inches. He was able to say most ordinary words, though some of them were still not very plainly spoken. He insisted upon being called "Jack" instead of "Johnnie," as he was previously called.

GUNSHOT WOUNDS OF CHEST WITH PENETRATION OF LUNG: EXTRACTION OF BULLETS: RECOVERY.

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THE following case is of interest in two particulars: (1) The proximity of one of the bullet tracks to the heart; (2) the fact that the bullet which traversed this path passed through the lung from front to back, accompanied by a small piece of bone and fragments of a woollen singlet.

D. C., an Italian seaman, aged 26, was found lying in a field near Penarth at 2.30 P.M. on November 10th, 1896, in a state of collapse, and bleeding profusely from the front of the chest. He was conscious, and said that at 9 o'clock that morning he had fired two bullets from a revolver into his chest with the intention of killing himself. This statement was afterwards proved to be correct, so that by the time he was discovered he had lain in the field for about 5½ hours. He was taken home in a cab, and when I saw him shortly afterwards, he was lying on a bed fully dressed, and his singlets, woollen shirt, waistcoat, coat, and overcoat were literally soaked in blood down the whole of the front and left side. He was extremely weak, his pulse being scarcely perceptible.

On opening out the clothes, I found two circular wounds in the præcordial region, one over the fourth rib and the other in the fourth interspace, both blackened with gunpowder, and both bleeding profusely, and from the lower one air was also escaping at each expiration, whilst there was emphysema of the cellular tissue on the left side, extending up into the neck and down to the level of the lower ribs.

On probing these wounds, the track of the upper one was found to pass outwards along the rib, while that of the lower led almost directly backwards with a slight inclination to the left. I used the probe freely, for reasons which will be stated later on, passing the instrument along the track of the lower wound for 6 inches backwards through the cavity of the chest. No bullets could be felt in either of the wounds. On account of the weak condition of the patient, no further search was possible until the evening, when I was able to turn him on to his right side, and by making incisions along the inner border of the scapula, and using a probe, was fortunate enough to discover two bullets: one of these, corresponding to the upper wound in front, was lying in contact with the outer aspect of the fourth rib, along which it had evidently run; the other one lay projecting between two ribs, and had to be forcibly dragged out by forceps, along with a piece of bone (apparently from the anterior part of the fourth rib), with which there were entangled fragments of wool, corresponding in colour and texture to that of his singlet. These bullets were of large size, and had sharp projecting spiral spurs on their surface, evidently due to their having been too large for the bore of the revolver.

As ether and chloroform were inadmissible, owing to the patient's condition, local anaesthesia was employed before performing the operation, and was effected by means of ethyl chloride spray and hypodermic injection of cocaine. The incisions were afterwards packed with boracic lint soaked in carbolic lotion, and no attempt being made, for reasons to be afterwards stated, to keep patent the communication, if such existed, between the incisions and the pleural cavity.

For the first three days the respirations were rapid—as to the minute—but the pyrexia was slight, the temperature not being above 103° F. morning or evening. On the second day he had a severe attack of dyspnoea in the early morning, simply gasping for breath for two hours.

There was no expectoration or cough until the fourth day, when he brought up a small quantity of plum-coloured sputum, this being repeated once or twice daily until the tenth day, after which it disappeared. On the first appearance of the sputum the odour of the breath became offensive, and a creasote spray was put in operation several times a day, the nozzle of the instrument being placed inside the mouth, and the patient made to deeply inhale the vapour, while the air of the room was also sprayed. The bad odour of the breath disappeared in a couple of days. No lung tissue was found in the sputum.

The incisions in the back were dressed daily, being packed with boracic lint soaked in carbolic lotion, as at the first. From the fourth to the sixth day a rubber drainage tube was substituted for the lint, but was discarded again, as the latter was found to produce more efficient drainage. The wounds in front had become filled with blood-clot, and were simply protected by boracic ointment and lint, and on the tenth day the clots fell out, leaving healthy-looking surfaces.

Throughout the progress of the case the highest temperature was 101.5° F., and this on one occasion only, the average temperature being between 99° and 100° F.

On about the fifth day dulness and other signs of pleuritic effusion on the left side appeared, and on December 2nd, the twenty-third day of the illness, when this dulness had reached the level of the spine of the scapula, an exploratory trochar was introduced, and 4 ounces of transparent blood-stained fluid drawn off. A week afterwards this operation was repeated, but this time no fluid could be obtained; on this occasion the costal pleura was felt to be enormously thickened. The dulness cleared up, except for a slight want of tone in the percussion sound, evidently due to the thickening of the pleura.

The posterior incisions finally healed up by the middle of December, and by the first week in January the patient was able to take a long walk, at the rate of four miles an hour without any sign of dyspnoea or fatigue.

REMARKS.

The first point of interest in connection with this case is the proximity of the lower bullet track to the heart. As has been already described, a probe inserted along this track passed backwards, in the direction of a straight line drawn from the lower wound in front to the inner of the two incisions behind. The position of the heart was as follows:—The apex beat was felt 1 inch vertically below the nipple, and the line limiting the absolute cardiac dulness passed outside the lower wound, so that it was evident that the track of this bullet must have been in the closest proximity to the heart, for the fact of the absolute dulness extending outside the wound showed that the latter must have lain well within the left border of the organ. To those who had an opportunity of examining the patient and observing the relation of parts, it appeared impossible that the bullet which traversed this track could have missed the heart; but, for my own part, I cannot believe that any penetration, or even grazing of its substance took place for the following reasons: (a) The relation which the outline of the heart bears to the direction of the track of the lower wound is such that if the bullet had come into contact with the organ, it seems most probable that it would have passed through the interventricular septum and the edge of the left ventricle, necessitating a wound of the left coronary artery, which seems incompatible with a recovery devoid of any cardiac symptoms. (b) There would further have been extensive laceration of the pericardium, considering the size and jagged nature of the bullet and the direction of the track, whereas symptoms of any pericardial affection were conspicuous by their absence. On the other hand, however, it must be borne in mind that gunshot wounds of the heart have been proved to be by no means necessarily fatal, since it has been shown beyond doubt that men have lived for months after the heart has been penetrated by bullets, and, further, that wounds of the ventricle are not so dangerous as those of the auricles.

The second point of interest is the injury to the lung, and here we have more definite data upon which to form conclusions, as there was no doubt of the fact that penetration of the lung tissue occurred, considering the escape of air from the wound at each expiration, and the emphysema of the cellular tissue. It is a cause for wonder that the patient did not die from primary hæmorrhage, seeing that he had lain in a field for 5½ hours after the infliction of the injuries, during which time he had evidently, from the state of his clothes, lost an enormous quantity of blood. The point which I wish to discuss, however, is the absence of septic pneumonia or empyema. When we consider that not only a bullet and a piece of rib, but that a fragment of woollen singlet also, had passed through the lung substance from front to back, it must be acknowledged that the risk which the patient ran of septic mischief within the chest was very great. One other factor has to be taken into consideration, however—namely, the presence or absence of external air along the bullet track, and by the phrase "external air" I mean air which has entered the thorax through its walls, in contrast to that which enters by the trachea and bronchi. It is this difference in the mode of entrance of the air, which, as is well known, constitutes its septicity or otherwise. Erichsen, for instance, asserts that "the air which escapes from a wound of the lung is...thoroughly filtered, and has no tendency to give rise to putrefaction of the extravasated blood or inflammatory effusions in the parts about the wound." Now in the case of this patient there was no evidence that air had entered through the bullet wound, for whereas air could be heard to pass out through the latter on expiration, none appeared to enter during inspiration. The inference was therefore that any air present in the pleural cavity had in all probability arrived there through the lung tissue, which was a guarantee of its aseptic condition; and it was the consideration of this fact which led me to make no attempt to keep the posterior incisions in communication with the pleural cavity, the more so as, in removing the bullet from between the ribs, I was unable to make sure as to whether it was lying on the inner or the outer aspect of the costal pleura. It appears to me that such an incision, even if it does include the pleura, is by no means sufficient for the purpose of thoroughly irrigating and draining the pleural cavity; hence it seems best either to pack the incision well and close the

aperture of communication, or to make a suitable opening by excising a portion of the rib, in order to provide facilities for efficient drainage. As the condition of the patient was such as to render any further operative procedure than was absolutely necessary inexpedient at the time, I chose the former alternative.

Fig. 1.—Scars of wound of entry.

Fig. 2.—Scars of wound of extraction.

One other point in the mode of treatment in this case remains to be explained, namely, the free probing of the bullet tracks, which was carried out when I first examined the patient. As has been mentioned already, a probe was passed through one of the wounds almost directly backwards for a distance of 6 inches, not once but a number of times during

my first visit. This is contrary to the usual teaching, but I fail to see what harm a blunt probe, rendered aseptic, is going to do provided it be used with the utmost care and gentleness, after a large bullet, with sharp ridges on its surface, has passed through the chest. The only danger seems to me to be the admission of air; but if the probing be performed whilst blood is flowing from the wound this risk is entirely avoided, while the same proviso dispenses with the argument that the introduction of the probe might disturb blood clots in the track. At the same time the procedure facilitates the escape of the effused blood from within the chest, thus tending to empty the pleural cavity, as probably happened in this case (for the fluid which was afterwards drawn off by the aspirator contained but a trace of blood, only as much, in fact, as might have resulted from the introduction of the exploring needle), and it is to this primary drainage, if we may so term it, of the pleural cavity that I am inclined to ascribe to a great extent the uninterrupted recovery of the patient.

The withdrawal of the effused blood through the very track which has caused the hæmorrhage, is likely to be of the most effective nature, and it certainly frees the patient from one of his greatest dangers; for otherwise, if the patient's condition is such as to limit operative procedure to what is absolutely necessary for immediate exigencies, should effused blood have to be left within the cavity of the chest, if only for a few days, it must pass through one or other of three changes, each of which is full of risk to the patient: (1) To be absorbed unchanged, which is the least dangerous but probably the least frequent, and which makes a severe demand upon the strength of a patient, already prostrated; (2) it may break down and make its way through the lung tissue into the bronchi, and thus be discharged, which is a process fraught with danger; (3) it may form a nidus for the growth of organisms, giving rise to septic empyema or pneumonia, or both, the dangerous character of which, in cases of gunshot wounds of chest, is too well-known to need further reference.

Fig. 3.—The bullets removed

To summarise, the two principles on which I would lay special emphasis in the treatment of gunshot wounds of the lung are: (1) To facilitate as much as possible the escape of effused blood through the original wounds; (2) to prevent the entrance of air into the chest, either through these wounds or through incisions which may be made for the purpose of extracting the foreign bodies.

Attention to this second point will limit as far as possible the entrance of septic organisms, whilst that paid to the first will deprive them of the principal nidus for their growth and development.

FOREIGNERS AND MEDICAL DEGREES IN FRANCE.—During the academic year 1895-96 the degree of Doctor of Medicine was conferred by the seven faculties of medicine in France on 1,029 persons. Of these, 125 were foreigners, of whom 95 (including 12 women) graduated in Paris, and 30 (including 2 women) in one or other of the provincial faculties. Among the various nationalities represented by these foreign students, Russia headed the list with 36 doctors, of whom 12 were women; next came Turkey with 28, including 1 woman; then Roumania with 9, South America with 6, Great Britain 5, Greece 5, Africa 5, etc.