ope covers the cord, and the external ring is reformed entirely as in the normal construction of the parts. The advantage of this is apparent in that it protects the abdominal wall from the formation of a direct hernia at the site of the internal inguinal ring.

In this and the character and method of suturing consists the chief differences between the operation called after my name which I have so long advocated and the various modifications, known as the Bassini, Halsted, Fowler, and other methods.

When all the aponeurotic structures, which go to make up the walls of the inguinal canal, are sutured *beneath* the cord, the transplantation of it has been by a direct opening through the strong abdominal wall, and the new canal or bed of the cord is found entirely in the fatty subcutaneous tissues. Even when the nutrition of the testicle does not suffer by this violent transplantation, a new danger is added in the subsequent risk of a direct hernia, occurring through a small opening which must necessarily remain in the abdominal wall.

This is ever in direct line of the intra-abdominal pressure and will be found liable to yield to it in the subsequent history of the patient.

In evidence that this is not an hypothetical criticism is adduced the fact that within a year I have myself operated upon four cases of recurrent direct hernia, following operation by this method.

The plain corollary to the problem is that the surgeon should follow strictly the teachings of normal anatomy and reconstruct the structures as far as possible after the normal order of normal development.

This occasion demands a brevity which permits the criticism of dogmatism. At the risk of emphasizing it, I trust I may be permitted to state briefly that my experience extending over a quarter of a century seems ample to corroborate the statements herein made. In a series now numbering nearly four hundred cases, where the operation has been undertaken for cure, I have yet to see a case where the life of the patient seemed endangered when the integrity of the intestine was not involved. I have operated at all ages from two months to eighty-three years, involving perhaps every variety of hernia. So far as I have been able to trace results, more than ninety per cent. of the cases have remained permanently cured. As a rule, the patient is permitted to leave the bed at the end of the third or fourth week, resuming light duties at the end of the sixth week. No supporting bandages of any character are advised.

My first cases operated upon for the cure of hernia by complete primary closure of the wound by the use of buried catgut sutures occurred in 1870, and were published in the *Boston Medical and Surgical Journal* the following year.

Soon after I instituted a long series of original investigations upon animals in order to determine the exact results which supervened in wounds thus closed. It was clearly demonstrated that an aseptic animal suture was first inclosed by leucocytes which, little by little, invaded its structure with a resulting formation of a living band of connective tissue, replacing the foreign material.

Based upon these demonstrations I readily determined the great importance and value of buried aseptic sutures in all aseptic wounds, nowhere more apparent, however, than in their application for the cure of inguinal hernia.

These demonstrations I made public by a series of articles upon the subject, and it was not until after the acceptance of these teachings, that it became possible to formulate or put into practice any of the modifications of procedure, which have been advocated under various names for the cure of hernia.

The great practical difficulty has been in securing suture material of aseptic, trustworthy character which would maintain its integrity sufficiently long to hold in coaptation the sundered parts, finally disappear by absorption, and leave in its place a vitalized band of connective tissue. For this purpose catgut, no matter how prepared (primarily a flat band of obliquely interlaced connective tissue), is necessarily defective. The tendons of various animals are far more satisfactory. Carefully selected tendons from the tail of the kangaroo furnish sutures of nearly ideal perfection.

Dr. W. Coley, of New York, writes me, under recent date, that he has operated upon three hundred and fifty cases, using kangaroo-tendon sutures, with only one death and but two or three relapses.

It is needless to emphasize here the importance of modern aseptic technique, since upon this the safety depends as well as in large degree the results to be obtained. Present experience, however, is ample to prove that the operation for the cure of hernia in the male, the most difficult of all the forms of hernia because of the complication of the cord, is really not dangerous or difficult, if the principles above mentioned and the anatomy of the parts are well mastered, and the operation for the cure of hernia in a very large proportion of all the sufferers of this distressing and dangerous affliction merits general adoption.

ACUTE PERICARDITIS: A STUDY OF ONE HUNDRED CASES.¹

BY GEORGE G. SEARS, M.D., BOSTON.

THE cases forming the subject of this paper include all which could be found in the general index of the hospital between the 14th of January, 1882, and the 12th of April, 1896, irrespective of whether the pericarditis was the primary affection or occurred as a complication of some other disease. Classified according to the products of the inflammation, 54 were dry, or at least the effusion was insufficient to give distinctive physical signs, 41 were serous, 4 being hemorrhagic in character, and 5 were purulent. Seventy-four were males and 26 females. While no age was exempt, the youngest patient being nine and the oldest seventy-eight years old, the largest proportion was found in early adult life, 42 occurring between the twentieth and thirtieth years. From this as a maximum, the curve quite rapidly and uniformly descended on either side; thus, from thirty to thirty-four years there were 13 cases, and from fifteen to nineteen, 12; from thirty-five to thirty-nine, 8, and from ten to fourteen, 7. Above the age of forty the liability appears to rapidly diminish, 8 only being found in the fourth decade, while but 7 were over fifty. In 2 the age was not stated. No inference can be drawn from the fact that but one patient was under ten as to the relative prevalence of pericardial inflammation among children, since they form a very small part of the hospital clinic. Although the occupation of the patients has

¹ This paper will appear in the Boston City Hospital Medical and Surgical Reports, Eighth Series.

been classed among the general factors which induce the development of this affection, it seems to have exerted but little influence here, as no marked preponderance was engaged in pursuits necessitating any special exposure. The influence of season, however, was more marked, as was to be expected, from the large proportion which were secondary to rheumatism and acute diseases of the lungs, very few being admitted during the four months from August to November inclusive. Among the remaining months the cases were very evenly distributed, although a slightly larger number was found in January. A history of the abuse of alcohol was, perhaps, no more prominent than was to be expected among a hundred hospital patients, no matter what their disease, 23 having used it to excess, while 11 confessed to a moderate indulgence.

A striking feature of these cases was the large percentage in which the heart was already affected, 34 showing evidence of some valvular lesion, either mitral, aortic, or both, while in several others degenerative changes in the myocardium were present. This may have been simply a coincidence, but the number is so large that it is more probable that the pre-existent lesions acted as a determining cause. Besides this frequent association with old cardiac trouble so many of the cases were complicated by, or secondary to, pneumonia, pleurisy, or both, either by direct extension from one to the other, or from a simultaneous infection, that it is difficult, often even impossible, to differentiate the symptoms due solely to the pericardial inflammation, so that but few points in their clinical history are worth noting. Pain was fairly constant, being present in 65 cases, and when absent its place was frequently taken by a sense of oppression in the chest. Its usual position, as was to be expected, was in the precordia or in the left side of the thorax, but in one it was situated only in the back between the scapulæ. Often, however, it was not definitely located, the patients complaining simply of "pain across the chest." Next in frequency was dyspnea, though for reasons which have been mentioned, but little stress can be laid upon it. Palpitation and digestive disturbances were comparatively rare. In a dozen or more instances delirium is recorded, at times so active that the patients required restraint, but these cases were so often complicated by other pathological conditions or by alcoholism that figures are valueless. The febrile movement was almost always slight, although occasionally rising to 102.5° or 103° F. for a single observation. If it exceeded the former figure for several days, even in the rheumatic cases some other acute process, usually pneumonia or pleurisy, was almost always present. Subnormal temperatures continuing for several days, and with wide daily fluctuations, were not uncommon, even when recovery followed. In one very pretty chart what appeared at first glance to be a well-marked septic rise and fall proved to be the variation between a morning temperature of 96° and an evening one of 99.5°. The highest point was reached in a rheumatic case, complicated by pneumonia, 107.4° being recorded just before death.

Recurrent pericarditis occurred in one case of rheumatic origin without any return of the articular symptoms, the relapses, of which there were several, being confined to the pericardium, but running a course perfectly analogous to those which take place so frequently in acute rheumatism where the disease affects only the joints.

From the point of view of diagnosis two cases may be mentioned as showing the necessity of a careful examination of the back as well as the front of the chest, where the possibility of pericardial inflammation is suspected. In one the friction rub was heard very feebly over the precordia, but was pronounced inside, and just above the angle of the left scapula behind; in the other a collection of pus which distended the posterior portion of the pericardium to the size of two fists, its anterior surfaces being glued together by a previous affection, defied detection, and was first discovered at the autopsy. In the former a slight diminution of the friction sound might have rendered it quite inaudible in the usual position although distinctly perceptible behind, while in cases similar to the latter, when the lungs are clear, careful percussion of the back might show an area of dulness whose position might be of great value in diagnosis.

Etiologically, acute rheumatism occupied the most prominent position, as it was associated with 51 cases and appeared in the previous history of four others. Pneumonia or infection with the pneumococcus was next with 18. In seven instances chronic nephritis was the primary disease and in five pleurisy. Chronic rheumatism and gonorrhea are both credited with two cases, while one occurred in each of the following diseases: empyema, tonsillar abscess, acute nephritis, hepatic cirrhosis, and chronic fibrous pneumonia. The latter was apparently not tubercular, but no histological examination was made. Phthisis was, however, present in two others, one of which was also complicated by empyema, but in both the autopsy proved that the pericardial inflammation was of pneumonic origin, and not the result of infection with the tubercle bacillus. The latter may have been a factor in the five cases associated with pleurisy, but in four there was no direct evidence; in the fifth the jagged temperature curve, which persisted as long as the patient was under observation, and the aspiration of bloody fluid from the pericardial sac were strongly in favor of such a possibility, but the diagnosis could only be made by inference. Chorea appeared in the history of three cases, but in only one (a rheumatic patient) was it associated with the pericarditis, and there it came on several days after the onset of the latter.

The nine remaining cases have been classed as idiopathic, no efficient cause being found, although a history of exposure was given in two or three instances, but in only one was the patient in normal condition before the attack. Six had chronic valvular lesions, the result in one case of five attacks of rheumatism, the last five months before, and in another of an attack four years before. In both the latter a rheumatic origin is possible, the infection either being confined to the pericardium, or else the joint symptoms were so slight as not to be thought worthy of mention by the patient. Another case had markedly atheromatous arteries, a somewhat enlarged heart, and, probably, a mitral leakage, while still another was admitted with a soft systolic murmur at the apex, which persisted during his stay in the hospital, but it remained doubtful whether this was the result of organic or inorganic causes.

Many of the cases occurred before cultures were taken as a routine part of an autopsy, but records of a bacteriological examination were found in eight, in four of which pneumococci were found in the pericardial effusion, and in one (acute nephritis) the colon

bacillus. In a third (chronic fibrous pneumonia) streptococci were demonstrated, and, probably, also pneumococci and the Klebs-Löffler bacillus, but the latter were not absolutely differentiated. In one case pneumococci had been shown in the sputum, but the organ at the autopsy proved sterile. In another (rheumatism with recovery) colon bacilli were found in aspirated pleural fluid, but no opportunity was afforded to investigate the contents of the pericardium.

Rheumatism occupies so conspicuous a position among these cases, more than half being attributable to it, that a more detailed account of them is given. Thirty-eight were males and 13 females. The youngest patient was a boy of nine the oldest a man of fifty-two. Only four were over thirty-five and only five under fifteen, but for reasons which have been given the latter figures are no criterion of its frequency in childhood. Between these limits, fifteen and thirty-five, if divided into periods of five years, the cases were very evenly distributed, although a slightly larger proportion occurred between twenty and twenty-five than at any other time. So many of them entered with the signs of pericarditis already present that it is impossible to more than approximate the date of its onset in any considerable number. In a few it antedated the appearance of the joint symptoms, in a few others, they came on simultaneously, but in a great majority it showed itself within the first 15 days. After that time its development was quite rare, yet in one case the first evidence was found on the 34th day. It was decidedly more common in the first attack than in the second and in the second than in the third, the figures being 23, 15 and 7 respectively. After the third attack it was much less common, but in one case it came on as late as the ninth or tenth. It does not, however, necessarily follow from this that the liability successively diminishes, since more patients are admitted in the first or second than in later attacks, and no attempt was made to get at the relative proportion in each. It was also decidedly more frequent where the disease affected many joints, five or more being concerned in four-fifths (41) of the cases, and inferentially also, although the records are not always explicit, when the inflammation was migratory and skipped about from one position to another. Yet it also occurred where the articular symptoms were so slight that the patient complained only of transitory pain, more often in the knees, elbows or shoulders. The probability that the infection was particularly virulent is also suggested by the presence of pulmonary complications in nearly one-half of the cases (23), pleurisy being found in 18 and pneumonia in three, while pneumonia (once on the right and once on the left side and double pleurisy occurred simultaneously in two. Infection by contact appears to have been the usual course, as in the cases of pleurisy the left side was more frequently affected than the right, in the proportion of 12 to 1, while five were double. Of the three simple cases of pneumonia two occurred on the left side and one was double. In cases also where pleurisy was the primary disease pericarditis was more common when the left side was affected, in the proportion of 3 to 1, the fifth case being double; but with the primary pneumonias the condition was reversed, eight occurring on the right to four on the left side, three being double.

But little opportunity was furnished by these cases

of observing whether thorough treatment by the salicylates has any effect in preventing the development of pericarditis, as in nearly every instance it was either present at the time of entrance or appeared only a few hours later, or else the joint symptoms had so far subsided that the drug was not given. Only six patients had obtained an amount sufficient to bring them at all under its influence before the friction rub was discovered, and one of these received but three doses of fifteen grains of the soda salt. The other five received an amount which varied from ten grains every hour for two days as a maximum to fifteen grains three times daily for three days as a minimum. All that can be said is that so far as is known, since it is impossible to tell how much they may have received before admission, the great majority of the cases were not under its influence, but that in a small number it was unable, in the doses given, to prevent its development.

Based on the total number of 100 cases, the prognosis of pericarditis must be considered grave, as 43 per cent. died and four were discharged unrelieved; but when it is considered how frequently it occurred as a complication of some other disorder this estimate of its gravity must be shaded somewhat, according to the diseases of which it formed a part. When associated with hepatic cirrhosis or nephritis either acute or chronic every case but two terminated fatally, and of these exceptions one was discharged unrelieved, while the other was evidently not connected with the nephritis but was of rheumatic origin and went on to recovery after the manner of such cases. Nor is the fatal ending always to be attributed solely to the pericarditis, since its onset is often but one form of expression of the critical condition of the patient, or at most may have hastened the end by adding another item to the load which he was already carrying. So far as these figures go a similar observation is applicable to cases associated with other chronic diseases, all those complicating phthisis, fibrous pneumonia and chronic rheumatism being fatal with one exception, a case of chronic rheumatism discharged unrelieved. Where, however, the primary disease was of an acute infectious nature the results were somewhat better, yet the mortality rate was still very high except in rheumatism. Fifteen out of the 18 cases classed as pneumonia, for example, died, but this undoubtedly over-estimates the true rate, since several fatal cases are included in this list which would have been overlooked had not an autopsy been held, as the pericardial affection had not manifested itself by any physical signs, an occurrence probably not uncommon in pneumonia, whatever the outcome, its signs and symptoms masking those of the secondary disease. Both cases complicating gonorrhea, two out of the five cases of pleurisy (another was discharged unrelieved), and the single case of empyema, were all fatal. The case complicating tonsillar abscess recovered. The marked contrast in the result between those cases which were secondary to acute rheumatism and those which complicated all other affections is shown by the following figures, 10 only of the former dying out of 51, while 32 out of 40 of the former were fatal, and three were discharged unrelieved.

Of the 10 rheumatic deaths, two had pneumonia, three pleurisy, one of whom was also suffering from old valvular disease, and one had pneumonia, serous pleurisy and old endocarditis. Two others had advanced

cardiac lesions and another died of delirium tremens. The tenth entered moribund, and a satisfactory examination was impossible, but the presence of a pericardial effusion was demonstrated by a post-mortem aspiration of the sac.

Of the nine so-called idiopathic cases but one died, and he was also suffering from a chronic valvular lesion. Another with the same complication was discharged "unrelieved," a term which applied more to the valvular than the pericardial affection, the signs of which were fast subsiding.

In view of these results it seems justifiable to say that in itself acute pericarditis is not a very serious affection, but when it comes on in the course of some chronic disease, or when the integrity of the heart has been already invaded by previous valvular lesions, when pneumonia or pleurisy are also present either as the primary disorder or as coincident complications, or when it is due to a general septicemic process, as in the gonorrheal cases, the outlook is serious.

The medical treatment given may be dismissed in a few words, as it was entirely symptomatic, save that in some instances an ice-bag, more rarely a poultice, and still more rarely a blister, was applied to the precordium. The subject of paracentesis, however, deserves fuller discussion, although I have been unable to find any mention of its being attempted in more than four of the 46 cases where effusion could be suspected from the physical signs. In a large number of them it was so slight that the question of aspiration evidently did not arise, in others the prompt absorption of the fluid confirmed the wisdom of the policy of non-interference, but in a few of the fatal cases no explicit explanation could be found in the records of why it was not done, although probably, as most of them were complications of some serious process, it was thought that the critical state of the patient was due to other conditions than the presence of fluid, and that puncture would add to his discomfort without hope of granting him any relief. The necessity for puncture may be stated in general terms to arise when the action of the heart becomes embarrassed by the amount of the effusion, but a consideration of these cases also shows that the time must vary somewhat according to the disease with which the pericarditis is associated. In acute rheumatism, for example, the tendency toward recovery, even when the effusion is very large, is so strong that in most instances nature may be allowed to take its course, whereas in others a prompt resort to aspiration is imperative. This would seem to be notably true of pneumonia, from the possibility that the fluid may be purulent, four of the five cases where the effusion was of this character being found in connection with that disease, while the fifth occurred as a complication of empyema, which may have been due to the same cause. The disappointing results which have so frequently followed permanent drainage of the pericardial sac might at times be averted if the diagnosis had been made promptly before the heart had become weakened by the continued presence of the fluid. That the danger arising from wounding the heart is theoretical rather than real received another illustration in one of these cases, when the needle thrust into the sixth interspace just to the right of the sternum entered a "solid body which pulsated" and caused it to describe an arc of one and a quarter inches with each beat; no harm resulted. Of the three other cases the site selected was in one in the

fifth interspace on the right, and in another in the fifth just to the left of the sternum. In the third fluid was obtained in the same interspace on the left just inside the nipple line; while an attempt with a hypodermic needle in the fifth right space failed; another attempt made later in the fourth left space slightly inside the mammillary line was successful.

Clinical Department.

FOUR CASES ILLUSTRATING A MARKED DEPARTURE FROM THE USUAL PHYSICAL SIGNS OF PLEURITIC EFFUSION.¹

BY VINCENT Y. BOWDITCH, M.D., BOSTON.

My object in reporting the four following cases, which occurred in two of my services at the hospital, is to emphasize the fact that frequently the typical signs of a pleuritic effusion, especially that of a diminished respiratory murmur, may be supplanted by the usual sign of consolidation, namely, marked bronchial respiration, a fact which causes at times a good deal of difficulty in diagnosis, to be decided only by the aspirating needle.

That faint bronchial respiration may be heard in the region of pleuritic effusions is doubtless mentioned in some text-books, but I fail to find sufficient allusion made to the not infrequent cases in which the signs are such as are usually taught to the beginner as characteristic of intra-pulmonary rather than pleuritic disease. It is only comparatively recently that I have had cases brought to my notice in which the bronchial breathing mixed with râles has been very marked over the seat of effusion; and from my experience with aspiration in these cases I am led to believe that in one or two others which I can recall where in convalescence from pneumonia days after the return of the temperature to normal the marked bronchial breathing persisted, and which I attributed to an unresolved condition of the lung, there was a pleuritic effusion present, the amount of fluid, however, probably not being very great. In consequence of this experience I should never hesitate to aspirate under the conditions mentioned, believing that less harm can come to the patient by possibly puncturing a solid lung with a sterilized needle than by leaving a pleuritic effusion to partially hamper the free action of the lung.

CASE I (Vol. 401 B, p. 124). A. C., male, thirty-one, single, cigar-maker. Previous history shows nothing of special importance. Entered April 2, 1896.

Personal History.—Bad cough, with malaise, for eight weeks. Gave up work the day before entrance, when he had a chill and a sharp pain in the right breast and shoulder-blade. Considerable expectoration for twenty-four hours; bloody at time of visit.

Physical Examination.—Sputa hemorrhagic. Dyspnea.

Lungs.—Good resonance and respiration over left front and back; slight dullness over right front below fourth rib, and here respiration is faintly bronchial. Dullness in right back from one inch below spine of scapula, becoming flatness below at base, but not extending into axilla; over this area breathing is tubular,

¹ This paper will appear in the Boston City Hospital Medical and Surgical Reports, Eighth Series.