of pain suffered by the patients and its short duration when the wounds are left exposed to the air. Severe pain, when not obscured by shock, only lasts from six to twelve hours, and I think is better controlled by hypodermics of morphin than by any other measure. I would urge that as little morphin be given as possible; it should not be given when shock is present.

Another astonishing feature is the character of the cicatrices after healing. In burns of the second degree, the skin is reproduced so well that only a white color marks the scar. Third degree burns result in smooth, flexible, skin-like scars. Two factors probably account for this: First, the tops of granulations which grow into the meshes of the dressings are not torn off, day by day forming scar ridges throughout the substance of the scar which firmly anchor the skin covering and probably interfere with its nutrition; and second, Nature seems better able to control the growth of the firm, small, healthy granulations which result from exposure to the air—a marked contrast to the large flabby efflorescent masses seemingly growing without direction in the moist chamber of an occlusive dressing. The length of time for skin to cover a wound, judging from Wagner's and my own observations, is shortened about two-thirds as compared with the time required under occlusive dressings. Wagner estimates that a normal granulating surface the size of a saucer can be healed over in from eight to ten days.

First, treat the shock as indicated above.

Second, control the pain as necessary and keep everything from contact with the burned areas.

Third, keep the patient surgically clean. Ordinary surgical principles govern here as elsewhere; bichlorid of mercury, carbolic acid and other strong antiseptics are to be avoided when possible because they are such powerful cell poisons that toxic effects both general and local are to be feared; the delicate covering of granulations will not stand escharotic action without interfering with the production of smooth, flexible scars.

Fourth, give frequent cold sponge baths to the sound skin with frictions, and keep room temperature high.

Fifth, cut away all blisters, cleanse with normal salt solution, dry thoroughly, and dust all second degree burns with stearate of zinc, carefully wiping away serous exudate until dry, brown, adherent crusts are formed.

Sixth, leave third degree burns exposed without powder and keep surface clean until granulations are ready for skin grafting.

Seventh, to maintain and to preserve function, body and limbs should be exercised as much as possible; the eschars of burns to fourth degree should be removed when Nature so indicates and amputation should be performed when needed.

My thanks are due the St. Paul surgeons mentioned in this paper and to Interne Dr. C. L. Larson of the City Hospital for a transcript of the records.

RADIUM TREATMENT OF CANCER OF THE ESOPHAGUS.*

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Cancer of the esophagus is one of the most intractable diseases with which we have to deal. Not even modern surgery has succeeded in combating this dis-

ease. Gastrostomy may for a time prolong life; it is, however, connected with certain dangers and annoyances and does not attack the real focus of the disease. It is, therefore, natural for the physician to search for new means of treatment in this malady.

When Roentgen gave his x-rays to the world, I experimented with them in cancer of the esophagus and stomach. In my cases (six in all), this method of treatment was of no avail, because the tumor lies deeply hidden and is covered by other parts of the body (skin, muscles, thorax). The rays, therefore, do not penetrate sufficiently to the tumor in any considerable strength.

After Curie had discovered the wonderful radium and had found the effect of its rays to be analogous to that of the Roentgen rays, I tried to apply radium locally by means of small receptacles in affections of the esophagus, stomach and rectum.¹

On Jan. 22, 1904, I demonstrated this method of treatment on one of my patients suffering from carcinoma of the esophagus at a meeting of German physicians at New York. Exner,² independently of myself, followed out the same idea and on Jan. 28, 1904, published an article entitled "The Treatment of Esophageal Cancer by Means of Radium."

Somewhat later I³ reported the results of local treatment with radium in 9 cases of cancer of the esophagus; in 6 a marked widening of the stricture was found.

Fig. 1.—The esophageal receptacle with tubing and mandrin.

Here I would like to report on 72 new cases of cancer of the esophagus in which local applications of radium were made.

METHOD.

The radium receptacle for the esophagus consists of a rubber tube (about 17 F. diameter) which is provided with a mandrin and a capsule, the lower part of which is made of hard rubber and the upper part of metal. The two halves are screwed together. The upper part of the capsule is provided with a screw thread by means of which it is attached to the tube portion (Fig. 1).

The capsules are made in three different sizes to fit strictures of various widths.

MODE OF APPLICATION.

The radium vial is placed in the capsule of the instrument and the latter screwed tightly together. The apparatus with the mandrin, having been first immersed in warm water, is introduced into the esophagus, with the patient in the sitting position (best in the fasting condition), and is pushed forward to the stricture. In introducing it, it is best to depress the tongue with the left

1. Max Elnhorn: "Radium Receptacles for Esophagus, Stomach and Rectum." *Medical Record*, 1904, p. 399.

2. Wiener klin. Wochen., No. 4, 1904.

3. Max Elnhorn: "Observations on Radium." *Medical Record*, July 30, 1904.

*Read before the East Side Medical Association, New York, 1905.

index finger and to hold the instrument like a pen in the right hand, compressing it somewhat so that the mandrin remains in place. When the stricture has been reached, as evidenced by the resistance, the mandrin is removed and the end of the rubber tubing fastened by means of a thread to the ear of the patient. The instrument is allowed to remain in the esophagus from one-half to an hour, according to the needs of the case, and is then removed.

When employing the larger capsule it is necessary when withdrawing the instrument to make the patient swallow when the cricoid cartilage is reached in order to avoid the resistance encountered at this spot.

After having removed the instrument, wash it, unscrew the capsule, open it, and remove the radium vial. The instrument may be easily disinfected.

The same instrument may be used in gastric carcinoma. It must then naturally be introduced into the stomach.

RESULTS OBTAINED IN THE NEW CASES.

I have lately treated seven patients suffering from cancer of the esophagus with local applications of radium. In all the diagnosis was established beyond doubt. They were all individuals who had been suffering from three to six months from dysphagia, becoming gradually worse and on examination with the bougie showed a stricture of the esophagus. In one of the patients (Mrs. M.), the tumor was seen with the esophagoscope. In the other six, the esophagus was not inspected.

Patient.—One of the seven cases (A. S.) was a private patient of mine about 75 years old.

Examination.—Nov. 10, 1904. Swallowing sound absent; bougie (35 F.) encountered resistance 15 inches from the teeth.

Treatment and Result.—He was treated for about two and one half months (from Nov. 10, 1904, to Jan. 20, 1905) with 0.05 gram of the pure radium bromid for about half an hour every second day. Exact measurements of the stricture were not made afterward. Before beginning treatment the patient could hardly swallow fluids. During treatment his condition improved, he could take fluids without difficulty and even semi-solid food was well borne. Even after stopping the applications of radium, the ability to take fluid and semi-solid food remained, and the patient was entirely free from pain until the present time. In consideration of the age of the patient no exact measurements of the stricture were made, so that we are unable to say whether the stricture widened. Nevertheless, the result is satisfactory.

The other six patients were treated at the German Hospital, New York. In each 0.25 gram of Curie's radium of 20,000 activity was applied to the stricture for one hour daily. Once a week, exact measurements were taken to determine the distance of the stricture from the teeth, as well as the circumference of the stenosis by means of bougies of different size. The radium applications were made by means of the esophagus receptacle. The instrument was pushed forward to the stricture and allowed to remain there. I would like to emphasize the fact that no force whatever was used either in the introduction of the instrument or in the measurement by means of the bougie. We can therefore exclude any mechanical dilatation of the stenosis.

Neither in the 7 cases just reported nor in the previous 19 have I ever met with any disagreeable accidents that might be ascribed to the radium treatment.

In the following table I have tabulated the 6 cases treated in the German Hospital:

TABLE OF CASES OF CARCINOMA OF THE ESOPHAGUS TREATED BY MEANS OF RADIUM AT THE GERMAN HOSPITAL.

Name.	Age.	Length of Treatment.	Result of Examination by Bougie.		Remarks.
			At Beginning of Treatment.	At End of Treatment.	
1. A. S.	52	Feb. 22-Mar. 9, 1905 (16 days).	Bougie 32 F. encounters resistance 15½ in. from the teeth.	Bougie 39 F. encounters resistance 16½ in. from teeth.	Patient feels somewhat better.
2. A. G.	55	Mar. 9-Apr. 6, 1905 (29 days).	Bougie 20 F. encounters resistance at 17½ in.; bougie 39 F. at 16½ in. from teeth.	Bougie 42 F. encounters resistance at 17½ in. from teeth.	Patient has improved considerably. He can swallow better and has no pain.
3. A. K.	38	Mar. 22-Apr. 20, 1905 (30 days).	Bougie 20 F. encounters resistance at 17 in. from teeth, but passes thro'; bougie 39 F. can be inserted only to 16½ inches.	Bougie 43 F. passes into stomach without resistance.	Patient has gained and can now take semi-solid and even solid substances.
4. C. M.	39	April 6-28, 1905 (23 days).	Bougie 20 F. encounters resistance at 14½ inches; bougie 39 F. at 16½ inches from teeth.	Bougie 52 F. passes into stomach without resistance.	Patient feels better; she can take semi-solid and some solid food.
L. Z.	50	Ap. 13-28, 1905 (16 days).	Bougie 26 F. encounters resistance at 15 in.; bougie 39 F. at 14 in. from teeth.	Bougie 52 F. passes into stomach without resistance.	Patient can now take solid food; has gained 8 pounds.
6. B. B.	53	Ap. 10-28, 1905 (19 days).	Bougie 25 F. encounters resistance at 11 in. from teeth.	Bougie 35 F. encounters resistance at 12½ in. from teeth.	Ability to swallow has not particularly improved. Has brought up at times a little bloody mucus, especially after the radium treatment; slight rises in temperature occasionally.

In looking over this table we find that in all 6 cases the stricture has improved under treatment. In 3 (Cases 1, 2, 6), the stricture did not become passable; the bougie, however, could be introduced deeper. In the other 3 (Cases 3, 4, 5), the stricture became passable for rather thick bougies (43-52 F.).

The improvement could usually be observed after a week's treatment, at times even earlier.

All these patients felt better than they did before treatment; 5 could swallow better; 3, in whom the stricture had become entirely permeable, were able to take semisolid and even solid food. The pain was less in five of the six patients.

The results obtained are very satisfactory, since we have to deal with an affection which has not been amenable to treatment until now. In the methodical application of radium we have the means to influence favorably the course and seat of the disease and to retard its progress, even if at present we can not entirely remove it. This mode of treatment is certainly destined to play an important rôle in the therapeutics of cancer of the esophagus and deserves to be tried on a large scale and in a thorough manner. Should my results be confirmed by other clinicians, radium therapy should take a high rank in the treatment of cancer of the esophagus.

The time is not far distant, writes E. L., in the *Alkaloidal Clinic*, when our great and grand profession will stand shoulder to shoulder, not only for the advancement of medical science, but for the protection of each other against unjust demands by the public and against unjust and selfish criticism by the members of our own profession.