STAB WOUND OF HEART: SUTURE OF HEART MUSCLE,
WITH RECOVERY

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History.—H. M., man, aged 42, roofer, admitted to Ward L-4, Second Surgical Division, Cornell, Bellevue Hospital, Nov. 10, 1918, had received a stab wound in the left chest, from which there was considerable hemorrhage. The family history was negative. The patient had had gonorrhea in youth. Since the age of 18 he had been subject to "fits" occurring on an average of once a month and generally following alcoholic excesses. There was a pronounced alcoholic history with more or less regular Saturday night spees. Otherwise the history was negative. On the night before admission the patient had been drinking heavily, and on the day of admission at 2:30 p. m. he came home and entered into an argument with his wife. He was evidently abusive, and in self defense, the wife seized a "long, sharp butcher knife" and stabbed him in the chest. The patient bled profusely from the wound and commenced to experience respiratory difficulty. He was, however, able to walk across the street to a police station, where an ambulance was called and the patient brought immediately to the hospital. He was still suffering from dyspnea, pain in the left chest, and inability to lie down, but the early profuse hemorrhage had subsided and there was very slight flow of blood from the wound.

Physical Examination.—The patient was a large, well developed man, with good muscular tone. When first seen he was sitting in a chair, with marked dyspnea; the respirations numbered 40 and were labored. The dyspnea was increased by lying down. The patient complained of pain in the precordial region, the pain being accentuated by respiratory motion. There was moderate cyanosis of the head and the extremities. The pulse was 80 and regular in rate, but apparently of low volume and tension. Over the costal cartilage of the left fifth rib, 6 cm. from the anterior midline,

Fig. 1.—Roentgenographic findings forty-eight hours after operation: large left pneumothorax outlined; slight displacement of heart to right.

there was a stab wound 2 cm. long with gaping edges. There was evidence on the clothing that there had been profuse hemorrhage from this wound. When seen first in the hospital, there was very slight oozing from it. Examination of the chest disclosed a resonant percussion note over all the pulmonic areas. The breath sounds were normal. There was no evidence of hemothorax. The area of cardiac dullness did not extend beyond the right sternal margin, and

extended to the left to the nipple line at the sixth rib. It had not apparently increased in extent. The heart sounds were faint, but there were no murmurs nor other adventitious sounds. The examination was otherwise negative.

It seemed advisable to submit this wound to surgical cleansing, on account of the nature of the agent causing it, and the attendant possibility of serious infection. Furthermore, because of the possibility of hemorrhage from the large

Fig. 2.—Eleven days after operation: left pneumothorax absorbed; heart returned to normal position; very slight left hemothorax.

vessels near the tract of the knife, it seemed prudent to explore the tract thoroughly and tie off any bleeding points.

Operation.—Four and one-half hours after the accident, with the assistance of Dr. M. T. Roote of the Bellevue Hospital house staff, the operation was begun under local anesthesia. The usual procedures of wound excision, with resection of the skin margins, following the tract of the knife through the subcutaneous tissues and the damaged muscle, were carried out. At this point it was discovered that the knife had passed cleanly through the fifth costal cartilage, severing it transversely. A general anesthesia was then employed, and 12 cm. of the fifth rib resected subperiosteally. The left pleural cavity was opened, the left lung collapsing moderately. No injury to the lung could be determined. Below the point of damage to the fifth cartilage there was a puncture wound through the pericardium 1 cm. in length. From this puncture wound, there was a slow, moderate flow of dark blood, and there were found in the left pleural cavity about 100 c.c. of blood. The opening in the pericardium was enlarged by a longitudinal incision 4 cm. long. A slight amount of clotted blood was found in the pericardial sac, anteriorly. There was no general hemopericardium. In the anterior wall of the left ventricle, there was a wound 1 cm. long extending for an unknown distance into the heart muscle, but apparently not penetrating into the cavity of the ventricle.

On opening the pericardial sac, there was a recurrence of severe bleeding from the wound in the heart, the blood flowing in large spurts synchronous with the contraction of that organ. This could be easily controlled by pressure, but immediately recurred on the release of pressure. Apparently this bleeding was from the muscular wall of the heart, the blood being quite dark. At this point in the operation the heart rate was much accelerated, and it was with great difficulty that two catgut sutures were introduced into the wound in the heart. As soon, however, as these sutures were secured in place, all bleeding ceased. Very little blood had escaped into the pericardial sac, and after the excess had been removed the defect in the pericardium was closed by continuous catgut sutures. However, during the suturing of

the heart muscles a considerable amount of blood had escaped into the left pleural cavity. On account of difficulty with the aspirating outfit, it was impossible to remove all of this blood without recourse to sponging, which caused respiratory distress and had to be abandoned. Therefore an excess of blood—about 300 c.c.—was allowed to remain in the pleural cavity and the wound in the chest wall was closed tightly in layers—parietal pleura, with intercostal muscles, pectoral muscles, subcutaneous tissue and skin. One rubber

Fig. 3.—Appearance of wound twelve days after operation: primary union; all stitches removed.

tissue drain was introduced into the wound as far as the pectoral muscles.

The patient stood the operation well and recovered satisfactorily from the anesthetic.

Postoperative Course.—November 11, the temperature rose to 100.5 and remained irregular during the day. The respiration varied from 18 to 32, the pulse from 62 to 94. Cyanosis was less marked. The general condition satisfactory. The heart sounds were apparently normal and distinct. The percussion note over the left chest was tympanitic, except in the axilla and posterior base, where it was decidedly dull, on account of blood which had not been entirely removed at the time of the operation. The chest was aspirated, and much dark, frothy blood was removed.

November 12, the temperature varied from 100 to 100.5, the pulse from 80 to 100, and respiration from 20 to 26. The systolic blood pressure was 128 and the diastolic 76. The patient was much less cyanotic, and there was less pain. The general condition was satisfactory.

The temperature reached normal on the fourth day after operation, and except for one slight exacerbation has remained normal since. The blood pressure has varied from 114 to 118 on subsequent reading. The pulse gradually steadied down to an average rate of 80. The respiration subsided to 18. Precordial pain disappeared rapidly and was not complained of after a lapse of five days from the operation. The left pneumothorax very rapidly disappeared. Roentgen examination eleven days after operation detected no trace whatever of this pneumothorax. The patient was kept in bed for one week after operation and then allowed to get up in a wheel chair without any untoward occurrence. Convalescence from that point was uneventful. The wound healed primarily, and sixteen days after operation the patient was transferred to the convalescent home at Burke Foundation, White Plains.

After his return from the convalescent home, he reported back to Bellevue Hospital for observation, and was found to be in a wholly satisfactory condition.

THORACOTOMY: A SIMPLIFIED TECHNIC

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The recent occurrence of epidemic diseases among the new troops in some of the cantonments was associated with an unusually large number of cases of pleural effusions, many of which developed into empyema. A large percentage of these empyema patients required surgical intervention. Some were successfully treated by aspiration alone.

At the base hospital, Camp Zachary Taylor, Ky., out of 128 cases of empyema, for the most part of hemolytic streptococcus origin, treated by open operation, up to the first day of May of 1918, in fifty-five rib resection was performed, and in seventy-three, simple intercostal thoracotomy was done. In the first group there occurred seventeen deaths, corresponding to a mortality of 30.9 per cent., while in the second group, eleven deaths occurred, giving slightly less than half the death rate of the former group, or 15 per cent.

It is not, of course, contended that thoracotomy without rib resection is responsible for this difference in mortality. There are other factors involved, chief of which are the virulence and extent of the invasion, the power of resistance of the patient, and the time that elapses between the occurrence of the effusion and its evacuation surgically. A mortality of 40 per cent. in patients operated on within twenty-four hours of the appearance of the septic effusion (pus or seropus) should be compared with a death rate of 10 per cent. (four deaths) in forty-two cases having an average interval of between nine and ten days between the appearance of fluid and its surgical evacuation, simple thoracotomy being the procedure in the latter group.

If, therefore, at least equally good results may be obtained by the simpler procedure, it should for obvious reasons be preferred. With the object of further simplifying the technic of the operation, the instrument herein illustrated was devised. It is made out of forged steel, following in general plan the Bodenhamer rectal speculum, but having one blade longer and wider than the other. The larger blade has cutting edges for the terminal inch and a half, and tapers to a sharp point. The other blade is narrower, one-half inch shorter, and its blunt end fits into the concavity of the larger blade.

The length over all is 8 inches, the handles measuring 6 inches from the lock. The longer blade is 3 inches long and three-fourths inch wide at the base.

The technic employed in brief is as follows:

1. The pus is invariably located by means of exploratory puncture, and note is taken of the depth at which it is encountered before the needle is withdrawn.

Instrument for simplifying technic of thoracotomy.

2. The skin is anesthetized at the point so determined for a length of 2 inches, the intercostal space being paralleled and incision being made with knife or scissors.

3. All structures to be penetrated are thoroughly infiltrated with either 0.2 per cent. solution of cocain, procain or cocain substitute.

4. With closed blades under gentle pressure the instrument is pushed between the ribs to a depth one-half inch beyond the point at which the pus was located and the blades separated by closing the handles. The set screw will hold the blades open to an extent sufficient to introduce a drainage tube of any size, even a Brewer tube with a small flange.