

TREATMENT OF CHRONIC TUBERCULOUS SINUSES  
BY BECK'S BISMUTH-VASELINE PASTE  
INJECTIONS.\*

BY JOHN B. SHOBER, M.D.,  
OF PHILADELPHIA.

DR. EMIL G. BECK of Chicago published in the *Illinois Medical Journal*, April, 1908, a paper entitled, "A New Method of Diagnosis and Treatment of Fistulous Tracts, Tuberculous Sinuses and Abscess Cavities," and at the Sixth International Congress on Tuberculosis, held at Washington, D. C., September 28 to October 5, 1908, he presented another paper entitled, "The Surgical Treatment of Tuberculous Sinuses and Their Prevention."

In order to diagnose the extent and ramifications of chronic tubercular sinuses, with a view of determining the advisability of surgical operation, Dr. Beck injected a number of cases with a paste composed of one part bismuth and two parts vaseline and then had radiographs made. The pictures clearly showed the extent of the fistulous network in the cases and explained the reason of failure in several previous operations. They also demonstrated the uselessness of an operation which does not reach every part of the diseased tract. On the other hand, by the use of bismuth radiographs as a guide in reaching the entire seat of disease, several successful operations were performed. This announcement alone would have been sufficient to attract the attention of the profession, and in the future the method will doubtless be universally used before undertaking surgical operations in these cases.

But this was not all. The first case injected for diagnostic purposes led to a most important discovery, namely, that the

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\* Read before the Philadelphia Academy of Surgery, February 7, 1910.

injection of liquefied bismuth-vaseline paste is not only valuable for diagnostic purposes, but for curative purposes as well. It disclosed a new method of treatment. In his first paper Dr. Beck says that after one single injection of the bismuth paste a fistula following a psoas abscess, which had existed nearly two years, entirely closed and has remained so up to date. Other cases were subjected to the same treatment with similar results. In his paper read before the International Congress on Tuberculosis Dr. Beck reported 192 cases treated by the bismuth-vaseline paste method, of which 64 per cent. were healed, 28½ per cent. improved, 6 per cent. unchanged, and 1½ per cent. died during the period of treatment or after. A large variety of cases were treated, including osteomyelitis of long bones with sinuses, empyema and tuberculous lung abscesses, suppurative sinuses of the head, sinuses following tuberculous glands, rectal fistulæ, and tuberculosis of the kidney with sinuses.

Impressed by Dr. Beck's first paper, I determined to try the method when occasion should arise. My personal experience has been confined to only five cases, but I have advised this method in consultation in a number of cases where the results have been equally gratifying.

My cases comprise 2 psoas abscess sinuses of five and three year' duration, 2 cases of tuberculous hip joint with sinuses of two and three years' duration, in which one had been operated on twice and the other once, and one case of tuberculous sacro-iliac synchondrosis with sinuses of one and a half years' duration.

CASE I.—Referred to me by Dr. F. Fremont-Smith in August, 1907, in Bar Harbor, Me. A woman of 35 years, from whom I had removed a tuberculous right kidney in October, 1907, and the pelvic organs in December, 1907.\* A persistent sinus existed from an old psoas abscess which was opened in 1902. No attempt was made to treat the sinus at the time of my operations. During the five years the sinus had existed it would frequently close,

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\* This case was reported in the *Therapeutic Gazette*, June 15, 1908, in a paper entitled "Nephroureterectomy for Tuberculosis."

causing great pain and requiring reopening which was always followed by a large discharge of pus.

In the summer of 1907 I diagnosed a tuberculous right kidney and proposed operation, which she accepted and went with me to Philadelphia. I removed a large tuberculous kidney and ureter and a month or so later was obliged to do a bilateral salpingohysteromyomectomy for symptoms which made me suspect tuberculous disease of these organs. I found chronic pelvic inflammatory disease and a fibrous uterus. The patient returned to Bar Harbor that winter, rapidly gained health and strength and began to earn her own living. The psoas abscess sinus, however, persisted, and upon my return to Bar Harbor in June, 1908, I proposed treatment with Beck's bismuth-vaseline paste.

The opening of the sinus was just above the middle of Poupart's ligament, on the right side. Between June 25 and October 24 she had 12 injections. From the time of the first injection the character of the discharge changed from a characteristic irritating purulent discharge to a mild, thin mucopurulent discharge, and it rapidly grew less in quantity. At first I was able to inject about 3 drachms of the paste and finally not more than 30 or 40 minims, until, at last, on September 24, it had closed completely and has remained so to present date. Before her operation in October, 1907, her weight was 117 pounds. In June, 1908, when I began treating the sinus, she weighed 142 pounds. During the summer and autumn she gained 10½ pounds. I made two radiographs during the course of injections. The first shows a single tract sinus extending to and pocketing around the base of the third lumbar vertebra, and the second a month later showing the same sinus but much narrower than at first, and the third a very narrow streak of bismuth along the tract but a pocket of paste on the left side of the body of the vertebra.

This was a very instructive case and the lesson I learned from it was that I made a mistake in attempting to keep the paste in the sinus after injection, by plugging the mouth of it with guaze and strapping it down. Dr. Beck has also come to the conclusion that better results are obtained by allowing the paste to escape into the dressing. I believe that fewer injections would have been required had I done so.

CASE II.—A similar case of psoas abscess sinus in a man of 27 years which had persisted for three years. The radiograph showed a straight tract to the third lumbar vertebra with a small pocket over the middle of its base. There were two bulging places and a widened place along the course of the tract. In this case I allowed the paste to drain into the dressings and noted that only a fraction of it escaped each time. After the fifth injection the sinus closed permanently. This case was treated in January, 1909, and has remained healed.

CASE III.—Referred to me by Dr. F. Fremont-Smith of Bar Harbor, Me. The man was an expert blacksmith, 32 years old, employed in a large buckboard factory. He had first consulted Dr. Smith three years previously for bilateral, very much enlarged cervical and axillary glands suggesting Hodgkin's disease. After careful study the condition was considered tuberculous. Subsequently several of the glandular swellings were incised but no distinct abscess cavities were found. For two years he led an out-of-door life and was placed on a carefully regulated hygienic, dietetic and tonic course of treatment and for a long time took regulated doses of arsenauro with the result that all the swellings entirely disappeared and he returned to work. One year before he was referred to me, which was in July, 1908, he began to suffer pain in the left hip on exertion. In December, 1907, a swelling appeared over the lower spine and sacrum. It increased slowly for four months and then the abscess opened spontaneously. It was a diffuse swelling, the size of two hands. There was one large bunch on the left side of median line and two smaller ones on the right side. A large quantity of pus escaped and one sinus on the left side immediately above the sacro-iliac synchondrosis had persisted, discharging pus freely and requiring two or more changes of dressing daily. I had this pus examined bacteriologically and tubercle bacilli were found. Injection of the pus into guinea pigs also gave positive results. Upon examination I found a small sinus opening to left of the median line one inch above the sacrum, and in a similar position on the right side there was a small red area, almost ready to open spontaneously, which gave a sense of fluctuation. Pressure over this area and also to the left and below the sinus caused a discharge of pus from it.

I gave him the first injection on July 10, 1908, and was able

to introduce easily one ounce of the paste which caused a well marked bulging on both sides of the sacrum immediately below the opening of the sinus and also a smaller bulging below the red spot above referred to. There was distinct improvement in the character and amount of discharge from the first, and after the fifth injection there was very little purulent discharge all summer. As time went on I was able to introduce less and less of the paste. On August 22, after the twelfth injection, it was noted that there had been only very slight, thin, translucent, brownish stained serum for a long time. At this time the cavities took only one-half ounce of the paste. There was a general feeling of firmness in and around the cavities on both sides. The rounded, firmly elastic bunch on the left side felt firmer. The skin moved freely over it. On the left side the injection caused no bunching and the tissues around this area felt firm and contracted. At the time of the twenty-first injection, on October 2, 1908, I could introduce only  $1\frac{1}{2}$  drachms of the paste. There had been no discharge for several weeks. The patient had gained weight and strength and resumed his occupation. Through the greater part of the autumn and winter the sinus continued to discharge daily a very small amount of a thin cloudy serum, when suddenly one day there was quite a large discharge which he described as pus. He then consulted Dr. G. R. Higgins in whose care I had left him on my return to Philadelphia. Dr. Higgins gave him a few injections of the paste, and then upon the patient's request wrote to Dr. Beck and sent him to Chicago. He remained in Dr. Beck's hospital only a few weeks, where he received a few more injections with some improvement and was promised a cure. He, however, decided to return home when he continued to improve. When I returned to Bar Harbor in June, 1909, I found the sinus almost closed and was able to inject only a few minims of the paste. The area around the opposite red spot, however, was slightly soft and fluctuating. I opened it and squeezed out a few minims of occluded paste. The tissues below and around the old cavity areas were firm and contracted. The wound I made soon healed. I cauterized the opening of the old sinus which promptly closed and there has been no sign of trouble since. I believe the discharge he had in the winter was not pus but the remains of occluded paste, and this illustrates the wisdom of favoring the

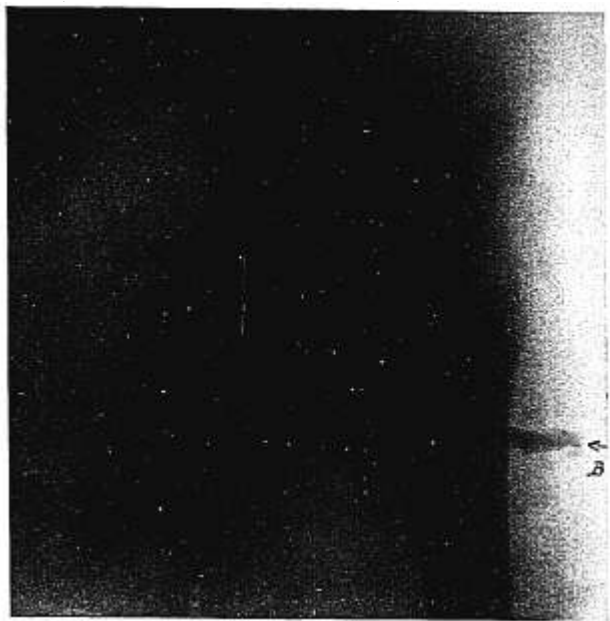
escape of paste in such cases. It probably acts as an irritant if allowed to remain any length of time.

CASE IV.—Tuberculous hip-joint disease with persisting sinus on outer aspect of left thigh of three years' duration, in a little girl of 8 years who had had two radical operations. This case was referred to me December 16, 1908. The radiograph showed a network of sinuses around the ankylosed joint and extending on to the sacrum and marked destruction of bone tissue and absorption around the head of the femur and the acetabulum. This case was given nine injections at intervals of four to seven days. She discarded her crutches after the third injection, her general health improved and she gained rapidly in weight. The sinus had closed February 8 and remained so until a short time ago. In August I received a letter from her mother stating the child had been feeling badly for a few weeks and the sinus had opened, discharging some of the paste and a small quantity of pus. She had two injections in December, 1909, and the sinuses now appear to be permanently closed.

CASE V.—Tuberculous disease of hip-joint in a boy of 7 years, referred to me by Dr. F. L. Ober of North East Harbor, Me., on July 19, 1909, for a bismuth-vaseline radiograph for diagnostic purposes. There were two sinuses, one in the groin and the other posteriorly about two inches above the great trochanter. I injected both these sinuses under firm pressure and made the radiograph which I herewith present for your inspection (Fig. 1). It is very like the picture of the previous case and shows extensive disease around the head of the bone. In a letter dated September 9, 1909, the father says that the boy went to the Maine General Hospital in Portland in September, 1904, and the following year he was operated upon in the Bar Harbor Hospital. The wound has never healed properly and has been discharging more or less ever since. In 1906, another place was opened which has also not entirely healed. Since the injection of the paste there has been very little discharge of pus, only a slight moisture around the sinuses. His health has improved and he seems to be gaining weight and has given up the use of his crutches.

The technic and rules to be observed in making these injections are very simple. The paste consists of bismuth subni-

FIG. 1.



Case V.—*A*, Anterior fistulous opening. *B*, Posterior fistulous opening.

trate 33 per cent. and vaseline 67 per cent. The bismuth should be slowly stirred into the vaseline while hot, but not boiling. When cool this mixture forms a thick soft paste. Just before using, it should be heated and thoroughly stirred until it becomes thin enough to be drawn into a suitable syringe. Dr. Beck recommends a syringe which I show you. Care should be taken that no water should enter the sinus, which requires no treatment other than washing its orifice with 95 per cent. alcohol. It is not necessary to dry out the sinus with gauze. The nozzle of the syringe should be placed firmly against the opening and under moderate pressure the paste is slowly forced in until the patient begins to complain. A pledget of gauze is then placed against the opening and an ice bag applied for a short time. The patient should remain quiet for a few hours. An anæsthetic is not required as the injections are usually painless.

Various theories have been advanced to explain the results which follow this method. Beck believes that the action of bismuth subnitrate is bactericidal, chemotactic and astringent, and says that he investigated its bactericidal action by systematic examination of the secretions from suppurating sinuses while under treatment and invariably found a continuous decrease in the number of organisms and in many cases their final disappearance. Tubercle bacilli were no exception to the rule. He goes on to say: "Whether the bismuth destroys the bacilli by its chemical action or whether its presence acts as a chemotactic, we have not yet determined, although the evidence predominates that its chemotactic property accounts for the destruction of the micro-organisms." He also believes that the mechanical action of the bismuth paste is a prominent factor in the healing process. The diseased walls are separated, bringing them in contact with a substance in itself bactericidal and stimulating. Another factor is the well-known influence of the X-rays upon tuberculous disease in the presence of bismuth vaseline, but he admits that it can play only a secondary part in the healing, since excellent results have been obtained without the aid of the X-rays.



For obvious reasons this method is not applicable in cases of biliary or pancreatic fistulæ or in sinuses communicating with the cranial cavity or hollow viscera. There are cases in which the bismuth plug may by pressure on a vital organ produce unpleasant symptoms. Neighboring large veins may be so altered by the suppurative process as to permit the injection to break through the thin and diseased wall, and in this way enter the circulation, causing serious consequences. By animal experiments he demonstrated that the bismuth paste injected into the axilla caused death within two minutes, due to the entrance of the paste into the axillary vein, and finally blocking the branches of the pulmonary artery.

Toxic effects from the use of large quantities of the paste have been observed in a few cases. The symptoms are those of nitrite poisoning so well known to the röntgenologist in the early work of bismuth feeding and injections for diagnostic purposes. When used with a moderate degree of caution there is no danger. Injections up to 100 Grams of the 33 per cent. paste produce no toxic effect.

Among the important conclusions with which Beck closes his paper are the following: Tuberculous sinuses, fistulous tracts, abscess cavities, including empyema, can be cured by injecting them with a 33 per cent. bismuth-vaseline paste. The formation of sinuses and fistulous tracts may be prevented by opening cold abscesses, evacuating the fluid, and at once injecting a quantity (not exceeding 300 Grams) of 10 per cent. bismuth-vaseline paste and not sealing the opening. While these injections are effective in all suppurative sinuses and cavities, those of tuberculous origin respond to them more readily. This method of treatment is applicable to the suppurative accessory sinuses of the head.