rather than as transverse rings the danger of subsequent stricture is avoided. 3. The anus being uninjured the sphincter acts normally after the operation. 4. In no case have I found the slightest indications of sepsis (the temperature never rose beyond 100° F.) after the operation; there has been no case of suppression of urine, comparatively little sickness following, and when the bowels were moved for the first time after the cauterisation no great pain was suffered. 5. In no case have I found recurrence of prolapse or of internal hæmorrhoids.

Glasgow.

A CASE OF INTUSSUSCEPTION AND VOLVULUS OCCURRING AT INTERVALS IN THE SAME PATIENT;

WITH OPERATIONS AND RECOVERY.

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AND
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THE patient, who was a married woman, aged 27 years, was admitted to the Hampstead General Hospital on July 6th, 1903, suffering from severe abdominal pains. Her family history contained nothing of importance except that one sister had died from volvulus. Until the present illness the patient had always been healthy. She had one child who was now aged two years. The present illness commenced on the morning of July 4th, when she felt tired on waking but was not in pain. At 9.30 A.M. she had severe abdominal pain, causing her to go to bed. This was followed by continuous retching but no actual vomiting. At night the pain became more severe and morphine was given. The bowels acted naturally next day. No blood was noticed in the stools. Later in the day the pain in the abdomen returned with persistent retching. As her condition did not improve she was sent to the hospital at 7.30 P.M. on the 6th.

On admission the patient presented typical abdominal facies. Her tongue was furred and moist. Her pulse-rate was 124 and her temperature was 100·4° F. There was much pain in the lower part of the abdomen, particularly on the right side. At 4 A.M. it was noted that her abdomen was not distended. There was good movement of the upper portion but restricted movement below, particularly on the right side. There was extreme tenderness over the lower part of the abdomen, especially on the right side; an ill-defined mass, dull on percussion and not moving with respiration, was felt. There was no œdema of the skin. The heart and lungs were apparently normal. An enema was given and a small action was obtained. On July 7th a catheter was passed and 15 ounces of urine were withdrawn. The swelling remained much the same. Retching returned with pain. Under A.C.E., administered by Dr. A. H. Cook, Dr. Ware operated, assisted by Dr. Gordon Strange.

In the belief that the condition was probably a large appendicular abscess an oblique incision was made in the right iliac region, but the appendix was found to be normal. On exploring towards the middle line a distended coil of bowel which could not be brought into the wound was felt. A central incision was made about three inches long, terminating one inch from the symphysis pubis. The gut referred to was found to be an intussusception involving the small intestine and extending to a point about two and a half inches from the ileo-cæcal valve; it was about two feet in length. After the abdominal cavity had been packed off an attempt was made at reduction but failed owing to gangrene of the intussusceptum. Clamps were then applied to the healthy gut adjoining the diseased area, and after sectional ligature of the mesentery the whole mass was excised. As much fæcal matter as possible was allowed to escape from the proximal gut, and the clamp being replaced the ends of the bowel were brought together and united by three layers of sutures, one continuous all through, one continuous Lembert's suture, and one separate Lembert's suture. The peritoneal cavity was cleansed by sponging and it was intended to fold over the divided mesentery, but this was found to be impossible owing to the condition of the patient. The abdominal wounds were rapidly closed, gauze drains being used in each. The time occupied by the operation was two hours. After rallying from the shock the patient made an uninterrupted recovery. Her bowels acted naturally on July 9th and after removal of the plugs 48 hours after the operation. The wounds rapidly healed and she was discharged on August 7th, 1903.

She was admitted for the second time in the afternoon of April 13th, 1905, with the following history. Since the previous operation she had continued very well until April 12th, having in the meantime given birth to a child in January, 1905. At noon on April 12th she felt pain in the abdomen and vomited, the bowels having previously been moved earlier in the morning; from then up till the time of admission neither fæces nor flatus was passed. At the time of admission her face had an expression of distress with a malar flush; there were some dyspnœa and cough. Her temperature was 101°, her respirations were 44 per minute, and her pulse-rate was 128. Pain in the lower part of the abdomen was complained of, a small area of greater tenderness being situated over McBurney's point; pain was also referred to the right side of the chest. On examination it was found that the hypogastric and right iliac regions were distended and that the respiratory movements ceased at the umbilicus and were absent from there over the lower abdomen. The percussion note over this region was tympanitic; just above and to the right of the umbilicus it was duller than elsewhere. The rectum was found to be empty. The scars of the former operation were present. No signs of abnormality were found in the chest; the urine was passed without pain and was found to be normal in character. An examination of the blood showed no evident leucocytosis. At 6 P.M. an enema of one and a half pints of gruel with half an ounce of turpentine was administered; 20 minims of tincture of belladonna were also given by the mouth and were retained. At 8 P.M. she felt a little more comfortable and a flatus tube was passed without result.

At 9.30 P.M, the abdomen was opened by Dr. Glover, Dr. E. Collingwood Andrews assisting. The A.C.E. mixture was the anæsthetic employed and was administered by Dr. Cook. On the peritoneum being cut through a coil of gut projected, which was absolutely black in colour and greatly distended; about six ounces of blood-stained offensive fluid escaped from the peritoneal cavity. The loop when followed up was found to consist of small intestine twisted on itself close to the cæcum and quite impossible to be reduced. The loop was accordingly incised and about 16 ounces of dark-coloured, fœtid, blood-stained fluid were drained away from it. It was then easily reduced. The bowel was clamped and divided about two inches above the gangrenous portion and the mesentery, which was much swollen and plum-coloured, and in which the veins were thrombosed, was tied off. The gangrenous portion was then removed, the lower end also being divided between clamps. At this time the patient, in spite of two hypodermic injections, each of $\frac{1}{25}$th of a grain of strychnine, was very collapsed and her pulse was running at 140 per minute. As rapidly as possible a Murphy's button was inserted into the divided ends of the gut and an end-to-end union was accomplished. Five Czerny-Lembert sutures were inserted in addition to the purse-string sutures around the two halves of the button. Nothing further was done beyond closing the wound by interrupted sutures; these were passed through the whole abdominal wall, no attempt being made to suture in layers; a drainage-tube was put down into Douglas's pouch. Dressings were applied and the patient was removed to bed as quickly us possible. The foot of the bed was raised and one pint of normal saline fluid with 15 minims of solution of adrenalin were administered by the rectum. The patient was sick once after the operation and rallied well. The drainage-tube was removed finally on April 22nd and by the 25th the whole wound was healed. She was up for the first time on May 8th.

On April 22nd it was noted that to the right of the lower end of the wound, midway between that point and the superior anterior right iliac spine, a hard knob could be felt "on palpation—probably the button." On the 25th this mass had moved outwards and was felt more deeply in the iliac fossa, the wound at this time being all but healed. On the 29th there was still something to be felt at this point but very indistinctly. On the tenth day after the operation the patient complained of severe pain in the rectum while going to stool and it is surmised that at this time the button was passed. Through an unfortunate oversight it was never found in the fæces, but an x ray photograph taken before her discharge from the hospital on May 26th failed to show any trace of a metallic structure in any part of the abdomen.

During the first week after the operation the temperature kept up to 100° but it then came down to normal and thereafter only reached 99·6°, the highest point, once in the six weeks of the patient's stay in the hospital. She has continued well ever since the operation.

For the notes of the cases we are indebted to the resident medical officers, Dr. H. W. Sinclair and Dr. J. A. Anderson.

FURTHER OBSERVATIONS ON THE INFLUENCE OF CALCIUM CHLORIDE ON THE AGGLUTINATION OF VIBRIOS.

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AND

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IN a previous paper on the influence of various salts on the agglutination of vibrios we showed that chloride of calcium greatly favoured this phenomenon; but the number of vibrios examined by us was too small to warrant the conclusion that this was a general rule. We thought it advisable, therefore, to repeat these experiments on a larger number of vibrios, more especially as we were able to examine six vibrios (El Tor), which, though agglutinated by the so-called cholera serum, yet did not present all the so-called specific characteristics of the cholera vibrios. Moreover, we studied the action of this salt, i.e., calcium chloride, on vibrios not agglutinated by cholera serum in order to see whether the action of the salt was specific for cholera vibrios or not.

Method.—The serum used in our previous experiments became inactive when diluted 100 times with distilled water. Since then, however, we have observed that the amount of serum necessary to produce agglutination in distilled water varied not only according to the strength of the serum, but also according to the agglutinability of the particular microbe at the time the experiment was made. Thus, whereas the vibrio CK was agglutinated as a rule by a 1 in 300 solution of cholera serum in distilled water, a much stronger solution—namely, 1 per cent.—was necessary in order to agglutinate it after it had passed through an animal. Similar variations depending on the age, virulence, mode of culture, &c., of the vibrios can be easily demonstrated. We therefore compared before each experiment for each microbe the agglutinative power of the serum when diluted with distilled water, and when diluted with physiological salt solution. The agglutinating power was always far less in serum diluted with distilled water than in the same serum diluted with physiological salt solution. Table I. illustrates this.

TABLE I.

No.	Vibrios.	Agglutinating strength of cholera serum diluted in physiological salt solution.	Agglutinating strength of cholera serum diluted in distilled water.
1	CK	1 in 1000	1 in 300
2	Berlin 70	1 ,, 1000	1 ,, 300
3	Berlin 76	1 ,, 800	1 ,, 250
4	Aida	1 ,, 1000	1 ,, 300
5	Fatma	1 ,, 1000	1 ,, 300
6	Machaout	1 ,, 1000	1 ,, 300
7	Berlin 115	1 ,, 1000	1 ,, 300
8	141	1 ,, 800	1 ,, 250
9	145	1 ,, 500	1 ,, 200
10	CV	1 ,, 1000	1 ,, 300
11	CVA	1 ,, 1000	1 ,, 300
12	El Tor No. 1	1 ,, 500	1 ,, 200
13	,, ,, 2	1 ,, 500	1 ,, 200
14	,, ,, 3	1 ,, 800	1 ,, 250
15	,, ,, 4	1 ,, 800	1 ,, 250
16	,, ,, 5	1 ,, 500	1 ,, 200
17	,, ,, 6	1 ,, 800	1 ,, 250

Let us, for instance, suppose that the 1 in 1000 solution of serum dissolved in physiological salt solution agglutinated a given vibrio, but that a much stronger solution—namely, a 1 in 300 solution—of the same serum in distilled water was necessary to produce the same effect, then the solution we used with the various salts to be tested was always a weaker one—namely, 1 in 400. The various solutions of calcium chloride were made with pure water distilled, tested with nitrate of silver and barium chloride and diluted 10, 100, 500, 1000, 2000, 5000, 10,000, and 20,000 times. Similar solutions of sodium, potassium, barium, and magnesium chlorides served as controls. The cholera serum was rabbit's serum prepared with cholera vibrio CK. 17 agglutinating vibrios were used, among which were the six El Tor vibrios mentioned above. The following table gives our results.

TABLE II.

No.	Vibrios.	Title of calcium chloride solution. 1 in 20,000	1 in 10,000	1 in 5,000	1 in 2,000	1 in 1,000	1 in 500	1 in 100	1 in 10	Distilled water.
1	CK	+	+	+	+	+	+	+	–	–
2	Berlin 70	+	+	+	+	+	+	+	–	–
3	Berlin 76	+	+	+	+	+	+	+	–	–
4	Aida	+	+	+	+	+	+	+	–	–
5	Fatma	+	+	+	+	+	+	+	–	–
6	Machaout	+	+	+	+	+	+	+	–	–
7	Berlin 115	+	+	+	+	+	+	+	–	–
8	141	+	+	+	+	+	+	+	–	–
9	145	+	+	+	+	+	+	+	–	–
10	CV	+	+	+	+	+	+	+	–	–
11	CVA	+	+	+	+	+	+	+	–	–
12	El Tor No. 1	–	–	–	–	+	+	+	–	–
13	,, ,, 2	–	+	+	+	+	+	+	–	–
14	,, ,, 3	–	–	–	+	+	+	+	–	–
15	,, ,, 4	–	–	–	–	±	+	+	–	–
16	,, ,, 5	–	–	–	–	–	+	+	–	–
17	,, ,, 6	–	–	+	+	+	+	+	–	–

From this table we see that all the vibrios, except the El Tor vibrios, are agglutinated by extremely dilute solutions of calcium chloride in the presence of the serum.

We now selected some vibrios which were agglutinated by cholera serum—viz., 98, 167, 52 (which were isolated from dysenteric stools at El Tor at a time when there was no cholera epidemic) and "Alioglu" (which was isolated from a cholera stool but which does not agglutinate with cholera serum) and investigated the influence of calcium chloride on their respective sera. It was evident that calcium chloride did not favour their agglutination to the same extent that it favoured the agglutination of the cholera vibrios.

TABLE III.

No.	Vibrios.	Serum prepared with each vibrio and diluted in calcium chloride solution. 1 in 20,000	1 in 10,000	1 in 5,000	1 in 2,000	1 in 1,000	1 in 500	1 in 100	1 in 10	Serum in distilled water.
1	98	–	–	+	+	+	+	+	–	–
2	167	–	–	–	+	+	+	+	–	–
3	52	–	–	–	+	+	+	+	–	–
4	Alioglu.	–	–	+	+	+	+	+	–	–

The other chlorides experimented with showed no regular