nerve, therefore it was concluded that the paralysis was due to pressure on the facial nerve in the middle ear, where possibly the bony wall of the aqueduct of Fallopius was deficient. Extradural abscess over the tegmen tympani was considered as a probable solution of the cause of pain, and on November 15th the previous operation was extended and the complete mastoid operation performed. The middle ear was filled with granulations, and no trace of the ossicles could be seen. The cavity in the bone was enlarged by cutting upwards and the middle fossa opened. The dura was covered with granulations but did not bulge. A probe passed under the dura in a forward and inward direction entered an abscess cavity $\frac{3}{4}$ in. from the opening, and about $1\frac{1}{2}$ drachms of thick, yellow, foul pus escaped. Good drainage was secured and the wound gently packed with gauze and drained posteriorly. The mastoid wound was also packed and drained through the auricle, from which a flap was cut. The temperature and pulse before operation were 99° and 100 respectively; after it they fell to 98.2° and 72. The patient became exceedingly restless in a few hours, having to be held down in bed; $\frac{1}{4}$ grain of morphine was given hypodermically and secured sound sleep for eight and a half hours.

November 16th. Much quieter, but still restless; slow cerebration; no pain in head; pupils equal and active; some stiff-

O, Operation. D, Death.

ness of back of neck; both knee-jerks very active. No other signs. Basal septic meningitis diagnosed and bad prognosis given; pulse 84, temperature 97.9°; facial paralysis much improved.

November 17th. Pulse 104, temperature 100°. Drowsy, restless, and irritable, reminding one very much of the picture of the first stage of cerebral irritation. Has vomited a little (one mouthful) once without retching. No pupil disturbance or other cranial symptom, except those present yesterday. Facial paralysis scarcely perceptible; taking nourishment fairly well.

November 18th. Cannot be roused. Conjunctiva insensitive. No squint, pupils equal. Pulse 132, respirations 46, no stertor.

Later. Pulse 144, respirations 48 and of Cheyne-Stokes type at intervals, temperature 100° F. Perfectly quiet, with an occasional gentle movement of the hands and arms, not at all convulsive in character.

November 19th. Died quietly at 8.30 a.m.; no autopsy obtained.

The infective process in this case had evidently passed from the naso-pharynx to the middle ear and destroyed the ossicles, and had also invaded the antrum and gradually rarefied the mastoid bone. No symptoms occurred, however, until the aditus became blocked with granulations or swollen mucous membrane, as until then a free road was available into the naso-pharynx for the products of inflammation. When the block occurred the symptoms appeared—the result of tension.

When the signs and symptoms set down as characteristic of intracranial disease, such as rigors, vomiting, optic neuritis, pupil changes, convulsions, hydrocephalic cry, etc., are absent, one is liable to be lulled into a false sense of security. Until the last two days of life of the patient whose case has been described, *restlessness* was the most noteworthy symptom. It was characterized chiefly by the continual efforts of the patient to get up on her hands and knees; she would stay in that position for a moment and lie down again. This sequence would sometimes occur five times in as many minutes.

It would undoubtedly have been better in this case to have explored the middle fossa at the time of the first operation, as well as the lateral sinus. This procedure would not have unduly prolonged the operation, and much valuable time would have been saved.

It has since appeared to me that a more effective route for draining the floor of the middle fossa might be obtained where the complete mastoid operation is done, if the infero-lateral opening usually made was continued inwards and forwards by removing the roofs of the external meatus, middle ear, attic, and antrum. The external semicircular canal would not be in danger if a bent probe were kept over it, and the others could be safeguarded by cutting, as before noted, inwards and forwards. (See figure.)

In the above diagram 1 corresponds to area over glenoid cavity; 2, to area over external auditory meatus; 3, to area over mastoid antrum; 4, to area over middle ear; E T, to area over Eustachian tube; B, to area over internal ear; 5, to position of lateral sinus. The area outlined in coarse is that to be removed.

A CASE OF OEDEMA WITH RESOLUTION BY URINARY CRISIS.

BY

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THIS case of what may be called a urinary crisis in a man with chronic parenchymatous nephritis is worth recording, if only on account of the phenomenal loss of 4 st. 3 lb. in four days coincident with the disappearance of oedema.

The patient, a man 27 years of age, got wet through twelve days before admission; nine days before admission he had abdominal pain, diarrhoea, sickness, and malaise; a few days later oedema was noted, and one day before admission phlebitis of the left thigh appeared. Eight years ago he had had an attack of kidney disease with oedema. On admission on July 11th, 1907, he had oedema of the legs and lower part of the abdomen, and thrombo-phlebitis of the left femoral vein. The urine—specific gravity 1028—contained a considerable amount of albumin, and showed diminution of chlorides, but there were no casts or blood. There was no hypertrophy of the heart, and the blood pressure was 100 mm. of mercury.

The phlebitis soon subsided, but the general oedema increased. On July 26th he weighed 11 st. 12½ lb.; on September 9th, 12 st. 1 lb.; on September 14th, 12 st. 10 lb.; on October 10th, 13 st. 11½ lb.; on October 16th, 14 st.; and on October 23rd, 13 st. 7½ lb. The average amount of urine passed was about 30 oz., and the intake of fluid was restricted for most of the time to 60 oz. From the time of his admission various means of reducing the oedema were employed, but without effect. He had successively and in different combinations theocin, caffeine, hot air baths, pil. digitalis co., puncture of the legs. For a period of four weeks, when in the summer Dr. Spriggs looked after the patient, the amount of fluid taken was not restricted. These measures did not have any beneficial effect. On October 5th he developed an attack of cellulitis of the left groin and lower part of the abdomen on the left side, which soon passed off. On October 16th his weight, as already stated, was 14 st.; it then slowly decreased, and a week later (on October 23rd), when it was 13 st. 7½ lb., the amount of urine suddenly increased from 48 oz. in twenty-four hours to 98 oz., and on the succeeding days was 112, 166, 180, 160, 204, 112, 138 oz. The hot-air baths were then stopped (on October 30th), and the amount then fell to 84 and 60 oz. on October 31st and November 1st; by this time the oedema had completely disappeared. On October 31st he weighed 9 st. 4 lb., having lost 4 st. 3 lb. since October 27th, and, after losing 2 lb. more, his weight increased to 9 st. 6 lb., when he left the hospital free from oedema on November 12th. After the sudden disappearance of oedema he

OCTOBER.

NOVEMBER.

Chart showing weight of patient, amount of fluid taken, and of urine excreted in the twenty-four hours, and temperature (continuous line) and blood pressure (interrupted line), of a man with chronic nephritis who lost 4 st. 3 lb. in weight and extensive oedema in four days.

had some slight headache and felt weak, but did not suffer from thirst.

The loss of over 4 st. in four days was so remarkable that the weighing machine was carefully tested in order to exclude any fallacy, but it was perfectly accurate. The alteration in the man's appearance produced by the disappearance of the oedema was very remarkable. In 1905 Dr. Atlee and one of us (H. D. R.) recorded a case of a man with chronic nephritis who lost 4 1/2 st. in weight in sixteen days, or at the rate of 4 lb. a day, as the result of disappearance of oedema and diuresis, which was then ascribed to the use of caffein citrate.¹

To arrive at some understanding of the nature of this process of resolution of oedema by urinary crisis, it is necessary to recapitulate briefly the following points in the history of the above case. The patient had been given hot-air baths daily from October 15th. On October 16th his weight was 14 st. The baths caused only very moderate sweating, and during the next seven days the weight diminished only by 2 1/2 lb. As will be seen by reference to the table, the urine fluctuated during this period between 38 to 50 oz., and similar fluctuations had been the rule during the preceding three weeks. On October 22nd the increased excretion began and continued for eight days, returning to about the normal excretion on the tenth day, whenceforward it remained fairly constant, about a mean of 56 oz. From October 23rd till October 30th the patient lost 56 lb. in weight, and, inasmuch as he still continued to assimilate an ample milk diet, the whole of the loss of weight may safely be attributed to the subsidence of the oedema. During this period the excess of urine excreted over the ingested fluid, calculated at a mean specific gravity of 1008, only accounts for a loss of weight of 39 lb., the remaining 17 lb. must therefore be accounted for.

During the period under consideration the bowels were constipated, and only open on alternate days, the faeces being very hard and firm. Since the faecal evacuations would not account for any appreciable loss of fluid, it is obvious that the loss of weight must be attributed to the increased secretion of sweat, which during this period was very profuse; the patient lay in a constant bath of perspiration, and his sheets had to be changed frequently. It is true that during the whole of this period the hot-air baths were continued daily, but the loss of weight due to the influence of the baths has been shown to have only averaged 3 lb. in seven days before the onset of the crisis, so that during the crisis the loss of weight by sweating must have averaged 2 1/2 lb. a day.

The blood pressure was recorded at intervals during the whole period of his illness, and was practically stationary at 140 mm. Hg till the day after the onset of the crisis, when it began to fall, reaching 130 mm. Hg on the fourth day, at which point it remained stationary till the patient's discharge. The cause of the subsidence of the oedema cannot therefore be

sought in an increased activity of the heart, nor can the fall of blood pressure, coming as it did after the first day of the crisis, be interpreted as other than that due to relief of the peripheral constriction caused by the subsidence of the oedema. Unfortunately during the crisis it was not possible to carry on observations on the urine other than a perfunctory record of the specific gravity.

The case is of interest on account of the light that it throws on the problem of oedema. The well-known *verdünnungsversuch* of Kövesi and Róth-Schulz² has directed attention to the incapacity of the nephritic patient to deal with increase of the water ingested. These authors consider the inability of the kidney to deal with increased amounts of fluid, as evidenced by the insufficient increase of diuresis and diminution of molecular concentration, to be an almost constant phenomenon in cases of parenchymatous nephritis. Cases occur in which the kidney shows an ability to deal with increased ingestion of water hardly below that of the normal kidney, and v. Noorden³ has shown that in such cases, in spite of their efficiency in this direction, there may be a well-marked oedema. Though oedema must be, of course, an expression of the retention of water, such retention may occur in spite of the ability of the diseased kidney to deal with an increase of water ingestion as efficiently as the normal one. A survey of the charts of this patient during the several weeks preceding the crisis gave no indication of considerable inability to deal with the slight increases of ingested water that had occurred during the course of his dietary, and, in order to set the question at rest, it was decided a month after the occurrence of the crisis to subject him to the *verdünnungsversuch* of Kövesi and Róth-Schulz.

A case of syphilitic nervous disease with normal kidneys and of about the same weight was selected for comparison and investigated by one of us (F. L. G.). The results are summarized in the following table:

	Normal.	Nephritis.
8 to 12 a.m. ...	70 c.cm. passed; Δ 2.05	115 c.cm.; Δ 1.75
1 to 2.30 p.m. ...	Given 1,200 c.cm. soda water	—
3.15 p.m. ...	160 c.cm. passed; Δ 0.80	200 c.cm.; Δ 0.75
4.15 p.m. ...	200 c.cm. passed; Δ 0.64	120 c.cm.; Δ 0.8
5 p.m. ...	150 c.cm. passed; Δ 0.15	94 c.cm.; Δ 0.12

Δ = freezing point of urine. After about three hours diuresis ceases.

The mean results show that in this case of nephritis there appeared to be no incapacity to deal with a large increase of ingested fluid. In both cases, when the mean nitrogen excretion was taken on days when the total diet was 700 c.cm., and on a day when the fluid was increased to 2,300 c.cm., there was an increase of the total

nitrogen and chlorides during the period of diuresis. In the case of the normal man the nitrogen increase was 5 per cent., and the chlorides 2 per cent., and in the case of nephritis the nitrogen increase was 7 per cent. and the chlorides 3 per cent. It is therefore possible that the absence of an equivalent diminution of the freezing point in Kövesi and Röth-Schulz results was due to the washing out of retained products of excretion in the nephritic cases.

A case like the one recorded here would apparently offer an argument against the attempts to reduce oedema by decrease in the ingested water, and indeed there would appear to be much to be said in favour of Strauss's⁵ view that such a decrease may be dangerous. If the retention of water be not due to the inability of the kidney to excrete it—and this seems to be proved in this case by the fact that the increased water excretion was effected to a great extent by the skin—such a retention is probably a response to the increased osmotic tension of the tissues due to retained products of excretion. It is not enough to show, as v. Noorden and his pupils⁴ have done, that the excretion of solids is not impaired by restricting the water given, we may still be depriving the organism of the protective mechanism by which the retained solids are prevented from disturbing the normal condition of the tissue cells, and such treatment may precipitate the onset of uraemia.

As to the cause of onset of these urinary crises when both kidneys and skin glands suddenly pour out the retained fluid, we are still in the dark. It is obviously of great importance that in such cases there should be records of the elimination of the nitrogen and salts both before and during the crisis.

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Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

IODINE FOR STERILIZATION OF THE SKIN OF OPERATION AREAS.

THAT the importance of this subject is fully recognized by most operating surgeons is well shown by the numerous methods which are practised, and which need not be enumerated.

They are based on the knowledge that germs of various kinds lurk in the depths of the true skin, as well as superficially, and that they have an unhappy tendency to sweat on to the surface during the operation, and to infect the wound. The amount of labour expended on attempts to sterilize the operation area is very great, and the consumption of material correspondingly large. Occasionally, owing to "over-preparation," eczema results. For military or naval surgeons it is important to secure some method which is certain, rapid, and capable of being effected with a minimum of assistance and materials. For emergency work in private practice the method which I am about to advocate would be very useful. It consists in the use of a 10 per cent. spirituous solution of iodine. The idea is not in any way original, for I first learnt of it from a note of a paper by Dr. A. Grossich, of Fiume, in the EPITOME of the BRITISH MEDICAL JOURNAL, of November 21st, 1908. Since that date the whole of my operation cases have been prepared as follows:

The evening previous to operation the patient has a hot bath, using plenty of soap, but excessive scrubbing of the operation area is not permitted. It is then shaved, washed, and a piece of dry lint bandaged on. Nothing more is done until the patient is on the table. If eucaine is being used the area is *freely* painted with 10 per cent. spirituous solution of iodine (practically the liniment) and the eucaine injected. Before making the skin incision the area is painted once more. In the case of a general anaesthetic the iodine is painted before the administration is begun, and again when the patient is ready.

Preliminary scrubbing and wetting is not desirable, for Grossich points out that the superficial layer of the epidermis is not an absolutely compact tissue. The cells are loosely packed, and intercellular spaces exist which communicate with the external air by microscopic clefts. These clefts, which contain fat, sweat, and bacteria, are readily penetrated by an alcoholic solution of iodine, which dissolves their contents. On the other hand, in the method of cleansing commonly practised these clefts are likely to be closed by the swelling of the cells which is caused by hot water; or their contents may be retained by water and microscopic fragments of soap. For these reasons it is much more difficult to disinfect the skin by liniment of iodine after it has been cleansed by soap and water than if it had not been so cleansed and is quite dry. At the end of the operation the sutures are painted.

The following operations have been performed under this method: Appendectomy, radical cures of hernia and varicocele, hammer-toe. In every case healing by first intention has resulted. The number of operations—30 in all—is not great, but it enables me to state that I have obtained just as good results from using this very simple method as when I had the skin prepared the day before and again on the table, using turpentine, ether, soap, and mercury biniodide. The labour involved is enormously diminished, and a great saving of material is effected.

The potency of iodine as a sterilizer of such septic material as catgut is now well known, and it is only reasonable to expect just as good results in the sterilization of the skin.

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Reports

ON

MEDICAL AND SURGICAL PRACTICE IN THE HOSPITALS AND ASYLUMS OF THE BRITISH EMPIRE.

WESTERN INFIRMARY, GLASGOW.

(Notes of cases under the care of Dr. J. CRAWFORD RENTON.)

1. *Gastro-enterostomy and Pylorotomy.*

J. M., sailor, aged 62, was sent to me by Dr. Whitehouse, suffering from dilatation of the stomach and an indefinite pyloric tumour. On opening the abdomen the tumour was found to be movable, with no evidence of disease of the liver. A small section of the tumour was cut out for examination. Gastro-enterostomy was performed. Professor Muir's report on the section was adeno-carcinoma. The patient recovered well from the first operation, and in three weeks pylorotomy was performed in the usual way. One or two glands were enlarged and were removed along with the others. The patient progressed favourably, and has gained 8 lb. since the operation two months ago.

2. *Gastro-enterostomy for Duodenal Ulcer.*

A. D., aged 35, was placed under my care by Professor Stockman. There had been severe haemorrhage in June when I first saw him with Professor Stockman, but his condition then was too serious to advise operation. The haemorrhage recurred in October, and he returned. Posterior gastro-enterostomy was performed (Mayo's method) and the duodenal ulcer blanket-stitched. He did well and has gone home.

3. *Gastro-enterostomy for Ulcer of the Stomach.*

M. A., female, aged 37, was sent to me by Dr. Monie of Airdrie, with symptoms of ulcer and pyloric contraction. On opening the abdomen a large ulcer was seen to occupy the lesser curvature of the stomach, with so much induration around it that a pseudo-hourglass contraction existed. Gastro-enterostomy was performed posteriorly. The patient made a good recovery and has gone to the country.