can be pumped through ether in a Woulfe's bottle, warmed by passing through a coil in a thermos flask, and finally passed into the patient's mouth through the air-way's lateral attachment.

In lieu of the air-way a mouth prop with a tube perforating it can be used. The air-way is preferable as by it the tongue is kept from falling back.

Hyde Park Gate, S.W.

DIAPHRAGMATIC HERNIA,

WITH REPORTS ON TWO CASES.

BY RICHARD WARREN, M.D., M.CH. OXON.,
F.R.C.S. ENG.,

SURGEON, LONDON HOSPITAL; SENIOR SURGEON, EAST LONDON HOSPITAL
FOR CHILDREN.

HERNIA of abdominal viscera through the diaphragm is tolerably rare, but likely to be more common in future as a late result of battle wounds. I have had two cases under my care in this hospital recently, and assisted a colleague with another in France. The records of this hospital show four cases in the past ten years, making a total of seven—sufficient to provide food for discussion.

Etiology.—The age varied from 16–68. Injury plays an important part. Three cases were the result of gunshot wounds of the chest and abdomen, a fourth had suffered from fractured ribs on both sides in a buffer accident. Of the other three, two were young people—16 and 30—with no history of injury, and probably due to congenital defects; the last case was a female of 68 with a long history of wasting and vomiting, no note of injury, and so may also have been of congenital origin.

Position of hernial orifice; contents of hernia.—In four cases the opening was about two inches in front of the oesophageal opening: in one case the opening was an enlarged oesophageal opening, in the other two position is not mentioned.

In 3 cases the contents of the hernia were stomach, in 2 large gut, in 2 small gut.

In 5 cases there were acute obstruction and strangulation, in 1 case subacute obstruction of a recurrent type, in 1 case no obstruction but an associated pyloric ulcer, laparotomy for which led to discovery of the more rare condition.

Diagnosis.—In most of the cases this was only made during a laparotomy for treatment of the obstruction, or in one case to treat a pyloric ulcer. In one case the combination of signs of acute obstruction, with a retracted empty abdomen, a small old wound in the mid-axillary line and a large well-healed laparotomy scar rendered the diagnosis of diaphragmatic hernia very likely, but examination of the chest showed nothing definitely abnormal except some doubtful tinkling sounds heard over the left chest on one occasion. Displacement of the heart was not definitely ascertained in any case. Examination of the chest was in all cases rather cursory as the attention was mainly directed to the severe intestinal obstruction, nor was there opportunity for careful examination by X rays with opaque meals, &c. Exact diagnosis, in fact, is not likely to be made in the urgent cases which appear to be those more commonly met with, but in the abstracts of the two cases which follow it will be seen that there are some points worthy of attention.

Notes of the Two Cases.

CASE 1.—Patient, aged 59, male, was admitted in January, 1919, with intestinal obstruction. He complained of pain in the lower abdomen for a week with copious vomiting and inability to pass flatus. The patient had been getting thin for 2–3 years. About three years ago he was crushed between buffers and stated that his lower ribs were fractured on both sides. On admission he was very ill, with marked abdominal facies. T. 96° F., P. 104, R. 24. There was a large resonant swelling of pear shape in the epigastrium, large end uppermost. A splash was elicited on palpating this swelling. The lower abdomen was quite hollow and retracted. Heart and lungs clear. Nothing felt per rectum.

Laparotomy revealed a curious condition: the small intestines were contracted and tiny, the stomach acutely dilated, but the pylorus and duodenum could not be found. The stomach was emptied of gas with a trocar, and it was found that the pylorus and part of the stomach and duodenum had passed through an opening in the diaphragm.

A stomach-tube was passed and the stomach further emptied, when it was possible to pull down the pyloric part of the stomach with pylorus and duodenum through the aperture in the diaphragm. A very distinct pressure ring was noted on the stomach where it had been compressed by the hole in the diaphragm. The hernial orifice admitted three fingers easily and was immediately in front of the cardiac end of the stomach and oesophagus which formed its posterior wall. Fingers in the sac felt the heart beating in front. The hernial ring was closed with a strong purse-string suture and the abdomen closed; operation lasted 30 minutes.

The patient, who was severely shocked before the operation, stood it well, but did not rally, and died 26 hours after. As he had been ill a whole week before coming under surgical treatment this is not surprising.

CASE 2.—Patient, male, aged 23, admitted in February, 1919, complained of pain in the right chest for six days with constipation. Vomiting had commenced three days before and had become more urgent, and finally brown in colour, but not faeculent. In 1916 he had sustained a gunshot wound in France. The entry wound was in the left mid-axillary line about the nipple level. A laparotomy had been done in France and, as appeared later, the spleen removed. Both wounds were well healed.

On admission patient was collapsed, sunken-eyed, with dry tongue. P. 112, T. 97.6°. The chest was resonant, vocal resonance, breath sounds heard all over. Once it was thought that tinkling was heard over the left chest. The heart was not obviously displaced, but the apex beat was rather diffuse and there was some dullness to the right of the sternum. The abdomen was greatly retracted and hollow, resembling the condition of an advanced obstruction of the oesophagus; there was no rigidity or tenderness.

Laparotomy was performed through the old scar. The small gut was empty and contracted, the stomach and pylorus had disappeared. Tracing the jejunum upward it was found that the stomach and most of the duodenum had passed through an aperture in the tendinous part of the diaphragm into the thorax. Some omental adhesions about the opening made matters rather obscure at first. An examination about the splenic flexure of the colon showed that the spleen had been removed. The constriction at the aperture in the diaphragm was tight and was divided with hernia knife and director. When this was done the duodenum, stomach, and omentum were pulled down, the stomach being moderately dilated; omentum adherent round the aperture was freed, and the aperture was found to extend back from the tendon of the diaphragm to the oesophageal opening. The opening in the diaphragm was closed with a purse-string suture and the abdomen closed, taking 35 minutes in all.

The patient made an uninterrupted recovery: the only one of the seven who survived.

It may be noted that in both these cases closure of the aperture in the diaphragm was fairly easy, since the obstruction was very high up and as there was no distended small gut to obstruct the passage of the needle.

Another Case: Value of Early Diagnosis.

Since writing the above an eighth case came under observation a few days ago.

The patient was also an ex-soldier of about 30, with a healed E. and E. wound of some standing passing from the left mid-axillary line to the left side of the spine rather below the nipple level. This patient had been vomiting for a whole week before he was sent up and arrived moribund and pulseless, with urgent vomiting, Hippocratic facies, subnormal temperature, and a very retracted but soft abdomen. This condition, and the position of his old wound, rendered the diagnosis of strangulated diaphragmatic hernia very probable. He was quite unfit even to be moved to the theatre, much less for operation, and in spite of stimulant, infusion of morphia, &c., did not rally at all, but died in 3 or 4 hours.

Post mortem a large hole was found in the diaphragm just in front of the oesophagus, into which all the stomach, except a small part of the cardiac end, as well as an inch of duodenum and a loop of transverse colon, had escaped. If only he had been sent up a few days earlier his life would almost certainly have been saved.

It is hoped that the publication of these cases will render practitioners alive to the likelihood of diaphragmatic hernia in patients with old wounds of the lower thorax, and it may be specially noted that though the general signs of intestinal obstruction—viz., urgent vomiting, collapse, and inability to pass flatus—are manifest the abdomen is not only soft and not tender, but even markedly hollow and retracted.

Weymouth-street, W.