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THE CANADIAN PRACTITIONER AND REVIEW

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Personal Experiences With Radium



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Reprinted from
THE CANADIAN PRACTITIONER AND REVIEW
 September, 1914.

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PERSONAL EXPERIENCES WITH RADIUM*

BY DR. W. H. B. AIKINS, TORONTO.

When asked by the Committee on Papers to present something on radium before this meeting of the Canadian Medical Association, I was at first at a loss to know just what aspect of the subject to approach. Radium therapeutics have been very much to the front during the last few years, and the papers in the various medical journals have been numerous. I have thought, however, that I could not do better than collaborate my results as I have experienced them during the five years that I have used this substance therapeutically, and therefrom draw conclusions which indicate just what role radium is playing as a therapeutic agent in modern medicine.

May I briefly recall to your mind that it is only a few years since this element was isolated by Prof. and Mme. Curie in Paris; that its action on the tissues of the body was not noted until 1901, some time after its discovery, and that it was only in 1905 that the first systematic attempt was made to study its action by the founding of the Paris Radium Institute under the charge of the late Dr. Louis Wickham.

It was in Paris that I first had the opportunity to see the results of the use of radium, and I saw them for three years in succession before I was tempted to invest in a small quantity of the precious metal. With this small plaque I had such remarkable success in the treatment of rodent ulcer in patients, which several of my colleagues were good enough to send me, that to my mind at least radium as a therapeutic agent had come to stay. Gradually further quantities have been added to the armamentarium, so that lesions can now be treated which at first were quite out of the question.

Altogether I have to date (June, 1914) records of 387 cases treated with radium. I am free to confess that the results in all these cases were not what was hoped for. There are certain types of malignant growths, which I would hesitate to take and do refuse now, over and over again, for which at first I tried to do something. On the other hand, there have been results which have surprised me, and improvement has sometimes been noted when none was expected. The point comes in here as to whether

* Read at the meeting of the Canadian Medical Association, St. John, N.B., July, 1914.

one is justified in taking cases for treatment where cure cannot be looked for. I think so, providing a proper selection is made. One naturally does not care to treat moribund cases, as certain colleagues have occasionally asked me to do. On the other hand, radium as a palliative measure very often relieves pain, controls hæmorrhage, lessens offensive discharge and undoubtedly prolongs life. Surely the physician's duty in such a case is plain. It is not our province to hold up our hands and say, "Go home and die," if we know we can be of some, even temporary, service. If radium is capable of affording even such temporary relief in inoperable cases in which formerly nothing whatever could be done to mitigate the sufferings of the patient, it represents an adjunct to palliative treatment which must be regarded as of inestimable benefit.

Of the 387 cases, 271 are cases of malignant disease, while the remainder comprised benign growths, such as papillomata, angiomata, naevi, port-wine stains, cheloid, together with various other dermatological lesions such as eczema, psoriasis, tuberculides, lupus, etc. These figures will serve to clear up an erroneous idea which is widely prevalent both among the profession and the laity that cancer is the only condition for which radium is used. On the contrary, there are many varieties of pathological conditions which respond well to radium treatment. Of the 271 cases of malignant disease 116 are of rodent ulcers, 27 are true cutaneous squamous-celled epitheliomata; 27 carcinoma of the breast, 22 of the uterus, 14 of the lip, 5 of the tongue. There are 20 cases of sarcoma and of endotheliomata.

DERMATOLOGY.

I do not wish in this paper to dwell at any great length on the great field of usefulness that radium has in dermatological practice. On papillomata it acts as a charm. Port-wine stains and angiomata are removed. I have had 17 of the former and 9 of the latter. On lupus, while not a specific, it produces very good results. Cheloid is influenced in a specific fashion. Eczema and psoriasis also are greatly benefited. Radium is so useful in this department of medical science alone that, leaving out of consideration its influence on malignant growths, it is a powerful adjunct to the armamentarium of anyone undertaking to treat skin lesions.

GOTTRE.

Dr. Robert Abbe, of New York, was the first to use radium for this condition, when in 1905 he treated a case of exophthal-

mic goitre by inserting radium tubes through an incision into the gland. In eight weeks the goitre had considerably diminished. The nervous symptoms disappeared, and the patient has remained well since.

I have used radium in sixteen cases of goitre. Ten of these showed evidences of hyperthyroidism, while six were of the simpler variety. Of the ten exophthalmic cases, in seven the improvement has been gratifying. The nervous symptoms disappeared, and the enlarged thyroids have decreased to a remarkable extent.

In one case, which I should like especially to refer to, the circumference of the neck was reduced from 16 $\frac{1}{2}$ to 12 $\frac{1}{2}$ inches by radium treatment of five months' duration, carried out between November and April.

In another case enlargement of the thyroid had been present for some years, involving especially the middle and right lobes, the circumference of the neck being 15 inches. It had lately been producing constitutional symptoms. In a comparatively short treatment of 100 m. g. hours of radium the goitre decreased so that the circumference of the neck was only 13 inches, and the nervous symptoms quite cleared up.

In two of my ten cases of exophthalmic goitre the improvement, though considerable, was not complete, and in one no improvement resulted.

Of six cases of simple goitre, in four considerable reduction occurred in the size of the gland, the neck decreasing in circumference from three-quarters to one and a half inches, with almost complete disappearance of the enlargement. In one case though there was a reduction of one inch in the circumference of the neck, a large mass remained present, and in one other, which was reduced three-quarters of an inch, the bulk of the goitre still remained. This particular one had been present for ten years. A great deal of fibrosis had evidently taken place, and, therefore, resolution could not so readily occur.

RODENT ULCER.

It is now, I believe, universally recognized that radium treatment is the best means of attacking this condition. The only cases which may not respond so readily are those which may have extended down to the cartilage or bone, or where the area of ulceration is so large that satisfactory epithelialization cannot occur. Even in these cases, however, the progress of the disease is arrested. The ordinary type of rodent ulcer responds almost as to a charm, and in about six or eight weeks after treatment a

smooth, non-depressed cicatrix is left, in many cases not to be distinguished from the normal skin. These cases have remained without recurrence ever since they were treated, which in my personal experience is a matter of five years. And cases treated in the Paris Laboratory about nine years ago, at the time when radium was first introduced into therapeutics, still remain without recurrence.

EPITHELIOMA OF THE SKIN.

Twenty-seven cases of cutaneous epithelioma have been under my observation. When confined to the skin, these lesions, in my experience, respond as well as do the rodent ulcers. If, however, the condition has been allowed to progress so as to involve the underlying muscle or bone, the results are not so satisfactory. Particularly has this been found to be the case where the X-ray has been previously employed. The vitality of the tissue seems to be impaired to such an extent that cicatrization does not occur, and although the progress of the disease can be arrested, complete healing does not take place. On the other hand, if such cases of cutaneous epitheliomata come under treatment before the process has extended so deeply, no type of lesion gives more satisfactory results, as shown in the following cases, which may be taken as representative of this class of lesion:

I. A patient, *æt.* 77, referred by Dr. Charles Foster in February, 1913. About three years before an ulcer had appeared below the right ear. It increased in size slowly, and when the patient was first seen it was $1\frac{1}{2} \times \frac{3}{4}$ inches in area. The edges were hard, thickened and everted. The lower edge of the auricle was also involved. After three heavy exposures to radium healing gradually took place and was completed in about two months.

II. A patient with a similar condition, referred by Dr. H. L. Anderson, Niagara-on-the-Lake. There was a large fungating epithelioma in the post-auricular region, which disappeared under appropriate treatment by radium, the patient still remaining cured at the present time, three years later.

III. A lady, 67 years of age, referred to me on January 3rd of this year by Dr. D. King Smith, of Toronto. She had an epithelioma on the left cheek, roughly triangular in shape, base uppermost, about $1\frac{1}{2} \times 1$ inch in extent. The edges were hard and everted. Under novocaine the edges were curetted and radium was then applied. She went home and I heard from her from time to time. There was quite a severe radium reaction, as was to be expected after the heavy radium dosage she had had,

but on March 6th, when she came to the city again, there was absolutely no sign of the growth, the skin being smooth and soft over the site of the former lesion.

In several cases radium has been used as a prophylactic against recurrence after excision for cutaneous carcinoma. I have no doubts as to the wisdom of this proceeding. So often cases have been met with where recurrence has followed surgical removal, that it seems to me justice is not being done to the patient if post-operative radiation is not advised. Thickenings that occur in such scars can be made to absolutely disappear, leaving a smooth, supple cicatrix.

EPITHELIOMA OF SPECIAL PARTS.

Epithelioma of the Eyelids.—I have found radium to be most useful in controlling malignant disease in this situation, where operative procedure must of necessity produce considerable deformity. Rodent ulcer, when it affects the eyelids, is also amenable; the apparatus can be readily applied, practically no inconvenience is caused to the patient, and within five or six weeks the healing process is completed.

Epithelioma of the Nasal Mucous Membrane.—This is not a very common condition, and my experience has been limited to one case, the result in which was so satisfactory that it is worth recording.

The lady was referred to me over two years ago by Dr. J. Price-Brown. There had been a growth in the right nostril, which had been excised, and on examination proved to be an epithelioma. Recurrence was almost immediate. The cautery was used on several occasions, but the growth always recurred. I used radium in very heavy dosage and the growth disappeared and has given no trouble since.

Epithelioma of the Lip.—My experience in this condition has been much more favorable than that which is reported by certain other authorities. When the malignant process involves the underlying tissues or has extended on to the mucous membrane of the mouth, I would hesitate to treat by radium alone. There are, however, certain early conditions where the lesion is confined to the superficial tissue at the muco-cutaneous margin, in which radium exerts, in my experience, quite as favorable an action as it does on such lesions of the skin. Out of six such cases all have responded favorably. One of these, a patient referred by Dr. A. R. Gordon, of Toronto, presented a recurrence extending for fully an inch along the margin of the lower lip. There had been an excision of the lip towards the inner

angle two years before. It was a question of the removal of the whole lip or the use of radium. The latter was used at the suggestion of Dr. F. N. G. Starr, with a result that was most gratifying. After a fairly severe reaction, which made the condition appear considerably worse than it was in the first place, complete healing occurred, and to-day the lip is perfectly normal in every respect.

Epithelioma of the Auricle.—Most authorities on radium speak of the difficulties in obtaining a satisfactory result where cartilaginous tissues are involved. With this statement I would in general agree, and yet I have seen cases where most excellent results were obtained in spite of the fact that the process had extended to cartilage. These were cases which involved the auricle, secondary to the skin over the post-auricular region.

An example of this condition may be given by the case of a man, a farmer, *et.* 63, referred by Dr. C. D. Hewitt, of Sintaluta, Sask., last August, when I was on vacation, and treated by Dr. F. C. Harrison.

The condition had begun about two years before, and the ulceration had steadily progressed until at the time of examination the whole of the posterior surface of the auricle was involved down to the cartilage, and there was a perforation through the lobule, with a cauliflower-like growth on the anterior aspect of the auricle. He was treated by very heavy dosage, as he lived at such a distance that he could not report very conveniently for further treatment if required. The condition was slow to heal, but gradually resolution took place, and he writes me now that the ulceration is quite gone, but that naturally the ear is somewhat misshapen owing to the contraction of the scar.

CARCINOMA OF THE BREAST.

Twenty-seven cases of this condition have come under my observation. Surgical measures had been used in all cases, with the exception of one of Paget's disease of the nipple, in which the patient refused operation. In 18 cases there was inoperable recurrence following operation; in 8 cases radium was used as a prophylactic immediately following operation. In none of these latter cases has there been recurrence. Of the 18 inoperable cases, 9 have since died, 3 from other causes, and 6 from the malignant condition. It may be said that in none of these cases was a curative result looked for. The treatment was palliative, and as such was a success. In the other 9 cases, however, the results have exceeded all expectations and the recurrences present have remained quiescent and in some retrogressed. Par-

ticular success was obtained in one case where there were two large masses adherent to the sternum. By inserting a radium tube through an incision into the masses, and allowing it to remain long enough to produce quite severe symptomatic reaction, very great improvement resulted. There was considerable necrosis of the tissues followed by a discharge. The size of the tumor mass decreased, the sinus has cleared up, and altogether the result is very satisfactory. She has remained under observation for over a year and has decidedly improved.

Another case somewhat of this type was seen in April of this year, referred by Dr. H. L. Anderson, Niagara-on-the-Lake. The growth had been allowed to progress until it was quite inoperable, and there was a large mass in the outer and upper quadrant of the breast. In consultation Dr. F. N. G. Starr decided that operation was not feasible, but it was decided to bury a radium tube in the mass. This was done and quite a severe reaction set up, the temperature running up to 104° , the pulse, however, keeping below 100.

There was quite a free discharge from the wound and a considerable decrease in the size of the mass. Pain, which had also been present, was relieved.

GYNAECOLOGY.

The use of radium in certain gynaecological conditions has in many cases given very satisfactory results. This is a field for radium therapy on which I would like to lay special emphasis, for the method of treatment is so comparatively simple and the results, as I have said, so encouraging, that one may be pardoned for being enthusiastic over the procedure. In this connection I would particularly like to direct your attention to a highly scientific paper entitled "Cancer of the Uterus and Radium—Clinical and Histological Conditions," by Drs. P. Degrais and Bellot, of Paris, published in the *CANADIAN PRACTITIONER AND REVIEW*, June, 1914, and also another published in the *Canada Lancet*, June, 1914, by myself on "The Value of Radium in Malignant Gynaecological Conditions."

SARCOMA.

I have treated 20 cases of sarcoma with radium. In all cases the treatment was either used as a palliative in inoperable cases or combined with operative procedures. Some of the cases were from the first recognized to be absolutely hopeless, and radium treatment was undertaken only at the request of the attending physician and the friends of the patient. Six of these cases

I regard as cures. In all of them there had been recurrence following operation. Under the use of radium the condition subsided and the patients are now well and in good health.

Case I. Was an infant referred by Dr. Wallace Scott, Toronto. A spindle-celled sarcoma had developed at the side of the anus. The mass had twice been removed surgically, but immediately recurred. Radium was then applied, complete healing resulted, and only normal scar tissue remained. That is nearly four years ago, and there has since been no sign of recurrence.

Case II. A patient referred by Dr. Faeder, of Dickinson's Landing, Ont. A small round-celled sarcoma developed in the right axilla. It was removed in the Montreal General Hospital. Very heavy radiation was carried out as a forlorn hope, for the prognosis was very grave. There has never been any recurrence, but shortly after a mass developed in the left axilla. It was not large and the patient was anxious to avoid further operation. It was heavily radiated and diminished somewhat in size. I thought, however, the proper thing was to have it out, and it was removed by Dr. Edmund E. King. On section a great transformation of the sarcoma tissue was seen.

The specimen was examined by Prof. J. J. Mackenzie, who reported as follows: "The tissue consists of a small portion of normal lymph gland with a distinctly fibrous capsule and trabeculae along with a large tumor portion, which is evidently sarcomatous. The sarcoma consists of very large cells, chiefly of the spindle-celled type, mixed with occasional cells almost circular in outline.

"The sarcoma cells tend to be arranged in fasciculi. Between these fasciculi is a connective tissue stroma which in many places is oedematous, and which shows deep pigmentation due to the deposit of masses of hæmosiderine.

"The nuclei of the sarcoma cells are very large, and measure on an average 16 microns in length by 6 microns in breadth, but occasional giant nuclei, measuring 30 microns in diameter, can be seen. These nuclei, however, vary very much in size. Here and there degenerating cells can be seen with deep eosine staining protoplasm and pyknotic nuclei. These are not numerous. Most of the nuclei stain well, but show marked vacuolization. Mitotic figures are fairly numerous in various parts of the section.

"The exact effect of the radium upon the tissue is difficult to estimate, but it would look as if some degeneration of the tumor cells has resulted, and there seems no doubt that the oedematous

connective tissue with the marked blood pigmentation indicates degenerative change and subsequent regeneration."

Following the removal of this mass the part was given further heavy radiation, since which time there has been absolutely no sign of recurrence. This is nearly three years ago.

Case III. A gentleman from Ottawa, who had a sarcoma develop at the angle of the jaw on the right side. He had twice been operated on in Ottawa, and in August, 1910, following a recurrence, was operated upon in London, England. Within a week after this operation he went to Paris, where at Dr. Wickham's hands he received a heavy radium treatment. He was advised to have radium applied from time to time after his return home, and I have used it in a prophylactic way since then. There has been no sign of recurrence, although recurrence was immediate following the previous operations.

Case IV. A farmer, *et.* 51, who was referred to me by Dr. H. Howitt, of Guelph, and who had developed a mass on the right thigh following traumatism. This was excised several times during the following year, as it recurred almost immediately. Finally the wound did not heal, and when first seen by me there was a large ulcer, the base and edges of which were firm and fibrous. A portion removed for examination showed that it was a fibro-sarcoma. He was treated by hypodermic injections of soluble radium salts, and by the external application of a radium plaque. The malignant process was arrested, the ulcerated area filled in and the patient has been free from recurrence.

Case V. A gentleman, referred by Dr. Jas. Caven and Dr. Geoffrey Boyd, of Toronto. A growth developed in the deep tissues at the naso-orbital angle. The mass was excised and proved to be a small round-celled sarcoma. Recurrence was almost immediate. A second excision was done, the orbital margin being chiseled away. Following this I applied radium externally, also internally by means of tubes inserted into the upper part of the nasal fossa. The dosage was enormous, and a very severe reaction resulted. The parts have healed, however, and there has been no sign of recurrence for over a year.

Case VI. A young man, 22 years of age, referred by Dr. Garrow, of Montreal, to me. There had been a sarcoma involving the left sacro-iliac joint. Dr. Garrow wrote me that "examination showed that the disease was situated entirely above the joint, and that it, in fact, involved the sacro-iliac synchondrosis. That it was of the nature of a sarcoma was suspected, and on exploration this proved to be the case from microscopical exami-

nation. It was entirely inoperable. Its situation, originally, I took to be in the iliac bone. It went on implicating the gluteal muscles from below upwards towards the skin. The gluteus maximus really formed a capsule, but the small gluteal muscles were extensively implicated." He then operated and removed as much of the growth as possible. When seen by me there was a large sinus leading down to the joint and about one inch in diameter. The patient was running a septic temperature with chills, sweats, etc.

On January 25th of this year I inserted radium into the sinus and left it there continuously for twelve days. The usual changes which follow radiation of a sarcoma occurred, the surrounding tissues becoming hard and fibrous. Scrapings were made on March 10th from the sinus wall, and examination by Dr. Mann revealed no evidence of sarcoma tissue. The sinus has since been allowed to close up very gradually. The patient is up and around and enjoying the best of health. The sinus at present (June, 1914) is not quite closed.

The main point is that there is no appearance of a recurrence of the growth, although there was every indication that such would take place.

One other case I would like to report, for it was a very striking one, although the ultimate result was not favorable.

A farmer, *æt.* 53, was referred to me by Dr. Cockburn and Dr. Arrell, of Hamilton, in October of last year. He had a large sarcoma of the parotid region, which had recurred twice after operation. When I first saw him there was a large fungating mass five inches in diameter, and projecting from $1\frac{1}{2}$ to 2 inches above the normal level of the skin. Mr. J. H. Cameron saw him in consultation. It was decided to curette the fungating mass and apply radium. This was accordingly done. He was given massive doses of radium, and the result was the reduction of the tumor mass and a transformation into hard, fibrous tissue. We thought for a time we had succeeded in arresting the process, and as regards the original site of the growth this apparently was correct. Unfortunately metastatic developments occurred in the other cheek and over the occiput, and the patient succumbed six months later. Locally, however, the change produced was remarkable, and proved of great interest to a number of colleagues who saw the case from time to time.

I am fully convinced that radium does exert a decidedly curative influence on sarcomata. It is, however, essential that heavy doses should be employed, as otherwise the treatment offers no prospect of success. I should also like to repeat here

the statement which I have previously made that I do not advise radium treatment in cases in which operation is possible. The point I wish to emphasize is that, judging from my own experience, every case of sarcoma which is treated surgically should afterwards receive the benefit of radium treatment, and that where surgery cannot be used radium offers a very good prospect of retarding the development of the malignant process, ameliorating the symptoms, and prolonging life in a condition of comparative comfort.

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