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REPORT

OF A

CASE OF EMPYÆMA,

WITH

OPERATION FOR CLOSURE OF PLEURAL CAVITY BY REMOVING PORTIONS OF FOUR RIBS,

WITH REMARKS.

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Report of case on admission kindly furnished by Dr Wyllie.

D. S., æt. 22, single, floorcloth printer, admitted into Ward 31, Royal Infirmary, on 12th April 1883, complaining of shortness of breath, cough, and general weakness.

History.—Had always been a strong healthy man till his present illness, which began, three months before his admission, with severe pain in the left side. Says that the room that he worked in was close, ill-ventilated, and dusty; and thinks his illness was due to cold, caused by a draught in the room. The pain began severely one morning when the patient awoke. He consulted a medical man, who diagnosed pleurisy, and tapped the chest about the end of the first week of the illness. At the operation, 2½ pints of clear fluid were withdrawn, and the patient was much relieved, though he states that much cough, with frothy expectoration, followed the operation. He was tapped a second time six weeks afterwards, but does not know what quantity of fluid was then taken. The pain in the side had disappeared before the first

operation, and has not since returned. There was no pain or discomfort after either of the tappings. There has all along been a short dry cough, and the illness has been attended with considerable loss of strength. The family history is good. The father died from accident, the mother from cancer of the mamma. The brothers and sisters are all alive and well.

Present condition.—The patient is well formed; height, 6 feet; weight, 12 stones. Looks pale and delicate, and says he has lost weight considerably during his illness.

There is some fulness of the left side of the chest, which measures at the level of the nipple $18\frac{3}{4}$ inches, as compared with $18\frac{1}{4}$ on the right side. On physical examination, it was evident that air was contained in the upper part of the left pleural sac, and fluid in the lower part, the dulness produced by the fluid having its upper limit about the level of the lower angle of the scapula behind, and about the level of the nipple in front. Hippocratic succussion could easily be produced, and the patient was conscious of a splashing in his side when he turned himself in bed. Over the upper or resonant portion of the left side there was some very faint and distant respiratory murmur of a vesicular type, accompanied, both in front and behind, by a few metallic tinklings. The vocal resonance and fremitus were much diminished. Over the lower or dull portion there was complete absence of breath-sounds, as well as of vocal resonance and fremitus. On the right side the percussion note was normal, and the respiratory sounds loud and harsh, but otherwise normal.

The heart was evidently pressed on to some extent, the apparent apex beat being in the epigastrium, and the right border of the cardiac dulness being 2 inches to the right of the sternal margin. The *appetite* was fairly good. The patient *slept* fairly well. The *urine* was normal. The patient's *respiration* as he lay in bed was moderately quiet, the number of respirations per minute varying from 24 to 32. His *pulse* was weak, rapid, and easily compressible, 108 to 134 per minute. His *temperature* presented a considerable amount of diurnal variation, the morning temperature being 98° to 99°, and the evening temperature 100°·5 to 102°.

On the 15th of April, three days after the patient's admission, as the rapidity of the pulse and respiration was increasing, the chest was tapped with an aspirator, and 34 ounces of pus withdrawn. The pus was not fœtid. The patient felt better after the operation, but as the case was thought one that would need to be treated by incision, the patient was, on the 17th April, transferred to the surgical wards, to be placed under the care of Mr Miller.

Surgical History.—Antiseptic opening of the pleural sac was performed in the beginning of May, and a large quantity of pus

evacuated. The incision was made below the angle of the scapula in the ninth intercostal space. As drainage was not perfect on account of the rising of the diaphragm, a second opening was made on 20th July, by removing a portion of the ninth rib.

Operation.—Considerable difficulty was found in administering chloroform, as the patient had to be laid on his right side, and partly on his face, to admit of the necessary manipulations, and this materially interfered with the expansion of the right lung, on which he had to depend for respiration. An incision was made at once down to the rib immediately above the previous wound, the rib exposed, the periosteum separated, and about an inch of the rib removed with the bone pliers, after being partially sawn through with a Hey's saw. There was little bleeding, and a knife was then pushed through the posterior layer of periosteum and costal pleura, and a permanent opening established by inserting a large-sized drainage tube. At this operation two drainage tubes were recovered which had previously been sucked into the cavity, notwithstanding ligatures having been attached to them. On examination with the finger, the pericardium and contracted left lung were easily felt, both covered with granulations; the latter apparently firmly tied down to the vertebral column. After this operation patient improved very much for some weeks.

Oct. 5th, 1883.—Examination by Dr Wyllie. Chest, right side, 18¼; left, 16—together, 34¼; left side somewhat shrunken. Anterior wall flattened, and movement very defective on left side. Percussion moderately resonant over whole left side, least so over base near wound. The note is nowhere quite so full as the normal percussion note of the right side. "Bell sound" beautifully present over whole side, except in the scapular region, where thickness of the parieties probably interferes with it. With wound closed there is absolute silence over whole left side on auscultation; but if air is allowed to enter at the wound it produces a sound which, on auscultation of any part of the side, is heard as a loud ringing amphoric breathing. The right side is normal, except that the breathing sounds are puerile.

Dec. 14th, 1883.—Carbolic gauze changed to boracic lint, as former was irritating the skin. From this period, eight months after opening, up till March 1884, no record was made in the case book. By the latter date the use of the spray and antiseptic precautions had been discontinued on account of the discharge having become putrid. At this period the dressings were of carbolic or salicylic wool changed almost daily. Sometimes as much as ℥xx. would come away in twenty-four hours. After this the patient began to lose ground progressively and perceptibly.

On *30th May,* 1884, an operation was performed to promote falling in of the chest wall, and, if possible, obliteration of the extensive suppurating cavity. About an inch and a half was removed

from four ribs, the 4th, 5th, 6th, and 7th, by a procedure similar to that previously described, only that a chisel was used instead of the Hey's saw. Each portion was removed by a separate incision made over the long axis of each rib in the anterior axillary line. This position was made necessary by the impossibility of laying the patient on his right side.

These portions of ribs were shown to this Society on the 2nd July last, when it was reported that their removal was somewhat difficult on account of the ribs being all closely jammed together. The portions removed were twice their normal thickness from deposit on the inner surface.

Soon after this operation the flattening of the chest wall visibly increased, the lower ribs (8th and 9th) standing out very prominently; and there was no space evident where the ribs had been removed.

Report of examination by Dr Wyllie.—*June 18th;* three weeks after operation. Circumference of chest at level of nipples, 33 inches; right side, 18; left side, 15. Much contraction on left side in anterior and lateral regions; very little in posterior region. During ordinary respiration, scarcely any expansion of left side except in lower posterior region. In upper anterior region there is movement of the clavicle during inspiration, but this seems to be altogether dependent upon the expansive movement of the right side, with elevation of the right clavicle and manubrium sterni. Box of larynx depressed very slightly, $\frac{1}{16}$ inch with each inspiration. Alæ nasi do not move at all. Percussion on left side behind markedly dull down to level of inferior angle of scapula, below which it is less dull, there being some boxy resonance in the percussion note. In front, percussion note quite dull above clavicle, and comparatively dull over whole of anterior and lateral regions; least marked between clavicle and upper edge of 3rd rib. *With two coins*, something of metallic clang can be heard in supraspinous region posteriorly; also over base below angle of scapula, but this "bell sound" is inaudible elsewhere in front or behind.

Auscultation. — Some vesicular breath-sound (not much) is audible over scapular and interscapular regions, but not elsewhere. Breath-sounds elsewhere absent.

Accompaniments.—None if wound be kept closed; but if air be allowed to enter at wound, loud metallic tinkling râles are audible, both over apex in front and behind and over base close to wound.

Vocal resonance diminished, except over lung posteriorly. Nowhere any metallic echo.

Right side percussion note fairly good all over.

Auscultation.—Breath-sounds harsh and vesicular, with prolonged expiration over the whole side. Bronchitic accompaniments,

especially sibilations present over whole side, but in no great abundance. Vocal resonance very distinct, but not louder than might be expected from emaciated condition of costal parieties.

After this period discharge diminished considerably, and there was promise of the wound closing, and the patient improved in general health and spirits. Injections of various lotions were tried to hasten the closure of the cavity and approximation of its walls. Iodine caused some irritation and increased the discharge. Corrosive sublimate (1 to 2000) seemed to do well, but had to be discontinued on account of its producing diarrhœa. Twice the wound was closed and sealed with collodion after careful washing out, but the discharge was merely dammed back, and had to be let out after a few days on account of the respiration being impeded.

The cavity which before the removal of the ribs contained many ounces of fluid, never could be made to retain more than 3 ounces of injection after the operation.

For a week or two before his death the patient suffered from fits of unconsciousness, which afterwards were accompanied by convulsions, sometimes unilateral and sometimes bi-lateral. In Dr Wyllie's absence he was seen by Dr Muirhead, who pronounced them to be due to uræmia.

Patient gradually sank and died on the 11th September 1884—one year and five months after the commencement of his illness.

Post-mortem examination made on September 13th, 1884, by Dr Alex. Bruce, in the absence of Dr Bramwell.

Chest.—Left side of the thorax below the level of the nipple is much contracted. The right side of the chest, at the level of the base of the xiphisternum and also that at the level of the second rib, measures 16½ inches. The corresponding measurements on the left side are 14 inches and 14½ inches.

On the left side there is a sinus pointing between the 8th and 9th ribs, and another between the 9th and 10th ribs, also four linear cicatrices over the 4th, 5th, 6th, and 7th ribs, 2½ inches long, crossing the anterior axillary line on the left side.

Heart.—Apex found lying between the 3rd and 4th ribs, 5 inches to the left of the middle line.

In the left mammary line the upper border of the diaphragm extends up to the lower border of the 4th rib.

The left pleural cavity contains 7 ounces of cream-coloured, not fœtid, pus. The fluid occupies less than a fourth of the cavity. The right pleural cavity is partly obstructed by adhesions. The left pleural cavity extended from the level of the lower border of the 4th rib upwards to the apex. This cavity communicated by an aperture ¾ of an inch in diameter with a smaller

cavity capable of containing 2 or 3 ounces of fluid. This second cavity lay behind the apex of the heart, and communicated with the external openings noted above. The parietal pleura of the upper cavity is much thickened and granulated. The left lung is contracted to a mass slightly larger than a kidney. The right lung was found to be healthy. The liver weighed 8 lb., and was indented by the ribs. It was markedly waxy. The left kidney weighed 10 oz.; the capsule was slightly adherent, congested, fatty, and waxy.

Remarks.—The case was one of *pyo-pneumo-thorax,* following tapping for effusion after pleurisy.

(*a.*) I would remark, in the first place, that aspiration was unequal to the task of permanently removing the pus from the pleural cavity, even though the fluid was apparently aseptic. The only test applied to the pus was the microscope. No bacteria were seen; but the belief that the fluid was aseptic is supported by the fact that when it became distinctly septic nine months after, the patient suffered from septic fever, and then multitudes of bacteria were seen in the discharge.

(*b.*) The stages noted in regard to the falling in of the chest are worthy of close attention. The measurements were, when he came in, 18¼ inches right and 18¾ inches left, the diseased side being the larger. Six months after admission, the measurements were 18¼ inches and 16 inches. This showed that collapse of the chest wall had progressed as far as it could; and this was proved at the second operation by the ribs being found in absolute contact. After this operation and the removal of portions of four ribs, the measurements sunk to 18 inches and 15 inches, showing still greater collapse. But besides the diminution in girth there was marked flattening over the part where the ribs had been operated upon. It will be seen, from the preparation lying on the table, that adhesion has taken place between the contracted lung and the chest wall just where the ribs were removed. And I think it is not too much to suppose that had portions of more ribs above, and perhaps also of the clavicle been removed, and still more had this been done a year sooner, complete closure of the cavity would have resulted and the patient's life been saved. An earlier operation was prevented by the obstinate refusal of the patient to submit to any interference.

(*c.*) As to the operation, I consider that if performed subperiostially, antiseptically, and by a separate incision for each rib made lengthwise, there should be no danger of life whatever, even though portions of seven or eight ribs were removed and part of the clavicle also. When I operated on D. S., he suffered very little from shock, though he was very weak at the time. The steps of the operation are simple—1st, an incision in the long axis of the rib for say 3 inches, carried down to the bone at once; 2nd,

the periosteum separated carefully; 3rd, the rib is then cut half through with a Hey's saw or a chisel, and its section completed with the bone pliers. There should be no hæmorrhage, for the intercostal artery is safe from injury outside the periosteum. At the attachment of the intercostal muscles, a few touches of the knife may be required.

(*d.*) Now as to the part of rib to be removed, I would recommend the anterior axillary line for the following reasons—1st, That part can be easily got at without having to turn the patient over on the opposite side, which necessarily impedes breathing, and interferes with the safe administration of an anæsthetic; 2nd, The ribs are thinner in front than behind, and more easily cut through; 3rd, The operation can be performed separately from the incision for drainage and dressed separately.

(*e.*) With regard to the question of drainage, I have found that a very dependent opening made at first, as in D. S.'s case, is not the best, because after the opening the chest collapses, and the diaphragm rising acts as a valve, preventing free flow from the cavity. The high level to which the diaphragm rose in D. S.'s case is worthy of notice, being 2 inches above the normal level. I would imagine, therefore, that an opening between the 7th and 8th, or 8th and 9th, ribs below the angle of the scapula would make the best drain.

(*f.*) In referring to the history of the case I have recorded, I would use it as an argument for early operation. I am as sure as one can be of anything that D. S.'s life would have been spared had I operated a year sooner. Because, 1st, He died of amyloid degeneration; 2nd, He greatly improved after the operation, weak as he was; 3rd, The man was in fairly good health when he came into my ward, and would then have stood a much more severe operation than the one I performed a year afterwards; 4th, The parts would probably have contracted more thoroughly at an earlier period; 5th, The operation being aseptic, if performed at first, there would have been less risk at that earlier period; 6th, The lung might have expanded and materially assisted to fill the reduced cavity.

(*g.*) I have but one remark more to make, and it is in regard to the alterations discovered, post-mortem, that had resulted from the operation.—1st, The cavity had become virtually obliterated opposite the part of the chest wall operated on; 2nd, Further obliteration was prevented by the rigidity of the chest wall in the upper part. The ribs being in contact and the lung tied down, it was impossible for that portion to be filled up.

I would now conclude this hasty sketch by repeating the main points demonstrated by the case.—1st, The removal of a portion of a rib is a simple and safe operation; 2nd, The removal of portions of several ribs is not dangerous to life; 3rd, The anterior

axillary line is the best point for operating, because there the ribs are thinner, and the operation can be performed with the patient on his back; 4th, A separate short incision for each rib is better than one long one in the long axis of the body; 5th, Removal of portions of ribs greatly assists the contraction of an empyæmic cavity, and if a sufficient number are removed from the proper ribs, such a cavity may be permanently closed; 6th, Such an operation should be performed early to give the patient the best chance while the health is fairly good, and there is a possibility of the lung expanding somewhat. I would be inclined to fix the time at that period when it has become evident that a simple drainage opening is not sufficient to effect a cure.

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