

The character of the material formed in the trachea and bronchi was not that usually seen in diphtheria of the respiratory tract, which gives a soft, dirty, greyish membrane. In this case, the material was granular, hard, dry, and gummy, somewhat similar to the cereal, grape-nuts. The color varied from dark red to a dirty brown. The casts were cylindrical and solid. The length varied from small fragments up to 2.5 cm. for the bronchial casts, and 4.75 cm. for the tracheal casts. The diameter of the bronchial casts was about 0.5 cm., average and for the tracheal casts 0.75 cm. tapering down toward the bifurcation to 0.2 cm.

Only a limited autopsy, through the tracheotomy wound, was allowed; so the lower portions of the primary bronchi and the lungs could not be examined. Dr. S. B. Wolbach, the pathologist, reports as follows: *Organs of neck.* Oesophagus is normal. On the ventricular and vocal folds of the larynx are small, grayish, papillomatous growths, the largest about 0.6. in length, being attached to the vocal folds. Attached to the mucosa, just above the slit in the trachea, is a fibrinous membrane about 2 by 0.5 cm. and about 2 m.m. thick. Below the opening, and in the primary bronchi, along with an injected mucosa, are similar bits of membrane, markedly adherent, which when torn away leave a bright red surface. Smears from these show Klebs-Loeffler bacilli. Culture also shows "B. Diphtheriae."

The specimen is now on exhibition in the Warren Museum at the Harvard Medical School.

SQUAMOUS CELL CARCINOMA OF THE ANTRUM. REPORT OF A CASE, TREATED WITH RADIUM ALONE, THAT IS FREE FROM RECURRENCE TWENTY-TWO MONTHS AFTER THE LAST APPLICATION.

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THE average patient with a carcinoma in his antrum has had little to choose in the past but the manner of his dying. Without the interference of the surgeon, his destruction was sure within the following twelve months. Plain surgery offered only a mutilating operation complete occupational disability for life, and the pushing back of death but a few months more, in the overwhelming majority of cases. With the coming of radium, the possibilities of a cure in the early cases have become something more than a useless hope.

Asepsis and operative methods taking less time and eliminating hemorrhage have reduced

the mortality following the initial procedure, from 15% to 30% as it used to occur in the European clinics to practically nihil as reported in the latest series of cases.

Davis¹ of the Charing Cross Hospital of London, has reported the results in thirty-nine cases of malignant disease of the antrum. Of these thirty-nine cases I am concerned only with the nineteen cases of squamous cell carcinoma: a ratio of occurrence to other types that is a true one.

The operative procedure was the removal of the jaw and the adjacent tissues by the Ferguson method. This consisted of running a M-shaped incision, starting at the base of the zygoma and proceeding along the inferior rim of the orbit to the base of the nose, thence downward to the naso-labial fold, around to the middle of the lip and down to the mouth. The soft parts of the cheek were turned back, exposing the bony structures to be removed. With saw and chisel, the junctions of the maxilla were freed from their attachments to the nose, the orbit and the mouth, and when successfully done the entire structure may be removed *en masse*. Considering the extensive removal, the wounds healed rapidly in a few weeks and in his series there were no deaths from the operation.

Five of the nineteen cases of squamous cell carcinoma were considered inoperable from the start because of the extent of the cancerous process. In these cases the tissues of the cheek were infiltrated, the orbit was invaded, and the upper deep cervical glands were greatly enlarged. These five patients died in an average of three months after their first visit, and six months from the apparent onset of their symptoms.

Of the remaining cases subjected to operation that could be traced, the cancer returned in six within the following year. Only three out of the initial nineteen were free from recurrence for periods of twelve months to two and a half years.

According to New,² the Mayo Clinic has abandoned the removal of the upper jaw in favor of a method combining the actual cautery and radium. He reports a series of thirty-three cases, covering a period of three years.

Out of the thirty-three cases coming for help, nothing was done in nearly 50% because of the extent of the process. Nineteen out of the thirty-three were squamous cell carcinoma and eleven of the inoperable cases were numbered among this group. Of the total number, twenty-one were males and twelve females.

A deep anesthesia was induced with ether; the mouth clamped open with a gag; and the soft tissues of the tongue and cheek protected from the heat of the cautery by a water-cooled retractor.

The cautery found most practical is a soldering iron heated to a dull red. The idea is to carry the iron gradually into the affected antrum and to cook the diseased tissue thoroughly for a half to three-quarters of an hour. No attempt is made to hasten the operation. As the patient comes out of the anesthetic the iron is withdrawn and a deeper narcosis is induced. By this method no bleeding occurs, which greatly facilitates the inspection of the field of operation for the limitations of the growth, a thing that is impossible to do well under the operative method.

The point of entrance into the growth is either through the palate, if the tumor points there, or if there is little bulging, it is made through the alveolar process above the tooth line. If the growth is very extensive, a large part of the palate and the jaw is removed with the cautery.

Radium is applied either at the time of the operation or within the next two weeks. One hundred to 200 milligrams of radium element are used and left in place from twelve to twenty-four hours. Applicators in the form of needles are inserted in the inside wall of the antrum. The same dose of radium may be repeated three weeks after the first application.

The inside of the antrum comes away as a sequestrum in about two months' time after the cautery is used. In this series of cases there was no operative mortality and no post-operative chest complications. In two cases in which the floor of the antrum was more or less involved, the eye on the affected side was lost from the reaction to the cautery and the radium.

The final result in the eight cases of squamous cell carcinoma subjected to the combined cautery-radium method was as follows:

SEX	AGE	TIME ELAPSED SINCE LAST OPERATION	RESULT
F.	38	15 mos.	no recurrence
M.	56	27 mos.	hopeless recurrence
M.	62	27 mos.	no data
F.	39	12 mos.	dead
M.	47	20 mos.	recurrence
M.	47	12 mos.	dead
M.	39	13 mos.	no recurrence
M.	57	17 mos.	no recurrence

The details of my own case, treated with radium alone, and free from recurrence twenty-two months after the last application, are as follows:

M. C., an optimistic dog fancier of 63, was referred to me by Dr. Richard H. Norton of Boston, an oral surgeon, for treatment of a squamous cell carcinoma of the left antrum. Two years previously, Mr. C. had had trouble with an upper left canine tooth, which was extracted. It was found then that a greater part of the root processes had been absorbed and that a previous dentist had left a pledget of cotton at the end of the root canal. Mr. C.'s

mouth was in very poor condition, with many decaying snags and considerable pyorrhea. The canine socket healed slowly and packing it with iodoform gauze was a part of the dressing procedure. Mr. C. discontinued his visits to the dentist before the healing was complete.

No further trouble was experienced with this area until about eighteen months later. A moderately painful alveolar abscess formed and Mr. C. was compelled again to seek the aid of a dentist. It was discovered shortly that a gauze dressing had been left in place in the socket from the time the patient had suddenly stopped his visits to the previous dentist some eighteen months before. The infected process in the meantime had worked its way through into the antrum. With the removal of the foreign body a temporary period of improvement ensued which was followed by steadily increasing swelling of the antrum, and a moderate amount of obstruction of the nose on the left side and constant discharge from it. The antrum was filled with a soft, pulpy material which, on removal of a portion of it for microscopic examination by Dr. W. H. Watters of the Homeopathic Hospital, proved to be squamous cell carcinoma.

In connection with this coincidence of chronic tooth disease and a following cancer, it is interesting to note that nearly twenty-five years ago Wendell C. Phillips³ recorded in detail sixteen cases, occurring in connection with a tooth or tooth socket which were evidently squamous cell carcinoma which filled the antrum and then burst through the alveolar processes after the extraction of teeth for the relief of pain.

The patient was first seen by me two years after the original tooth trouble and six months after the symptoms referable to the antrum had appeared. At this time the patient showed a badly swollen cheek. The skin was slightly reddened but otherwise unchanged. The mass was large enough to push the nose well over to one side. The shape of the palate was not altered. As has been previously noted, there was obstruction and discharge from the affected nostril. Mr. C. complained principally of the extreme soreness of his teeth on that side of the upper jaw. This was so pronounced that he was unable to hold a pipe between his teeth, a matter of great personal hardship. No glands were palpable.

November 20, 1919.—Under ether anesthesia an incision was made into the antrum through the canine fossa and the radium introduced. This consisted of 50 milligrams of radium element, screened with 0.5 millimetres of silver and 1.0 millimetres of brass. This was localized as nearly as possible in the center of the antrum, which was full of a soft, pulpy tissue that bled freely. It was left in place for twenty-four hours, giving a dosage of 1200 milligram hours.

The immediate effect was excellent. At the end of three weeks a greater portion of the swelling had subsided. The pain and tooth tenderness had gone to such an extent that he was able to smoke a pipe again. The only reaction to the radium up to this time was a redness and a slight tenderness of the hard palate on the treated side and a small radium burn on the tongue. The hair on the cheek and the left half of his moustache was beginning to fall out.

December 23, 1919.—On this date 50 milligrams of radium were introduced again by the same method and with the same screening and dosage. This gave a total of 2400 milligram hours within a closed cavity in less than five weeks' time. At this time exploration of the cavity of the antrum with a dull curette revealed little of the soft tissue that had been present so plentifully before.

Three weeks after the second treatment a period of three months of extreme suffering began. At this time the opening into the antrum enlarged from necrosis and drainage from the antrum was maintained. The cavity was flushed daily with a warm boric acid solution. The few remaining teeth on that side loosened and came out. The hard palate up to the median line and the alveolar processes gradually sloughed away, leaving borders of necrotic tissue flapping in the mouth. Although the necrotic process was continuous there was little odor and nothing of the characteristic fetor of carcinoma. Surgical consultation resulted in the advice to let things alone but in another similar case I should insist on operative removal of the necrotic tissue which could be done with comparative ease.

The constitutional effect upon the man himself was most striking. It is best described as a mental dulling and a complete physical failing. Eating was, of course, most difficult, anyway, and his appetite disappeared completely. He had to be urged to take even eggs and milk. His memory failed and his mind became childish. The pain was so extreme as to demand morphine over a period of several weeks. This pain appeared over different areas on the head, a favorite location being the top of the head. He described the sensations as those of severe burning and swelling as if the top of his head was going to blow off. He would try to allay this with the constant application of ice. He was confined to his bed for the last month of this three months' period. The eye on the involved side was not affected at any time. His weight fell from 180 to 130 pounds. A fatal termination seemed the only possible outcome to family and physician alike. On one Sunday forty-five relatives and friends came in to bid him farewell and he remarked cheerfully, months afterward, "it seemed more like a wake than a visit of comfort to a sick man."

On the following Tuesday morning a very large mass of sequestrum came away and Mr. C. tells that from the moment it was out he began to improve. He got out of bed for the first time for a month, that same day, and his appetite came back immediately. The final result was complete removal of the antrum and its surrounding structures from the mouth to the orbit. The normal tissue healed readily and no further treatment or procedure has been necessary. Within a comparatively few weeks he was back at his work and he felt as vigorous as he had been all his life. His weight returned to 185. His speech is thick and difficult to understand and he has some trouble in eating, but for the present he declines any prosthetic device to help this condition. No recurrence has appeared in the twenty-two months that have elapsed since the second treatment on December 23, 1919.

REFERENCES.

- ¹ Davis: "Malignant Growths of the Upper Jaw and Antrum." *Lancet*, 1920, No. 2, p. 1090.
- ² New: "Treatment of Malignant Tumors of the Antrum." *Jour. A. M. A.*, Vol. lxxiv, p. 1296.
- ³ Phillips: "Primary Epithelioma of the Antrum of Highmore." *Jour. Laryngol., Rhinol., and Otol.*, 1898, Vol. xiii, p. 325.

MONITOR VENTILATION.*

BY WALTER A. GRIFFIN, M.D., SHARON, MASS.

IN monitor ventilation there is nothing new or untried. The principle is at least as old as this continent, for the Indian, in his wigwam, which, as you remember, was built in the shape of a cone with an opening at the apex for the escape of smoke, had a very good example of it. We are also familiar with it in our every day life although we may not have given it particular attention. For example, nearly all railway coaches have windows near the roof, and if they were not so provided traveling would be unendurable at times. Again, those of us who are at all familiar with the country know that old barns were usually built with a cupola as an aid in carrying off the various foul smells arising from the animals. As a means of ventilation, however, for buildings, such as halls, theaters schools and hospitals, there seems to be but little general knowledge of this system, very possibly because there are so few examples of it. In fact, of the numbers of people who have visited the Sharon Sanatorium I have not found anybody, either layman or physician, to whom our monitor system in the children's ward did not seem to be a new thing. It is well worth while, therefore, to consider at this time this new-old method of ventilation.

The object to be sought in any system should be to rival as far as possible the purity of the outside air. Practical hygienists have seemed to give most of their attention to a considera-

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