

If not, was it due to total or partial suppression of the renal function or was the small amount secreted due to great shock? Among other ways (singly or several of them combined) I saw uræmia declare itself by drowsiness, hiccough, vomiting, rigor, renal pain, unhealthy condition of the wound, urine which was practically urea-less, restlessness, thirst, frontal headache, dry tongue, dry skin, muscular twitchings, small pupils, wasting, jaundice, incontinence of feces, or rashes especially on the back. Therefore I was always on the look-out for any indication, however obscure. If there was any doubt the patient was treated actively for uræmia. As this most often appears during the first few days after operation, it is invaluable to be able to collect all the urine by the method mentioned above in order to estimate the total quantity of urea being excreted. I always started treatment by infusing saline solution (20 ounces) with brandy (one ounce) into each breast, for this is an excellent diuretic, and linseed poultices were applied to the loins, on one hour and off from three to four hours. I do not think it safe to do anything further than this until 24 hours after operation on account of danger of hæmorrhage. At the end of this 24 hours I gave pulv. jalapæ co., grains 80; brandy per mouth or per rectum; a mixture containing digitalin, a diuretic, and a diaphoretic; and strychnine (grain $\frac{1}{60}$) every four hours hypodermically. If the patient did not improve special nurses were obtained and continual rectal irrigation was employed. A long rectal tube of large bore was introduced as far as possible, sometimes reaching the splenic flexure of the colon, and saline solution at the rate of two pints per hour and at a temperature of from 102° to 110° F. was employed. My reason for doing this was that I remembered as a student seeing a case under the care of Mr. J. Rutherford Morison where a fatal latent uræmia occurred due to the removal of a tuberculous kidney and where the other kidney, notwithstanding it felt normal when palpated during operation, was functionless, the condition being accompanied by excretion from the bowel of what was taken to be crystals of urea. I cannot say whether the hot saline solution stimulates the bowel and mucous membrane to excrete urea, or if the heat transmitted to the underlying kidneys persuades these organs to resume work—at any rate, the results justified the treatment. It is, however, disagreeable for both nurse and patient. This was employed every hour for two days and at longer intervals afterwards, depending on the condition of the patient. If there was no improvement on the day following the onset the lungs were carefully examined and in the absence of moist sounds a further pint of saline solution was infused into each breast; more than this was not injected on account of the danger of œdema of the lung. Vomiting is very difficult to treat; if copious draughts of 1 drachm of sodium bicarbonate to 1 pint of water or an emplastrum lyttæ applied to the epigastrium failed, the stomach was washed out. For hiccoughing little can be done; if it is bad nothing can stop it. Cocaine, $\frac{1}{8}$ th grain in a pill, or atropine, or morphine was tried. Champagne makes an excellent stimulant in uræmia.

If following operation any lung trouble supervened the patient was propped up in bed after the first 12 hours. If it was necessary for him to cough and he could not be induced to do so for the suprapubic pain caused thereby, the drainage-tube was removed at the end of 24 hours. To remove the tube so early entails great risk of the urine tracking laterally and into the pelvis; there were at least four cases like this. Should there be tracking, a catheter was tied in through the penis as soon as safe (about the fifth day) in order to drain as much urine by this route as possible, and the wound was irrigated every six hours with perchloride of mercury 1 in 1000, or if the urine was very phosphatic a freshly prepared saturated solution of boric acid was used. Postural treatment is important; if the patient can be persuaded to lie in the prone position (even for 24 hours) great improvement will ensue. I did not see any case bad enough to lead to abscess formation. All cases did well. In every case, for a few days after removal of the tube, the sinus was always explored digitally each day to make certain that there was no tracking.

Sepsis in the prevesical space was not common. When present I believe it is usually due to the bacillus coli communis. It can be quickly cured by irrigation every eight hours and by getting the patient to assume the prone position, thus insuring good drainage of the cavity. Sepsis in the prostatic cavity is rare; it must be treated by frequent irrigation. It is a cause of persistent suprapubic sinus. It

is usually due to a prostatectomy being done when there is a bad cystitis; a preliminary cystotomy with continuous irrigation for a day or two will obviate this.

The average stay in hospital was one month.

The number of patients admitted with enlarged prostate during my period as house surgeon was 60. Of these, 38 had suprapubic prostatectomy performed; in six cases this was preceded by a preliminary cystotomy. Two cases died in hospital before they could be operated upon. Of the remaining 20 sent out without any operation, three at least died shortly afterwards; five had inoperable carcinoma; the remainder were either put on catheter life for chronic bladder distension and were, or would be, readmitted for operation, or the cardiac condition would not admit of operation at the time of discharge. This series of consecutive successful cases was in great part due to the all-round excellency of the nursing staff and to the great interest shown by them in their work. I thoroughly appreciate their devotion to these old men who for the most part were unable to do a thing for themselves.

My thanks are due to the honorary staff at St. Peter's Hospital for their courtesy in allowing me to refer to cases.

The irrigator mentioned was made for me by Mr. J. H. Montague, 69, New Bond-street, London, W.

Newcastle-upon-Tyne.

TWO CASES OF ACUTE SPREADING GANGRENE,

WITH A NOTE ON THEIR BACTERIOLOGY.

BY R. R. JAMES, F.R.C.S. ENG.,

LATE HOUSE SURGEON AT ST. GEORGE'S HOSPITAL.

(From the Clinical Laboratory, St. George's Hospital.)

A MAN, aged 30 years, was run over by a motor omnibus on Feb. 13th of this year and was admitted into St. George's Hospital under the care of Mr. Francis Jaffrey. The patient was much collapsed and there was a compound fracture of both bones of the left leg in their upper third; posteriorly there was a long gaping wound, exposing the bellies of the gastrocnemius, one of which was partially ruptured. The wound was very dirty and as no pulsation could be detected in the vessels below the seat of fracture it was thought that amputation would have to be performed. When the man reached the theatre, however, pulsation was definitely present in both tibial vessels at the ankle, so the wound was cleaned as well as possible with the usual lotions, a nail-brush, and irrigation with saline solution. Lacerated pieces of muscle and contused bits of skin were cut away and the bones having been brought into apposition the wound was sewn up and the limb placed on a back and pair of side splints after a tube had been placed in the lowermost angle of the wound. On the next morning the wound presented no abnormal appearances and the man's condition was pretty good. 26 hours after the accident the temperature, which had been 101° F. in the morning, rose to 103°; the patient shivered and said he felt as if an attack of ague were coming on. Early on the next morning he became very restless and the condition of the leg was as follows. The wound was definitely gangrenous in places and the whole thigh and leg were much swollen, red, and shiny; there were no emphysema and no crackling but in one and a half hours' time the limb had turned a dusky purple colour and was obviously the seat of an acute spreading gangrene. The man's condition was now too bad to admit of an amputation, so all the stitches were removed and frequent dressings with hot gauze fomentations were ordered, together with stimulants. On the 16th the leg was black and green about the seat of fracture and large black bullæ had made their appearance; the thigh was tense, purple, but not emphysematous; dusty patches of purple had come out on his face and arms and he died at midnight, 80 hours after admission.

Some of the fluid from a bulla was drawn off in an aseptic pipette and sent to the bacteriological department for investigation. I am indebted to Dr. C. Slater for allowing me to make use of his notes on the bacteriology of the case.

Bacteriological examination.—The material examined was clear blood-stained fluid obtained during life from a bulla on the gangrenous limb. In unstained preparations nothing could be seen, but in stained specimens cleared in acetic acid a small number of large square-ended, Gram-staining

bacilli were found, occurring in single elements for the most part but also found in chains of two or more rarely of three elements. No other organisms could be seen. Aerobic and anaerobic cultures were made from the fluid. The aerobic cultures were not sterile but showed no organism resembling the bacillus seen in the fluid. Anaerobic cultures yielded a bacillus resembling that in the bulla and a streptococcus which persistently appeared in the cultures. After some subcultures the bacillus was obtained pure and from its action on animals would appear to have been the cause of the gangrene. Subcutaneous inoculation of one cubic centimetre of a broth culture killed the animal in 24 hours. The guinea-pig soon became ill, had a swelling at the site of inoculation, and showed convulsions of the hind limbs. At the time of death the local swelling had disappeared and there were no sign of injury at the site of inoculation and no emphysema or bullæ. On section, however, a most extensive subcutaneous œdema was found which practically stripped the abdominal skin from the subjacent tissues, which latter were red and infiltrated. In places the tissues were œdematous but there were no gas and no odour of putrefaction. There was much fluid in the tissues which drained into dependent parts. The organs of the chest and abdomen were apparently healthy and there was no peritonitis. The subcutaneous fluid was crowded with bacilli. Anaerobic cultures from the cardiac blood and the subcutaneous fluid yielded growths of the inoculated bacillus, the former in a pure state, the latter contaminated by a streptococcus, as in the original tubes from the bulla. The bacillus is a large, probably motile, Gram-staining, anaerobic organism producing in culture on (1) agar, moderately large greyish-white, rather transparent colonies, with a thickened centre and transparent edge; (2) gelatin, liquefaction with faint turbidity; (3) serum, a thin dry growth; (4) potato, an "invisible" growth; and (5) milk, cultures resembling those produced by bacillus enteritidis sporogenes but without evidence of any copious production of gas. In none of the cultures could any evidence of spore formation be detected.

Cases very similar to the above were reported from this laboratory by Dr. Slater in THE LANCET of July 20th, 1889, p. 108, and by Dr. H. R. D. Spitta in the Transactions of the Pathological Society, Vol. LIII., Part 2, 1902.

Organisms usually anaerobic have been isolated from many cases of spreading gangrene. Though generally identified as bacillus aerogenes capsulatus, bacillus enteritidis sporogenes, or bacillus œdematis maligni, the organisms isolated rarely conform strictly to the classical descriptions of these microbes. In the present instance the bacillus obtained seems to be most nearly related to the bacillus aerogenes capsulatus though differing in some respects.

Quite recently there has been in the hospital a case of acute spreading gangrene following compound fracture similar to the above. The case was under the care of Mr. Jaffrey and Mr. W. F. Fedden. Gangrene made itself evident 31 hours after the accident and the limb was amputated by Mr. Fedden within 35 hours from the time of the accident, and the man made an excellent recovery. The bacteriology of the case is exactly similar to that already quoted—namely, cultures were obtained of a variety of the bacillus aerogenes capsulatus, and it was impossible to discover any attempt at spore formation.

In conclusion, I have to express my gratitude to Mr. Jaffrey and to Mr. Fedden for allowing me to publish these two cases, and to Dr. Slater for allowing me to make use of his notes on the bacteriology of each case.

A CASE OF ERYTHROMELALGIA.

By REGINALD G. HANN, M.R.C.S. ENG., L.R.C.P. LOND.

THE majority of recorded cases of erythromelalgia have been, as Weir Mitchell in 1878 originally suggested, intercurrent troubles in the course of disease of the central nervous system. The case now reported must, for the present at least, be considered as idiopathic.

The patient was a married woman, aged 50 years; she had never been pregnant. It seems likely that her occupation as a baker may have been a factor in the causation of her disease, for she practically lived in two rooms, one of which was an unwarmed shop open to the street and the other a very hot room situated over a bakehouse and itself containing a baking-stove in constant

use; she was in consequence exposed to very great variations of temperature and was also continually upon her feet.¹ Her previous medical history is a record of many illnesses and numerous ailments. In 1897 she was laid up for eight months as a result of concussion of the brain received in a railway accident. Closely following upon this she was disabled for five months by a painful swelling of the heel, which she insisted very much resembled her present disease. It was too painful to allow her to walk and evidently puzzled her medical attendant, who on more than one occasion desired to incise what he took to be an abscess; she refused to allow it and eventually it cleared up without surgical interference. During the following year she had acute rheumatism and since then many attacks of sciatica, lumbago, and muscular rheumatism. In 1905 she had an acute iritis with adhesions, the cause of which was not apparent. Her present illness began at the end of August, 1906, with pain in the right foot as though she had sprained it. It varied in degree but was not disabling in severity and she continued to work for three weeks when the appearance of a swelling and great increase in the pain drove her to bed. I now saw her for the first time. There was a bright red swelling about the metatarsal region of the right foot to be seen on both dorsal and plantar surfaces; it involved the second toe but not the others. This swelling did not pit and had the light puffy character of an œdematous eyelid; it was the seat of acute pain with a subjective feeling of intense heat, becoming almost unbearable on placing the foot to the ground. The foot was exquisitely tender on the slightest pressure; the superficial veins were distended and prominent; no change of position affected the objective signs of swelling and redness. For two weeks pain of great severity continued without intermission and in consequence she had very little sleep, took food badly, and her general health suffered. Following upon this long attack some improvement appeared, for though a steady, dull ache was present and increased at times to severe pain, still these paroxysms, lasting at first two or three hours and recurring several times a day, soon became less frequent and more bearable; as before the pain was always associated with a subjective feeling of intense heat and was not accompanied by objective changes in the foot. The knee-jerks and plantar reflexes were normal; tactile sensation was not affected. The exciting cause of the exacerbations could not be determined, but any indiscretion such as placing the foot on the floor or allowing it to become too hot in bed, would be sufficient to induce an attack.

As the acuteness of the disease passed away local changes were observed. The swelling, now mahogany-brown in colour, persisted, but was doughy and pitted on pressure and was suggestive of pus formation; to a great extent it had lost its tenderness even to deep pressure, and though the pain was still too severe to permit of walking, it was no longer agonising in severity, nor was it intensified by the dependent position. This stage was most clearly defined during the first week in November after ten weeks of illness. She continued to improve and began to get about the house with the aid of a stick when, early in December, the disease began in the left foot. At this time free desquamation was taking place in the right foot. After a week of pain and a subjective feeling of great cold the left foot became very tender, swollen, and pink, with a subjective feeling of burning. She was again confined to bed. On Dec. 17th she had such pains about her fifth left metacarpal bone that she was obliged to keep her hand in a sling, and although on the following day the pain had gone, on the 23rd, to her great distress, a pink hot swelling with much pain and dilated veins made its appearance. The pain was relieved by placing the arm in a sling but this had no effect upon the swelling or its pink colour. Immediately afterwards a slighter attack occurred in the corresponding part of the right hand. The symmetrical distribution of the lesions was now very striking.

The left foot desquamated during January, 1907; as in the case of the right foot it was not due to local therapeutical applications. From this time the disease became less troublesome. She was able to take short walks and to resume part of her work, though prolonged standing or much exercise gave rise to pain and occasionally to sensations of burning. Objectively there was nothing beyond slight fulness on the dorsum of each foot. This was the condition

¹ Cf. Gerrard (cases in Malays): Dublin Journal of Medical Science, 1904.