CASE III.—Intestinal Obstruction from Band with Adhesions.

A woman, aged 58, was admitted into the Royal Victoria Infirmary on July 26th, 1910.

History.—She had had attacks of pain in the abdomen and vomiting since July 10th, bowels moved only by enemata. Five years previously she was in bed for ten months with pain and vomiting.

On Admission.—She looked ill and emaciated; temperature 100.2° F., pulse 120. There was no abdominal distension; tenderness present over the right iliac fossa and rigidity of the lower half of the right rectus. Nothing felt in pelvis.

Operation.—August 3rd, 1910. An oblique incision was made over the right iliac fossa; the appendix was found to be normal. Down in the right side of the pelvis the small bowel was obstructed by a band adherent to the pelvic brim. This was ligatured and the gut released. On pulling up the small intestine from the pelvis about 3 ft. of it presented thickened, oedematous, and hypertrophied walls. At one point a tight simple stricture was seen as if a band had compressed it. This narrow stricture was divided longitudinally and enteroplasty was done. Further along (about 4 in.) the gut presented a raw and profusely bleeding area, which had been adherent in the pelvis. The bleeding was so persistent that it was necessary to approximate the two sides of the bowel with Pagenstecher thread, so as to shut in the raw area. This decidedly kinked the bowel, so much so that the Surgical Registrar thought we should have further obstruction.

Result.—The patient got quite well and the bowels act normally.

SOLID CARBON DIOXIDE IN THE TREATMENT OF HAEMORRHOIDS.

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HAEMORRHOIDS and naevi have an almost identical histological structure, and, having had excellent results in the treatment of the latter by means of solid carbon dioxide, I determined to try it in the former. Both naevi and haemorrhoids show congeries of dilated vessels in a connective tissue basis; but the histological appearances of haemorrhoids differ much from each other, the differences depending on their duration and the irritation, mechanical and bacterial, to which they have been exposed. Thus it is difficult to demonstrate by means of the microscope any selective action on the part of the solid CO₂. Its action depends on its extremely low freezing point (−79° C.). Morton has advanced the ingenious theory that the tissues are cooled and become rigid and the individual cells, with their semifluid contents, become hard and firm; now water and water-containing substances undergo expansion progressively as the temperature falls below 4° C., and this expansion following on rigidity causes fracture of the cell wall and injury to the nucleus. I have not examined haemorrhoidal tissue immediately after freezing, but have done so after fourteen days. Then the changes seen are inflammatory—effusion of blood, round cell infiltration, etc. In one case there was distinct ulceration where the snow had been applied.

The snow is easily prepared from the gas cylinder; a crayon $\frac{3}{4}$ in. in diameter is used. The patient is prepared in the ordinary way, gas is given, and the anaesthesia prolonged for a little by means of ether, the whole operation being over in from three to five minutes. The sphincters are lightly stretched, and the piles brought down by means of pressure forceps. The crayon is then applied with fairly firm pressure for twenty seconds to each haemorrhoid in turn, white saucer-like depressions being produced where the crayon has been applied. The frozen tissues are returned within the anus, and, as no bleeding occurs, a tube is not required, but a simple gauze dressing completes the procedure. No pain should be experienced; the bowels can be opened on the third day and the patient allowed up after that time.

I have now treated 5 cases of piles in this way.

CASE I.—L. L., aged 28, tailor, admitted to Metropolitan Hospital August 30th, 1910, with haemorrhoids of thirteen years' duration. He had haemorrhage, some prolapse, slight pain and constipation. On September 4th solid CO₂ was applied to four uncomplicated haemorrhoids—twenty seconds to each. He had no pain, slept well afterwards, and had no difficulty with micturition. Bowels were opened on the third day, and he was allowed up at the end of a week. The anal canal was examined each day and felt quite smooth. He was dismissed on September 17th and was seen again in the out-patient department, when he was free from symptoms.

CASE II.—H. K., aged 20, tailor, admitted to Metropolitan Hospital on September 25th, 1910, with haemorrhoids of ten months' duration. He had haemorrhage at intervals, slight protrusion, constipation, but no pain. On September 27th three small uncomplicated haemorrhoids were treated by CO₂, as in Case I. He had no pain, but the catheter had to be used for a day or two. He was dismissed on October 8th and seen again in December, when he was free from symptoms.

CASE III.—A. M., aged 29, housewife, admitted to Metropolitan Hospital on September 13th with haemorrhoids of twelve years' duration. She had prolapse, haemorrhage, and pain. On September 16th solid CO₂ was applied to three large internal haemorrhoids for twenty seconds each. There was also present a ring of oedematous external piles. She had no pain afterwards, slept well, and did not require the catheter. The bowels acted on the fourth day, and no prolapse occurred, but on rectal examination the haemorrhoids could be felt as before. All went well for another week, and then prolapse again occurred. On September 30th I did a ligature operation and examined the haemorrhoidal tissue microscopically, but, as stated before, the changes were those of an inflammatory nature.

CASE IV.—Female, admitted to St. Mark's Hospital with haemorrhoids of some years' duration. October 12th, 1910, three large internal haemorrhoids were treated for thirty seconds each with solid CO₂. But the haemorrhoids prolapsed again on the third day, and they were removed by Sir F. C. Wallis a week later by the Whitehead method. I cut sections of the tissue, which showed superficial ulceration where the snow had been applied.

CASE V.—Male, admitted to St. Mark's Hospital suffering from haemorrhoids. He had prolapse and haemorrhage. Three uncomplicated piles were found, and I applied snow to the two lateral piles for twenty seconds each whilst Mr. Gordon Watson, who had charge of the case, ligatured the perineal pile. The patient had no further prolapse or haemorrhage, and was dismissed well.

This treatment by means of solid CO₂ is only suitable for small, uncomplicated internal haemorrhoids, as in Cases I and II. With the good results obtained in the first two cases I believed I had found a simple remedy for the cure of piles, but, as the other cases show, it is only a remedy to be applied in selected cases.

A CASE OF RUPTURED LIVER AND RIGHT KIDNEY: OPERATION: RECOVERY.

BY

GATHORNE R. GIRDLESTONE, M.B.Oxon., F.R.C.S.,

OSWESTRY.

On August 26th, 1911, Thomas D., aged 14, received a severe blow in the right loin from a falling rope bridge at a quarry. He was bending forward when struck.

He was brought up four miles to Oswestry, and was seen by Dr. W. A. Lewis, who sent him straight to the Cottage Hospital, where I saw him at once. His appearance showed extreme shock; his pulse was only 76, small and regular; his pupils widely dilated. There was no external bruising, but his right loin and the right side of the abdomen were very tender and rigid. No abdominal dullness was detected. He was made warm in bed and closely watched.

Two hours later his colour was better, his pulse 88, no change in local signs was discovered. An hour later pulse 96, and shortly after it rose to 104. Exploration was decided on, although no other change was detected.

First Operation.

Chloroform was administered by my partner, Dr. J. H. Crofton. On opening the abdomen through the upper outer part of the right rectus sheath, much free blood and a loose triangular piece of liver about the size of a walnut presented. The anterior part of the liver was intact, and I did not at the first moment find the liver rupture, but on passing my hand into the right loin I felt the kidney with its inner border split and ragged. I then found that the liver in relation with the upper pole of the kidney was widely ruptured. There was a rapid flow of blood from this region, and the boy's condition was becoming very bad. I slightly enlarged my incision by cutting transversely outwards, rapidly shelled out the kidney, from which the whole pelvis, ureter, and vessels had been completely torn away, felt for the renal vessels and put a long-handled clamp on them, thus stopping all the haemorrhage except a slight oozing. I put a large gauze plug in the liver tear.

By this time the patient's collapse was extreme, and I had to cover the wound temporarily and infuse a pint of saline into the median basilic vein, leaving the cannula in place. The patient's condition was still extremely bad; the only hope lay in getting him back to bed as soon as possible. I left the clamp on the renal vessels and sewed the wound up with four stitches, finally infusing another pint of saline.

After-History.

The boy was returned to bed with little hope; his colour was ghastly, his breathing feeble and gasping; his pulse was 110, very soft, but much improved by the saline infusion. I did not give him more saline, as I feared pulmonary oedema or exudation. As a last resort I gave him strychnine mij , ether mij , hypodermically. He was devotedly nursed. Strychnine mij , ether mij , was given again in four hours, and half a pint of saline was given per rectum later as often as he would retain it.

Next morning he was a little better, but extremely weak; pulse 108. In view of the fact that I had not been able to sponge out the blood, which must have been contaminated with renal and hepatic exudation, I feared peritonitis, so gave him calomel gr. v, followed by mag. sulph. 3j hourly; an enema at 4 p.m. was without result. He had further saline rectal injections, and in the night strychnine and ether were again given. Next morning the calomel and mag. sulph. were repeated with good result.

On August 29th he seemed better; the bowels were opened again; the general condition of the abdomen was good. The exudation, which had been very copious, was less.

On August 30th he was better; the pulse varied from 86 to 92.

Second Operation.

C.E. was given by Dr. Crofton. I reopened the wound, sponged out sero-sanguineous fluid from the loin, then, with my finger on the vessels, gently removed the clamp; no bleeding occurred. I replugged the liver rent, put a cigarette drain down to the region, and sutured the wound in layers with silk and, for the skin, salmon gut. The peritoneum had retracted far, and was very difficult to bring together.

The general peritoneal cavity had not been shut off by adhesions; it was clean and dry; the extravasated blood and fluid had entirely disappeared; there was no peritonitis.

The patient stood the second operation most satisfactorily. The sinus healed in a few weeks, and the boy left the hospital on October 25th.

I saw him on December 7th. He was strong and well; the scar was perfectly sound.

The following points seem to me very striking:

1. The severity of the injury: (a) The kidney was ruptured completely away from its pelvis and vessels and partially split; (b) the liver was extensively torn, and a portion completely detached.

2. The fact that the renal vessels were only bleeding comparatively slowly, suggesting wonderfully efficient re action.

3. The slowness of the pulse at the time of admission and the slowness of its rise. I think that this may be accounted for by rupture of the suprarenal with absorption of its secretion.

4. The capability and activity of the peritoneum in dealing with a considerable quantity of blood and exudation so completely in four days.

ON ACETYL-SALICYLIC ACID, WITH SPECIAL REFERENCE TO ITS VALUE IN TYPHOID FEVER.

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ACETYL-SALICYLIC acid is formed from salicylic acid,

by replacing the hydrogen atom of the hydroxyl group by the radicle acetyl, CH_3CO . The chemical formula of acetyl-salicylic acid is therefore

The aspirin is protected.

Many of the physical and chemical properties of acetyl-salicylic acid are very similar to those of salicylic acid. Like the latter, it is a solid, crystalline, very slightly soluble in water, and freely soluble in ether and alcohol. It also resembles salicylic acid in being a monobasic acid, but differs from the latter in being less stable. For instance, it is decomposed by boiling with an alkali or a mineral acid into a salicylate or salicylic acid. Martindale and Westcott state that heating the drug in presence of moisture decomposes it into salicylic acid, and that the solution in water effected by means of sodium bicarbonate contains sodium salicylate and sodium acetate. They also state that when the drug is administered by the

mouth it passes unchanged through the stomach, decomposing only on reaching the alkaline intestinal juices. Cushny holds a similar view, for he states that the systemic action of the drug is dependent upon its decomposition in the intestine into sodium salicylate. According to these authors, therefore, the actions of salicylic acid and acetyl-salicylic acid, administered by the mouth, are the same, except with regard to their local actions in the stomach. This, I believe, is incorrect; and I shall report observations in this paper which show that the pharmacological action of the two drugs, after absorption, are not the same, and that acetyl-salicylic acid is absorbed, at least in part, before decomposition occurs. Solutions of the drug, which should be similar to those which occur after the drug is administered by the mouth, were tested for salicylic acid, making use of a solution of ferric chloride, which gives a violet colour with salicylic acid, but not with acetyl-salicylic acid. This is the usual qualitative test for a salicylic acid, and it was used, in addition, to determine quantitatively, by a colorimetric method, the amount of salicylic acid or sodium salicylate formed from acetyl-salicylic acid.

Summary of Chemical Experiments.

1. A solution of the drug in cold water gives no violet colour with ferric chloride.
2. A solution of the drug in boiling water gives a violet colour with ferric chloride.
3. If one dissolves the drug in cold water, and then boils, the intensity of the ferric chloride reaction increases for several minutes.
4. The drug, dissolved in water, at the temperature of the body, gradually decomposes, the amount decomposed varying with the length of time for at least twelve hours. A colorimetric method showed that the amount of acetyl-salicylic acid decomposed in twelve hours was four times greater than that in three, and that very little was decomposed in half an hour.
5. The drug dissolves in a solution of baking soda or in a 1 per cent. solution of sodium carbonate without decomposing into a salicylate. If either of these solutions is kept at the temperature of the body decomposition gradually occurs, but very little is decomposed at the end of half an hour.
6. The drug dissolves in a 0.2 per cent. solution of hydrochloric acid without decomposition. If the solution is kept at the temperature of the body decomposition gradually takes place.

These experiments indicated that the decomposition of acetyl-salicylic acid in a medium such as the gastric or intestinal juice is a gradual process, and that thirty to forty minutes after the drug is exhibited, at which time its pharmacological action is frequently evident, very little of the drug is decomposed. I believe that this is true, because I can show that the analgesic and antipyretic actions of acetyl-salicylic acid are more potent than those of salicylic acid, which could not be the case if acetyl-salicylic acid were decomposed by the intestinal juice, as Martindale and Westcott, Cushny, and others state. I should judge, therefore, that as a rule the greater part of acetyl-salicylic acid is absorbed undecomposed.

Pharmacology.

The principal difference in the pharmacological action of the two drugs—salicylic acid and acetyl-salicylic acid—is due probably to the presence in the latter of the radicle acetyl, because the introduction of this group into a compound as a rule augments both the analgesic and antipyretic actions. For instance, acetanilide, which is the acetyl derivative of aniline, and acet-phenetidine (phenacetine), which is the acetyl derivative of phenetidine, are more analgesic and antipyretic in character than aniline and phenetidine respectively.

The Analgesic Action.

Nowadays the analgesic property of acetyl-salicylic acid is fully recognized, and it is extensively used in the relief of pain. It has the advantage over acetanilide, antipyrin, and phenacetine of being less injurious to the blood and other tissues of the body.

The principal indications for the exhibition of acetyl-salicylic acid as an analgesic are the relief of the milder forms of pain, such as that of sore throat, tonsillitis, myalgia, pleurisy, etc. My surgical colleagues tell me that it is very valuable in the relief of pain of diseases of bone and joints, and I have found it, in doses of 5 grains every three hours, of considerable value in the relief of pain of malignant disease.