

THE USE OF THE TREPHINE IN TRAUMATIC EMPY- EMA ASSOCIATED WITH FISTULA.

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Chronic suppurative pleuritis with an imperfect fistulous outlet, either external or bronchial, is not an uncommon result of gun-shot or other penetrating wounds of the thoracic cavity; and it is no secret that the resources of surgery have not heretofore offered much encouragement to the unfortunate sufferers. In the majority of such cases there is contraction or sinking in of the injured side, a constant discharge of fetid pus, persistent cough, irritative or septic fevers, and more or less rapid exhaustion of strength, terminating usually in death within a few months, or a year or two at the farthest.

Two main difficulties are encountered in the treatment of such cases: 1st, imperfect drainage, upon the correction of which the life of the patient depends; and, 2nd, permanent separation of the lung from the chest-wall by contraction of the organized exudative membrane upon the surface of the former. It is to these two points alone that I shall call attention in this brief contribution.

1st. The serious obstacle to drainage in these cases is not the ordinary stenosis to which nearly all sinuses in the soft parts are liable, but approximation of the ribs, consequent upon the sinking or falling in of the chest-wall. Owing to the shortness and greater degree of fixedness of the first four or five ribs, very close approach of their adjacent borders is seldom seen except in quite young subjects. The same is true of the entire series near the spine in consequence of their close attachment to the vertebræ. But in other situations where greater latitude of motion exists, more especially along the lateral planes of the thorax below the fifth and sixth ribs, it is not rare, in the class of cases now under consideration, to find the adjacent edges closely applied, and sometimes even slightly imbricated. Under these circumstances it is impossible by any ordinary means to preserve satisfactory drainage by an opening, however extensive it may have been made, in an intercostal space. Tolerably strong silver canulæ have been indented by the approaching bones, and rubber tubing is frequently worse than useless. The result is entrance of air, decomposition of the pus, septic or irritative fever, and death more or less rapid as the disease may assume the former or the latter character.

2. The condition resulting from compression of the lung by inflammatory membrane, and consequent inability of the organ to expand to its original dimensions, is not necessarily fatal or altogether irremediable. Pyogenic sacs when freely drained, and at the same time protected from dessication, more especially if kept moist by antiseptic fluid or vapor, do not usually give rise to pyæmia or even to irritative fever. They are certainly sources of great discomfort and sometimes grievous annoyance to patients, but fortunately in

the class of cases here referred to, they are frequently obliterated by the operation employed for overcoming the obstacle to drainage, as I hope to be able presently to show.

Seeing, then, that the great danger in these cases depends mainly upon imperfect drainage, it is to the best method of correcting this difficulty that our efforts should be directed. The impracticability of securing a sufficiently free opening through one or more of the intercostal spaces, especially along the lateral and lower parts of the thoracic wall, has already been mentioned; and I may here add, that in this respect counter-openings, necessary as they often are, have no advantage over the original outlets. Under these circumstances, the surgeon's only resort is removal of a portion of one or more ribs. This may be accomplished by one or other of the ordinary methods of bone-resection, but, in my judgment, much more readily, and in most cases, with equally good results, by the use of a large trephine.

The idea of "trepanning" the thorax is not new. The operation is said to have been proposed by Hippocrates, and, in more modern times, has been modified by Reybard and adopted by Récamier, Troussseau and others in idiopathic empyema.¹ This consisted, however, in simply perforating a rib and inserting a canula, the greatest care being taken to prevent the ingress of air.

Lossen, of Heidelberg, ascribes the first suggestion of resection of the ribs, for what he terms retro-costal abscess, to Roser in 1859, and states that this surgeon performed the first operation of the kind in 1865, with the effect of curing his patient in fourteen days. He (Lossen) adds that in 1869 Simon excised a portion of the sixth rib in a case of empyema with fistula for the purpose of permanently enlarging the canal. The cavity ultimately closed, the favorable result being due in the opinion of the operator, to sinking in of the resected rib.²

Dr. Schneider, of Konigsburg, in 1877, in a case of pleuritic suppuration, resulting from a gun-shot wound involving the third rib, removed from the second rib a section two inches in length, from the fourth, 3.8 inches, from the fifth, 3.8 inches, from the sixth, 4.4 inches, and from the clavicle, 1.5 inches, by which means the chest-wall was allowed to sink in and obliterate the pleural cavity.³

It will thus be seen that the benefits derived from resection are threefold: 1, Unobstructed drainage; 2, free space for the application of antiseptics; and, 3, shrinkage of the chest-wall. In a large number of cases, more especially those in which the collection of pus is confined to the lower and lateral regions of the thorax, the mobility of the ribs, the flexibility of the long costal cartilages, and the yielding nature of the diaphragm permit the closing of quite large retro-costal cavities without any assistance at the hands of the surgeon other than may be necessary for drainage and asepsis. In such cases a large opening at the site of the fistula, or, if needs be, at a more dependent

¹ *Traité de Pathologie Externe* Par. Aug. Vidal (de Casses) Tome IVme.

² *London Medical Record*.—*Am. Journal Med. Sciences*, July, 1878.

³ *Op. cit.*

point, is all that is required. For this purpose the application of a trephine having a sufficiently large crown to embrace the entire breadth of a rib, commends itself as the readiest and safest method, and does not hinder subsequent resection of adjacent ribs, if such procedure should become necessary.

So far as I have been able to investigate the question of priority, this operation originated in New Orleans, and is almost peculiar to this city where it has been frequently performed within the past twenty years, and with increasing favor. Indeed, since it is no longer a rarity, those who resort to it seldom keep records of their cases. This is greatly to be regretted, and I am obliged to confess that I am myself probably more at fault than anyone else. But though defective in histories of individual cases, I trust that my presentation of the subject may not be discredited or its importance underrated. To the late Professor Warren Stone, Sr. M.D., is due the credit of having first performed this or any other method of resection of the ribs for empyema, as the following history will, I think, clearly prove:⁴

Case, Charles W., æt. 17 years, was stabbed in the back with a large pocket-knife, in the hands of one of his college-mates, at a well-known institution in North Carolina, November 19, 1860. The wound penetrated the eight thoracic cavity about two inches from the spine, between the fifth and sixth ribs. Pleuro-pneumonia was the result, and very soon offensive pus, mixed with grumous blood, began to discharge from the opening. After several weeks confinement to bed the patient rallied, and was taken to Paris the following summer. There he was placed under the professional care of MM. Velpeau, Maisonneuve and Nelaton, who attempted unsuccessfully to dilate the fistula and keep the cavity cleansed. No benefit having resulted after several weeks treatment, no operation proposed, and no encouragement to remain longer having been given, the patient was carried to his home in Mobile, Alabama, with every expectation of an early death.

A fatal result not having occurred, he was brought by his parents to New Orleans the following February, 1862, and admitted into the private infirmary, of which Professor Stone and I then had charge. At this time he was emaciated to an extreme degree, racked by cough and thoroughly exhausted by irritative fever and hectic. The right chest was somewhat contracted, and from a small fistulous opening at the site of the wound fetid pus was slowly exuding. Notwithstanding the nearness of the wound to the spine, in which situation the ribs are naturally so nearly fixed in their position that only the slightest movement can be effected, the two adjacent bones had become so nearly approximated that a No. 8 bougie could hardly be passed between. A careful examination disclosed a considerable collection of fluid in the pleural cavity.

⁴ Since this paper was read my attention has been called by Professor S. W. Gross, M.D., to an article in the *British Medical Journal* of January 21st, 1860, entitled "Case of Traumatic Empyema of sixteen months standing with Fistula, treated successfully. By Albert G. Walter, Surgeon, Pittsburg, Pennsylvania, United States." The case was a knife-wound, resulting in retro-costal abscess which opened spontaneously. December 8, 1857, one inch of the eighth rib was removed with bone-pliers. To secure better drainage two inches of the eighth and ninth ribs were removed in like manner February 11, 1858, followed by injections of tincture of iodine. On January 1, 1859, patient was reported entirely well.

To get rid of the latter, establish free drainage and render the walls of the sac aseptic, were clearly indicated, but how to accomplish these ends after the signal failure of the three most noted surgeons of France was not so distinctly perceived. The problem was solved, however, by my distinguished colleague, when, after contemplating the situation for a few moments, he turned to me and asked what would be the objection to enlarging the fistula by a trephine applied to the rib below. The proposition met with a hearty approval, and was immediately carried into execution. But the removal of the disc of bone involving the whole breadth of the rib did not complete the operation. In consequence of the densely thickened pleura the cavity was still unopened. To divide this freely, despite the possible wounding of the intercostal artery, was the work of a moment, when out gushed an immense stream of pus, so disgusting and overpowering in its odor as almost to drive everyone from the room. After fifteen or twenty ounces of this had escaped, and the flow in a measure ceased, the cavity was washed with a tepid solution of chlorinated soda, and a small roller bandage thrust into the opening to serve both as lint and plug. No hæmorrhage followed the operation, and I have since then been convinced by additional experience that in such cases the intercostal artery in the immediate vicinity of the fistula is obliterated by contraction of the fibrinous deposit. The plug was subsequently removed twice a day, and the cavity freely injected with the antiseptic fluid. The patient's health began to improve immediately, and in less than six weeks he was upon his feet and able to go unaccompanied wherever he desired. In the meantime the sac was undergoing steady diminution in size, partly by expansion of the lung, but principally by subsidence of the chest-wall, and we indulged the hope that it would ultimately become entirely obliterated, but in this we were disappointed.

For reasons not necessary to mention, the patient left the city soon afterward, and the following year, 1863, was sent to Europe, where he was advised to continue the treatment begun at New Orleans. In 1866, I met him in Paris, and was much gratified to find him in the enjoyment of a fair state of general health, notwithstanding the annoyance of daily emptying and disinfecting the sac. I measured the latter, and found it capable of holding six ounces, and learned that the secretion amounted to four ounces daily. The ribs upon the affected side were more considerably depressed, but the respiratory murmur could be distinctly heard in front.

Mr. W. returned to Mobile in 1868, where he remained until 1880, and is now living in New York. His health is feeble, but he is able to attend to all the ordinary duties of life without special distress. In a recent letter he informs me that the cavity has undergone no material change since 1866; that it still measures six inches in capacity, and secretes from two to three ounces of pus daily. The opening is nearly an inch in diameter.

Considering that the operation was original in its conception and performance,⁵ and resulted in the pre-

⁵ I am confident that Professor Stone had never heard of the suggestion of Roser, nor of the operation of Walter's, mentioned in a preceding foot-note.

servation of a valuable life, it may seem invidious to criticize it, but one cannot now shut his eyes to the fact that if two or three ribs below the one which was trephined had been subsequently resected, the probability is that complete obliteration of the sac would have occurred.

In connection with the preceding case, which I have deemed of sufficient interest to report in detail, I take the liberty of mentioning briefly another which came under my care only a few weeks later.

CASE II. Captain H., of the Confederate States Army, entered the infirmary March 15, 1862, suffering with empyema, resulting from a gun-shot wound received two or three months before. A small fistulous opening existed between the seventh and eighth ribs, an inch or more beyond their cartilages, but was not large enough to keep the cavity drained, nor could it be sufficiently dilated for this purpose in consequence of the nearness of the two adjacent ribs. Acting upon the experience I had already gained in the preceding case, I applied a large trephine to the eighth rib, immediately below the fistula, divided the thickened pleura, and thus discharged a large collection of fetid pus. The cavity was thoroughly cleansed by a weak solution of chlorinated soda, and a plug consisting of a small roller bandage pressed into the opening. The patient was sufficiently recovered to leave for his home in Texas a week or ten days afterwards with directions to continue the antiseptic injections until the cavity closed. I heard nothing from him for three years, when he presented himself at my office to show me the result. The side of the chest was somewhat contracted, but not enough to cause marked deformity; the opening was closed by a firm cicatrix, and the respiratory murmur could be heard everywhere within a short distance of this point. He informed me that complete closure occurred a few weeks after he left the Infirmary, and that since then the wound had given him no trouble whatever. From recent accounts Captain H. is still alive, actively engaged in business, and in the enjoyment of most excellent health.

Complete recovery in this case was evidently due to the fact that the empyema was localized opposite the most moveable part of the thoracic walls. The sinking in of the latter was sufficient to meet the partially expanded lung, and the cavity being kept perfectly drained, obliteration was complete.

Since the last mentioned case, which occurred twenty years ago, several of similar character have been admitted into my wards in the Charity Hospital, and have invariably undergone the same treatment, but owing to the restlessness and nomadic habits of the patients it is impossible to state with any assurance of accuracy what have been the ultimate results. In every case, however, up to the time of their leaving the hospital there were good reasons for a favorable prognosis. As one of these cases presented an exceptional complication it is worthy of special mention.

CASE.—M. Barry, æt. 27 years, came under my care in December, 1881. He had been shot from behind through the right lung a year previously, the ball emerging at the seventh intercostal space in front, a little in rear of the junction of the adjacent

ribs with their cartilages. A low form of pleuropneumonia followed, accompanied by a free discharge of offensive pus from the two external openings, and expectoration of similar fluid from the lung. After a protracted illness, during which the right side of the chest became greatly contracted below, the wound of entrance closed entirely, and, in consequence of the approximation of the ribs, the opening of exit was reduced to the size of a No. 2 bougie. When I first saw him, he was suffering from irritative force and hectic, coughing up large quantities of fetid pus, and so reduced in strength that he could scarcely bear to be propped up in bed for examination. I succeeded, however, in determining the presence of air and pus in the plexural sac, a tolerably free communication between the latter and the bronchial passages, and a small fistulous opening in the seventh intercostal space.

A few days after the diagnosis was completed, and in the presence of the medical class of the University of Louisiana, I made an incision downward from the fistula across the eighth rib, applied the largest trephine to the latter, and then, with a bistoury, divided an unusually densely thickened pleura. Immediately air rushed into the cavity with a deep gurgling noise, and the next instant rushed out again bringing with it a large quantity of stinking pus which bespattered everyone around, and filled the amphitheater with its nauseous odor. At the same time, and, doubtless, in consequence of the ingress of cool air into the cavity, a violent cough occurred, accompanied by a shower of the same fowl fluid mixed with blood, much to the chagrin of the assistants, who had moved out of range of the opening in the side. It was altogether a most disgusting affair. However, not to be tedious, after the escape of more than a pint of pus, and when the cough and agitation had subsided, warm carbolyzed water was gently injected by means of a rubber bulb syringe, care being taken not to disturb the sac, and thus force the fluid into the bronchial passages.

I need not enter into the details of the subsequent treatment, farther than to say that the injection was repeated twice a day, the opening being in the meantime plugged with a small roller bandage. The patient rallied rapidly. In a week all communication between the suppurating cavity and the air-passages was closed, and in about six weeks from the time of the operation, the cavity was so nearly obliterated that the patient thought it unnecessary to remain longer in hospital, and insisted upon being discharged. I have good reason to believe that entire recovery was completed soon afterwards.

A NEW OPERATION FOR THE CURE OF RANULA.

WITH REPORT OF A CASE. BY T. F. PREWITT, M.D.,
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Read to the Section on Surgery and Anatomy.

I do not propose to go into the literature of ranula; its mode of development, the special strictures involved, or a consideration of the differential diag-