NOTES ON A CASE OF TRAUMATIC HERNIA OF THE DIAPHRAGM PROVING FATAL SEVEN MONTHS AFTER THE WOUND.

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Pte. D., of the S.A.I., aged 29, was admitted to the Connaught Hospital on the afternoon of August 31, with the following history:—

Having had no previous illness and led a vigorous and healthy life, he was wounded in February, 1916, whilst fighting against the Senussi. He was stooping forward when hit, so that the bullet, which entered over the left scapula, apparently came to rest in the subcutaneous tissues of the abdominal wall in the left hypochondrium.

He was taken to a dressing station where he vomited some blood, and subsequently to a base hospital, at which an operation was performed on his abdomen, and he believed the bullet was removed.

Both wounds were healed in ten days, he was kept in bed for five weeks, became restored to full health and was eventually discharged to duty.

About six weeks after the original wound he had his first attack of abdominal pain; it was very slight, and he did not take much notice of it. Subsequently he had many such attacks—three or four a month, latterly they had become more severe, but he had not felt ill enough to report sick. He had observed that the attacks were nearly always preceded by constipation; he then had a premonitory feeling of uneasiness in the abdomen, and if he could now get his bowels to open well could sometimes avert the attack. The pain came on after, or half-way through a meal, and would pass off in a few minutes, being relieved when he lay on his right side; while it lasted it was very severe, but in between the attacks he felt quite well, though he thought his wind was not as good as it had been.

He was admitted in what he described as a typical attack, but much more severe than any before experienced. His bowels had not been open for two days, and then half way through breakfast had come on the pain; he vomited the food just taken, but with no relief.

On examination he proved to be a well developed man of normal physique; over the centre of the spine of the left scapula was the scar of the entrance wound; in the middle of the left hypochondrium was a healed, two-inch linear incision.

He complained of a dull, continuous pain across the upper abdomen, to which were added occasional paroxysms of agony, during which he turned pale and cold, and broke out into a sweat, while his pulse was small, slow, and irregular; the position he adopted during these paroxysms was very striking, sitting bolt upright with his knees huddled up to his chin, the slightest attempt at straightening the back being intolerable.

On inspection and palpation the left hypochondrium appeared emptier, and the left thorax fuller, than on the other side.

The physical signs in the chest resembled those of a hydropneumothorax. The right border of the heart was $2\frac{1}{2}$ inches to the right of the sternum ; the apex beat was not palpable, but was best heard in the fourth left space close to the sternal margin.

At the apex of the left lung the percussion note was of a higher pitch than at the right, and the breathing was bronchial. But from the second space downwards the note was tympanitic all over the cardiac area and continuous with the stomach resonance.

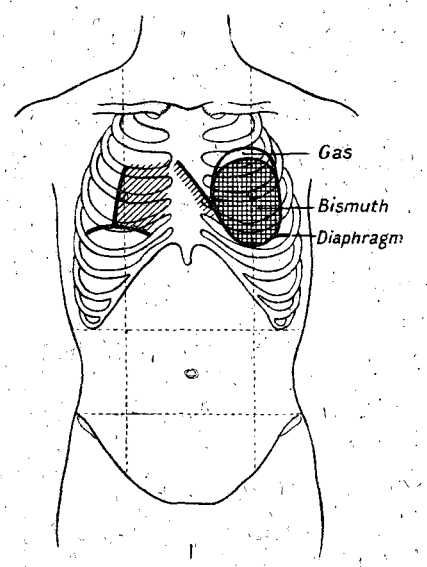

FIG. 1.—To illustrate X-ray appearance on August 31.

There were no breath sounds over this area, but with the patient in the sitting position curious tinkling sounds were audible in the third space. The signs at the back were similar, and bell sounds with coins were easily demonstrated.

The true diagnosis did not strike me at the moment ; I thought the dilated stomach was pushing up the diaphragm. But in a quiet interval between two paroxysms I gave the patient three ounces of bismuth carbonate, and with the help of Captain Hawks, radiographer to the hospital, examined him with the screen. The horizontal position was the only available one, but the picture obtained was quite definite.

All the bismuth was contained in the stomach, which reached up to the second left rib in front, and above it could be seen the dense com-

pressed lung. The time for observation was limited, for the patient had a paroxysm of pain which compelled him to revert to the sitting position, but Captain Hawks was able to see a fine shadow to the left of the lower end of the stomach, having a slight vertical movement with respiration, which he took to be the diaphragm. The diagnosis of diaphragmatic hernia was now made. Most of the bismuth was removed by means of a stomach tube and evacuator, but this gave no relief. Two doses of $\frac{1}{4}$ grain of morphia were given in the night, and the patient had a little sleep still in the sitting posture, and as his general condition was better he was transferred early next morning to the care of the surgeons at the Cambridge Hospital.

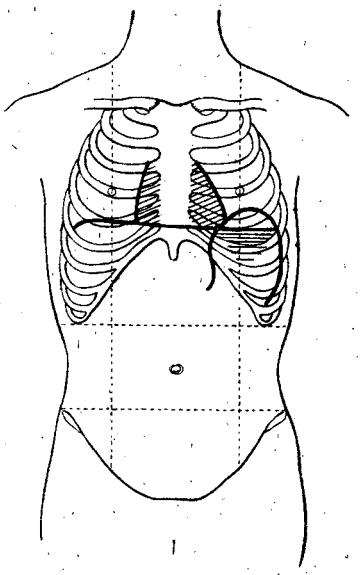

FIG. 2.—To illustrate X-ray appearance on September 19.

Here his condition rapidly improved, the pain disappeared, and in a few days he was able to take his food without discomfort.

Through the courtesy of the officer commanding the Cambridge Hospital and the officers in charge of the case, I was able to see the patient again nineteen days later. No operation had been performed, and he was apparently in normal health.

Physical examination showed the stomach resonance to reach the fourth rib, and the heart was a little displaced to the right. This was confirmed by X-ray examination in the vertical position.

The left dome of the diaphragm showed as a clear, thin line with no breach in its continuity; the stomach lay below it and the picture was

apparently that of distension of this viscus with consequent stretching of the diaphragm.

There can be no doubt, however, that the correct interpretation of this picture was that the surface area of the diaphragm was increased and its contractile power diminished by reason of the large gap in its substance which was subsequently discovered, and that the high position of the stomach with displacement of the heart was consequent upon this.

There was now some debate as to the validity of the original diagnosis. Those who opposed it brought forward the argument that the bullet, if it had indeed passed through the diaphragm, must have damaged the scapula, of which a plate was produced showing no evidence of injury; moreover, that continuing its course, it could hardly have failed to pierce the heart and so cause death.

Subsequent events showed the fallacy in any argument based on the theoretical course of a modern bullet between wounds of entrance and exit.

A fortnight later the unfortunate patient had another attack of abominal pain; operation was performed, and the hole in the diaphragm found, but his condition was desperate, and he subsequently died of shock.

At the post-mortem a large circular opening with quite smooth and rounded edges was found near the centre of the left dome of the diaphragm, which would admit of a medium-sized hand being passed into the thorax, in which were contained the stomach, great omentum, transverse colon, and the upper half of the small intestine, the last being kinked in several places, distended, and of a deep plum colour. The stomach reached as high as the second rib and was partly adherent to the chest wall; the apex of the heart lay just to the left of the sternum.

Finally, the expanded copper casing of a rifle bullet was discovered in one edge of the wound in the diaphragm, but no trace of the leaden core was found; presumably it was that which had been removed from the abdominal wall.

A remarkable point about this case is the length of the history. The wound in the diaphragm must have existed from the first, and apparently the increased intra-abdominal pressure resulting from constipation was the occasional cause needed to force a knuckle of stomach through the opening. The contractions in this knuckle set up by taking food then caused the agonizing pain, partly relieved only by the crouching position, in which the tension of the diaphragm was reduced to its minimum.

To this was added the continuous ache probably due to the drag of the stomach and other viscera upon their peritoneal attachments.

Up till the attack in which I first saw him spontaneous reduction must have occurred quite easily on every occasion, and eventually happened even after the stomach had been above the diaphragm for at least twenty-four hours.

Of the symptoms when the patient was first seen, the most important features were the presence of gastric distension and abdominal pain *without* vomiting, the fact that the condition was not relieved by the passage of a stomach tube, and especially the posture adopted.

Although in this case the rent in the diaphragm was so large that nothing could have been done to repair it, it is possible that such cases may occur again and that an earlier diagnosis might enable the surgeon to operate with some hope of permanent relief.

I am indebted to Lieutenant-Colonel W. Turner, Officer Commanding the Connaught Hospital, for permission to publish this case.