of surgical and obstetrical cases of thrombophlebitis are associated with loss of blood through natural or operational causes or through trauma, such loss of blood, if not corrected, and that quickly, sets in action, to a greater or lesser degree, the differential distribution of the remaining blood volume. The lower limbs, when they are inactive, tend to suffer most from the cuts in blood supply, as Sheehan (1949) found in obstetrical shock.

The risk of post-partum thrombosis is greater in women with a family history of varicose veins, leg ulcers, or venous thrombosis, and inquiries about this should always be made.

An attempt to prevent post-partum thrombosis must take these points into consideration. It is clearly important that special precautions be taken in primigravidae with a positive family history who have difficult labours. Haemorrhage should be treated promptly. Ochsner (1947) has stressed the value of leg exercises to prevent thrombosis in recumbent patients, especially when the limbs have been compressed from toes to groin.

The treatment of venous thrombosis is not considered here, but mention must be made of the importance of firm elastic support of the affected leg in order to prevent chronic oedema and ulceration later. The patients in the present series had not been treated in this way.

Summary

A series of 160 patients suffering from leg ulcers following post-partum venous thrombosis are considered and certain aetiological factors determined. The importance of intravaginal or intrauterine intervention during or after labour and the importance of haemorrhage are stressed. Inquiries about the family history are shown to be useful. It should be possible, by attention to the aetiology of the condition, to do more to prevent it and certainly to foresee when it is likely to occur.

It is a pleasure to acknowledge the kindness of Dr. John T. Ingram, of Dr. F. F. Hellier, and of other colleagues and practitioners who have referred patients to me.

REFERENCES

- Anning, S. T. (1950). *British Medical Journal*, 2, 1305.
Barker, N. W., Nygaard, K. K., Walters, W., and Priestley, J. T. (1941). *Proc. Mayo Clin.*, 16, 1.
Franklin, K. J. (1951). *Proc. roy. Soc. Med.*, 44, 503.
Linton, R. R., and Hardy, I. B., jun. (1948). *Surgery*, 24, 452.
Ochsner, A. (1947). *J. Amer. med. Ass.*, 133, 1275.
Sheehan, H. L. (1949). *Rotunda Hospital Bicentenary*, p. 151. Parkside Press, Dublin.

The sixty-eighth annual general meeting of the Medical Sickness, Annuity, and Life Assurance Society, which limits its business to members of the medical and dental professions, was held on June 16. Mr. R. J. McNeill Love, F.R.C.S., chairman of directors, announced an entirely new policy which the Society is now offering. The Society had always transacted sickness and accident insurance and life assurance, and for the last 20 years had provided family income benefit, but it was now including all these three in a single policy. The personal requirements of the individual could now be met in one policy at a low rate of premium. Mr. Love went on to say that the membership had risen to over 14,000, and the combined funds amounted to over £5,000,000. New life assurance effected during the year amounted to £1,153,243, and the new sickness policies issued reached the record figure of 11,929 guineas. The meeting adopted a recommendation for the payment of an interim bonus on with-profit policies for permanent sickness and accident insurance and life assurances terminating at the stated age or by death in the year ending December 31, 1953, at the interim rates approved in 1951. Much regret was expressed at the resignation of Dr. A. Hope Gosse as the Society's chief medical officer. Dr. T. C. Hunt has been appointed medical officer. Dr. S. P. Meadows and Mr. Bertram Sutton, the retiring directors, were re-elected. A vote of thanks to the chairman was proposed by Sir Cecil Wakeley, and the chairman in response paid a tribute to his co-directors and the staff.

EMERGENCY THORACOTOMY FOR MASSIVE SPONTANEOUS HAEMOPNEUMOTHORAX

BY

JOHN BORRIE, F.R.C.S.

Thoracic Surgeon, Otago Hospital Board, New Zealand

Massive spontaneous haemopneumothorax is a serious complication of spontaneous pneumothorax with an appreciable mortality. According to Cunningham (1950), of 65 cases recorded in the literature 18 have been fatal. Since then Moser (1951) reported another four cases, all successfully treated by thoracentesis; and Hyde and Hyde (1951) reported 12 further recoveries, 11 of which were treated by thoracentesis and one by decortication. In 1951 Myers *et al.* had one patient with massive spontaneous haemopneumothorax who required emergency thoracotomy. Ross (1952) has similarly stated that one of his series of six patients was treated by emergency thoracotomy and ligation of the bleeding-point. Hansen's (1949) case, treated 19 days after onset of bleeding by thoracotomy for continuation of the pneumothorax, was found to have multiple ruptured bullae which could not be sutured. He died 36 hours later. With the following three cases, the present recorded total is now 93, with 19 deaths. The purpose of this paper is to emphasize the serious nature of spontaneous haemopneumothorax, to stress that its onset may be delayed after the onset of the accompanying spontaneous pneumothorax, and to report two cases with massive spontaneous pneumothorax, both of which were successfully treated by emergency thoracotomy. They had evacuation of blood and blood clot from the pleural cavity, control of the bleeding-point, immediate re-expansion of the totally collapsed lung, with rapid recovery and return to normal life. The third patient, seen three weeks after the onset of the haemopneumothorax, required decortication of his lung.

Case 1

A ship steward aged 21 suddenly experienced pain in the right side of his chest while carrying out his duties on the morning of January 12, 1952. He was sent to the Auckland General Hospital, where a chest radiograph was taken two hours after the onset. This showed a small right spontaneous pneumothorax, with a right apical "string" adhesion and a little collapse of the right lung. At first it was thought too trivial a lesion for his admission to hospital; but because of the severity of the pain it was decided to keep him there for 24 hours. During the night his condition rapidly deteriorated, and in the morning he was completely exsanguinated and almost pulseless. The medical registrar realized that the patient had had a severe intrathoracic haemorrhage, which was confirmed by aspirating 3 pints (1.7 litres) of blood from the right pleural cavity. With continuous blood transfusion given through two infusion sets, he slowly improved, and after 7 pints (4 litres) had been given his blood pressure rose to 120/80 mm. Hg. A further chest radiograph showed that the right chest was completely filled with blood. At this stage, with two transfusions still running, the patient was transferred by ambulance to the operating theatre at Green Lane Hospital, where he was admitted at 6.15 p.m.

Operation.—At 6.45 p.m. on January 13, under general anaesthesia (Dr. Lyne), a thoracotomy was performed through the bed of the resected right sixth rib. After opening the right pleural cavity, 4 pints (2.3 litres) of blood

and several large blood clots were evacuated from the chest. The right lung, which was totally collapsed, was re-expanded by the anaesthetist. At the apex of the chest cavity, on the parietal pleura, was an area, 2 cm. in diameter, from which blood steadily oozed. This area was cauterized with diathermy, and covered with oxidized cellulose powder. At the apex of the right lung was a localized collection of emphysematous bullae, one of which had ruptured. As no apical adhesions were found at operation, though they were clearly visible on the original radiograph, it was surmised that, owing to the increasing tension of the pneumothorax, the adhesions between the visceral and parietal pleurae had torn, thereby precipitating this profound haemorrhage. Two intercostal under-water seal drains were inserted, and the chest was closed in layers.

Convalescence was uneventful. The sutures were removed on the sixth day, and he was discharged fit on January 28, 15 days after operation. As an attempt to induce a right artificial pneumothorax was unsuccessful a fortnight later, it was concluded that the visceral and parietal pleurae were now adherent in that area.

Case 2

A stevedore aged 26 was admitted to Green Lane Hospital as an emergency at 10 p.m. on February 26, 1952. He had reported to the casualty department of the Auckland General Hospital at 5.20 p.m. on that day, complaining of pain in the right chest which had come on suddenly in the cinema 24 hours previously. An hour before reporting, the pain had become much worse. A radiograph of the chest showed a right spontaneous pneumothorax with fluid at the level of the right tenth rib posteriorly. The right lung was partially collapsed by the pneumothorax. Aspiration of the fluid proved it to be fresh blood. The diagnosis of spontaneous haemopneumothorax was established. Further check radiographs two hours later showed that the level of the fluid had risen and that the right lung was now totally collapsed. As the bleeding was obviously continuing, emergency thoracotomy was advised.

Operation.—At 10.30 p.m. on February 26, under general anaesthesia (Dr. Lyne), right lateral thoracotomy was performed through the bed of the resected sixth rib. The pleural cavity was found to contain 2 pints (1.1 litres) of fresh blood and parietal pleura. The apex of the right lung was found to be replaced by a group of small emphysematous bullae, of which one had ruptured. From this the bleeding was occurring. After evacuation of the blood clot, the lung was re-expanded by the anaesthetist, and the bleeding stopped. These bullae were then locally excised, and the lung sutured with continuous 2/0 plain catgut sutures. Further inspection confirmed that there was no parietal bleeding-point. The visceral and parietal pleurae were then painted with 5% silver nitrate solution to induce pleural adhesions, and the chest was closed with two under-water seal drains, one in front and one behind. During the course of the operation the patient had 2 pints (1.1 litres) of blood.

The post-operative course was uneventful. Check radiographs the morning after operation showed the right lung to be well expanded. The intercostal tubes were removed 48 hours after operation, and the skin sutures on the sixth day. The patient was discharged, fit and well, on March 11, just 14 days after admission. No evidence of any other lung disease was detected.

Case 3

A schoolboy aged 18 was admitted on March 25, 1952. Three weeks previously, while taking part in the New Zealand Rowing Championships, he began to feel off colour and noticed a "splashing" in his right pleural cavity. A radiograph of the chest showed a right pneumothorax with pleural effusion and with apical adhesion. The chest aspirate was heavily blood-stained. It was sterile on culture, and no acid-fast bacilli were found. Because there was little response to aspiration, decortication was advised.

On April 2 a right thoracotomy was performed by Mr. Douglas Robb. There were innumerable filmy fibrinous adhesions between the chest wall and the collapsed lung, and haemorrhagic fibrinous material was found thickly deposited on the surface of the lung, completely imprisoning the lower lobe in a thick peel. This proved to be well organized and at least $\frac{1}{4}$ in. (3 mm.) thick. Both upper and lower lobes were successfully decorticated; and as no trace of a separate middle lobe could be seen anywhere it was assumed to be completely fused with the upper lobe. Because of his general state, parietal decortication was not attempted. After operation the right lung re-expanded satisfactorily and the patient was discharged fit on April 22, one month after admission and seven weeks from the onset of his illness.

Dr. Stephen Williams, pathologist, reported that the specimen consisted of three components—namely, thin sheets of firm pale fibrin, gelatinous clot containing blood, and deeply icteric fluid. In some fragments old blood clot was inextricably bound up with the firm fibrin sheets, suggesting that the three elements had resulted from a single pathological event—namely, a haemorrhage into the pleural cavity.

Discussion

Rottenberg and Golden (1949) found three patients with spontaneous haemothorax in a series of 97 with spontaneous pneumothorax, and Hyde and Hyde (1951) similarly found five patients with haemothorax in 112 with spontaneous pneumothorax. The age of patients reported in the literature has ranged from 17 to 44 years, and all but four cases have been in males.

Pathogenesis.—Cunningham (1950) stated that of the 18 fatal cases in which necropsies have been performed, in three no lesion was found and the source of the bleeding could not be traced. In a further three, ruptured adhesions alone were found, and there was apparently no lesion to explain the pneumothorax. Cystic disease of the lung was found in one case, and in the remaining 11 cases there were bullae or vesicles, usually ruptured, and accompanied by torn adhesions.

In Cases 1 and 2, described here, thoracotomy established the site and cause of the pneumothorax and haemothorax. Each had a cluster of emphysematous bullae at the apex of the right lung, and in each a bulla had ruptured. In Case 1 a string adhesion, clearly visible in a radiograph taken within two hours of onset of the pneumothorax, ruptured, presumably with mounting tension of the spontaneous pneumothorax, and thereby precipitated severe and continuous bleeding from its parietal pleural attachment. In Case 2 there was no adhesion between the parietal and visceral pleurae. The bleeding continued from the torn edges of a ruptured emphysematous bulla at the apex of a collapsed lung. In both Case 1 and Case 2 bleeding continued until stopped at operation.

Moser (1951) and others have remarked that the fluid aspirated from the pleural cavity in spontaneous haemopneumothorax fails to clot on standing. Cosgriff (1950), finding no prothrombin, fibrinogen, and thrombin in the aspirate, which also had anticoagulant properties, concluded that intrapleural clotting had already occurred and that the aspirate was what remained from the clotting process. This was conclusively proved by thoracotomy, when massive clot, which would have been most difficult to aspirate and likely to lead to permanent collapse of the lung if left, was successfully removed.

Prognosis.—Haemopneumothorax is a serious thoracic emergency. Prognosis varies with the amount of haemorrhage and clot formation, and the degree of pulmonary collapse and mediastinal displacement. Death may occur any time within three days, as in 6 of the 14 patients reviewed by Helwig and Schmidt (1947), and in one of the two cases reported by Cunningham (1950). It may occur later from complications of the haemothorax. When treated by chest aspiration alone, recovery is usually slow,

and not uncomplicated. Treatment in the 12 cases reported by Hyde and Hyde extended from 15 days to 3 months, with a mean of 48 days, one patient requiring decortication of his lung after three months. Similarly in Jones and Gilbert's series (1936) treatment ranged from 10 days to 4 months. Those of Waring (1945) recovered 60 and 150 days after onset, and those of Nalls and Matthews (1949) three and five weeks and five months after onset. The recovery time following emergency thoracotomy is much shorter. The patient reported by Myers *et al.* was well in 14 days, as were the two reported here.

Management.—The problems of management are: resuscitation of the patient; removal of air, blood, and blood clot from the pleural cavity; complete re-expansion of the lung; and prevention of further episodes. From published reports already mentioned, there is no doubt that in mild cases repeated and careful aspiration of the haemopneumothorax has proved an adequate method of treatment. Blood loss is replaced by blood, and over a period of time, ranging up to three months, it is possible to achieve full re-expansion of the underlying lung, though the ultimate ventilatory function may be limited owing to parietal pleural thickening. In this group, too, there is probably a place for early use of streptokinase and streptodornase, as advocated by Sherry, Tillett, and Read (1950), to aid the liquefying of the blood clot. As pleural adhesions will certainly form during this treatment, further pneumothorax episodes are unlikely. In some patients it has not been possible to aspirate all the blood and clot from the pleural cavity, and therefore decortication of the affected lung has been performed following the methods already established in wartime for the treatment of traumatic haemothorax. Seley and Neuhof (1951) claim that the first pulmonary decortication for clotted haemothorax following idiopathic spontaneous haemopneumothorax was done by Neuhof in 1936. Three of the series reported by Ross had been successfully decorticated, and my Case 3 similarly required decortication.

Critical analysis of published cases, however, shows that an appreciable number have bled to death shortly after the onset of their spontaneous haemopneumothorax. Where, therefore, profound and continuous bleeding has occurred, as in Case 1, it is obvious that, having once restored the general condition of the patient by adequate blood transfusion, direct control of the bleeding-point is the only logical and safe procedure; and it should be advised.

Similarly, where bleeding, detected early, has continued and has been accompanied by further collapse of the lung, as in Case 2, it is wiser not to temporize, but rather to control the bleeding-point before the condition of the patient further deteriorates. It cannot be assumed that the bleeding will stop spontaneously. Even after aspiration of the blood and air the clot still remains and may thereby keep the lung partly collapsed and the bleeding-point patent.

These patients are usually fit young men. With modern endotracheal anaesthesia thoracotomy is safe, the pleural cavity is rapidly opened, the pneumothorax is released, blood and blood clot are rapidly evacuated, the bleeding-point is controlled with a hot moist pack, the lung is completely re-expanded, the causative lesion is then deliberately dealt with, recurrence of the pneumothorax is prevented by inducing an artificial pleurisy, and the chest cavity is finally closed with under-water seal drainage. The rapidity of recovery following treatment by emergency thoracotomy is remarkable.

Myers *et al.* reported the first successful early thoracotomy for the condition, occurring 60 hours after the onset of symptoms. From the right pleural space 2,500 ml. of blood was removed, of which approximately 600 ml. was clotted. The lung was totally collapsed, and in the apex of the right upper lobe was a shaggy irregularity in the visceral pleura. Blood was briskly flowing from a corresponding area on the parietal pleura in the superior sulcus. The bleeding was controlled by pressure. Ross reported a similar patient successfully treated by emergency thoracotomy by Griffen in Newcastle-upon-Tyne.

A survey of the available literature has failed to reveal further cases successfully treated by emergency thoracotomy, so that, with the two reported here, the present total is four.

Summary

Massive spontaneous haemopneumothorax is a thoracic surgical emergency which is best treated by resuscitation of the patient, early emergency thoracotomy, evacuation of the blood and blood clot, deliberate control of the bleeding-point, treatment of the causative lesion, and the induction of an artificial pleurisy to prevent recurrence. With emergency thoracotomy recovery can be rapid and complete.

The literature is reviewed: of 91 cases reported, 19 were fatal. Only four patients, including the two reported here, have so far been successfully treated by emergency thoracotomy.

I wish to thank Dr. Eyre, medical registrar, Auckland General Hospital, for his prompt diagnosis and assistance with Cases 1 and 2, and Mr. Douglas Robb for allowing me to publish Case 3.

REFERENCES

- Cosgriff, S. W. (1950). *Amer. J. Med.*, 8, 57.
 Cunningham, J. A. K. (1950). *N.Z. med. J.*, 49, 708.
 Hansen, J. L. (1949). *Acta med. scand.*, 132, 517.
 Helwig, F. C., and Schmidt, E. C. H. (1947). *Ann. intern. Med.*, 26, 608.
 Hyde, L., and Hyde, B. (1951). *Amer. Rev. Tuberc.*, 63, 417.
 Jones, O. R., and Gilbert, C. L. (1936). *Ibid.*, 33, 165.
 Moser, M. (1951). *Dis. Chest*, 19, 339.
 Myers, R. T., Johnston, F. R., and Bradshaw, H. H. (1951). *Ann. Surg.*, 133, 413.
 Nalls, W. L., and Matthews, J. H. (1949). *Dis. Chest*, 15, 612.
 Ross, C. A. (1952). *J. thorac. Surg.*, 23, 582.
 Rottenberg, L. A., and Golden, R. (1949). *Radiology*, 53, 157.
 Seley, G. P., and Neuhof, H. (1951). *J. thorac. Surg.*, 21, 600.
 Sherry, S., Tillett, W. S., and Read, C. T. (1950). *Ibid.*, 20, 393.
 Waring, J. J. (1945). *Clinics*, 4, 940.

MANIPULATION AND ACCURATE MANUAL METHODS IN GENERAL PRACTICE

BY

R. BARBOR, M.B.

*Late Clinical Assistant to the Department of Physical
Medicine at St. Thomas's Hospital*

I have been in the same practice for 18 years and am thus in a good position to compare the past with the present. Only four years ago my eyes were opened to the possibilities of accurate physiotherapy. Hence 15 years' experience of the natural course and progress under traditional treatment of soft-tissue lesions provides a background against which I can contrast the benefits of these new methods. Originally, owing to lack of training—in common with all medical students—in the methods whereby an exact location could be made in these conditions, I thought little or nothing could be done. This view was strengthened when my patients were referred to various hospitals and received more or less prolonged physiotherapy but did not seem much the better for it. Patients with lumbago, treated by rest in bed for some weeks, seemed to get better at least as quickly as those treated at hospital by heat and massage. On painful shoulders, tennis-elbows, and sprained knees and ankles I could say the same.

Dissatisfied with this situation, I decided to seek special medical tuition at my old hospital. There in due course I developed enough diagnostic ability in exactly locating these lesions to be able to instruct and employ a physiotherapist trained in the accurate manual techniques for which St. Thomas's Hospital is renowned.