usually reached that stage at which cavity formation or multiple dilatations of the bronchi make re-expansion, even after a considerable interval, undesirable.

The operation is designed to collapse the whole of the chest wall together with the lung on the affected side. The method of obtaining the result has changed since a decade and a half ago when the Wilms or Brauer-Friedrich operation was in vogue. This change is mainly due to Sauerbruch, who recognized (and put in practice) the importance, above all else, of excision of the posterior parts of the ribs right up to the transverse processes of the vertebrae. Variations of opinion exist as to the number of stages in which the operation should be done—as to the method of anaesthetization, the amount of rib to be removed, and so on—but the essential principle stands.

I cannot discuss the technique here; I hope to publish that in full later. Briefly, the operation entails the removal of portions of the posterior ends of the first ten or eleven ribs through a paravertebral incision. A total of 110 to 140 cm. of bone is removed. The collapse of the chest wall is surprisingly immense, but the actual visible deformity of the patient when dressed and padded somewhat in the axilla is almost *nil*. There is a considerable tendency to scoliosis, but this can be corrected by effort on the part of the patient.

The results on the symptoms are often startling. It is not uncommon to find immediate and complete cessation of all cough and expectoration. One of my patients who had had incessant cough and sputum for two years despite continuous treatment, partly in a Swiss sanatorium and partly in this country, said that the complete disappearance of these symptoms from the time of the operation was alone worth the ordeal. Another, who had his trachea drawn over to the affected side, complained that whenever he coughed his windpipe seemed to vibrate as a tense cord, and that he had the sensation that sooner or later he would suffocate; this sensation disappeared directly after the operation, and this, combined with the cessation of cough and sputum, gave the greatest physical and mental relief.

The operation, as is to be expected, is not always successful; it may be fatal. It must be remembered, however, that most of the cases operated on would almost certainly get progressively worse until they succumbed, and that therefore every case improved or healed is a big gain to set off against those who die. Considering the condition of those who undergo the operation, the mortality ratio is low.

Sauerbruch has operated on 381 cases. The mortality in the first week has been 14 per cent., while 35 per cent. have been practically healed.

Brunner, out of 117 cases, had an 11 per cent. immediate mortality, 22.2 per cent. were improved, and 41.9 per cent. practically healed.

Gravesen, out of 96 cases, had an 8.3 per cent. mortality, while 21.9 per cent. improved, and 44.8 per cent. were much improved or practically healed.

My own figures are much smaller. Out of 25 thoracoplasties done for bronchiectasis and tuberculosis, 20 were for the latter condition. Of these, 7 have become free from symptoms, 5 are considerably improved, while 4, still under treatment, bid fair to come under the "free from symptoms" group. One case died of tuberculous enteritis eleven months after the operation. One case only died immediately after the operation, and that case was complicated by a pyopneumothorax. Previous to the operation on this patient about two pints of pus had to be aspirated every few days.

If the above figures are combined, we have the observation that out of 514 patients who submitted to this operation, 237 derived very considerable benefit from it.

Just as after pneumothorax treatment it is possible in many cases for the patient to return to work, so, too, is it possible for cases who have had thoracoplasty done. But just as it is essential for patients with a pneumothorax to consider their health, be regular in their habits, and careful in their exercise and in the avoidance—if possible—of infections, so, too, is it the case with patients who have undergone the major operation.

Cases suitable for this operation are selected from among those on whom pneumothorax has been tried and has failed *in toto*, or in whom the amount of collapse is inefficient and cannot be improved; also from those on whom a pneumothorax has been done and in whom the lung has re-expanded with return of symptoms and recrudescence of signs. The

greatest consideration must be given to the sound side. In my opinion, any evidence of activity in this lung is a contra-indication to operation on the other. This view is not held by all Continental surgeons. Moreover, if, in the past, the less affected lung has been at all extensively implicated—that is, if there has been more than slight scarring or slight root involvement—there is too much danger from the strain that thoracoplasty will throw upon this lung. Slight myocarditis is no bar to the operation; but the presence of additional disease, tuberculous or otherwise, elsewhere than in the larynx, is an absolute contraindication. I have already mentioned that Sauerbruch favours a preliminary phrenicotomy on the affected side as a means of obtaining information as to the ability of the sounder lung to withstand the strain of a complete thoracoplasty.

BIBLIOGRAPHY.

- Brauer: Das Ziel und die Abarten der extrapleurale Thoracoplastik sowie die Methodik der subcapular-paravertebralen Form. *Beiträge der Klinik der Tuberculose*, vol. 51, 1922.
 Brunner: *Die Chirurgische Behandlung der Lungentuberculose*, Leipzig, 1924.
 Deist: Can pleural adhesions be diagnosed *in vivo*? *Tubercle*, vol. 5, No. 2, 1923.
 Felix, W.: Anatomische, experimentelle und klinische Untersuchungen über den Phrenicus und über die Zwerchfellinnervation. *Deut. Zeit. f. Chir.*, vol. 171, 1922.
 Goetze: Die radicale Phrenicotomie als selbständiger therapeutischer Eingriff bei der chirurgischen Lungentuberculose. *Arch. f. klin. Chir.*, vol. 121, 1922.
 Gravesen: Discussion on the Present Position of the Surgery of Pulmonary Tuberculosis. *BRITISH MEDICAL JOURNAL*, September 22nd, 1923, p. 506.
 Sauerbruch: Die chirurgische Behandlung der Lungentuberculose. *Wien. med. Woch.*, vol. 72, 1922. Kritische Bemerkungen zur Behandlung von Lungen-erkrankungen durch künstliche Lahmung des Zwerchfelles. *Muench. med. Woch.*, vol. 70, 1923.
 Ziegler: Bekämpfung der Lungentuberculose durch Ruhigstellung der Lunge. *Zentralbl. f. die gesamte Tuberculoseforschung*, vol. 22, 1924.

PURULENT PNEUMOCOCCIC PERICARDITIS: PERICARDIOTOMY: RECOVERY.

BY

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THE number of cases in which a purulent pericarditis of pneumococcal origin has been successfully opened and drained is not large. This is not to be wondered at, seeing that the condition is only one item in a serious general infection, and its very presence points to an extension beyond what occurs in most cases. Apart, however, from its interest in this respect, this case is exceptional in the time at which the pericardial infection began.

On September 23rd, 1923, a youth, aged 17, whilst walking in the country was suddenly seized with dizziness and acute pain over the left front of the chest. He had difficulty in getting home. As the pain became more severe he was admitted to hospital on September 25th, the third day of disease. He was then in great distress, and there were signs of pericardial effusion. It was impossible to examine the back of the chest as the slightest attempt at movement caused extreme embarrassment to the breathing, and much distress. He vomited at frequent intervals. He was collapsed and grey with a moist skin. The tongue was furred. There was herpes on the lower lip. His temperature was 102.8°, pulse 120, and respirations 40.

On September 26th he was no better in spite of treatment, and paracentesis was decided upon. The area of cardiac dullness was much increased to both sides. The heart beat could be felt indistinctly, well within the left edge of the dullness, and for a short period a pleuro-pericardial friction sound was heard at the upper part of the left border. When examined again a few hours later it had disappeared.

Paracentesis pericardii was performed (V. T.). The needle was introduced in the fifth space $1\frac{1}{2}$ inches from the sternum, passing backwards, slightly upwards and inwards, and 300 c.cm. of sero-fibrinous straw-coloured fluid were drawn off. This gave immediate relief. After its removal pericardial friction sounds were heard over the upper part of the dullness. The fluid contained many polymorphonuclear leucocytes with Gram-positive diplococci; pneumococci were obtained culturally.

During the next three or four days the temperature fell gradually to normal. He slept well; the breathing, though still frequent, was not distressing. There was no cough or sputum. The herpes became more marked. Occasional pleuro-pericardial friction was heard just inside the left nipple line, also bronchial breathing in the left upper chest in front, and pleural friction in the left axilla. There was also some dullness with diminished breath sounds at the left base behind.

On October 1st, the ninth day of disease, he was listless and apathetic. He was a bad colour, and the pulse remained frequent in spite of the fall of temperature. The liver edge could be felt 1 to 1½ inches below the costal margin, and there was epigastric tenderness. The pericardium was therefore again aspirated, and 200 c.cm. of thin purulent fluid removed. This was again followed by definite pericardial friction sounds. Later in the same day it was decided to drain the pericardium. This was opened (V.T.) under local anaesthesia (alypin), and one inch of the fifth left costal cartilage excised. The internal mammary vessels were retracted inwards, and the pericardium was exposed and incised. A considerable quantity of thin purulent fluid escaped. A drainage tube was inserted, passing behind the heart. After this he improved in his general condition. The pulse came down considerably. He began to eat his food. The wound discharged freely, the pus becoming much thicker. He also developed a cough which caused some pain. In spite of this, however, the temperature, which had been sub-normal at the time of the operation, continued the rise which had begun two days after this.

As the pyrexia continued it was determined to explore the left base, where dullness and diminished breath sounds persisted, and, pus being found, the left pleura was opened and drained on October 31st. The empyema was a very small one. After that the temperature fell to normal and he made a steady recovery. He went out on December 11th apparently in excellent health. The pleura had healed up some time before the pericardium ceased discharging.

At the present time, nearly a year after his attack, he is in robust health. He is able to carry on his work just as before. He plays football without any discomfort whatever. The apex beat is slightly outside the nipple line. The scar, which is about an inch to the right of this, is slightly retracted with each systole, but there is no retraction at the apex. There is no murmur.

As a rule pneumococcal pericarditis is diagnosed, or overlooked, as the case may be, at some time after pulmonary symptoms have established themselves in characteristic fashion. In this case it was fully developed, and causing mechanical distress by the third day. Whether there was also an initial infection of the lungs or not must remain uncertain, but if so it could hardly have preceded the pericardial infection. Neither the temperature nor the general appearance of the patient suggested a pneumococcal infection, although the presence of herpes and the pulse-respiration ratio corresponded to what is seen in a pul-

monary infection. There was a striking absence of cough during the first week, and indeed a pneumococcal infection was not suspected until the bacteriological report on the fluid was received.

In a very incomplete reference to the literature no definite case of a primary pneumococcal pericarditis of this severity has been found, or one in which surgical measures have been necessary on the fourth day of infection. Attention has of recent years been called to the possible danger of injury to the left pleura at operation, and Connor¹ reports a case in which this occurred, with the result that an empyema followed, which was not recognized during life, and proved

fatal. This may be the explanation of the empyema in our case, but on the other hand the presence of pleuro-pericardial friction on the left side prior to the first paracentesis shows that this pleura had not altogether escaped early infection.

There is a tendency in the literature to depreciate

the value of paracentesis in cases of pericardial effusion, many surgeons preferring the operation of pericardiectomy on account of possible injury to the heart or coronary vessels caused by the needle, but if a diagnosis of pericarditis with effusion is correct there should be little risk. Paracentesis is easy and quick, and relief, when the fluid has been drawn off, is immediate; the operation of draining the pericardium can then be carried out in more favourable circumstances. This was the procedure adopted in our case. The oblique sinus was not drained, as recommended by Ballance, and yet there was a complete recovery. Possibly there is less necessity for drainage of this space in cases met with in civilian practice than in those occurring as a result of war wounds. In support of this view one may instance the comparative success of arthrotomy for septic infections in civil practice, when compared with the unfavourable result of this operation in joint infections met with in war wounds.

REFERENCE.

¹ Connor: *Medical Record*, 1900, 77.

Chart showing pulse rate and temperature.

EARLY PREGNANCY AND EPITHELIOMATA.

BY

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Do the conditions prevailing in the first three months of pregnancy assist in a study of the etiology and treatment of epitheliomata? It is in the hope of eliciting an answer to this question, or at any rate of inducing others to consider the suggestion contained therein, that I have written the following notes.

It has always seemed to me that a clue to the cause and treatment of epitheliomata through the conditions to be found in early pregnancy has never been given the care and thought to which it is entitled. There is no other normal condition in which one tissue, if it does not definitely attack, at least invades another, so that unless every possible clue fails we ought not easily to be turned aside and pronounce it a "blind."

The fundamental point to be kept in view in a study of any disease is that the normal human body is fully equipped to withstand disease, and it should be our duty to find out, in the first instance, why its resistance fails—not the nature of the attacking force. Remember that the tissues are fully equipped at the start, therefore the weakness is on their side. Working from this standpoint, we would have to allow that the body tissues are prepared to, and normally can, resist the growth of an epithelioma, and that if the

tissues are prepared against this particular growth they will resist any invading growth, whether malignant or not. This leads me to suggest that, as a result of this preparedness, the body will resist the normal invasion of the chorionic epithelium. The chorionic villi are able to invade the uterine wall, and so in some way this resistance has been overcome—but how? That the body shows signs of a reaction taking place is evidenced by the general malaise, nutritional disturbances, and sickness of pregnancy. We also know that lutein cells have appeared in the ovary after the ovum left it and these cells seem to grow in proportion to the rate of growth of the placenta, and that when the placenta ceases to grow, at the third month, these lutein cells also cease to grow. That there is some connexion between these two points is admitted. It is also generally admitted to-day that the function of the corpus luteum is that of an internal secreting gland. When Fränkel found that destruction of the corpus luteum in pregnant rabbits resulted in abortion, he concluded that it produced a secretion which maintained the implantation and growth of the ovum in utero. I suggest that this might be modified by saying that the secretion produces a body reaction, the result of which is to provide an antibody to the normal "body resistance to any invasion," and so the chorionic epithelium is able to maintain its hold, and that Fränkel's experiment allowed the normal body resistance full play so that the chorionic epithelium was repelled.

Pregnancy sickness is evidence of this auto-inoculation. This also explains the abnormal lutein activity found in