

lymphatic leukaemia, which in many respects, especially in its frequently rapidly fatal results, resembles a germ infection; but in symptoms and course spleno-medullary and lymphatic leukaemia are so different that one sometimes wonders why they have generally been described together, unless it is that both are due to the same cause, but one running a very acute course, the other a chronic one, just as may happen in some other germ diseases, as, for instance, tuberculosis or glanders.

I have narrowed down diseases from the point of view of cause into ten groups only. This may appear surprisingly small and surprisingly simple. Allowing for that latitude which is always necessary when looking at very many objects from a large standpoint, I do not think I have taken many liberties in putting any particular disease into any particular group, although I do not pretend that the classification is one strictly conforming to the logical laws of classification. But I think the grouping is a convenient one, and I trust that on testing it will be found to stand criticism, and may be helpful in enabling us to steer a true course to reach the haven of real cause, and after reaching it to perform our next and highest duty, real prevention.

THE LATER HISTORY OF CASES OF GUNSHOT WOUNDS OF THE CHEST, WITH RETAINED MISSILES.

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THE question of what becomes of soldiers who have been shot in the chest and in whom the missiles are still present is one of great importance, as it bears directly upon the treatment of such cases. Should such missiles be immediately removed or should they be left alone? are the questions which are being much discussed at the present time. In a general way it may be said that among the French medical officers the tendency is frequently to attack such cases surgically, while amongst the British practitioners a more conservative policy is usually adopted.

The matter can only be settled when we have sufficient data to enable us to form an opinion as to what harm such foreign bodies do when left *in situ*, and also we must know what is the immediate risk to life of active surgical interference. This war is, unfortunately, providing us with only too much material upon which to form such opinions, and in the meantime, until great masses of statistics are available, as many cases as possible may be placed on record to help in this direction.

The Present Investigation.

For some months now I have been endeavouring, at the suggestion of Lieutenant-Colonel T. R. Elliott, to collect notes of patients in the Canadian hospitals in England, who have undoubtedly got foreign bodies in the chest, as shown by X ray examinations, and, although the list is still a small one, I give it as an early contribution to the subject. A large number of cases have been seen in the hospitals who have not yet been finally disposed of, but these are not included, as it is the final fate of such cases that we wish to ascertain.

In each of the cases in the list the X ray findings are given, and it will be seen that I include all cases in which the foreign body lies deeper than the ribs, so that in some instances these are not in the lung at all, but it seemed wise to include them in the series.

It will be observed that there were only two deaths in the list, and it is interesting to note that these two patients had been operated upon for the late removal of the retained foreign body. In one of them (No. 9) an abscess had formed round the offending missile, so that in this case an operation was urgently required, but in the other instance (No. 13) the patient was apparently well, and it would probably have been wiser, as the sequel showed, if he had been left alone. In a paper in THE LANCET of Sept. 8th last, by Colonel Elliott, there is a list of 170 cases of gunshot wounds of the chest, in which the after-history had been traced, and the only case that had a fatal issue in England was one in which

there had been an operation for the removal of a rifle bullet from the lung. In 51 of his cases a foreign body remained in the chest, and Colonel Elliott does not think that this increased the gravity of the prognosis in any instance.

As regards the disposal of our 50 patients, 12 have been invalided to Canada or Australia or have been discharged as permanently unfit. One was tuberculous. Two died (as already mentioned, after operation). Three were categorised as "C 3" or "permanent base duty," 4 went to "light duty," and the remaining 29 were sent to full duty, "A 3," or "Command Dépôt," where they would soon be considered fit to return to their units. Thus out of the 50, 36—i.e., 72 per cent.—were fit for some military duty, and only 14 were lost to the Army. The different ways of disposing of the patients is due to the fact that some were imperial men, while the rest were from overseas.

There must now be an immense number of these cases back at the Front and on other military duty, and yet how seldom is it that they are again invalided on account of disability resulting from the late effects of the retained foreign bodies. During my work in the past year in Canadian hospitals in England, and again in such work in France for nearly two years, I do not remember having come across such a case, and my colleague, Colonel F. G. Finley, tells me that his experience has been the same over a similar period.

Nearly all soldiers who have been shot in the chest, and in whom the missiles are still retained, complain of some cough and shortness of breath and of some pain in the chest, but I cannot say that they complain any more than do those in whom the missile has passed through and through. Further, in the former case most men have unfortunately been told that the foreign body is still in the chest, and have even been shown the X ray plates, and the knowledge so acquired is bound to make them introspective and thus will retard their complete recovery.

The Question of Operation.

The question of the early removal of large pieces of, in all probability, septic foreign material is not one that can be discussed now, but I note with entire approval that Colonel Elliott thinks that such large pieces of shell and shrapnel casing in the lung should be disposed of at once, as they will almost certainly produce gross infection, with frequent severe hæmorrhage, if left alone; but with this exception it would seem well to be very chary about removing small foreign bodies, especially rifle bullets and shrapnel balls. These do not seem to do any harm if left alone, and in no way increase the gravity of the symptoms produced by other associated conditions, such as hæmothorax, pneumothorax, and actual lung lesions.

Colonel Elliott states that it would appear from recent French publications that the mortality is much higher in chest wounds than was at first supposed, and that this high mortality requires vigorous efforts on the part of the surgeons to save life. "Also, in respect of casualties who survive these wounds, evidence is brought forward to show that retained projectiles, and especially shell fragments, almost always cause trouble, either by the introduction of sepsis, or, if sterile, by the introduction of later pathological changes or symptoms that incapacitate the patient for service."

Hence it has been urged by several surgeons that all shell fragments, other than those of small size, should be removed within the first 24 hours, with a cleansing of the wound track, suture of the lung, and evacuation of blood-clot from the pleural cavity. With this rule there will probably not be much difference of opinion. But the same authors go on to advocate "the removal from the thorax of all other retained foreign bodies at a much later date when the possibility of septic complications has passed away." In my humble opinion no such routine operation is called for. There are exceptions, of course, as where such a foreign body is giving rise to active trouble. Thus, in Case 6 in our series the patient had a resection done for an empyema and a permanent sinus remained, which eventually was found to lead directly to a piece of shrapnel which lay in the lung surrounded by fibrosis. This was removed and all the acute symptoms disappeared and the sinus closed, and the patient was well on his way to recovery before he left for Canada.

Even if it should occur that these foreign bodies do commonly at a much later date produce distress, probably it would then be less risky to remove them than to do so earlier merely in anticipation of such possible trouble.

No.	Age	X ray.	Weeks before final disposal	Disposal.	No.	Age	X ray.	Weeks before final disposal	Disposal.
1	—	Shows bullet (shrapnel) left chest at level of spine of scapula; many fragments also here.	25	C 3.	27	32	Shows medium-sized piece shrapnel intrathoracic close to articulation of 7th right rib.	42	Canada.
2	—	Shows pieces of shrapnel all over left side of chest.	—	Com. depôt.	28	—	Shows piece of shrapnel between 5th and 6th ribs on left side, 3 in. from sternum. Developed empyema. Chest opened and drained.	—	Duty.
3	—	Shows piece of shrapnel between 4th and 5th ribs rt. side. Piece of shrapnel upper 3rd right lung.	—	A 3.	29	—	Shows F.B. 1 cm. by $\frac{3}{4}$ cm. lying in rt. chest $2\frac{1}{2}$ in. from spine and 4.3 in. from sternum.	—	"
4	—	Shows large piece shrapnel intrathoracic just on left diaphragm. Moves with respiration.	—	Com. depôt.	30	—	Shows shrapnel ball just inside left lateral chest.	—	"
5	—	Shows shrapnel bullet in region of junction 11th and 12th rib and vertebra.	—	Duty.	31	—	Shows shrapnel at level of angle of scapula. Pleura drained.	—	"
6	22	2 pieces shrapnel, 1 large, 1 small, intrathoracic, left side, large piece just internal to 7th rib 9 cm. from vertebral border. Opacity left lower lobe. Fracture 9th rib.	—	Invalidated to Canada.	32	—	Shows small piece shrapnel over 9th rib. Wound enlarged and rt. chest drained. F.B. not removed.	12	Invalidated to Australia.
7	27	Bullet lying intrathoracic left side just posterior to 5th interspace on diaphragm, point toward back. Marked opacity left base. Movement of diaphragm restricted.	—	Duty.	33	—	Shows rifle bullet rt. chest at junction of 11th rib and vertebra.	—	Duty.
8	34	Shrapnel ball, intrathoracic, left side, lying on diaphragm, 5 cm. in from apex of heart. Marked opacity in rt. lung. Diaphragm higher than normal, with adhesions to lateral chest wall.	—	Com. depôt.	34	—	Shows F.B. left side behind lower end of sternum.	25	"
9	—	F.B. $4\frac{1}{2}$ in. from spine at the same level, with a large abscess around it. Oct. 17th, chest opened and abscess drained. Small piece of bone removed from lung. Oct. 28th, patient died of hæmoptysis.	—	Died.	35	—	Empyema developed. Chest opened and drained. X ray shows F.B. in chest opposite 7th dorsal vertebra.	30	Invalidated to Canada.
10	—	Shrapnel bullet left chest just opposite heart. No lung changes July 27th, 1917, D. 1.	11	D 1. Com. depôt.	36	—	Shows bullet in centre of lower half of left chest with fibrosis around it.	11	C 3.
11	—	Injury to rt. clavicle 2 in. from external end, some necrosis occurring. F.B. in lung.	16	D 1. Com. depôt.	37	—	Shows F.B. $\frac{3}{4}$ in. \times $\frac{1}{2}$ in. right chest $4\frac{1}{2}$ in. from ant. chest wall. No hæmothorax. Paralysed arm from injury.	16	Canada.
12	—	F.B. in chest opposite 1st interspace, close to sternum. 11 cm. from back.	—	D 1. Com. depôt.	38	—	Shows bit of explosive bullet $\frac{3}{4}$ in. \times $\frac{1}{2}$ in. in right lung behind 3rd rib.	16	Com. depôt.
13	—	Rifle bullet in lung. Operated on. Died suddenly on 3rd day, apparently from pulmonary thrombosis.	—	Died.	39	—	Shows piece of shrapnel $\frac{3}{4}$ in. \times $\frac{1}{2}$ in. in right chest behind 2nd rib. Wound of entrance over middle of rt. scapula.	17	"
14	18	Several small fragments of shell in right lung. Large hæmothorax, relieved by oxygen replacement.	20	Duty.	40	—	Foreign body present.	29	"
15	29	Shows large piece shrapnel intrathoracic, rt. side, level 3rd rib, 7 cm. right of mid. line. Marked infiltration rt. upper lobes and cavity here. <i>Tubercular bacilli in sputum.</i>	2	Invalidated to Canada.	41	—	" "	8	"
16	27	Shows small piece shrapnel lying 1.5 cm. internal to 10th rib, mid-axillary line, rt. side. 2 small pieces just external to 9th rib, 2 cm. from vertebral border, lt. side. 1 small piece just internal to 8th rib, 2 cm. from vertebral border, rt. side.	15	Com. depôt.	42	—	" "	9	"
17	31	Shows shrapnel ball intrathoracic 2 cm. in front of the 6th interspace, just to right of spine; no lung involvement.	9	Light duty.	43	—	" "	11	"
18	39	Shows shrapnel ball intrathoracic lying 2 cm. anterior to 8th interspace near spinal column, lt. side. Multiple fine shrapnel at site of fracture of 8th rib.	15	Invalidated to Canada.	44	—	" "	8	"
19	24	Shows medium-sized piece shrapnel intrathoracic just above diaphragm near apex of heart, about 4 cm. anterior to 10th rib posteriorly. Old fracture 8th and 9th ribs.	15	Permanent base duty.	45	—	" "	9	Invalidated, perm. unfit. Com. depôt.
20	29	Shows large piece shrapnel near diaphragm opposite 10th vertebra, left side.	70	Invalidated to Canada.	46	—	" "	16	"
21	23	Shows large piece and several small pieces shrapnel intrathoracic, left side, posterior, level 6th rib, moves with respiration. Also large and multiple shrapnel intrathoracic rt. side posterior level of 4th rib.	31	Light duty.	47	—	" "	8	"
22	20	Shows medium sized piece shrapnel between 9th and 10th ribs, 2 cm. to left of spinal column.	33	"	48	—	" "	12	"
23	23	Shows F.B. in diaphragm in front of 10th dorsal vertebra, near rt. border, just below heart.	54	"	49	—	" "	52	"
24	19	Shows large piece shrapnel just internal to 5th interspace, nipple line, rt. side.	13	Com. depôt.	50	38	Several small pieces of shell in rt. lung, empyema and resection.	18	Invalidated to Canada.
25	32	Shows shrapnel ball intrathoracic left side, 6 cm. deep, level of 10th intercostal space. 3 cm. from vertebral margin. Fibrosis and opacity here.	13	Invalidated to Canada.					
26	18	Shows large piece shrapnel intrathoracic left side, 3 cm. from mid-axillary line, level 7th rib posteriorly.	30	"					

Conclusions.

1. Evidence is lacking that small fragments of shell and shrapnel and likewise rifle bullets and shrapnel balls retained in the lung commonly give rise to any serious trouble.

2. The mortality of gunshot wounds of the chest in patients that have survived the early days of their invalidism and been sent to England with retained missiles in the chest is practically nil if these foreign bodies be left alone.

3. Hence, when it has not been considered necessary by the surgeons at the Front to operate immediately, it should not later on be done, unless, indeed, some very definite indication, such as an abscess, exists.

ABNORMAL MEDIAN AND ULNAR NERVE-SUPPLY IN THE HAND.

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DURING the last six months I have met with four cases of abnormal nerve-supply to the hand, two of the sensory distribution and two motor. In two cases the first and second dorsal interossei were quite unaffected in severe ulnar nerve lesions from gunshot wounds, indicating their supply to be from the median nerve in these cases, while the other two cases illustrated an abnormally large sensory supply by the ulnar to the inner two and a half fingers instead of the usual one and a half.

In one of these latter, Captain J. A., aged 34, a case of median-nerve injury from a shell wound in the upper arm, in which the brachial artery was also severely injured, there was the usual wasting of the flexors and of the thenar eminence, with reaction of degeneration of these muscles, but the anæsthesia was limited to the palmar surface of the thumb, the index, and the outer half of the middle finger, both on palmar and dorsal aspects, no trace of anæsthesia being present on the inner half of the middle finger, though the injury was sufficiently severe to abolish sensation completely to prick and to firm pressure on the two distal