you will find them soft and pliable for use over tender surfaces, and for cleansing deep wounds otherwise difficult of access.

You will expect me to tell you, more definitely than I have as yet, the extent to which you may look for healing of a wound by primary adhesion of its surfaces. You may, I believe, reckon upon obtaining this result whenever you can keep the surfaces which are to be united in accurate apposition; if this be impracticable, the wound must be filled up by a process of granulation. If you consider the difficulty of getting, for example, the flaps of an amputation exactly applied, you will understand that, although the entire margin of an amputation-wound will unite at once, you cannot reasonably anticipate that the deeper parts of the wound, save in rare cases, will be healed, except by the gradual filling up of the interstices, which must here and there exist, by some process which takes time, as by granulation, and during which process you are not unlikely to have some, although it may be but little, discharge of laudable pus. It is the necessity of leaving the parts at rest for the completion of this process which chiefly compels us to keep a patient in bed, after an amputation, for three weeks or longer, for it is not prudent to allow the parts to be in the least disturbed until the repair has become what we may term consolidated. At the end of this rest-period, any sutures which have been used (and I prefer after most operations the use of silver wire, as it is little irritating and holds better than catgut, which is apt to give way under any strain) should be removed, unless for some reason it has been necessary to take them out at an earlier period, and, in so doing, you should be careful, if wire have been employed, after cutting each one, to turn back the end distant from the twist, so that the metal may be withdrawn smoothly and without pain.

During all the progress of wound-healing, carbolised oil dressings may be continued. I have only once had trouble from their use, and that was in a case of excision of the knee, the boy apparently suffering constitutionally from the action of the acid upon the system; at least, we got on much better when the use of the acid was discontinued. But we are not tied to this particular dressing, and we sometimes substitute for it warm water applications, or we employ a solution of sulphate of zinc or some other remedy, if a wound be open, and if its granulations require a change of treatment.

If I seem to you to dwell too much upon these details, let me remind you that it is impossible to be too careful about little things; upon the right management of these it is that the comfort of your patient and the result of an operation largely depend; and, if you are to make the recovery of a patient from a capital operation well-nigh a certainty, you must, as I said at first, leave nothing to chance. And, of course, what holds good of cutting operations is equally true for those practised by help of the *écraseur*, by galvanic cautery, or in other ways; only I do not now refer so much to these, because, from the nature of such procedures, you cannot expect them to be followed by the rapidity of repair which you may get under more favourable conditions, and the measures for obtaining which we are now considering. And it is equally true for injuries; for, although amongst the thirty-five amputations I set out by referring to six were primary, or for injury, there were admitted into the same wards, during the time my amputation cases were under treatment, twenty-eight compound fractures of bones of the leg, arm, or thigh, all of which recovered, and amongst which were fractures involving the elbow, knee, and ankle-joints which would certainly, in years gone by, have added to the list of primary amputations.

What I am telling you is not the story of any new plan of treatment; I am telling you what you may reasonably expect to accomplish by strictly adhering to the well-known principles and practice of surgery. If you are, as you should be, attentive observers of nature, you will see how this practice accords with her processes, and how it has come to us as the result of such observations. Look at any cut of little size—does nature attempt its repair before the bleeding has ceased? Is the wound at rest, is it free from pain, is it sweet and clean? It is all this if it is healing; and this is what you have to help nature to secure for her larger hurts, and you can do so if you will only take the pains. This is a trouble and a great tax upon your time, but it will ensure your obtaining good results after great surgical operations.

FRACTURE OF BOTH PATELLÆ FROM MUSCULAR ACTION.

IN 1870, a publican and builder, well known in this town, from mistaking the lower step in coming down stairs, transversely fractured both patellæ. He was many months in getting the free use of his knees, but he recovered without any limp.

THOMAS GODFREY, F.R.C.S., Herne Bay.

CLINICAL LECTURE

ON

A CASE OF ANEURISM OF THE ARCH OF THE AORTA TREATED BY GALVANO-PUNCTURE.

Delivered at University College Hospital.

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PART I.

GENTLEMEN,—We have recently had in Ward 4 a patient suffering from aneurism of the arch of the aorta, who was treated by galvano-puncture. Seeing that the method of treatment is as yet comparatively novel, and considering the gravity of the affection for the relief of which we have recourse to it, it is especially desirable that such cases, as they occur, should be carefully considered.

R. W. Faraday, aged 53, single, was admitted on September 28th.

Previous History.—He was born in Westmorland, and lived in this country till his twenty-ninth year, when he went to the United States, and continued to live in Virginia till the present year. He had turned his hand to all sorts of employment. He had been accustomed to make great efforts of strength, and had been much exposed to the weather at times. His general health had been very good; he said he had not taken a dose of medicine for forty years. During the last six years, he had occasionally suffered from shooting pains, "like tooth-ache," in different parts of his body, but chiefly in the lower limbs. These pains might last for twenty-four hours, and then vanish for two weeks or more. He never had rheumatic fever. There was no history of syphilis. His habits had been temperate.

Present Illness.—Ten years ago, his pulse was noticed to beat irregularly, "going twice and stopping once," though he never suffered from palpitation. Two years ago, he first noticed a small swelling, of about the circumference of a shilling at the base and very slightly elevated, at the bottom of his neck. It did not throb, and caused no pain; he felt it accidentally. He never experienced any sensation of "something giving" in the chest. The swelling scarcely increased at all during the first twelve months, though about six months ago its circumference at the base had reached the size of a crown-piece. During the last month, it had been enlarging rapidly on the right side of the sternum and below the inner end of the clavicle; and during the same time he had suffered from occasional slight pains in the occipital region. For a shorter time, he had had a sort of aching pain in both shoulders.

State on Admission.—The patient is thin, sparely built, though of fair muscular development, and 5 feet 8½ inches in height. He is rather pale, but has no expression of pain or anxiety. There is no turgescence of the neck, or lividity. He sits up and walks about without any inconvenience. The chest is cylindrical in shape, and fairly well developed. The costal angle is open and well formed. The direction of the ribs is normal. The intercostal spaces are tolerably wide. At the upper part of the sternum, and extending a little to the right under the clavicle, is a somewhat pyriform swelling, rounded at the upper and smaller extremity, where it projects over the supra-sternal notch, and fading away gradually as it passes downwards. Its length is three inches and a quarter, and its greater breadth about two inches. It occupies the part of the sternum above the level of the lower border of the second rib on the right side. The upper part has no osseous structure over it, and the covering appears to be very thin. In this part of the swelling there is a strong expansile pulsation; but the pulsation becomes less marked as we pass downwards, and is scarcely perceptible at the lower part. The skin over the round end is a little injected; it is not tender, and is quite cool.

The upper part of the left front of the *thorax* seems to expand more than the right; and this is confirmed by the measure. The circumference of each side at the level of the axilla is 17½ inches; below the nipple, right 16½, left 15½. The movement of the left at the base is quite as great as that of the right side. On light percussion, the whole part occupied by the swelling is high pitched and resistant; and the percussion-note is deficient also at the inner part of the first left interspace—which does not appear to be occupied by any morbid swelling, although it is rather full, whilst other spaces on this side are a little depressed. The percussion-note over the rest of the front is normal. Liver-dulness begins just below the sixth rib, and extends to the margin of the thorax. Inspiration is less loud and somewhat higher pitched at the right lung apex than at the left. The breathing at the bases is similar in character on the two sides. In the back, the per-

cussion-note is fairly resonant throughout. Slight rubbing is heard over the left apex on inspiration. *Heart.* The cardiac dulness is normal. The apex-beat is seen just below the fifth rib and inside a vertical line through the inner edge of the nipple. The impulse is firm, not diffused. There is no epigastric pulsation, no thrill anywhere. The heart-sounds at the apex are weak. The second sound is distinct at the apex and base. There is no *bruit* at the base or anywhere over the swelling. The *pulse* varies from 62 to 70 in the minute. In one quarter-minute, there may be eight beats and two intermissions; and the next quarter, fifteen beats and three intermissions. That of the right carotid is full, slow, and occasionally intermittent; of the left carotid almost imperceptible. The pulse in the right carotid and the pulse in both wrists are synchronous, and intermit simultaneously. The pulse at the left wrist is a little fuller and softer than that at the right; and the pulsation of the subclavian beneath the clavicle is also more distinct on the right than on the left side. The pulsation of the brachials is visible at the elbows. No appreciable loss of elasticity or induration of arteries is to be felt. Arcus senilis is slightly marked. The pulse at the wrist immediately precedes the pulse in the tibials.

The tongue is irregular on the surface, broad, rather flabby, and a little furred. The appetite is fair; digestion good. The bowels are slightly confined. He has to strain in micturition; the bladder is not distended. The stream is never forked, but occasionally twisted; the last drops dribble away. The temperature of the patient is normal.

He sometimes feels aching pains in the shoulders, but no pains in the tumour itself; and has an occasional aching, scarcely amounting to pain, below the right clavicle. There is no oedema or distension of the superficial veins of the upper limbs or chest. He has no dysphagia; no dyspnoea; no modification of voice; no cough; but on rare occasions, when he has had a little cough, during the last four months, has noticed that it breaks off in the middle, and assumes a hoarse barking character. The right pupil is more dilated than the left, whilst both are rather sluggish. Examined with the ophthalmoscope, both discs present a natural appearance, the vessels of each being about equal in size. There is no paralysis in any part of the body.

Now, taking all these facts into consideration, it seemed certain that we had to deal with an aneurism; and it seemed highly probable that it was an aneurism connected with the transverse portion of the arch of the aorta. As to whether it was a distinctly sacculated aneurism or not, the evidence did not enable us to decide. It was true, there was no *bruit* of any kind to be heard; though too much importance should not be attached to this merely negative sign. Whether communicating with the aorta by a narrow orifice, or not, it was evident, by the localised nature of the throbbing swelling, that it had become in a measure sacculated; and moreover, judging from its recent rather rapid increase in size, the thinness of the integuments covering it, and the almost total absence of deep-pressure signs, the tendency seemed to be towards death by external rupture—if not immediately, certainly at no very distant date. What, then, was it in our power to do? Two distinct methods of treatment were open to us. On the one hand, we might have recourse to that modification of Valsalva's treatment which has been ably advocated and carried into effect during the last ten years by Mr. Jolliffe Tufnell; or we might resort to galvano-puncture, with the view of building up a strong wall of fibrine in that portion of the sac whose yielding already began to threaten death. It cannot be denied that the disadvantages of Tufnell's method are grave, involving as it does an almost motionless state and a starvation-diet for four, five, or even six months, if the method is to have a fair chance. On the other hand, after looking carefully into the evidence, I had come to the conclusion that galvano-puncture, if it is to be fairly tried, should not be had recourse to, as has been often the case, only in the last stages of the disease. It seemed desirable that we should be able to try it carefully and tentatively, and under conditions in which we had leisure to study the best methods of procedure. For these reasons, and because past experience of this mode of treatment has shown the great rarity or almost complete absence of fatal results attaching to the mode of treatment itself, I thought it desirable to have recourse to it in this case. Dr. Russell Reynolds very kindly examined the patient with me, and he also came to the conclusion that it was a case peculiarly well fitted for the trial of galvano-puncture.

The patient soon gave his consent to the proposed method of treatment. No very appreciable change in the physical signs or symptoms had taken place during his stay in the hospital; and on October 8th I had recourse to the first trial of galvano-puncture, in which I was kindly assisted by Dr. Reynolds and Dr. Wilson Fox.*

* The following note had been made by Mr. Downes on the previous day. "The swelling has not notably increased during his stay in hospital. He says, however, that it is much more prominent than it was three weeks ago, at the upper part."

At 10 A.M., the patient was put under the influence of chloroform. He took it badly, and whilst under its influence was almost choked by two sets of artificial teeth which had become loose in his mouth during the administration. A fit of coughing was brought on at the same time, the cough having a somewhat hoarse brazen character. A small hare-lip needle, insulated except at its upper end, and to within half an inch of its point, was introduced to a depth of three-quarters of an inch into the left side of the upper and most prominent part of the bulging. The end of this needle was then connected with the positive pole of a new Foveaux's battery made by Weiss, five cells of which were in action; whilst the negative pole was brought into contact with the other side of the small rounded swelling by means of a rather large sponge well moistened with salt and water. After eight minutes, Dr. Reynolds heard a slight systolic *bruit* over the aneurism. The chloroform was now discontinued, in order to ascertain whether the mere passage of the current produced any pain. On recovering consciousness, the patient remained quite still, and felt no pain whatever during the remainder of the period in which the current continued to pass. At the expiration of twenty minutes, a slight blush was seen round the needle, and there was some reddish mottling of the skin of the neck immediately above the swelling. The slight *bruit* over the swelling was still audible. After thirty minutes, the current was stopped, and the needle was taken out, but not without a decided sense of resistance in withdrawing it. Not a drop of blood appeared, and the puncture was immediately covered with a small pledget of lint dipped in collodion. The uncovered portion of the needle was discoloured, but not corroded. A slight systolic *bruit*, audible with some beats only, was still to be heard over the aneurism after the withdrawal of the needle; and the pulsation continued strong and expansile. Pulse 76, and tolerably regular.

The patient was ordered middle diet, no stout, weak tea; and to remain as much as possible in the supine position, not getting up even for defecation or micturition.

Subsequent notes of the case, taken principally by the physician's assistant, Mr. Arthur Downes, M.B., run thus.

3 P.M. The skin has returned to its normal colour over the swelling. Pulse 64. He has no pain; occasional cough; pulsation the same.—6 P.M. The pulse in the left carotid has markedly improved, although it is still much weaker than that of the right carotid. No pain, nor any new sensation.—11 P.M. Temperature 98.4; pulse 72; respirations 18. The pulsation in the aneurism is as strong as before the operation.

October 9th. No change. Temperature normal.

October 10th. Pulsation remains stronger in the left carotid than before operation, but is still weaker than in the right. He remains in bed, but gets up to pass his motions, etc. [This permission was given at his own request, because it was thought to be less of an evil than the straining to which he had to resort in the supine position, and the worry which this occasioned him.] There is no change in the aneurism. He has slight cough occasionally; no dyspnoea; no difficulty of swallowing.

October 11th. Breathing is much louder and harsher over the left front of the chest than over the right. The same kind of difference exists in the back. A distant sound, as of slight rubbing, is heard near the spine in the right infrascapular fossa. A slight systolic *bruit* is heard over the aneurism. Slight pain is felt on pressure above the episternal notch. The patient thinks that the pulsation in the tumour is less forcible.

October 12th. No change. Temperature normal.

October 13th, 10 A.M. Distinct *bruit* is still heard over the aneurism. Pulsation is felt in the left carotid.—10.35 A.M. *Second galvano-puncture* by Dr. Bastian. Same battery as before. Eight cells were now employed. The needle (positive) was introduced in the same way and nearly in the same situation as before. The sponge (negative pole) was applied over the other side of the swelling. No chloroform was given. He had no pain nor any other sensation after the introduction of the needle. Pulse 74.—10.40. There is slight drawing in of the skin round the needle, and a blush of the size of a shilling around it. There is red mottling of skin, extending up into the episternal notch (as on last occasion).—10.45. The blush extends to the sponge and around it. Pulse 68. The *bruit* is more distinct.—11.5. The needle was taken out. No blood was seen. The puncture was covered with lint dipped in collodion. There was a patch of minute vesication upon an erythematous base, where the sponge was applied. The *bruit* is quite as loud as when the needle was in the aneurism.

October 14th. Temperature normal; skin natural in colour; no pain. Pulsation seems less at the extreme upper end of the aneurism, but is as marked as before over the anterior part of the rounded end.

October 15th. The tumour is more prominent and superficial at the sternal end of the second right costal cartilage.

October 16th. Pulsation is now distinct in the second right interspace close to the sternum. Temperature 97.2; pulse 80; respirations 16.

October 17th. The lint and collodion were removed from the seat of the last puncture, of which scarcely any trace was to be seen, the skin around being quite natural in appearance.

October 18th, 10 A.M. The aneurism at the upper and left part seems very slightly less full; but lower down the prominence is decidedly more marked, and the pulsation more superficial. A very soft *bruit* is still to be heard over the upper part of the swelling. *Third galvano-puncture* by Dr. Bastian. Two fine harelip needles were introduced into the lower part of the swelling, where pulsation had been increasing of late (just above the outer end of the second costal cartilage). The needles were inserted in a horizontal line, and about one inch apart: the right was zinc-coated, and not insulated; the left, a simple steel needle, was insulated to within half an inch of its tip. The left needle passed through the coat of the artery with some difficulty. No chloroform was taken, and no particular pain was experienced. A slight red blush appeared round the needles before any current was passed; and the patient stated that his skin had always been very sensitive and irritable. Both needles were connected with the positive pole of the same Foveaux's battery, of which *eleven cells* were now in action; whilst the sponge at the negative pole was placed just above, in the situation of the previous punctures. A pricking sensation was felt on first passing the current, but went off almost immediately. He experienced a slight dull aching pain in the swelling while the current was going, apparently due to the moderately firm pressure of sponge upon the upper rounded end of the swelling. No sensation was felt in the situation of the needles. Soon after the current began to pass, the blush increased in intensity and area, both round the sponge and the needles. The current was stopped at the expiration of half an hour. Beneath the sponge was an erythematous patch and small bullæ, as on the last occasion, though less marked; and around each needle was a deep red tinge for a depth of about one-twelfth of an inch—whilst the part immediately in contact with the right needle was of a dead white colour. There was some difficulty in pulling out the left needle, and still more in taking out the right, though their extraction did not seem to cause much pain. There was no trace of blood at either puncture. Lint and collodion were immediately applied. The right (zinc-coated) needle was very distinctly corroded for half an inch; the tip was eaten away; the surfaces black and roughened. The left needle was slightly corroded at the extreme point; the other parts were merely tarnished.—4 P.M. The redness of skin where the negative pole was placed has entirely disappeared. The *bruit* is not more marked than it was this morning.

October 19th. During the night the patient has had some dull aching pain in the swelling, but thinks it beats less forcibly. No pulsation is now to be felt below the middle of the second rib. Pulsation is still notably less in the right radial than in the left. The pulsation in the left carotid is difficult to feel, but is even *visible* in the right. There is a distinct red blush below and to the inner side of where the negative pole was placed. The lint over both punctures is slightly blood-stained; it was again painted over with collodion. Temperature, 98.4; pulse, 68; respiration, 16.

October 20th. The upper end of the tumour has increased in size perceptibly since yesterday morning; the summit is much more rounded. The redness of skin has increased in extent, but not in intensity. The patient takes his food well. Temperature, 97.2; pulse, 72; respiration, 16.

October 21st. There is no pain in the aneurism. Pulsation is still expansile in the upper part. The redness of skin has diminished. There is a little more redness around the lint covering the right than that covering the left puncture.

October 23rd. The lint and collodion were removed from punctures. Two small patches of discoloured skin are seen around, each one-fourth of an inch in circumference. To be dressed with lotio rubra.

October 24th. The redness round the needle-punctures is not diminished. Pulsation is notably less in the situation indicated in the note of October 19th, and all round the base of the swelling. Temperature, 97.2; pulse, 78; Respiration, 18.

October 26th, 11 A.M. The apex of the aneurism is somewhat larger. He complains of severe shooting pains in both legs, commencing at the hips, and slight pains in the hands. He has passed a sleepless night in consequence. He feels quite as well as usual, except for these pains. He has experienced them often before (see history). He says they are better after a good sweating. Temperature, 100; pulse, 72; respiration, 18. No dyspnoea nor dysphagia.—10 P.M. Temperature, 101.8. The pains are less. He complains of nothing now.

October 27th. At 10 A.M., temperature (taken twice), 97; pulse, 69;

respiration, 18. Soon after this he had a rigor, and the temperature began to rise again.—3 P.M. He has intense pains in the legs; movement brings on pain which darts at intervals. The tongue is furred; the bowels confined. He was ordered some aperient medicine and quinine. The upper part of the swelling is of the same size as it was yesterday. The last punctures still present traces of irritation around them. Pulsation over the whole lower part of the swelling continues much less, and this part is also somewhat less prominent than it was before the last operation.—6 P.M. Temperature, 104.6; pulse, 100; respiration, 20.—10 P.M. His mental condition seems strange. He says the quinine does not agree with him—that it will derange him. He got up when unobserved and walked towards the water-closet; was seen then, and seemed very weak. The expression of his face is more pinched. He would not have a hypodermic injection; said the pains would pass off. There is no pain in the aneurism, nor any notable change.

October 28th, 6 A.M. Temperature, 104.8. He has passed a restless night.—10 A.M. Temperature, 105.2; pulse, 112; respiration, 32. The pains have gone off again. He has a troublesome irritative cough, and has vomited two or three times, bilious matter. The whole of the swelling is much enlarged; but this seems to be chiefly, if not wholly, due to oedema of the integuments covering it and immediately adjacent parts. (Light pressure of the stethoscope caused deep pitting.) There is some oedema also of the neck; the episternal depression is obliterated; the veins on the upper part of the right side of the chest are enlarged. There was slight oozing of blood-stained fluid from the right puncture. No pain anywhere. Pulse regular—not intermitting at all. The breath-sounds are weak over the right front and upper part of the right back. Crackling *râles* (few) are heard over the right scapula. Inspiration is sonorous, and the breath-sounds generally harsh on the left side, and the right base behind. The percussion-note is good, except where the swelling is seen; it is hyperresonant over the lower part of the sternum and towards the cardiac region. There is resonance also over the cardiac region, and breath-sounds are heard in this situation. The heart's apex is in almost the same place as before.—3 P.M. Temperature, 105; pulse, 104; respiration, 36. He has not been sick for the last two hours, previously to which he took five minims of liquor morphine hydrochloratis.—6 P.M. Temperature, 104; pulse, 124; respiration, 38. He has frequent fits of dyspnoea and muttering delirium. There is slight oozing through both needle-punctures.—10 P.M. Temperature, 105.2; pulse, 120; respiration, 40. Part of the swelling, especially towards the right side, is livid red in colour.—11 P.M. The dyspnoea is much worse; the cough is hoarse and raucous; the bases expand equally; the breath-sounds are sonorous, with harsh inspiration and prolonged expiration at both bases. At the left apex, the breath-sound is more whistling in character; at the right apex (back), the breath-sounds are weak. Over the vertebræ harsh tracheal breathing is heard. There is resonance on percussion at the bases. There is no alteration in the position of the heart's apex. Dyspnoea is less when he is supported, so that his body bends forwards.—12 P.M. He continues in much the same state. The dyspnoea is worse at intervals. The face is pale, the lips a little bluish. The pulse is much smaller than it was this morning, and has more of its old character—intermits and remits. There is no more oozing.

Oct. 29th, 1 A.M. He stiffened himself once or twice; had gasping respiration, and was pulseless. There were spasmodic contractions occasionally of the sterno-mastoids; rigidity; and death.—1.20 A.M. The aneurismal swelling was now seen to have notably collapsed. It certainly was not so half an hour before death.

Necropsy Thirteen Hours after Death.—The swelling in front of the chest had disappeared, with the exception of a small conical eminence about half an inch in diameter, having the right puncture in its centre (this part having been covered by lint and collodion). The skin of this region had a reddish purple discoloration, which extended, though to a notably less degree, downwards to the nipple, and thence outwards to the axilla; a slighter amount of purple discoloration also extended over the sternum into the left subclavicular region. On cutting through the thoracic parietes, a small quantity of blood was found effused into the substance of the pectoralis major, about two inches away from the right puncture, and a smaller amount was found diffused round this part as a centre. On cutting across the sternum just below the third rib, and reflecting it together with the rib cartilages, a considerable quantity of blood was found diffused through the loose tissue of the anterior mediastinum, and over the pericardium. No blood was found in the pleuræ, and only about three drachms of fluid in the pericardium, free from blood. There was no blood in the posterior mediastinum. After the heart, with the great vessels and portion of sternum attached, had been removed and the whole cleaned, an aneurismal sac about the size of a small orange (two inches and a half in diameter) was found

connected with the anterior and upper part of the transverse part of the arch of the aorta, and projecting forwards in front of the innominate artery and the left carotid—the left subclavian apparently coming off immediately to the left of the sac itself. The sac extended forwards so as to be closely adherent to the under surface of the sternum. The anterior and lower walls (immediately adjacent to the sternum) were almost as thin as tissue-paper, extremely soft and infiltrated with blood. (Some blood appeared to have passed through a minute aperture in this very thin tissue into that of the anterior mediastinum, with which it was continuous). The ascending aorta was slightly and uniformly dilated; and the same condition appeared to exist, though to a somewhat less extent, in other parts of the arch. On opening the aorta from the posterior surface, a rounded opening (an inch and a quarter in diameter) was seen in the situation before mentioned leading into the aneurismal dilatation—the left subclavian coming off direct from the aorta just beyond the sac, the innominate arising completely outside the sac, but posterior to it, and the left carotid taking origin just within the sac itself. The descending portion of the arch, as well as the thoracic aorta, seemed to have undergone slight general dilatation; and the coats throughout, from the aortic valves downwards, had quite lost their natural elasticity. The internal surface also was notably irregular from wrinkling, and the presence of numerous opalescent and whitish, more or less flattened, elevations above the surface—interspersed with abundant yellowish areas of superficial fatty degeneration. The diminution of elasticity was more marked in the descending than in the ascending part of the arch. The abdominal aorta gradually became more free from morbid changes, and presented an almost normal elasticity. The iliacs were also healthy. The internal surface of the aorta was also in most of its extent distinctly blood-stained. On opening the posterior part of the aneurismal sac, it was found that about three-fourths of an inch above its line of separation from the aorta its altered arterial walls gradually thinned away, so as to leave nothing but a layer of condensed connective tissue. The aneurism itself was partly filled with a large, somewhat conical, clot, about two inches and a half in length, by an inch and three-quarters in diameter at the base, weighing almost two ounces. This clot was nowhere adherent except very near the junction of the aneurism with the aorta, where the last layer forming the base of the clot was adherent in several places, so as partially to shut off the sac from the lumen of the aorta. The clot was firm, and of a light reddish colour on the surface. On section, it was found to be colourless within, and most distinctly laminated from above downwards. (The microscopical examination of a hardened portion of this clot subsequently showed that it was composed of a dense felt-work of interlacing fibres of fibrine, containing only a few white blood-corpuscles within its meshes. Here and there, however, aggregations of altered white blood-corpuscles were met with more plentifully amongst the fibres.) After removal of the clot, the following additional particulars were made out concerning the sac and its relations to other parts. It was found that the upper part of the sternum and the adjacent portions of the right clavicle and first rib were completely absorbed: two or three pieces of almost detached bone could be felt forming the wall of the sac itself inside the left sterno-clavicular articulation, and in the situation of the eroded end of the right clavicle. The walls of the sac were formed almost wholly of condensed connective tissue, showing only here and there a small patch of thin and degenerated arterial tunic. The portion of the sac corresponding with the last two punctures through the skin, seemed in no way different from other parts, except that immediately inside the puncture of the zinc needle was a small portion of very firm fibrine, about half an inch in diameter and one-fifth of an inch in thickness, adherent to the wall of the aneurism. This portion of fibrine was similar in character to the substance of the clot, and was of the same diameter as the laminae of its apex. One inch to the right of the situation of the right puncture, there was a minute opening through the attenuated wall of the sac in the situation of the eroded inner end of the clavicle, and a needle, passed outwards through this, traversed the pectoral muscle at the site of maximum blood-infiltration. Two inches below the level of the last punctures (just inside the lower border of the second rib), where the sac projects into the anterior mediastinum, there was also a very minute aperture through the much attenuated coats, by which blood had made its way into the anterior mediastinum. The communication between the left carotid and the sac was now found to be quite obliterated by a thin layer of partially decolorised fibrine, which covered the opening and adjacent parts of the sac. From the mode of connection of the artery with the sac, the blood-flow must necessarily have been much diminished, since distension of the aneurism tended to close the commencement of the vessel. On opening the vessel a thrombus was found, extending from the origin of the artery upwards for two inches: the lower inch of the thrombus was quite decolorised, and firmly adherent to the arterial wall next the

aneurismal sac. The upper portion of the clot was altogether softer, slightly reddish, and terminated in a conical point. There was no notable disease of the coats of this vessel: in the left subclavian were two or three small patches of atheroma, whilst the right innominate and its branches seemed healthy. Firmly adherent to the left border of the sac, close to the carotid artery, was the left pneumogastric nerve. In one part of its extent it was lying at the side of a minute pouch projecting from the sac, whose walls were extremely attenuated (so as to be on the eve of rupture). The walls of the sac in this situation were blackened; and on section of the nerve in the same part, it was found that half of its substance next the little pouch was also notably blackened and softened.

The heart was of normal size, the left ventricle not being at all enlarged. The mitral, tricuspid, and aortic valves were healthy, with the exception of a very slight amount of opacity and increased thickness. The right lung was healthy; there were no patches of consolidation, no evidence of pneumonia, and only a very slight increase of redness of the mucous membrane in the main bronchi. The upper lobe of the left lung was notably emphysematous, especially at the apex and along the anterior portion. The lower lobe was very slightly more solid than natural, and more vascular: the main bronchi were rather more hyperæmic than on the right side. The trachea and commencement of the large bronchi were decidedly more hyperæmic than natural. The liver was of medium size, and apparently quite healthy; no increased consistence; no thickening of capsule. It weighed fifty-nine ounces and a half; the gall-bladder was full. The spleen was somewhat small; its consistence was rather above the average; no thickening of capsule. It weighed five ounces and three-quarters. The kidneys each weighed five ounces and three-quarters; they were apparently quite healthy. The stomach and intestines were healthy; the bladder was full. On removing the calvaria, the dura mater seemed healthy; the vessels of the pia mater were notably turgid; the arteries of the base were healthy. The brain-substance was everywhere of natural consistence, and apparently quite healthy.

[To be continued.]

ON THE CAUSES OF UNAVOIDABLE HÆMORRHAGE DURING MISCARRIAGE OR LABOUR WHEN THE PLACENTA IS PRÆVIA.

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THERE is in obstetrics no subject more important, or which has attracted more attention, than unavoidable hæmorrhage. Its causes, sources, and the mechanism of its arrestment, have been variously described; and most authors, especially those of recent times, base their practical recommendations on their theoretical views on these subjects; and, as the theories differ, so of course do the practices enjoined. The treatment, therefore, in this very grave class of cases, is in an unsettled state; and it will probably remain so until the whole theory of the hæmorrhage is surely established.

I have in former papers* discussed the separation of the placenta when prævia, and the hæmorrhages which take place during the continuation of pregnancy; but the topic of the present paper is beset with more difficulties, and cannot, I fear, be regarded as so well cleared up as those of the preceding.

The hæmorrhage during miscarriage or labour at the full time is the only loss that can be truly called unavoidable; and it is so in two different senses. It is, first, unavoidable because we have no means of preventing it. It is, second, unavoidable, because labour (and here, as well as in future in this paper, we shall include under the term labour both miscarriage and labour at the full term) cannot go on without inducing it. No doubt many authors† take particular care to describe cases without any hæmorrhage; Cazeaux, indeed, says, “without the loss of a drop of blood.” But such statements require consideration, and do not disprove the inevitable character of the hæmorrhage. The placenta is never separated without loss of blood. It is easily conceivable, that a case of placenta prævia may go on in labour without serious loss of blood or great hæmorrhage. The function of parturition is sometimes conducted with so great energy and rapidity, or with so early discharge of the liquor amnii, that such cases, complicated with

* See *Lancet*, Oct. 18, 1873, p. 558; and *Edinburgh Medical Journal*, November 1873, p. 385.

† Mercier, Moreau, Cazeaux, Simpson, Barnes, etc.