occasion she reported herself as free from trouble with her legs, and asked for a tonic. The patient declared that she had derived much relief from the local application of methyl salicylate ointment.

Case 7.—A married woman, aged 55, consulted us for "tender lumps on her legs." She complained of not feeling well, but, apart from slight anaemia and the condition of her legs, she appeared to us to be quite well. Our usual treatment was prescribed, and when she reported again in a week's time she was much improved.

Case 8.—This patient, a married woman aged 65, was under our treatment for heart trouble—aortic and mitral regurgitation. On this occasion she suddenly fell ill, with a temperature of 102° and a rapid irregular pulse. After four days of irregular pyrexia she apparently improved, the temperature returning to normal, but her pulse remaining somewhat irregular. Two days later—on the seventh day of her illness—she developed erythema nodosum, first in the left leg and later in the right leg. She could not tolerate salicylates, and it was many weeks before the nodules disappeared from her legs. The patient recovered from this attack, but died about nine months later from heart failure.

Case 9.—An unmarried woman, aged 22, reported with erythema nodosum in one leg only, much debility and anaemia, but no fever. She found great relief in the local application of methyl salicylate ointment. Finally, she made a complete recovery, but the marked debility and anaemia persisted for several weeks. We attended this patient subsequently on two occasions for erythema pernio, which responded to treatment with calcium lactate.

The series obviously is too short to warrant any final conclusions, but we could not help being struck by the following facts:

1. In four cases only were we able to detect pyrexia (Cases 2, 3, 4, and 8). In two cases the nodules on the legs apparently were present before the pyrexia (Cases 3 and 4); in the other two cases (2 and 8) the fever had abated before the nodules appeared.
2. The close association in two cases (4 and 5) between a family history of acute rheumatism and erythema nodosum. In two of the cases (1 and 8) there had been a definite attack of acute rheumatism.
3. In every case marked relief to the tenderness in the legs was obtained by the local application of methyl salicylate, either as the liniment or as the ointment.
4. Internal administration of sodium salicylate definitely did appear to have a beneficial effect, and intolerance to the drug was accompanied by the prolonged course of the condition (Case 8).
5. The families of all these patients are well known to us, and in no instance, except Case 3, was there a past history of tuberculosis.

THE USE OF HEROIN AFTER ABDOMINAL OPERATIONS: A WARNING.

BY

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THE relief of pain after an abdominal operation is not infrequently one of the first cares of the surgeon, and for this purpose the injection of morphine or heroin is often necessary. For some years, in common, I believe, with many surgeons, I have favoured heroin rather than morphine. My reasons are shortly as follows: (1) heroin is more effective as an analgesic than morphine; (2) it has less after-effect as regards distension, constipation, and general malaise; (3) if a tube of morphine has been kept for some little time a change into apomorphine may occur, with resulting vomiting.

For a good many years, both in hospital and in private practice, when necessary $1/6$ grain of heroin has been administered without the slightest ill effect. The following two cases are cited, however, as a warning.

CASE I.

A lady, 64 years of age, rather asthmatic, suffered from chronic cholecystitis. Owing to the asthma, in order to give as little anaesthetic as possible, $1/4$ grain of morphine together with $1/100$ grain of atropine was administered half an hour before operation, but it was done purposely for the reasons mentioned above.

The operation consisted of a cholecystectomy, and the anaesthetic was gas and oxygen and warmed ether. The operation was completed in forty-five minutes, and the patient was back in

bed at about 10 a.m. At 1 p.m. I saw her, when she was well round, and complaining of a lot of pain. She was sufficiently conscious to be asking for her artificial teeth. As she seemed to be in great pain I ordered $1/6$ grain of heroin, which was administered just after 1 o'clock. At 1.25 I received a telephone message to come round to the nursing home at once. The injection had relieved the pain within five or six minutes, and the matron had left the room, but thought that she would go in and see her again after about ten minutes. On going into the room the patient was talking, when suddenly she became quiet and the matron noticed a change in her breathing. She immediately realized that the patient was profoundly unconscious, administered strychnine, brandy, and ether hypodermically, and sent for me. When I arrived the patient was blue, the skin was mottled, and she was breathing about once in every two and a half minutes; but the pupils were not pin-point, and never were during the whole course of events. The pulse was good, about 80. I immediately thought of internal haemorrhage and of a possible embolism, but obviously neither of these catastrophes had occurred.

At the time I was in the dark as to the cause of the patient's condition, and although it occurred shortly after the administration of the heroin, I did not believe this to be the cause. The patient was literally in *extremis*. The tongue was pulled out, the mattress turned round, and artificial respiration commenced. Owing to the conformity of the chest the greatest difficulty was experienced in forcing inspiration, and all that seemed possible to do was to empty the chest of air. A voluntary breath was taken about once every two minutes. After a short time I sent for Dr. R. J. Clausen, who had administered the anaesthetic, with the intention of possibly inflating the lungs through a laryngeal tube. Pending his arrival, artificial respiration was maintained. Dr. Clausen considered that it would be inadvisable to pass a laryngeal tube, and tried to stimulate inspiration by the administration of carbon dioxide. This, however, did not meet with any success.

After about an hour the respirations seemed to be rather better. The patient was now breathing about once every minute, and it was then noticed that if artificial respiration was stopped the pulse began to flag. After about an hour and a half the respirations approximated two to the minute, and the first sign of hope appeared—namely, the coffee which had previously been administered per rectum was returned. Just about this time a few involuntary face movements were noticed, and artificial respiration could be left off for a short while. After about two hours I noticed that the inspiratory movement of artificial respiration stimulated a voluntary respiration, but that without artificial respiration only two to three respirations a minute were voluntarily performed. At the end of three hours there were definite signs of returning consciousness, and a conjunctival reflex was occasionally obtained when artificial respiration was continued. On ceasing the artificial respiration the reflex disappeared.

At this time I realized that the breathing was that of a profoundly drugged person, similar to what I had seen in morphine poisoning. It was necessary to continue intermittent artificial respiration for another hour, care being taken that the artificial inspiratory movement did not stifle a voluntary expiratory effort, and vice versa. At 6 p.m. respirations were about five to the minute, and the need for artificial respiration no longer existed. At 6.30 the patient recovered consciousness—that is, after five and a half hours.

The following morning respirations were ten to the minute. Convalescence after this was uneventful, except for considerable pain in the right arm, which had been dislocated during the movements of artificial respiration. This necessitated another anaesthetic for replacing the joint by Kocher's method.

The tube of heroin tablets ($1/6$ grain) was subsequently investigated. It was not a new tube, and tablets had already been administered to other patients without ill effect.

While the patient was convalescent I vaccinated the right arm with $1/6$ grain of heroin dissolved in water, and vaccinated the left arm with a normal saline to act as a control, in order to see if a possible idiosyncrasy for heroin existed. No difference between the two sides could be detected. It is, of course, possible that a desensitizing effect may have been produced, though this is very unlikely.

CASE II.

The second case, for particulars of which I am indebted to Mr. W. E. Tanner, was that of a patient, aged 49, on whom cholecystectomy and appendicectomy had been performed. Before the operation $1/100$ grain of atropine was given, and the anaesthetic was open ether. About an hour after the patient had been put back to bed $1/6$ grain of heroin was given hypodermically. The patient became comatose, with pin-point pupils and no conjunctival reflex. The respirations fell to three a minute, the pulse to 60. She was given pituitary extract and strychnine, and artificial respiration was carried out.

Five hours after the injection of heroin the respirations were nine to the minute. The patient was drowsy, but could be roused. Fifteen hours later the patient was fully conscious; the respirations were eighteen to the minute, and she made an uninterrupted recovery.

CONCLUSIONS.

I have thought it well to put these two cases on record to serve as a warning. Respiratory stoppage must be very rare, but nevertheless when it does occur the very alarming situation can scarcely be imagined.

It is interesting that both these cases were cholecystectomies. In the one case morphine had been given prior to the operation, but not in the other. On the other hand,

the case which had had no morphine prior to the operation had had the heroin administered much sooner than in the first case. Since this episode, which nearly ended in a catastrophe, my practice has been (1) to be quite sure that the patient is fully round from the anaesthetic before any hypodermic injection is administered, and (2) to give only 1/12 grain of heroin, and to repeat it if necessary. My preference for heroin over morphine is still very strong; but the above two cases show that its effect on the respiratory centre may be exceedingly dangerous unless it is given in small doses. It is to draw attention to this fact that I have thought it advisable to publish these two cases.

THREE CASES OF VOLVULUS OF THE SIGMOID FLEXURE OF THE COLON.

BY

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In the first half of 1928 three cases of intestinal obstruction due to volvulus of the sigmoid flexure of the colon came under my care and recovered after operation.

CASE I.

A woman, aged 45, was admitted to the Bedford County Hospital on January 6th, 1928, suffering from extreme abdominal distension, severe pain, and great difficulty of breathing. She gave a long-standing history of constipation, sometimes getting no action of the bowels for three weeks. For three years she had been liable to attacks of abdominal pain, but had never vomited. The history of the present attack was absolute constipation for five days, abdominal pain for two days, retching but no vomiting, and great difficulty in breathing.

On admission to hospital the abdomen was greatly distended, no movement was visible, and there was tenderness in the lower abdomen, especially on the left side.

Operation.—The abdomen was opened in the middle line, and a large quantity of stinking blood-stained fluid escaped. A large cyst-like swelling presented, filling the pelvis, extending well above the umbilicus, and measuring ten or twelve inches vertically. This swelling was black in colour, resonant, and evidently was gangrenous bowel. It was too large to extract through the incision, so was punctured with a large trocar, giving vent to horribly fetid gas. The gangrenous bowel was then delivered from the abdomen, and a piece about eighteen inches long was found to be twisted. This was resected, and the ends of healthy bowel were brought out of the wound and tubes tied in. The cut ends of healthy gut were fixed to one another and to the edges of the peritoneum. When the patient recovered from the anaesthetic her first remark was that she could breathe freely.

The colostomy acted three days later. On February 20th the spur between the divided ends of bowel was crushed by an enterotome, and came away on March 2nd.

She left the hospital on April 23rd with a small sinus. When last seen, on October 19th, there was a pinhole aperture from which a little gas escaped; her bowels were acting well, she had grown stout, and was in perfect health. After the operation x-ray examinations with a barium meal and enema showed that the part of bowel removed consisted of sigmoid flexure and pelvic colon.

CASE II.

A lady, aged 19, pupil at a physical training college, was taken ill at 4 a.m. on May 27th, 1928, with abdominal pain situated chiefly under the left costal margin and in the left loin. She did not vomit, and there was no rise of temperature. Enemata were given without result, and no flatus was passed. These symptoms continued until I saw her on May 28th, at 7 p.m. There was then slight distension of the abdomen, and the chief pain was in the left upper quadrant. There was considerable difficulty of breathing. Morphine and atropine were given, as it was thought the symptoms might be due to enterospasm.

On May 29th there was no improvement, and she was admitted to a nursing home for operation. A subumbilical median incision was made, and the sigmoid flexure of the colon was found to be enormously distended, twisted, and gangrenous. It measured about six inches in diameter, and pressed on the diaphragm. The gangrenous bowel was brought out of the abdomen and resected. Tubes were tied in the cut ends.

On June 2nd, as the abdomen remained distended and there was no discharge from the colostomy, a caecostomy was performed, and 25 c.cm. of *B. welchii* serum was given. Ten days later the caecostomy closed, and on July 1st the patient got up.

On July 11th an enterotome was inserted to crush the spur between the divided ends of the bowel. The bowels acted naturally on July 18th, and next day the clamp was removed. From this time the opening rapidly closed, the bowels acted daily, and on August 4th she left the nursing home with a minute fistulous opening. On October 30th this had completely closed; the bowels acted daily after a dose of petroleum.

Before the attack of volvulus the patient had been very healthy except that she suffered from constipation, for which she had taken large doses of various aperients.

CASE III.

A gentleman, aged 74, was admitted to a nursing home on June 10th, 1928, suffering from symptoms of intestinal obstruction of three or four days' duration.

Previous History.—In 1917 he suffered from constipation, with pain in the back and chest due to flatulence. In 1919 he had a similar attack. In 1926 he had a worse attack, and was in bed for a month.

On admission to the nursing home he had absolute constipation, and no flatus could be passed. Enemata had no effect. He had been vomiting for two days. The abdomen was very distended.

A subumbilical median incision was made and an enormous distension of the pelvic colon and sigmoid flexure was found, due to a twist. Owing to the age of the patient and to the bowel not being gangrenous resection was thought to be contra-indicated. After untwisting the bowel an opening was made near the lower end of the volvulus and a large tube inserted. This gave some relief, but the abdomen remained distended. At the operation 25 c.cm. of *B. welchii* serum was given.

On June 16th caecostomy was performed. This was followed by acute gastric dilatation, manifested by great swelling over the stomach and persistent vomiting. The viscous was washed out two or three times a day for three days, and saline enemata, pituitrin, and strychnine were administered.

He gradually improved, and the caecostomy and colostomy openings discharged freely. He gradually regained health and strength, and, except for the bowel acting through the colostomy, may be considered to have regained his normal health.

Remarks.

The interest of these cases lies in the fact that they all recovered, that they occurred within six months, and are the only cases of volvulus I have met with in a period of over thirty years' work as surgeon to a hospital.

THE SAFETY OF ETHYL CHLORIDE, AND THE POSITION OF THE PATIENT DURING GENERAL ANAESTHESIA.

BY

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At a coroner's inquiry into a recent death under ethyl chloride in Melbourne the question was raised as to the safety of ethyl chloride as an anaesthetic. Like every other anaesthetic, there is a risk in its administration under certain conditions, especially by the closed method—that is, a method in which air is not admitted to the patient during induction—but given a free supply of air during induction and used in either the open or semi-open method, it is one of the safest of all anaesthetics, not even excepting nitrous oxide and oxygen. The above remarks do not mean that one can be free and easy with it; no anaesthetist at any time can ever be free and easy with any anaesthetic. By the semi-open method the air valve in the inhaler, which should have a diameter of not less than half an inch, is gradually closed over as induction proceeds, so that by the time induction is completed—which is, as a rule, in from one and a half to two and a half minutes—the air valve is fully closed. This will give from three to five minutes' full anaesthesia.

Ethyl chloride is not a drug that should be used for prolonged anaesthesia, nor is it intended that it should so be used, except under very exceptional circumstances, and in the hands of an expert. This is for two reasons: first, its great cost, and secondly, its wastefulness when used for any length of time by the open method. It is one of the very best of all the anaesthetics we have for short operations of from one to five minutes or for preliminary induction to ether. In using the words "ethyl chloride," I include also somnoform, which is 83 per cent. ethyl chloride, 16 per cent. ethyl bromide, and 1 per cent. methyl bromide. At the Melbourne Dental Hospital and the Melbourne Eye and Ear Hospital it has been used in considerably over 75,000 patients of all ages during the past twenty-three years, and there have been two deaths, one of which I think should not have happened. The collapse occurred during a second administration of ethyl chloride to an exceptionally delicate female patient who had recently had a very severe haemorrhage and was not, in my opinion, a fit subject for the second administration of an anaesthetic, either local or general.