

could walk as usual, but her legs absolutely refused to go fast, as she expressed it. She has tried several times since, and each time has been unable to run. As early as seven or eight years ago, the patient first noticed an occasional sharp, cutting pain running down the leg. There was no gradual increase in the frequency of these occasional pains, and as they gave little inconvenience, the patient gave them no attention. In July, 1904, she also experienced sudden pain in her right eye with rather marked impairment of vision. The latter continued for about four weeks, and then disappeared. Her other history is rather unimportant, except that she admits illicit intercourse at the age of 19, with the appearance of a red macular rash on her body about four or five months later. It was distributed over the trunk, especially the back, and over the face. She was treated at that time in Vienna, Austria, by mercurial inunction, and discharged in six weeks as cured. There is no history of a sore throat at that time, and she can remember no adenopathy. Her hair has fallen out freely, more when a young girl of about 20. Since the disappearance of her rash, the patient has had unusually good health. She has had no difficulty in urination, except during the last few weeks of her pregnancy, and no difficulty on defecation, though after catharsis perhaps greater difficulty than normal in retaining feces. The diagnosis of locomotor ataxia was made on the basis of the history as cited above, and the physical findings, especially Argyll Robertson pupils, absent knee-jerks, Romberg sign, ataxic gait and positive Wassermann test both of the blood and the spinal fluid.

During the first pregnancy the patient had nausea and vomiting for three or four months, but no gastric crises. She could eat comfortably in the afternoon and evening, but not in the forenoon. In the last pregnancy she probably vomited during four months, but never had any sharp pain above her thighs.

For the pregnancy recently terminated she was unable to supply accurately the date of her last menstrual period, but thought it was May 9 or June 9, 1916, which would have made her due to deliver about February 15 or March 15. She did not know her quickening date. The date of lightening was not determined. She carried her first child nine months, probably. Physical examination led us to believe that she was due to deliver about the first week in March.

March 6, the patient was placed on the table and examined by Drs. Allen and Bashor. The perineum bulged slightly every few minutes. The cervix was soft, and there was approximately $1\frac{1}{2}$ inches dilatation. Effacement was not complete. Sagittal suture was easily palpable, and the head was movable. The fetal heart rate was 146; the quality of the tones was good. The patient was having no pain, but was in labor. She was not disturbed, but allowed to walk.

March 7, the patient was observed to have had irregular uterine contractions all the morning, but no pain, though she said she frequently felt as if the baby were moving.

March 8, the uterine contractions were of much less force. A rectal examination showed no increase in the original amount of dilatation. The head was very movable. The fetal heart tones were of good quality, and the rate was 152. At 11:30 a. m. a medium sized Voorhees' bag was inserted. At 7:30 p. m. the bag was expelled with considerable fluid. At 8 a. m., March 8, a rectal examination showed no further increase in cervical dilatation and no easily palpable uterine contractions. The fetal heart tones were 156. At 3 p. m. 5 grains of quinin were given with no painful effect following, though at 4:30 p. m. dilatation was nearly complete. An attempt was then made to hasten delivery by inserting a De Ribes bag, but it twice expelled itself immediately, that is, would not stay inside the cervix. I accept this fact, aside from palpation and its evidence, as an absolute criterion of practically complete cervical dilatation, yet up to this point there had been absolutely no pain. Five-tenths c.c. of pituitary solution was now given hypodermically at about 6 p. m. After approximately fifteen minutes, pains began, and a 7 pound boy, 24 inches in length, was born spontaneously at 7 p. m. The pains were probably two-thirds as severe as ordinary labor pains. No anesthetic was used. The placenta

delivered spontaneously twenty minutes later. The subsequent pathologic report stated that it was somewhat smaller and denser than normal, but microscopic examination by Drs. Hammack and Bashor found no syphilitic lesions. Mother and child had an uneventful afebrile puerperium. Lactation was somewhat subnormal, but involution seemed normal. The baby was breast fed during the first month, though it had supplemental feeding, and gained during that time 1 pound and 11 ounces. Nursing was then discontinued by the patient because of scanty milk and for economic reasons.

The outstanding features of the case were the spontaneous onset of the indolent labor of probably seventy-two or more hours' duration, the absence of pain until the head was on the perineum, and then less than might be expected, and the promptness and efficacy of the action of pituitary solution.⁵

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MALIGNANT DISEASE OF THE THROAT AND SINUSES

REVIEW OF CASES TREATED BY RADIUM AND
ROENTGEN RAYS*

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At the present time, no single method of treatment is adaptable to all cases of malignant disease. Of the many procedures now employed, surgery has the widest adaptation in cases in which the growth is accessible and can be completely eradicated, with the possible exception of superficial epitheliomas in certain localities. In many instances, the lesions must be attacked by a combination of several of the procedures now at our command. Radium and Roentgen rays, while by no means the only agents that may be employed in cases not suitable for operative procedures, have probably the widest field of application next to surgery. When large surfaces must be exposed, as in the treatment of mammary carcinoma with its many harbors of metastasis, and when intensive deep cross-fire radiation is essential, as in the treatment of mediastinal, abdominal or pelvic tumors, Roentgen therapy is the method of choice between the two agents. When growths originate in cavities such as the mouth, throat and ear, deep cross-firing by Roentgen rays, or possibly by radium, is an essential part of the treatment, but the possibility of adding to the dosage and to the efficiency of the treatment by direct local applications of radium has a distinct advantage.

I have selected as a basis for this report a group of cases peculiarly adapted to combined radium and Roentgen treatment or to radium therapy alone. In each instance the direct application of radium to the

5. In addition to the references already given, the following will be found of interest:

Dufour and Cottenot: Soc. de neurol., Paris, 3, December, 1908, and Bull. Soc. med. d. hôp., Paris, 1909, 11, 211-214.
Medail: Tabes—Grossesse intercurrente, Soc. anat. de Bordeaux, 1885, p. 231.
Heitz: Grossesse et accouchement chez les tabétiques, Gaz. de med. et chir., Bordeaux, July, 1902, 13.
Offergeld: Ovarialkrisen im Verlaufe der Tabes dorsalis, Beitr. z. Geburtsh. u. Gynäk., 1911, 16, 373.
Penkert: Tabes dorsalis im Geschlechtsleben der Frau, Monatschr. f. Geburtsh. u. Gynäk., 1909, 29, 141.
Abadie and Grenier de Cardenal: Accouchements indolores et crises douloureuses de faux accouchement dans le tabes, Province med., 1906, No. 38, p. 446.
Mirabeau: Schwangerschaft und Geburt bei vorgeschrittener Tabes, Zentralbl. f. Gynäk., 1902, No. 5, p. 125.
* Read before the Section on Pharmacology and Therapeutics at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.

primary growth was indicated, although not always followed, and cross-fire radiation by radium or Roentgen rays was employed for the effect on metastases or the primary lesion, or both. Operation was either undesirable, or a complete extirpation of the growth was impossible. In the selection of the two agents employed, we now believe that when cross-firing is desirable or is possible only over a comparatively small and superficial area, rather large amounts of radium with heavy filtration can be used to better advantage than Roentgen rays. When the area is larger and the lesion deeper, Roentgen rays are indicated as the agent of choice.

The outcome in the cases in this group was not successful in every instance, but the failures, of which there were more than are here reported, were of great assistance in the development of a more effectual technic which proved more efficacious in other cases. The clinical diagnosis was, in some instances, not confirmed by a pathologic examination of tissue, as the removal of a section was not always possible or desirable, but the nature of the condition was beyond question to all the consultants concerned.

REPORT OF CASES

CASE 1.—*Sarcoma of the right tonsil with metastasis to cervical lymphatics.*—A man, aged 47, referred by Drs. J. A. Babbitt and J. B. Deaver, had a marked enlargement of the lower part of the tonsil extending into the root of the tongue, with lymphatic enlargement under the ear the size of a small fist. The pathologic diagnosis was that of round-cell sarcoma. The growth was first noticed about six weeks before presentation. Treatment: Radium element, 110 mg., distance filtration, thirty-nine areas one and one-half hours each over face and neck, followed in a few days by 90 mg. in two platinum tubes buried in the growth at two points for twenty-five hours. This was not followed by sloughing. There was an immediate effect on the external growth, and the tonsil became about one-half the original size. At the end of two weeks a 50 mg. tube was buried in the tonsillar mass for twenty-four hours. Later experience with other cases proved that this should have been done at once. By the thirty-ninth day the reaction had subsided and external cross-firing, followed by burying a tube in the tonsillar mass was repeated, but with diminished dosage. At the end of fourteen weeks the tonsillar growth had disappeared and only a small mass the size of a walnut remained back of the angle of the jaw. This was excised by Dr. Deaver, and a 50 mg. tube of radium inserted for twenty-four hours. About two weeks later a very rapid metastasis appeared in the front and base of the neck. Under combined radium and Roentgen applications this disappeared within twenty-four hours. The patient was also exhibiting signs of cerebral metastasis and died two weeks later. There was no recurrence in the neck or tonsil.

Comment.—Later experience demonstrated that: 1. This growth was too long in its disappearance and too much time was allowed for metastasis. 2. The growth should have been attacked more vigorously at the start when it was found not to subside more rapidly. (A tube of radium might have been inserted in the tonsillar mass at once. Only those cases responding promptly are likely to be cured.) 3. When there is decided cervical gland involvement in such cases, more distant metastases are likely to be present and treatment should be directed toward them.

CASE 2.—*Sarcoma of the left tonsil with metastasis to cervical lymphatics.*—In a patient referred by Dr. B. A. Randall, examination revealed a large sloughing mass involving the left tonsil and soft palate and almost closing the fauces, with lymphatic enlargement under the ear. This seemed a hopeless case. The patient was in a very weak condition and hardly able to swallow or speak. The Wassermann test proved negative, and there was no response to treatment with mercury and iodid. Treatment: Radium element, 90 mg., aluminum filter, 2 mm., was applied to twenty-nine areas both sides of

neck, seventy-five minutes each. Immediate improvement was noticed, swallowing was easier and the patient could talk. Dr. Randall feared to adopt my suggestion to bury some radium in the tonsillar mass lest the sloughing already present should be increased. Later experience showed that this would probably not have occurred. In three weeks the tonsillar mass was about one-third smaller and the external glandular mass had nearly disappeared. Although a second series of external applications was made a week later the patient died soon afterward.

Comment.—This case is cited as an example of the effect of cross-fire radium radiation and its value as a part of the technic. Although this case was probably hopeless from the start, a more decided influence on the primary growth could no doubt have been obtained by direct applications in addition.

CASE 3.—*Carcinoma of the left tonsil.*—In a patient referred by Drs. George P. Müller and W. Estell Lee, examination revealed a large sloughing mass in the region of the left tonsil, with no apparent cervical glandular metastasis. Treatment: Radium in platinum capsule was buried twenty-four hours in the growth by Dr. Müller and repeated in three weeks, and again at the end of seven weeks. Four weeks later a short superficial application was made to the only remaining portion of the growth and again about three weeks later. A few days later there was a sudden swelling of the peritonsillar tissues and of the neck, and it was thought that extensive sloughing from too vigorous treatment was the cause. The patient died shortly after this, and necropsy disclosed no evidence of local recurrence. The unfortunate terminal phase of the case was found due to a very rapid and deep extension of the growth into the neck posteriorly.

Comment.—This case, one of our earliest ones, demonstrated the fact that too much attention was paid to the primary growth and too little to possible metastases, which must always be suspected, even though not apparent. We must also recognize the possibility of stimulation of distant parts of the growth beyond the reach of the destructive dosage. Even though this was a case of carcinoma, and not so amenable to treatment as sarcoma, it proved a valuable lesson in the perfection of our technic in connection with subsequent cases of this kind.

CASE 4.—*Sarcoma of left tonsil.*—In a patient on the service of Drs. Charles H. Frazier and George P. Müller, examination revealed a large tonsillar growth extending past the midline. There was no sloughing, but there was probably some cervical glandular metastasis which became visible later. Treatment: Radium element, 50 mg., in platinum tube was buried twenty-four hours in the tonsillar mass by Dr. Müller. This was repeated ten days later and smaller amounts were similarly applied four times during the following three months. When seen at the end of five months, all evidences of the growth had disappeared, but there was still some resistance under and behind the angle of the jaw. Cross-fire radiation was employed over this area and the side of the neck, and repeated seven weeks later as a precautionary measure. The patient is now perfectly well at the end of two years, and during this time has been a useful citizen engaged in the making of heavy guns.

Comment.—This was also one of our early cases, and had the growth been carcinoma instead of sarcoma we probably should not have succeeded. Comparing this with the cases that follow, it will be seen that implantation alone is insufficient for a rapid cure, which is far more safe than the slow reduction of a growth over a period of several weeks or months.

CASE 5.—*Sarcoma of the left tonsil with metastasis to cervical lymphatics.*—A man, aged 74, referred by Drs. R. E. Buckley and John B. Deaver, had a large growth in the left tonsillar region extending to the midline, with no sloughing. There was very evident glandular enlargement in the neck under the ear. Treatment: Radium element, 110 mg., aluminum filter, 2 mm., was used in cross-firing from both sides of the face and neck and a tube of 35 mg. in a platinum capsule was implanted eighteen hours in the tonsillar growth. The patient was sent home and returned for inspection in sixteen days. No evidence of the growth remained. A second series

of cross-fire applications was administered at the end of three weeks and a third at the end of fifteen weeks, although there was no recurrence. A fourth series will be given later.

CASE 6.—Postpharyngeal lymphosarcoma with metastasis to cervical lymphatics.—A man, aged 56, referred by Drs. Howard Whittaker and Francis R. Packard, had a large mass completely occluding the fauces and apparently springing from the pharynx back of and above the left tonsil. It bulged into the mouth, but more into the posterior nares, and pushed the soft palate downward. The eustachian tubes were obstructed, breathing was difficult, and only liquids could be swallowed. Punctures by another physician showed no suppuration. In addition, there was a large glandular swelling below and back of the angle of the jaw about the size of an egg. The Wassermann test was negative. The patient had lost 40 pounds in four weeks. Treatment consisted of external application over the left side of face and neck by 110 mg. of radium element, 2 mm. aluminum filter, thirty-five areas, one hour each; 35 mg. radium in platinum tube was implanted eighteen hours in growth in throat, and cross-firing by Roentgen rays was applied through the right side of the face and neck and the thorax. In less than two weeks all evidences of the growth had disappeared. The external radium and Roentgen applications were repeated a month later, and a third series was administered in another month. At present, three and one-half months after the first treatment, the patient is apparently entirely well and has gained 41 pounds. Another series of applications will be given later.

Comment.—This patient received as vigorous treatment as it is possible to administer. There was no sloughing in the throat, and the skin reactions, while quite marked, were well within the bounds of safety.

CASE 7.—Sarcoma of left turbinates and antrum.—A woman, aged 51, on the service of Dr. Charles H. Frazier, University Hospital, had large turbinates blocking the left side of the nose, with granular surface and not shrinking under cocaine or epinephrin. Roentgenogram showed dense clouding of the left antrum. The pathologic report on section removed was sarcoma. Treatment: Radium element, 75 mg., in two platinum tubes was placed twenty-four hours above and below the lower turbinate. About two months later, 25 mg. were again inserted in two areas twenty-four hours each. The antrum was now open. A month later the antrum still contained sarcomatous tissue, and there were some metastatic enlargements in the neck. Applications were made over these glands, over the antrum and in the antrum, for the last time. Later another series over the cervical enlargements failed to affect them materially, and a block dissection was performed nearly eight months after the first admission. Subsequently a post-operative series of applications was made. The patient was last seen, April 1, 1917, twenty months after beginning treatment, and there has been no recurrence.

Comment.—Experience with this and similar cases has shown that implantation alone is not always sufficient to control such a growth that is not very definitely localized. It is a wise precaution to employ radium or Roentgen-rays over the neck even when the primary growth is in such a locality as in this case.

CASE 8.—Carcinoma of the left auditory canal, with metastasis to cervical lymphatics.—A woman, aged 54, referred by Dr. B. A. Randall to the service of Dr. Charles H. Frazier, had a sloughing red mass projecting from and entirely occluding the external auditory canal. Under the ear there was a metastatic cervical enlargement the size of a walnut. The pathologic report was carcinoma. Treatment: Radium element, 25 mg., in a platinum tube was inserted twenty-five hours into the mass in the auditory canal. The cervical enlargement was treated by cross-fire radium radiation. In five weeks the latter had entirely disappeared, and the canal was open. The same treatment was repeated. Five weeks later, Dr. Randall reported too much granulation tissue in the canal, and a radium tube was again inserted for twenty-eight hours. There was no recurrence in the neck. When last seen, about one year after admission, the canal was clear, though there was still a little discharge, and there was no cervical enlargement.

CONCLUSIONS

1. In the treatment of inoperable malignant growths originating in cavities such as the mouth, throat and ear, radium therapy is an extremely valuable adjunct for the reason that it can usually be applied directly to the growth, which is more or less inaccessible to direct Roentgen-ray exposure. This alone is not sufficient, and the growth should also be attacked from every possible direction by cross-firing either by radium or by Roentgen rays or both. Any nearby area in which metastasis is likely to occur should also be exposed.

2. When implanted directly into sarcomatous tissue, radium usually causes little or no sloughing if the growth responds promptly.

3. It is advisable to produce as rapid subsidence of the growth as possible in order to minimize the possibility of metastasis during the period of treatment.

4. Our experience has seemed to prove that growths insufficiently treated at the periphery may be stimulated to more rapid proliferation at this portion.

5. Sarcomatous growths, especially in the tonsillar region, are more amenable to treatment than carcinomas.

6. It would be best to continue treatment for some time after the apparent complete disappearance of the growth.

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THE TRUTH ABOUT RADIOACTIVE THERAPY IN MALIGNANT GROWTHS*

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Ever since the days of the ancients the medical mind has been interested in the subject of the possible cure of cancer, and each generation has had its hopes raised on high, only to see them dashed again to earth. Of all the methods for cure that have been offered, the only one that has endured to the present day is that of radical surgical removal, recommended by Hippocrates, and adapted and perfected into its modern form by the persistence of the surgeon himself aided by the researches of a Vesalius, a Pasteur and a Lister. And yet, after centuries of effort by the most brilliant surgical minds of succeeding generations, the results are far from perfect, and even the surgeon admits that, if further improvement is to follow, it must result from work along educational lines leading to earlier access to the patient, with all that this implies diagnostically.

The surgeon has for centuries past found himself in the pleasant position of being the arbiter of the destinies of all new suggestions for cure. He has weighed and balanced them with what he could accomplish himself and has always been able justly to discard the proposed method in favor of his own. With the advent of the radioactive methods some twenty years ago (Roentgen ray, 1895, and radium, 1905), it was natural that enthusiastic advocates of these methods should claim more for them than they

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