an atypical form of reparative process. One of the present authors had the misfortune several years ago of misinterpreting, as a reparative process with unusual and peculiar damage to fibroblasts, a spindle-cell carcinoma of the alveolar ridge which followed the radium treatment of typical epidermoid carcinoma after a relatively short interval. Before the true nature of the process was recognized the lesion was too far advanced for therapy.

Putschar and Holtz (15) observed tumors in rats following prolonged ultraviolet radiation. They clearly recognized the epithelial nature of the metaplastic spindle-cell tumors. Pronounced spindle-cell
metaplasia was recognized by Jonkhoff (16) in experimental roentgen carcinoma of mice (his Figs. 3 and 5). The case reported by Coley (17) in 1913 as one of carcinoma, radiated and followed by the development of a sarcoma, is probably to be regarded as belonging to the same category, although from the anatomy of the lesion one can be less certain of the sequence of events. However, the story is highly suggestive of the development of spindle-cell metaplasia of epidermoid carcinoma after irradiation. We are inclined to interpret the recent case described by Wagner (18) in a similar manner, although Wagner himself discusses possibilities and reaches a different conclusion.

Spindle-cell metaplasia in epidermoid carcinoma producing lesions microscopically simulating sarcoma is not confined to tumors arising after various forms of irradiation. The process was clearly recognized by G. Döderlein (19) in experimental tar cancers. Borst (20) recognized the epithelial nature of the “stroma” of certain tar cancers. Roussy (21) describes what he calls “fusocellular pseudosarcomatous epitheliomas” among the tar cancers, and in a recent paper Reinhard, Thibaudeau, and Candee (22) speak of spindle-cell and fibrosarcomas arising in tarred and radiated mice, but later in their paper admit that more careful study indicates that most of these tumors arose from epithelium.

**Histogenesis**

It appears from our material that the histogenesis of these spindle-cell epidermoid carcinomas is far from uniform. In different cases where it has seemed possible to trace the morphology of the process, the
pictures are dissimilar. The impression is gained from Krompecher's description of the evolution of the spindle-cell type in basal-cell epithelioma that he derives these spindle cells from altered cylindrical basal cells, although his drawings offer little assistance. In the few basal-cell tumors studied by the authors which might be designated as spindle-cell varieties of rodent ulcer, it appears that the spindle-cell process develops in the central core of the epithelial sheets and only subsequently involves the entire thickness of the layer (Fig. 5). The cells are long fusiform elements which, when they infiltrate as such, might be mistaken for smooth muscle cells were it not for the structure of the tumor in general. We are inclined to interpret the process as an abortive attempt at the formation of a flat keratinized layer, with the assumption of the morphology of the superficial keratinized cell in the absence of keratinization. The cells may be thought of as analogous to the elongated elements entering into the root cuticle of the hair. We are not concerned, however, with this variety of spindle-cell epithelioma.

In the true spindle-cell epidermoid carcinoma, but not in the spindle-cell alteration developed in a basal-cell epithelioma, the pathological problem is not so much to explain the carcinoma as it is to explain its peculiar morphology, i.e. why it differs so markedly from ordinary epidermoid carcinomas. In seeking the explanation we are reduced to a survey of the inherent potencies of epithelium and the known factors involved in the genesis of the tumor. Noted authority admits the possible transformation of epithelium into mesenchyme and hence, a priori, the development of mesenchymal derivatives from epithelial sources. Oncology supplies numerous examples of such processes, as witnessed, for example, in the salivary gland tumors. These facts,
however, do not explain why the process should occur in the particular group of tumors with which we are concerned. Undoubtedly the most common cause for the peculiar morphology of these tumors is roentgen irradiation. It is not the only cause. We have witnessed the development of the spindle-cell character, in the few cases in which it could be traced, in the following manners:

In one case the epithelium was markedly atrophic (Fig. 6). The cell layers were reduced in number until over much of the growth the epithelium was but four or five cells thick. The tumor cells in the upper portion of the growth tend to lie parallel to the surface epithelium and their morphology suggests that they may have split off from the lowermost epithelial layer in the same manner as illustrated in the laryngeal tumor of Fig. 4. More deeply they become disorderly and lack orientation. Still more deeply the growth infiltrates muscle, where the tumor cells lie within muscle sheaths and simulate myosarcoma. In another tumor, in the deepest area (Fig. 7) where the muscle fibers have been destroyed by growth, the tumor cells become larger, more polyhedral, resemble epithelial cells, and show what are probably intercellular bridges, although in more superficial areas the resemblance to sarcoma is striking.

Whereas in most of our tumors evidence indicates the presence of sclerosis and cicatrization prior to the development of the carcinoma, it is difficult to interpret the exact significance of the cicatrix in the morphology of the tumor cells. While scar tissue may alter cell morphology, it must be admitted that in our cases the indications point to the fact that the spindle-cell morphology may be established independently of the cicatrix. Furthermore, this morphology may be main-
tained in metastases to lymph nodes and in one case it was found in distant visceral metastases.

In one case where no evidence of scar tissue was found the epithelium seemed rather abruptly transformed into a peculiar type of intraepidermal carcinoma made up of large polyhedral and spindle cells. The basal layer as such was absent. Infiltration was absent, yet from the photograph (Fig. 8) it is easy to assume that when this lesion became infiltrative it might well assume a spindle-cell structure. Figs. 9, 10, and 11 are taken from a roentgen carcinoma. The first stage appears to be a curious patchy disappearance of the basal-cell layer and its transformation into a pink-staining, large polyhedral and spindle-

![Fig. 7. Epidermoid Carcinoma Infiltrating Muscle](image)

Here the process is readily identified as epidermoid carcinoma, but more superficial portions fully resembled sarcoma. This case was at first thought to be neurosarcoma.

cell layer. Infiltration is absent. In another area of the same tumor one finds a mixture of typical infiltrating squamous carcinoma but the squamous areas are interrupted by loose, irregular, infiltrating spindle cells, simulating sarcoma but readily traceable to epithelium. In a deeper area (Fig. 11) the lesion becomes decidedly of the spindle-cell sarcomatoid variety, although at intervals one finds traces of what resembles an epithelial syncytium. The impression is gained that in this case the pre-existing roentgen cicatrix has accentuated by pressure the spindle-cell morphology of the invading tumor cells.

There are, however, cases of typical, fully developed spindle-cell carcinoma where there is no evidence for the existence of a cicatrix. There are cases where either no roentgen irradiation has been given or where the amount of such therapy is insignificant. In one case of spindle-cell epithelioma of the lip (not reported with our own cases because it was received for diagnosis from another hospital) the follow-
Fig. 8. *Intra-epithelial Spindle-cell Carcinoma*

Fig. 9. *Beginning Roentgen Carcinoma: Patchy Disappearance of Normal Basal Layer and Replacement by Spindle Cells*
Fig. 10. **Infiltrating Squamous Carcinoma Intermingled with Spindle-cell Carcinoma**
Same lesion as that shown in Fig. 9.

Fig. 11. **Fully Developed Spindle-cell Epidermoid Carcinoma**
From deeper portion of lesion shown in Figs. 9 and 10.
ing features were observed. There was diffuse and very marked degeneration of the elastic tissue of the corium. The reason for this degeneration is not known with certainty, but prior to the development of tumor the patient sustained a severe prolonged blistering of the lip by three weeks' exposure to sunburn in an open boat. The tumor cells in this case first appear in the lowermost layer of a thin atrophic epithelium. In places the basal layer as such is absent and is replaced by pink-staining, spindle-shaped or flattened cells. In the lowermost layers these cells appear separated by fluid and the separate cells seem to split off from the epithelium and to lie at first parallel to the epithelium, as if forming a basement membrane. In multiple foci they dip downward and become arranged perpendicularly to the epithelium and

![Fig. 12. Spindle-cell Epidermoid Carcinoma](image)

Note clinical resemblance to carcinoma. The microscopic appearance is that of sarcoma, but in places cells are traceable to epithelium (Fig. 2).

subsequently invade in loose intertwining bundles. Traces of melanotic pigment appear, but this seems confined to isolated chromatophores and is not in excess of the amount one might expect with the history of intense sunburn. The profound degeneration of the elastica may be a factor in the peculiar morphology of the tumor cells in that tension relations are undoubtedly altered, yet the degeneration is not more marked than that seen in many basal-cell tumors in the senile skin, tumors showing no unusual morphology.

In another case the patient presented a generalized chronic furunculosis. The tumor is described as first appearing as a pimple, which subsequently ulcerated (Fig. 12). Here the main portion of the tumor consists of interlacing strands of large polyhedral and spindle cells which might readily be confused with myosarcoma or neurosarcoma.
The confusion with myosarcoma is especially easy, since in places there is invasion of remains of dermal musculature. Over most of the tumor the epithelium appears normal. Yet in isolated regions one finds the basal cells assuming a spindle shape. Occasional isolated cells resembling Paget cells appear in the basal portion of the epithelium. The lowermost cells occasionally show very large hyperchromatic nuclei and even atypical giant nuclei with large nucleoli like birdseye inclusions. In places these cells are directly continued into the tumor below the epithelium, where they infiltrate the subcutaneous tissue in a very bizarre fashion. Multiple mitoses give rise to atypical giant cells which resemble proliferating muscle nuclei. Where the tumor is directly continuous with the epithelium, it is possible to trace epithelial fibrils into the tumor, and we believe that much of the fibrous tissue of the tumor itself is really “epithelial” connective tissue. The tumor cells of epithelial origin behave like mesenchymal derivatives. We accept this fact, as have other authors, but cannot explain it. Could it be that in some instances radiation, particularly roentgen irradiation, or infection, as in the present case, has paralyzed the normal mesenchymal response and that the tumor is endeavoring to create its own stroma? This vague supposition is insufficient to explain the phenomena in all the cutaneous cases and probably would be applicable to few of the mucous membrane tumors, and it is likely that the correct explanation for the morphology will long be lacking.

Etiology

Spindle-cell carcinoma of the skin is a comparatively rare tumor. The last seven of our cases represent less than 1 per cent of all patients with skin cancer admitted to the clinic at Memorial Hospital during the years 1930 to 1933. The incidence in males and females is almost equal. The youngest patient in our series was thirty, the oldest sixty-four, and the average age was forty-five, as compared to fifty-eight in carcinoma of the skin in general (Pack and LeFevre, 23), but no particular significance should be attributed to this relatively early age incidence, since the precancerous skin changes giving rise to these tumors are most apt to begin in early adult life.

The most common anatomical location in our series was in the skin of the lower half of the face (7 out of 8 cases). This apparent regional predilection is probably not as significant as the figures would suggest. This phase of the subject will be discussed at greater length below. In one case, the tumor occurred in the skin over the shoulder.

Spindle-cell carcinoma is undoubtedly most often a variety of scar tissue cancer. In 6 of our 8 cases, the scarring was apparent on physical examination, and is known to have existed from three to twenty years before the development of the tumor. In each of the other 2 cases, there had been an open wound for over a year, and there is presumptive evidence that spindle-cell carcinoma was a secondary development and did not exist from the beginning of the ulceration.
The causative agents responsible for scarring, in the order of their frequency, were as follows: (1) repeated applications of lightly filtered low-voltage x-radiation; (2) actual cauterity or endothermy; (3) radium; (4) contused wound possibly complicated by a foreign body. In several instances, more than one of the above mentioned forms of trauma had been sustained (Table I, p. 286).

**X-radiation:** In four cases there were widespread skin changes over the lower half of the face, due to repeated applications of low-voltage, lightly filtered x-radiation, which had been given twenty, eighteen, nine, and eight years, respectively, before the development of the growths. These treatments had been given for hypertrichosis in two cases, and for sycoisis barbae and lupus erythematos, respectively, in two others. One patient stated that she had received sixteen applications. The others were less specific and gave the number of treatments as "many." In all four of these patients, the skin of the cheeks, lips, chin, and upper portion of the neck showed the alterations in character and appearance so typical of long-standing radiation changes resulting from repeated lightly filtered x-radiation.1

In two of these patients, single nodular tumors arose in the atrophic skin over the chin. In another case, the growth developed in the scarred, atrophic skin of the upper lip. Treatment was followed by recurrence, and later by an apparently separate tumor. In the fourth x-radiation case spindle-cell carcinoma developed in the edge of a wound which followed cautery removal of a squamous carcinoma.

In addition to the four patients mentioned above, two others had received some x-ray treatment to the local area about one year prior to

1 Such degenerative radiation changes in the skin may be enumerated as follows: superficial induration; telangiectasia; mottled pigmentation; loss of elasticity; dryness and atrophy. The histories of the cases referred to us reveal that such skin damage is most apt to follow x-radiation given for benign conditions, such as dermatoses, hypertrichosis, hemangiomas of the port wine stain variety, and tuberculous cervical nodes. The doses given for these conditions are apt to be small and repeated, and to be followed by partial relief or improvement over long periods. The late effects of such repeated applications of lightly filtered x-radiation were not widely known until comparatively recently, even by the medical profession. Such dermatoses as acne and sycoisis barbae are almost always benefited by a few small doses of x-radiation. Partial improvement or repeated recurrences with no apparent radiation change in the skin have, in the past, encouraged the dermatologist to continue x-radiation, without due consideration as to the cumulative effect, which may not reach a maximum for ten to twenty years. At the present time, dermatologists consider a total of about three to four erythema doses of x-radiation as the limit of safety for these dermatoses, even though this amount is divided into several applications delivered over an extended period.

The medical profession has long considered epilation by x-ray a wholly unsatisfactory and dangerous practice, but until recently such treatments were commonly administered by beauty parlors for hypertrichosis of the face in women. We have observed a number of such patients in our clinic because of the late radiation changes in the skin. Fortunately, a comparatively small percentage of these lesions undergo malignant change, although the appearance is much more unsightly than the hirsutism for which the "treatment" was originally given.

In malignant tumors, larger unit doses must be given in a shorter time, and if the total amount of radiation is beyond skin tolerance, persistent ulcers are apt to occur. Squamous carcinoma (rarely basal-cell) is by far the most common tumor developing in radiation scars. But in any case, the occurrence of cancer is so uncommon in skin exposed to properly conceived and administered therapeutic irradiation that the matter has little significance from the standpoint of prophylaxis.
the definite proof of the existence of spindle-cell carcinoma. Evidence of the causal relation of the x-radiation in these cases is not conclusive.

**Late Radium Effects:** In one of our patients, radon had been applied in contact with the vermilion border of the lower lip for the treatment of papilloma, three years before the development of spindle-cell carcinoma in the edge of the treated area. The dose of gamma radiation ordinarily given for a small carcinoma or papilloma of the lip, as in this instance, will cause a permanent noticeable radiation effect in the local tissues, which, however, was not unduly marked in this case. It is worthy of note that, although radon applicators have been extensively used in our clinic for the treatment of growths of the skin of the face and of the lips, this is the only case of spindle-cell carcinoma which followed radium treatment.

**Table I: Causes of the Precancerous Scarring in Eight Cases of Spindle-cell Carcinoma**

<table>
<thead>
<tr>
<th>Case number</th>
<th>X-ray</th>
<th>Radium</th>
<th>Cautery or endothermy</th>
<th>Contused wound</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>+</td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>+*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significance doubtful. Patient had furunculosis.

A possible explanation for this fact may be found in the following observations. Radium treatment is usually applied in single massive doses, while x-radiation, especially in the treatment of dermatoses, is commonly applied in small doses repeated over a long period. In the production of spindle-cell carcinoma, it is probable that the chronicity, or the repetition of the application of the causative agent which induces the fibroblastic reaction, is of more importance than its nature.

**Cautery or Endothermy:** Scar cancers in general (not spindle-cell) arise most often in thermal burn scars. It is noteworthy that in none of our cases of spindle-cell carcinoma was a thermal burn the original cause of the scarring. In three of our cases with x-radiation scarring, the actual cautery or endothermy had subsequently been applied in the exact locations where spindle-cell carcinoma later developed. The cautery in these instances seemed to supply the immediate stimulus which caused the pre-existent radiation scar to undergo this malignant change. In two of these cases (Cases 2 and 6), the use of the cautery in our hands was followed by such a prompt recurrence or development of an adjacent new tumor that we would hesitate to use this method in similar cases in the future.

**Other Causes:** In Case 5, the only antecedent trauma was a contused wound of the lip, possibly complicated by a retained foreign body. This injury produced a persistent indurated scar in the lip, and was followed
by the development of spindle-cell carcinoma in the scar after eleven years.

**Symptoms and Clinical Course**

These spindle-cell tumors may arise either in the unbroken skin or in the edge of a chronic ulcer. In the unbroken skin the growth seems to begin in the deeper layers of the dermis, and first appears as a firm, rounded nodule incorporated in the skin. As the nodule increases in size, it becomes raised and rounded and usually does not ulcerate until it has reached a size of 1 to 1.5 cm. Unbroken skin seems to exercise considerable resistance to invasion and perforation by the growth, and surface ulceration is usually delayed, and in the uncomplicated case tends to remain limited to a small area over a more bulky tumor. In several of our patients, surface ulceration occurred only after treatment by endothermy, incomplete surgical excision, or after the skin had been pricked open by a pin, and the tumor squeezed (self-administered treatment under a diagnosis of "pimple").

When the tumor begins in the edge of a chronic ulcer, or when it recurs in an open wound, after incomplete removal, there is usually rapid fungation, and the formation of a cauliflower-like mass. The ulcerated surface of spindle-cell carcinoma presents the smooth, glistening, bluish red appearance of sarcoma, rather than the roughly granular, sometimes nodular, pinkish red, so characteristic of carcinoma. The fungating tumor mass may grow rapidly and become very bulky, as in our Case 2, where it blocked the pharynx and caused death by suffocation.

The subcutaneous tissues offer very little resistance to local spread of the tumor, which invades without displacement of the tissues to a greater extent than does squamous or basal-cell carcinoma. The mandible was invaded by direct extension in one of our patients. In the lower lip, the growth may spread widely over several centimeters, and infiltrate the entire thickness of the lip, without surface ulceration. In such cases, there may be diminution in the thickness of the lip and retraction of the tissues, rather than swelling. When the lip is so invaded, there is a peculiar board-like induration with loss of elasticity of the part, the like of which is not seen in any other type of neoplasm found in this anatomical location.

In the subcutaneous tissues, the borders of the growth are rather indistinct, and it is often impossible to determine the exact extent by palpation or even by pathological examination. In the average case of epidermoid carcinoma (not spindle-cell) of the skin or mucous membranes, the borders of the tumor can be felt with sufficient accuracy to include a safe margin of normal tissue in a surgical excision. In spindle-cell carcinoma the border is so indistinct that recurrences are quite common after wide surgical removal (Cases 1, 2, 5, 6 and 7).

On the whole, the progress of the disease is apt to be slow and gradual, although some cases pursue a rapid course, with metastasis, and terminate fatally in less than a year. One of our patients died
about six months following the onset of the disease, but there is some question as to whether there was not also a concurrent second neoplasm of the mediastinum in this patient. In three other fatal cases, death occurred one and one-half, two, and four years after the onset. These survival periods are perhaps shorter than the average in squamous carcinoma of the skin. One patient is now living with disease four years after the onset of spindle-cell carcinoma.

Local recurrences are very common after any form of treatment. This complication occurred ten times in four fatal cases. One of our three patients living and free of disease also had one recurrence after local surgical removal.

Metastases occurred in three of four fatal cases. The regional lymph nodes (cervical) were involved first, with later widespread dissemination to the lungs. In one of these, there were metastatic foci, also, in the liver, breast, ribs, and spine. The initial spread of the disease *via* the lymph channels and subsequently through the blood stream is of course characteristic of carcinoma rather than sarcoma. After metastasis has once occurred to the lymph nodes, further dissemination of the disease has always been rapid and fatal in our series.

**Treatment**

In our experience, spindle-cell carcinomas have not been radiosensitive. The heaviest doses of radon implants have failed to produce sterilization of the tumor bed, and have permitted recurrences after the main bulk of the tumor had undergone radionecrosis.

In many instances, the local setting renders local excision by the scalpel a difficult or impossible procedure, due to the scarred, inelastic, and relatively avascular character of the tissues in which the tumors arise. In other cases, the growth may be attached to underlying bone, and in these the actual cautery or endothermy at once suggest themselves as the most feasible method of surgical extirpation. Unfortunately, in our experience, the use of these cautery methods has invariably been followed by local recurrence or by the development of a new tumor. It has seemed to us that, since the growth invariably arises in scarred tissues, any cautery method, by exciting the fibroblastic activity of the tissues, might be responsible for the development of an entirely new tumor in an area condemned to carcinogenesis, even though the one already existent were destroyed.

If the lesion is movable over underlying structures, surgical excision of the local tumor is undoubtedly the treatment of choice. All the patients now living and free of disease in our series had wide local excisions. Local excisions failed to cure, and were followed by repeated local recurrences in 5 of our cases, and by metastases in 3 of these. If the growth infiltrates widely in the subcutaneous tissues, we would recommend a far wider local removal than would be considered necessary in other forms of epidermoid carcinoma.

Block dissection of the regional lymph nodes should be done if there are palpable metastases, although probably the procedure is of little
value after the disease has once metastasized. Prophylactic dissection of the regional lymph nodes seems to us to be both illogical and useless.

**Case Reports**

**Case 1:** George W., aged forty-seven, was admitted in April 1923. About one year previously, a small "sore" had appeared in the skin of the lower lip. The physician whom he first consulted pronounced the lesion "skin cancer," and treated it for six months by several applications of endothermy and actual cautery. Under these treatments, the ulcer increased in size, and a mass appeared in the left neck. The patient was then referred to a surgeon, who excised a V-shaped portion of the lower lip, including the ulcer, and performed a local dissection of the left neck. This was followed by several

![Fig. 13. Case 2: Spindle-cell carcinoma of the left cheek arising in skin which had been scarred for fifteen years following repeated X-ray treatments for lupus](image)

Eventually this perforated the cheek and fungated into the pharynx, causing death by suffocation.

x-ray treatments, at intervals, for a period of four months. A month before admission, a mass appeared in the skin of the lower lip, and the patient was referred to Memorial Hospital.

On admission, there was an obvious recurrent tumor in the operative scars of both the lip and the left submaxillary region. There was a rather short vertical scar in the left lower lip, about which was a diffusely and deeply infiltrating, indurated, ulcerated mass, about 1.5 cm. in diameter. In the left submaxillary region was a curved scar about 6 cm. in length; anterior to this and along the lower edge of the mandible was a movable node 1.5 cm. in diameter. A histological slide of the lesion removed from the lower lip was obtained, and the report from our laboratory was "neurogenic sarcoma." This diagnosis was later revised to "spindle-cell carcinoma."

**Treatment and Clinical Course:** The recurrent lesion in the lip was treated in April 1923 by contact application of filtered radon. The neck node was treated by submaxillary dissection, and the implantation of glass radon seeds. Although the radiation reaction was of average intensity, there was little if any regression of the growth, and two months later the lip lesion was treated by the insertion of platinum radon needles. Although the immediate result seemed fair, there was an obvious non-ulcerated recur-
rence deep in the lip, and at some distance from the old scar, after six months. Despite repeated applications of radium, externally and interstitially in January and February, 1924, the recurrence in the lip steadily increased in size. In February 1924, cough and pain in the chest developed, and the patient began to fail rapidly. A roentgenogram of the chest showed widespread bilateral metastases to the lungs, from which death occurred in March, 1924.

*Comment:* It is reasonable to assume that the original growth was squamous or basal-cell carcinoma of the skin, and that this tumor in the local tissues underwent spindle-cell metaplasia as a result of repeated endothermy, cautery, applications of x-radiation, and inadequate surgical excision.

**Fig. 14.** Remains of Degenerating Vacuolated Squamous Carcinoma in an Earlier Biopsy in Case 2

**Case 2:** Alexandra P., aged thirty-nine, was admitted in April 1930. Eighteen years before admission, she had lupus erythematosus, which was treated for two years with carbon dioxide snow. Obtaining little or no improvement, she then went elsewhere and began taking x-ray treatment. For the past sixteen years she had received numerous x-ray treatments at irregular intervals, occasionally alternating with ultraviolet light treatments. During this time, the skin of the face had undergone marked changes, such as scarring, telangiectasia, and atrophy, but she had persisted in the treatment because of the conviction that she obtained temporary relief. About six months before admission, two slightly raised, thickened and crusted areas had appeared, one in the skin of the forehead and one in the skin over the left zygomatic region. At the time of their appearance, she was receiving ultraviolet light treatments, which were continued, and both lesions increased in size and became ulcerated. She was then referred to Memorial Hospital.

*Examination* on admission showed the skin and subcutaneous tissues of the entire face, except the eyelids, to be scarred, atrophic, indurated, and telangiectatic. In the skin of the center of the forehead and over the left zygoma were two raised, crusted, ulcerated, indurated lesions, each about 3 cm. in diameter, and raised above the skin level about 6 to 8 mm. They were both quite typical of squamous carcinoma, arising
in scar tissue, and were found on histological examination to be "squamous carcinoma Grade II."

Treatemnt and Clinical Course: In April 1930, both lesions were treated by one of our common technical methods in such cases, that is, by the removal of the projecting portion of the lesion by the endothermy knife down to the skin level, and the application of a radon plaque. Both lesions regressed under this treatment and healed.

The patient was then followed at frequent intervals for two years, without recurrence until July 1932, when a small, indurated area of ulceration appeared at the edge of the site of the former lesion over the left zygoma. A biopsy from this lesion was again reported as "squamous carcinoma Grade II." This lesion was treated during August 1932 by insertion of radon gold seeds. The radiation reaction produced local necrosis sufficient to expose an area of the malar bone about 8 mm. in diameter, which remained surrounded by a depressed scar for the next several months. About eight months later,

---

**Fig. 15. Fully Developed Spindle-cell Epidermoid Carcinoma; Later Biopsy in Case 2**

in March 1933, a smoothly granular mass, a few millimeters in diameter, appeared in the anterior edge of the scar (Fig. 13). Three biopsies were taken before a definite report was obtained of "spindle-cell carcinoma."

In May 1933, radon gold seeds were implanted into the base of this lesion after endothermy removal of the projecting portion. Although there seemed to be no recurrence for ten months, the base of the wound did not heal. The skin of the whole face underwent progressive atrophic radiation changes, and numerous keratoses developed, requiring regular visits to the clinic for cleansing and the application of protective ointments and dressings.

In March 1934, a rapidly growing, smoothly granular, fungating tumor developed in the edge of the unhealed area in the skin of the left cheek. A biopsy showed "spindle-cell carcinoma" again to be present. On two occasions, in May and in June 1934, attempts were made at wide destruction of this local recurrence by actual cautery, but after a few weeks of local improvement the growth seemed to recur with greater rapidity. It finally deeply invaded and destroyed the soft tissues of the left cheek, perforated into the mouth, and extended onto the upper jaw and palate. Death occurred in October 1934, from suffocation, due to extension of the growth into the pharynx (Figs. 13, 14, 15).

**Comment:** This is a clear-cut case in which spindle-cell carcinoma developed under observation. Repeated applications of lightly filtered
x-radiation, and carbon dioxide snow eighteen years before, were followed by atrophic changes in the skin. Squamous carcinoma first developed, and in the additional scar following treatment of this lesion by cautery and radium, spindle-cell carcinoma developed, recurred repeatedly, and eventually caused death by invasion of the pharynx and suffocation.

**CASE 3:** John S., aged forty-nine, was admitted to the clinic at Memorial Hospital in July 1930, complaining of an ulcerated lesion of the lip. There was no very definite history of chronic irritation, except that the patient stated that he had a nervous habit of biting the lip. About three months before admission, he had noticed on the left lower lip a small "sore" which had slowly and painlessly increased in size.

**Examination** revealed a deeply infiltrating, indurated, and partly ulcerated lesion of the vermilion border of the lower lip. It was about 2 cm. in diameter, and it infiltrated the substance of the lip to a depth of about 1 centimeter. There was no adenopathy. A biopsy was reported as "hornifying epithelial papilloma, deep cells somewhat atypical, but there are no definite signs of invasion."

**Treatment and Clinical Course:** Despite the histological report of a benign process, the lesion was treated as if it were fully developed cancer, by contact application of filtered radon tubes in a mould of dental modeling compound. The clinical response was entirely satisfactory. The lesion regressed and the lip healed. The patient was followed at regular intervals without any sign of recurrence for about three years, or until May 1933. At that time he returned for observation after a two months' interval, stating that an ulcer had appeared on the lip and another on the skin of the left temple one month previously.

Examination revealed an indurated, ulcerated lesion of about 1 cm. in diameter on the inner aspect of the vermilion border of the lower lip, in the midline. This lesion was quite separate from the former growth on the lip, but lay within the zone of the therapeutic irradiation by the radon tubes applied three years previously. The lesion on the skin of the left temple had the appearance of a superficial basal-cell carcinoma of about 1.5 cm. in diameter. In the posterior triangle of the left neck, just above the clavicle, was a group of enlarged, hard nodes, six to eight in number, varying from 1 to 4 cm. in diameter.

The following laboratory and clinical findings were obtained during the next two weeks: A biopsy from the lip was reported as "spindle-cell carcinoma." A biopsy from the ulcer of the left temple was reported as "atypical squamous carcinoma, suggesting origin from skin and sebaceous gland ducts, Grade I." A biopsy from a node of the left neck was reported as "carcinoma, Grade IV," and the pathologist (F. W. S.) added: "I have never seen any such tumor arising from the lip, and believe it to be a third primary, possibly lung, possibly thymic."

The presence of a mediastinal tumor was suggested by symptoms and physical signs, such as cyanosis and congestion of the face, dilatation of the superficial veins of the chest wall and neck, orthopnea, edema of the hands, feet and ankles, and percussion and auscultation of the chest. A roentgenographic report was as follows: "Film of the chest reveals a large rectangular shadow, 12 cm. in width, and a large area of infiltration extending out to occupy most of the right upper lobe. The right interlobar septum is thickened. The mediastinal shadow has a perpendicular margin suggestive of thymic involvement. The right costophrenic sinus is partially obliterated by an an adhesion."

Although the general condition was failing, palliative radiation was begun to the lip, temple, and mediastinum. The patient was not able to travel back and forth from his home to the hospital, as an out-patient, and was lost track of within a few days. About six weeks later we were advised that he was dead.

**Comment:** This patient was treated and subsequently observed at regular intervals for three years. There is entirely adequate evidence of the development of spindle-cell carcinoma three years following the application of radium to the lip for papilloma. The second tumor began.
in the edge of the irradiated area of the lip. The exact nature of the mediastinal tumor was not satisfactorily settled.

**Case 4: Mary G., aged thirty, was admitted in July 1931.** At the age of about eighteen years, an abnormally heavy growth of hair had appeared on the skin of the cheeks, lip, and chin, which she considered aesthetically objectionable. Nine years before admission, a "beauty doctor" whom she consulted advised x-ray therapy, and administered sixteen treatments over a period of several months. The growth of hair was effectively removed for a time, but later returned in part. After a period of about four years, the skin of the lower half of the face gradually underwent pigmentation, fibrosis, thickening, and telangiectasis. Two months before admission (nine years after the x-ray treatment), a small non-ulcerated, rounded mass appeared in the skin of the left side of the chin. Believing it to be a pimple, the patient squeezed it and applied hot packs on several occasions, but it increased in size quite rapidly and finally ulcerated over a small area on the surface.

**Examination** revealed a moderate degree of atrophy and fibrosis with pigmentation and telangiectasis over the skin of the cheeks, lip, chin, and upper neck. In the skin of the left side of the front of the chin, there was an infiltrating, indurated mass about 2.5 centimeters in diameter, raised about 1 cm. above the skin level. Over its tip was a crusted, ulcerated area about 3 to 4 mm. in diameter. The tumor was easily movable over the underlying bone. The biopsy report was: "A very peculiar diffuse spindle-cell epidermoid carcinoma, simulating sarcoma. Tumor will be highly radioresistant."

**Treatment and Clinical Course:** Surgical excision rather than irradiation was advised on account of the histological and anatomical character of the growth, the marked radiation changes in the surrounding skin, the known comparative radioresistance of such tumors, and the desire for the best possible cosmetic result.

In August 1931, the tumor was widely and deeply excised, and the resultant defect closed by a plastic flap brought up from the submental region. Healing occurred by primary union, and the patient has been followed at regular intervals up to the time of this writing. No recurrence has developed, but the late radiation changes in the skin of the rest of the face have been slowly progressive.

**Comment:** This case of spindle-cell carcinoma is typical of those arising eight to ten years after the repeated application of low voltage x-radiation for hypertrichosis.

**Case 5: James F., aged forty-four, was admitted to the clinic at Memorial Hospital in October 1931.** In 1918, while serving in the Army in France, he was struck on the face by a falling timber as he was entering a burning building. The lip was moderately bruised and bled slightly from a contused and abraded wound. A few days later, the patient thought he removed a sliver of wood from the wound. Soon after healing of the injury, he noticed a firm nodule in the scar. This increased very slowly in size for the next ten years and had reached the size of a pea by 1929, when a doctor was consulted and made a diagnosis of fibroma. During the next two years, the nodule enlarged more rapidly, to the size of a lima bean, and became quite painful and tender. In 1931 it was excised surgically and the patient was told that the microscopic diagnosis was "fibroma." The wound did not heal following this operation, and the growth rapidly extended into the cheek and lower lip. The patient was then referred to Memorial Hospital by the Veterans Bureau.

**Examination** on admission revealed a retracted, ulcerated lesion of the vermilion border of the right lower lip, with surrounding and underlying indurated infiltration, extending from the midline of the lower lip across into the right cheek, beyond the commissure. The horizontal diameter of the tumor was about 6 cm., and the downward extension into the lip was about 2.5 cm. The disease seemed to infiltrate the entire thickness of the lip and cheek over this area, and could be palpated immediately under both the skin on the outer surface and the mucous membrane on the inner surface. Except for the partly ulcerated, scarred, and retracted portion about 2 cm. in diameter near the right commissure, the lesion was not ulcerated, and had caused little or no alteration in the contour of the lower lip or cheek, and it did not have the usual appear-
ance of carcinoma of the lip. There was no cervical adenopathy. A biopsy from the lip was reported as "neurogenic sarcoma, Grade I." (This was later revised to spindle-cell carcinoma.) (Fig. 16.)

Treatment and Clinical Course: Wide surgical excision and plastic repair rather than irradiation were decided upon, chiefly because of the bulk of the tumor and the probable comparative radioresistance of the growth. On October 26, 1931, under conduction anesthesia, the right two-thirds of the lower lip and the invaded portion of the cheek were excised and the defect closed by mobilizing lateral cheek flaps, and by bringing down an Estlander's triangle from the right upper lip. The wound healed by primary intention. The histological report of the tissue removed at this operation was "spindle-cell epidermoid carcinoma."

Two months later, in December 1931, a node 1.5 cm. in diameter was found in the right submaxillary region, the patient was again admitted, and on Dec. 5 a right submaxillary dissection was performed under local anesthesia, with healing of the wound by primary intention. Histologic examination of the nodes removed at this operation showed invasion by the same type of growth as was found in the lip. Because of the extremely malignant character of the tumor, this operation was followed by x-radiation to both sides of the neck—2000 r to each side in doses of 400 r per day to alternate sides—portal 8 cm. in diameter.

The patient was then followed at regular intervals for about one year without any sign of recurrence. In January 1933, a small, deeply situated nodule, 3 to 4 mm. in diameter, was observed in the line of the healed scar in the right lower lip. This nodule was firmly attached to the underlying mandible. A month later, in February 1933, this nodule had grown larger and the patient complained of a persistent cough. Roentgen examination of the chest showed a rounded, metastatic nodule, measuring 3 cm. in diameter, opposite the level of the sixth rib on the right posteriorly.

From this time on, the disease steadily progressed in the region of the old operative scar in the right lower lip and cheek, eventually producing a very hard infiltration over an area 6 cm. in diameter, without surface ulceration, but with a destruction of the cortex and invasion into the mandible. Cough and pain in the chest increased, and in March 1933 an x-ray examination revealed an increase in the size of the pulmonary metastasis. In June, the metastatic mass in the right chest extended to the periphery of the lungs and perforated the chest wall, appearing as a mound-like, subcutaneous swelling, 6 cm. in diameter, on the right posterior chest wall, medial to the scapula at about the level of the sixth dorsal vertebra.

![Fig. 16. Case 5: Spindle-cell Carcinoma of Right Lower Lip Arising in a Wound Scar, Before and After Operation](image-url)
Palliative x-radiation was given to the chest at intervals throughout the summer of 1933; the general condition progressively failed, and the patient died at the Veterans Facility Hospital No. 81, in October 1933. We are indebted to the officers of that institution for a report of the autopsy findings, which are summarized as follows: "Recurrent carcinoma was present at the site of operation. A large metastatic nodule was present in the right upper lobe of the lung. There were several smaller metastases scattered throughout the remaining portions of both lungs. Metastases were also found in the left ventricular myocardium, liver, and right kidney. A paravertebral metastasis measuring $5 \times 7$ cm. involved the origin of the 8th, 9th, and 10th ribs, invaded the spinal cord, and pressed upon dura and cord."

**Comment:** This is the only case in our series in which the antecedent trauma was due to a wound. There is a definite history of a contused wound, possibly complicated by a foreign body, eleven years previously.

---

**Fig. 17. Case 6: A. Spindle-cell Carcinoma of Lip Arising in Skin Scarred by Repeated X-ray Treatments for Sycosis Barbae. B. Second, Apparently Independent Spindle-cell Carcinoma Arising at a Distance from the Original Growth**

**Case 6:** Harry H., aged fifty-six, was admitted in April 1932. About 1912 (twenty years before), he had suffered from "barbers' itch," for which he was given numerous x-ray treatments in several clinics and by several private physicians. These treatments relieved the skin infection, but there gradually developed the typical radiation atrophy and telangiectasis of the skin of the cheeks and chin.

In 1925 a small, rounded, non-ulcerated nodule appeared in the skin of the right upper lip. This lesion was treated by an electric needle and healed in a few weeks. There was no further difficulty for seven years (1932), when about six weeks before admission, a raised, ulcerated lesion appeared on the skin of the right upper lip at the site of the former tumor (Fig. 17).

**Examination** on admission revealed a smoothly granular, indurated, raised, ulcerated lesion about 1 cm. in diameter in the skin of the right upper lip, just above the labial commissure. There were no palpable cervical adenopathies. The skin and subcutaneous tissues of the lower cheeks, lips, and chin showed a marked degree of fibrosis and telangiectasis with moderate induration and scarring, which were typical of the late atrophic changes due to repeated x-radiation. The fibrosis and induration of the subcutaneous tissues were especially marked in the lips. A biopsy from the lip was reported as "spindle-cell epidermoid carcinoma."

**Treatment and Clinical Course:** Radon gold seeds were implanted in the lesion of the upper lip in April 1932. The subsequent radiation reaction was of the expected intensity, but was not followed by regression of the tumor, which remained about the
same size. Six weeks later the patient was admitted, and the lesion, including a margin of apparently uninvolved tissue, was excised by the actual cautery. The resultant ulcer healed by granulation in about six weeks, by which time a nodule was observed in the skin of the midline of the upper lip, quite separate from the first lesion. By September 1932, this had grown to almost 1 cm. in diameter without ulceration, and a biopsy again showed "spindle-cell carcinoma."

This lesion was excised by endothermy, and the wound left wide open. Healing took place in about six weeks, and the patient remained apparently free of disease until January 1933, when a suspicious nodular mass appeared between the two scars of the cautery removals. A biopsy specimen removed at this time was reported as negative. Following this the patient was confined at his home until April 1933, due to an intercurrent illness. He returned to the clinic in April 1933, at which time the suspected recurrence observed four months previously had increased to about 1.5 cm. in diameter. The growth had infiltrated to a depth of about 5 to 6 mm. in the old scar and was ulcerated over about one-half its surface.

In May 1933, a third local removal was performed by actual cautery, and healing took place after about six weeks, with an increase in the scarring of the lip. No recurrence was noted for three months. Then, in September 1933, there seemed to be a diffuse thickening and induration, without ulceration, of the entire right upper lip, over an area 2.5 cm. in diameter. At this time it was proposed to prepare a pedicle tube flap to be followed in two weeks by wide excision of the involved area and closure of the defect by the plastic flap. The patient refused this procedure, but consented to a local excision of the area and the application of a Wolff graft. The latter procedure was carried out successfully in November 1933. After this there was no recurrence for ten months, but in September 1934, a nodular, indurated thickening was again noticed in the center of the scar. A wide removal of the right upper lip with plastic closure was again strongly advised, but the patient refused. Although he was willing to submit to another local removal, he refused to consider anything more radical, and was lost track of in December 1934, with the disease extending diffusely throughout the scar of the right upper lip.

Comment: The history and physical evidences of radiation changes were definite in this case. The repeated recurrences illustrate the difficulty of local eradication. Some of the recurrences may have represented new foci of the disease. This patient has lived longer than any other in our series (four years) with disease and without metastases.

Case 7: Esther S., aged thirty-three, was admitted in August 1932. About eight to nine years before admission, she had several x-ray treatments to the cheeks and chin because of excessive growth of hair. The hypertrichosis was partly relieved, but after a few years the skin of the treated area, particularly of the chin, began to show thickening, pigmentation, and atrophy. Two or three months before admission, and about eight to nine years after the x-ray treatments, a small non-ulcerated mass was noticed in the skin of the left side of the chin. This lesion was first treated by electrodesiccation, which caused it to enlarge rapidly. The patient was then referred to Memorial Hospital.

Examination revealed typical atrophic radiation changes in the skin of the cheeks, chin, and lips. In the skin of the left side of the chin, there was an indurated, excavated, ulcerated lesion with raised, rolled edges, about 1 cm. in diameter. The lesion seemed quite superficial and was movable over the underlying tissues. There was no cervical adenopathy. A biopsy was reported as "spindle-cell epidermoid carcinoma, very radioresistant."

Treatment and Clinical Course: Surgical excision rather than radiation therapy was advised for the same reasons as those given in Case 4, with which this case is almost identical, both in etiology and physical findings. The local lesion was surgically excised by Dr. James Duffy in August 1932, and the wound closed by undermining and drawing
together of the skin edges. Healing was slightly delayed, and occurred in part by sec-
ondary intention.

There was no sign of recurrence until June 1933, when a small, non-ulcerated
odule about 3 to 4 mm. in diameter was observed in the upper angle of the scar. The pa-
tient was readmitted and the lesion again locally excised, and the wound closed by under-
mining and drawing together of the wound edges. The wound healed by primary inten-
tion, and the patient has been followed at regular intervals without recurrence at the time
of the present writing.

Comment: This case is almost an exact duplicate of Case 4. A local
recurrence after surgical excision has been successfully controlled to
date by a second local surgical removal.

Case 8: Thomas McO., aged sixty-four, was admitted in November 1933. Eighteen
months previously he had noticed what he thought was a small "boil" in the skin of the
left shoulder. His family physician referred him to a clinic for x-ray treatment. He
received one or two applications of x-radiation and then discontinued treatment for
over a year. The lesion continued to enlarge, and became ulcerated, and the patient
was referred to Memorial Hospital.

Examination on admission revealed a punched-out, ulcerated, excavated lesion of
the skin of the left upper scapular region. The edges of the ulcer were raised and
rolled, and the entire lesion was about 5 cm. in diameter (Fig. 12). There was no axillary
adenopathy. A biopsy was reported as "ulcerating, atypical spindle-cell carcinoma,
radio-resistant."

Treatment and Clinical Course: In November 1933, the lesion was widely excised
under general anesthesia. The wound was left open to heal by granulation. Healing
took place after about six weeks, and there has been no recurrence to date.

Comment: The laboratory data before admission in this case are not
t entirely complete. It is possible that spindle-cell carcinoma existed
from the beginning.

Results

Of the 8 patients in our series, 4 are dead of the disease. One is
living with disease after three years, and 3 are living and free of dis-
 ease after two, three, and four years, respectively. Two of the latter
cases presented slightly ulcerated, well delimited, non-infiltrating tu-
mors of the skin of the chin, which were freely movable over the under-
lying tissues and bone; the third presented an ulcerated, well delimited
and movable tumor in the skin over the shoulder. The length of life in
the fatal cases was one-half, one and one-half, two, and four years, re-
spectively, or an average of two years. Once the tumor has metasta-
sized, even to the regional lymph nodes, no lasting results have been ob-
tained in any of our cases.

Summary

The histogenesis of spindle-cell carcinoma of the skin is discussed.
Eight cases of this tumor are reported, with a consideration of the
etiology, clinical features, treatment, and end-results.

Bibliography

1. Krompecher, E.: Der drüsenaartige Oberflächenepithelialkrebs. Carcinoma epitheliale
adenoides, Beitr. z. path. Anat. u. z. allg. Path. 28: 1, 1900.


