Medical Memoranda

Stab Wound of the Heart

Stab wounds of the heart seem to be a rarity in Great Britain. I have found only one reported case of surgical repair (Gissane and Schulenburg, 1937). The condition, however, is not uncommon in the U.S.A., especially among coloured people. Several large series of surgically treated cases have been reported, with an overall mortality of less than 50%, while in some smaller series the mortality rate has been much less. If a patient lives to reach hospital, therefore, the outlook is remarkably good. This is rather contrary to what one might imagine. The following case is reported in order to draw attention to the good results of treatment.

Case Report

A man aged 54 was admitted to hospital at 6.25 a.m. on October 24, 1949, having attempted suicide about an hour previously by stabbing himself in the chest with a pair of scissors. He was seen on admission by Dr. E. Keen.

On examination he was restless and irrational, and cyanotic. When he was supine the external jugular veins were considerably distended, but when sitting up this partially disappeared. The systolic blood pressure was 50; the diastolic was not recordable. The pulse rate was 95. The heart sounds on auscultation were faint. There were three puncture wounds over the praecordium to the left of the sternum. An intravenous drip was begun. Approximately 10 oz. (284 ml.) of blood was given before his arrival in the theatre at 8.30 a.m., when his condition had deteriorated markedly. The cyanosis was very noticeable, the radial pulse was not palpable, and the blood pressure was not recordable.

An attempt was made to aspirate the pericardium with a large-bore needle through both the subcostal approach and the fourth left interspace. Nothing, however, was obtained. A light general anaesthetic was then begun by Dr. J. Black. Thoracotomy was performed through the fourth left intercostal space from the axilla to the right border of the sternum. The fourth and fifth costal cartilages were divided adjacent to the sternum. A rib spreader was inserted. The pericardium was seen to be tense and bulging, the cardiac pulsation being just palpable. A small incision was made in the pericardium and enlarged downwards, forwards, and medially with scissors. A considerable quantity of blood clot extruded spontaneously. The patient's condition improved dramatically with relief of the tamponade. Copious venous bleeding then occurred.

The heart was palpated and a wound in the anterior surface of the right ventricle found. This admitted the terminal phalanx of the left index finger, being $\frac{7}{8}$ in. (2.2 cm.) in length. The insertion of the finger controlled the bleeding. As exposure was not good the skin incision was carried vertically downwards in the midline and the incision of the pericardium enlarged to give adequate exposure. A stay suture was inserted through the ventricular wall in the line of the wound and a deep suture passed under the finger as the latter was withdrawn. This suture was then tied, but, unfortunately, the friability of cardiac muscle was not appreciated and it cut out, converting a simple linear wound into a T-shaped rent. Torrential bleeding occurred. Three further sutures were rapidly inserted across the wound and tied. These went right through the wall and included endocardium. Most of the bleeding was now controlled, and complete haemostasis was finally obtained by the insertion of four further sutures through the muscle. Catgut was used for all sutures. The pericardium was then partially closed, the pleural cavity evacuated of blood by suction, and the chest closed without drainage, after expansion of

the lung. During operation 3 pints (1.7 litres) of blood was transfused under pressure.

On the evening of October 25 the patient became cyanotic and dyspnoeic. Examination revealed collapse of the left lower lobe. Bronchoscopy was performed under curare-thiopentone anaesthesia and a considerable quantity of mucus aspirated through the left main bronchus and lower-lobe bronchus. An immediate improvement in air entry was observed, and post-operatively his condition was much improved and remained satisfactory until October 28, when a further collapse occurred in the left lower lobe. This responded to conservative measures—breathing exercises, penicillin, and sulphonamides. He was allowed up on November 15 and discharged on December 5. An E.C.G. on October 29 revealed no abnormality. When seen on February 6, 1950, he had apparently made a complete recovery.

Comment

The effects of heart wounds are in the main due to cardiac tamponade or exsanguination—the former when the pericardium is intact, the latter when a communication of sufficient size to allow free drainage exists between the pericardial and pleural cavities. In the above case the classical symptoms of tamponade were all present—namely, increased venous pressure giving rise to visibly distended veins and cyanosis, a fall in arterial pressure, and heart sounds which were faint and difficult to hear.

Blalock and Ravitch (1943) recommended conservative treatment, giving intravenous transfusions in an attempt to raise the venous pressure and overcome the tamponade. The fact that the external jugular veins became partially collapsed on sitting up suggests that the increased venous pressure in this position was overcoming the tamponade. An intravenous drip, however, of 10 oz. of blood pre-operatively had no effect in improving the circulation; bigger quantities may have done so, but I doubt this because of the free communication between the right ventricle and the pericardium. Aspiration is also advocated as a means of lessening the tamponade. In the above case, however, the clotting of the blood within the pericardium rendered this measure valueless.

Most authors recommend surgical approach and suture of the wounds. A variety of incisions have been employed, but that used in the above case is probably the easiest and quickest to make and seemed to give an adequate exposure. To control the bleeding Beck (1942) recommends a finger on the wound, but not in it, as the latter is apt to cause further tearing of the myocardium. The simple expedient, however, of plugging the hole with the finger proved of considerable value. The usual suture material recommended (Elkin, 1941; Beck, 1942) is fine silk. The use of catgut, however, had no apparent disadvantage, and was possibly advantageous in view of the fact that some of the initial sutures penetrated endocardium. An important point in suturing is to realize the friability of cardiac muscle. Failure to do so nearly caused a disaster. The pericardium was left partially unsutured in order to allow drainage into the pleural cavity of any further bleeding and prevent the recurrence of tamponade.

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REFERENCES

- Beck, C. S. (1942). *Ann. Surg.*, **115**, 698.
Blalock, A., and Ravitch, M. M. (1943). *Surgery*, **14**, 157.
Elkin, D. C. (1941). *Ann. Surg.*, **114**, 169.
Gissane, W., and Schulenburg, B. (1937). *Lancet*, **2**, 132.