This condition is equally necessary to the maintenance of vitality, since anoxemia induces acidosis and a general intoxication.

Could any better argument be given for the open method than this? How do you keep the patient pink? By giving oxygen, not by shutting it out. These authors refer to anesthetics in Germany. I would not select Germany or any other foreign country to see anesthetics well administered. The best anesthetics in the world are given right here in America.

With an experience of over 30,000 open ether administrations, I may be privileged to say with assurance that the patients leave the operating room after severe major operations with normal color which indicates good circulation and with normal respiration. In our work it is a rare exception for a patient not to have a perfectly smooth narcosis lasting throughout a long, difficult operation. It is very unusual also not to have the patient sufficiently awake to move about or answer when spoken to within ten or twenty minutes after the anesthetic is withdrawn.

Offergeld¹⁰ studied the pathologic changes in the lungs which occurred after an etherization lasting from seventy to eighty minutes. His results were obtained in guinea-pigs, rabbits and cats after using the closed method, a mixture of oxygen and ether, and by the open method. The animals which did not die were killed at various periods after the narcosis. With a closed anesthesia some of the animals died in a few days from bronchopneumonia. Some were killed in two or three days and their lungs showed patches of bronchopneumonia and desquamation of bronchial epithelium, blood and pus. None of the animals that were given ether and oxygen died. If killed at the end of the first day, patches of consolidation and some blood and desquamation of epithelium were present in the bronchi. With the open method there were no deaths. The animals were killed in from one to eight days after narcosis. Two days after the anesthesia, necropsy showed a perfectly normal condition of the lungs. When the closed method was used, it required four days for the mildest cases to repair.

CONCLUSIONS

The anesthetic state should resemble normal sleep.

Simplicity in the administration of ether, as simplicity in other branches of medicine, is desirable.

As much air or oxygen as is consistent with narcosis should be allowed.

That there is any distinct advantage in warming ether vapor is very doubtful.

The conservation of body heat during anesthesia is of great importance.

With the open method of etherization, the patient's blood is well oxygenated throughout the most difficult operation, and patients leave the operating table with normal color and normal respiration.

There is less injury to the lung epithelium when an abundance of air is allowed with the ether.

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10. Offergeld: Beitr. z. klin. Chir., 1907, lxxxiii, 505.

The Value of Health.—O blessed health! thou art above all gold and treasure; 'tis thou who enlargest the soul, and openest all its powers to receive instruction, and to relish virtue. He that hath thee hath little more to wish for, and he that is so wretched as to want thee wants everything with thee.—Sterne.

THE TREATMENT OF GENITO-URINARY TUBERCULOSIS WITH ROSEN-BACH'S TUBERCULIN*

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In 1910 Rosenbach¹ described a new tuberculin, and reported a number of successful results of its application in the treatment of surgical tuberculosis. Since then a number of articles² have appeared in the German literature dealing with the same subject, and for the most part substantiating the claims of Rosenbach and his followers.

In all the literature on the subject, only one case has been described in which the treatment has been used in tuberculosis involving the urinary tract. From this case, one of renal tuberculosis, the insufficient data, and the short period of time during which the patient was under observation, do not permit of any definite conclusions. In view of the numerous reports of cures in surgical tuberculosis, it was decided to use the tuberculin in the treatment of postoperative and inoperable tuberculosis of the genito-urinary organs. A brief synopsis will be given of the results obtained in a series of thirteen cases, under observation for periods of six months to one and one-half years.

Rosenbach's tuberculin is a product of symbiosis of the tubercle bacillus and *Trichophyton holosericum album*. It differs from other tuberculins in the following respects: In its preparation the harmful substances which have no therapeutic value have been destroyed. The toxicity is considerably less than with other tuberculins, according to some authors 100 times less so than Koch's old tuberculin. As a result, much larger doses may be given without diminishing the therapeutic and immunizing substances. No heat is used in its preparation.

The tuberculin is a perfectly clear brown fluid with a peculiar odor. It is put up in 1 c.c. and 5 c.c. ampules.

Rosenbach's tuberculin is injected either locally into the diseased part or subcutaneously. Where practicable the local injection into the fistulous tract, or into the walls and floor of the focus is to be preferred. For foci which cannot be reached, one must use the ordinary subcutaneous injections.

The initial dose should be from 0.01 to 0.1 c.c. As a rule the dose can be successively increased by 0.1 c.c. unless a severe reaction ensues. The interval between

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1. Rosenbach: Ein neues Tuberculin, Deutsch. med. Wchnschr., 1910, Nos. 33 and 34.

2. Rosenbach: Erfahrungen über die Anwendung des Tuberculin Rosenbach bei chirurgischen Tuberculosen, *ibid.*, 1912, Nos. 12 and 13; Klinische, morphologische und experimentelle Untersuchungen über örtliche, durch örtliche injection bewirkte Tuberculin-reactionen bei Hauttuberculosen, Ztschr. f. Hyg. u. Infectious-krankh., 1913, lxxiv.

Among articles by other authors are the following:

Seyberth: Beitrag zur Behandlung der örtlichen Tuberculose mit Tuberculin Rosenbach., Beitr. z. klin. Chir., lxxiv.

Kausch: Erfahrungen über Tuberculin Rosenbach., Deutsch. med. Wchnschr., 1913, No. 6.

Meyer, H.: Zur Behandlung der chirurgischen Tuberculosen mit Tuberculin Rosenbach., Beitr. z. klin. Chir., lxxxv, No. 1.

Eisasser: Erfahrungen mit dem Tuberculin Rosenbach., Deutsch. med. Wchnschr., 1913, No. 25.

Köhler and Plaut: Erfahrungen mit Rosenbach'schem Tuberculin, Ztschr. f. klin. Med., lxxiv, Nos. 3 and 4.

Beck: Die Behandlung der kindlichen Tuberculose mit dem Rosenbach'schen Tuberculin, Ztschr. f. Kinderh., vi, Nos. 5 and 6.

Curschmann: Diagnostische und therapeutische Erfahrungen mit Tuberculin Rosenbach., Verhandl. d. 29. Congr. f. inn. Med.

Iselin: Die Behandlung der chirurgischen Tuberculose, Samml. klin. Vortr., 677 (Chirurgie No. 187).

injections depends on the reaction produced as well as on the condition of the patient. As a rule, injections are repeated from every three to seven days; if severe reaction follows, from every eight to ten days. Violent reactions should be avoided, but mild reactions are rather favorable. Fever in itself does not preclude the use of tuberculin. The maximum dose of an injection should not exceed 1.5 c.c. Should a reaction occur, it is inadvisable to increase the dose at the next injection. A total of from 40 to 60 c.c. of tuberculin generally constitutes a course of treatment. Rosenbach recommends a repetition of the course of treatment some time after.

Reactions may be general or local, or both. There is often a rise of temperature a few hours after injection, which reaches its maximum in about six hours and then returns to normal. It is seldom above 38 C. (100.4 F.). At times the rise in temperature does not occur until the following day, and it may persist for twenty-four hours or longer. Headache and lassitude often accompany the febrile reaction. Local reactions are of two varieties, reactions at the site of the injection, and the reaction in the tuberculous focus. There may be no local reaction, or at the site of injection a painful red induration may develop. The local reaction at the tuberculous focus may manifest itself by redness, pain and a phlegmonous swelling. When the injections are not given locally, the reaction in the tuberculous focus is generally less marked. The cases reported have been treated according to the principles which I have outlined.

REPORT OF CASES

CASE 1.—Man, aged 45. Operation, November, 1914. Nephrectomy and ureterectomy for tuberculosis of the left kidney and ureter. Patient applied for treatment in April, 1914. Examination showed two sinuses in left loin which discharged pus in moderate amounts. Patient complained of frequent burning urination, every one to two hours by day and night, with marked dysuria.

Treatment was started with 0.01 c.c. tuberculin; there being no reaction, the dose was increased to 0.1 c.c. a few days later and then increased 0.1 c.c. at each injection every five to eight days until dose of 1 c.c. was reached. No reactions were obtained until this was given. Patient then complained of pain in wound, and had general reaction. After 5 c.c. had been injected improvement was noticed, sinuses discharged less pus and looked healthy, and urinary symptoms abated. Treatment was continued for ten months, during which time 50 c.c. were injected. One sinus has closed; the other is still discharging slightly; urination is less frequent, three or four times at night, every three hours by day.

Comment.—Although this patient showed improvement, a period of ten months had elapsed, during which time the usual methods of treatment employed would most likely have effected a similar result.

CASE 2.—Man, aged 36. Operation, January, 1912. Orchidectomy for tuberculous epididymitis. In 1913 nephrectomy for left renal tuberculosis. After operation, discharging sinus in kidney wound, which persisted in spite of all treatment. Ureterectomy eight months after nephrectomy.

At the beginning of tuberculin treatment in April, 1915, there was a discharging sinus in loin, and pyuria from vesical tuberculosis; tubercle bacilli were found in the urine. The patient was in poor general condition. During the course of treatment a tuberculosis of the right epididymis developed; this went on to suppuration. A tuberculous perineal fistula also developed. In the course of ten months, 55 c.c. of Rosenbach's tuberculin were administered; the general condition became progressively worse and death ensued some months later.

Comment.—In this case there was no improvement under treatment; other tuberculous foci developed.

CASE 3.—Man, aged 17. Nephrectomy for tuberculosis of right kidney, December, 1911. Treatment was begun in April, 1915. The patient complained of frequent urination for the last few months—four or five times at night, every hour by day, with burning sensation in urethra and bladder. Persistent hematuria for past few weeks. Cystoscopic examination demonstrated a vesical tuberculosis, left kidney normal.

Patient was treated from April, 1915, until the end of June, 1915, during which time he received 8 c.c. of tuberculin. As no improvement was noticed, treatment was discontinued. He then reappeared in September, 1915, with the same symptoms; hematuria more marked. Tuberculin was again administered until the middle of June, the patient receiving a total of 20 c.c. At the end of that time the general condition was good; the urinary condition was unchanged. Cystoscopy showed no improvement in condition of bladder.

Comment.—There was no improvement in the vesical tuberculosis, and consequently in the urinary condition.

CASE 4.—Woman, aged 30. Nephrectomy for tuberculosis of right kidney, April 10, 1914. Treatment was begun at the end of April, 1914. At that time there were two discharging sinuses in the wound. The patient complained of frequent burning urination, four or five times at night. After administration of 30 c.c. of Rosenbach's tuberculin in eight months, the sinuses closed. The urinary symptoms, however, persisted. Cystoscopy revealed two tuberculous ulcers in the bladder. These were treated with the high frequency current, after which the symptoms disappeared and the urine became clear.

Comment.—In this patient, after eight months' treatment, the sinuses following nephrectomy closed; the urinary symptoms, however, were uninfluenced by the tuberculin.

CASE 5.—Man, aged 29, on admission to hospital in December, 1913, was found to be suffering from genito-urinary tuberculosis, involving the prostate, seminal vesicles, right epididymis and right kidney. Right orchidectomy was performed in December, and in February, 1914, the right kidney and ureter were removed. Later it was found that there was also a tuberculosis of the left kidney. This patient received a total of 28 c.c. of Rosenbach's tuberculin. There was absolutely no improvement in the general or local condition. The urine is now bloody, and contains much pus and many tubercle bacilli. Urination is frequent and accompanied by burning. The patient finally discontinued treatment.

Comment.—This patient showed no improvement at all during the course of treatment.

CASE 6.—Woman, aged 38. Operation, 1912. Nephrectomy for tuberculosis of left kidney. A sinus persisted in the renal wound for over a year, at the end of which time the ureter was removed. Since then the sinus has not closed; it is a long, deep, tortuous tract in the left loin which discharges moderately. No urinary symptoms. General condition good. Treatment was started April 24, 1914. The patient received 45 c.c. of Rosenbach's tuberculin, injections being made into the fistulous tract. The discharge from the sinus has diminished considerably, and the tract is now very superficial.

Comment.—In this case a tuberculous sinus which had persisted for over three years was almost closed under tuberculin treatment.

CASE 7.—Woman, aged 43. Operation, April, 1914. Nephrectomy for tuberculosis of right kidney. Applied for treatment, May, 1914. There were two discharging sinuses in the wound, and urination was frequent and painful, four to five times at night and from one to two hours by day. A total of 25 c.c. of Rosenbach's tuberculin was administered with no appreciable effect. The sinuses are still open and discharging, and the urinary symptoms are but slightly improved.

Comment.—Five months' treatment with tuberculin failed to close the sinuses or improve the local condition.

CASE 8.—Female. Nephrectomy was performed for left renal tuberculosis in 1913; six months later the left ureter was removed on account of a discharging sinus in the renal wound. In May, 1914, the sinus was still open, and the

patient complained of frequent burning urination every hour by day and night. The urine was cloudy, and contained pus and no tubercle bacilli. After six months' treatment with Rosenbach's tuberculin, a total of 22 c.c. having been administered, the sinus was still open and discharging. The urinary symptoms continued uninfluenced. The sinus was then treated with phenol (carbolic acid) and alcohol, while tuberculin was continued. After two months of this treatment the sinus closed; the urinary symptoms persisted. Cystoscopy at this time revealed small hemorrhagic areas scattered over the bladder; no ulcers. The patient was then treated with phenol instillations, and immediately rapid improvement was noticed. She now retains urine three or four hours.

Comment.—Rosenbach tuberculin in this case did not seem to influence the urinary condition. No effect was noticed on the sinus until special local therapy was used.

CASE 9.—Woman, aged 28. Operation, October, 1913. Laparotomy for tuberculosis of adnexa; left salpingo-oophorectomy. Since the operation the patient had had a discharging sinus in the abdominal wound, which persisted in spite of all therapeutic measures. She was treated with Rosenbach's tuberculin from May, 1914, until December, 1914, after which the patient discontinued the treatment. A total of 25 c.c. of Rosenbach's tuberculin had been administered. Injections were given into the wall of the fistulous tract. The sinus was still open and discharging when patient discontinued treatment.

Comment.—Seven months' treatment with tuberculin failed to close a tuberculous sinus in the abdominal wall.

CASE 10.—Man, aged 37. Operation, May, 1914. Nephrectomy for right renal tuberculosis. The patient applied for treatment, June, 1915, complaining of frequent and burning urination, every half to one hour, day and night. The urine was cloudy and contained pus, blood and tubercle bacilli. The general condition was poor. The patient received in all 35 c.c. of tuberculin. During the course of treatment he developed a tuberculosis of the right epididymis, which progressively grew worse, until Roentgen therapy was instituted. Soon after, marked improvement was noticed. Frequency of urination improved; the patient was able to hold urine three hours by day, and voided but twice at night. The general condition was improved, there being a gain of about 5 pounds in weight.

Comment.—In this case the local urinary condition improved; a new tuberculous focus, however, developed during the course of treatment.

CASE 11.—Man, aged 42. Suprapubic cystotomy in May, 1914, for relief of marked vesical symptoms, frequency of urination, dysuria, hematuria and pyuria. The patient had a markedly contracted bladder which made cystoscopy impossible. Tubercle bacilli were not found. Sections removed from the thickened bladder wall showed tuberculosis. In October, 1914, the left kidney was removed for a large hydronephrosis which was not tuberculous in nature. The patient at this time was in rather poor general condition. Urination was painful and frequent, and part of the urine discharged through the suprapubic fistula. A total of 35 c.c. of tuberculin was administered. During the course of the treatment the patient developed a tuberculous epididymis.

Comment.—No improvement was noticed in either local or general condition during the course of the treatment.

CASE 12.—Woman, aged 33. Nephrectomy for tuberculous pyonephrosis of left kidney in December, 1913. Applied for treatment in January, 1914. There was a suppurating sinus in wound. Complained of frequent and burning urination. Cystoscopy revealed presence of tuberculous cystitis. The patient received a total of 45 c.c. of Rosenbach's tuberculin in nine months, at the end of which time very slight improvement was noticed. The sinus is still open and suppurating, although less; the bladder symptoms remain unchanged.

Comment.—Nine months' treatment with tuberculin failed to improve a tuberculous cystitis and lumbar sinus.

CASE 13.—Man, aged 27. Genito-urinary tuberculosis involving both kidneys, bladder and testicles, prostate and seminal vesicles, and also tuberculosis of the lumbar spine.

Both testes were removed in July, 1913. The patient applied for treatment, October, 1914, and during the next five months, 25 c.c. of vaccine were administered. No improvement was noticed in general or local condition. The patient died about four months later from generalized tuberculosis.

Comment.—A generalized genito-urinary tuberculosis did not show any improvement after five months' treatment with tuberculin.

SUMMARY

Thirteen cases of urogenital tuberculosis were treated with Rosenbach's tuberculin. Two patients showed improvement; the others (eleven) were absolutely unimproved; a few developed additional tuberculous foci during the course of treatment. As a result of the experiences in this series of cases, it must be concluded that Rosenbach's tuberculin is of no definite value in the treatment of tuberculosis of the genito-urinary tract.

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BRUIT OVER THE EYEBALL IN EXOPHTHALMIC GOITER *

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About two years ago I saw a young girl with exophthalmic goiter. She had all the signs of this polysymptomatic disease, and as the vascular phenomena were especially well marked, it occurred to me to place the stethoscope over the eyeball, whereupon I heard a loud hum or bruit synchronous with the beat of the heart. When I saw her again some weeks later the sound was still present. As I had not heard or read of this sign before in connection with exophthalmic goiter, I naturally thought that I had made an original discovery. My belief was strengthened when I did not find any reference to it in any of the monographs on exophthalmic goiter. A deeper search of the literature, however, showed me that the sign had been discovered before, but had not found its way into even the most recent works on the disease. Dr. Barker¹ does not enumerate it in his comprehensive article in which he cites no less than thirteen eye signs.

Quite recently I saw with Dr. Westcott of Atlantic City a woman, aged 35, suffering from exophthalmic goiter. All the classical signs and symptoms of the disease were present, including a probable substernal goiter and pigmentation of the face. On placing the stethoscope over the eyeball, I heard the bruit most strikingly. Without telling Dr. Westcott anything, I asked him to listen. He heard the sound immediately and was much amazed by it.

The sound when present is easily elicited by placing the bowl of the stethoscope over the eyeball with the lids closed. At first one may be a little confused by a more or less continuous sound or hum which is evidently due to the muscular movements of the eyelids, but very soon one can make out the rhythmic murmur keeping time with the pulse. As I have intimated, the sound has been described by several writers. The first to notice it was Snellen, whose observation was reported by Donders.² Duroziez³ heard a sound over

* Read before the Section in Medicine of the College of Physicians, Philadelphia, Nov. 22, 1915.

1. Barker, L. F.: The Diagnosis of Exophthalmic Goiter, THE JOURNAL A. M. A., Oct. 12, 1907, p. 1235.

2. Donders: Arch. f. Ophth. Albrecht von Graefe's, Berlin, 1871, p. 102.

3. Duroziez: Gaz. d. hôp., June 16, 1874, No. 69, p. 543.