ON PUERPERAL EMBOLISM.

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(Communicated by Dr. Graily Hewitt.)

It is always gratifying to meet with new theoretical and scientific views which admit of application in the actual practice of our profession. We feel then that medicine is a really progressive science, a point which it is sometimes difficult to realise.

Our satisfaction reaches its highest pitch when the new knowledge enables us to cure a disease previously beyond our control. This gratifies both our humanity and our vanity at the same time.

On the other hand, we are, perhaps, apt to feel, if not to say, "What use in adding another to the list of necessarily fatal diseases?" To this question I can only answer that I believe the advances of medicine during the last half century have conferred almost as much benefit upon the subjects of those diseases which we are confessedly impotent to combat as upon the subjects of those others which we are able to treat *citius, tutius, et jucundius*, than our predecessors.

Though we cannot cure incurable disorders, yet when we know them to be so we address ourselves more undividedly to their relief; we abstain from those useless efforts which in our ignorance we should make to cure them. And what is of most importance, we devote ourselves more strenuously to their prevention, which may be within our power, though their cure is beyond it.

The subject of this paper illustrates these remarks in a very forcible manner, and it therefore seemed to me that it might not be unworthy of the consideration of the Obstetrical Society this evening, the more especially as the views of Virchow upon this subject are not yet so familiar to, or

so unreservedly admitted by, many members of the profession as their importance and truthfulness seem to me to demand that they should be.

As the diagnosis of the case which I shall presently relate was based upon these views, it may not be out of place briefly to recapitulate them.

Virchow's doctrines, then, respecting the formation of clots in the venous system (thrombosis), are briefly as follows:

When clots are found in the pulmonary artery of so long a duration before death as to have preceded or to be independent of any alterations in the parenchyma of the lungs, these clots have been formed originally in some portion of the circulating system below the lungs—that is, either in the systemic veins or in the right side of the heart. Each time that Virchow has found clots in the pulmonary artery he has found them also in the veins, *except* when they obviously depended upon disease of the parenchyma of the lungs. Of 76 autopsies made during one year at the Berlin Hospital, 18 showed clots in the veins and 11 clots in the pulmonary artery.

The coagula, when recent, fill the artery without adhering to its walls; afterwards adhesion takes place, but in neither case is the lining membrane diseased. The clots are generally found near a bifurcation, and not infrequently astride the tongue which separates two branches at their point of divergence.

A venous clot extends itself, not merely up to the junction of the next succeeding vein which remains pervious, but also a little beyond this point, so as to present a little floating tongue to the action of the current of blood flowing through the patent vein. This "appendix of the clot" it is which, being detached by the force of the blood-current, is carried by the blood into the right heart, and thence into the pulmonary artery.

That there is no physical impossibility in this transportation (emboly or embolism), Virchow has proved by experiment. Fragments of coagula, of other animal substances, of caoutchouc, &c., half an inch long and a quarter of an

inch thick, introduced into the subclavian vein, *always* found their way into the pulmonary artery, and *never* remained in the right heart. This is very important. The actual proof that clots in the pulmonary artery not only might be, but actually are, produced by emboly are fourfold :

1. The soundness of the coats of the artery, and the co-existence of phlebitic coagula elsewhere.

2. The length of the "appendix." Virchow has found that in the same part of the venous system the length of the "appendix" is uniform, *e. g.* the "appendix of a clot" formed in the common iliac vein always extends up to the renal vein ; consequently, should this not be the case, we are justified in assuming that a portion of the clot has been detached.

3. The point of the "appendix," looking heartwards, should be smooth, rounded, and uniform ; if a portion has been detached the point will be jagged, rough, or irregular.

4. Fragments may be found at a distance from the primitive coagulum, which, from the shape of their ends, may be recognised as having originally belonged to it.

The results to the lungs (in Virchow's experiments) varied according to the substance introduced into the subclavian vein. Caoutchouc produced only obliteration of the pulmonary artery, without any disease of the lung substance. Animal substances caused pneumonia, terminating in purulent infiltration.

Virchow divides the cases observed in the human subject into three classes :

1. Obliteration of a large pulmonary trunk, followed by sudden embarrassment of the respiration.

2. Less considerable obliteration, unattended by either local or general signs.

3. Limited pulmonary lesions as a consequence of the obliterations. These consisted of—

α Pulmonary atrophy in one instance ;

β Pneumonia not infrequently ; and

γ Gangrene, not primary, but resulting from antecedent pneumonia.

Pulmonary apoplexy has never been ascertained to occur in these cases. In one instance the lungs were found much distended with air, in others somewhat congested or very œdematous. In all these cases there was obstruction of a large trunk of the pulmonary artery.

The subjoined case is interesting in connection with Virchow's views upon the question of thrombosis and emboly. It is also of special interest to obstetricians, because phlebitis, of which obstruction of the pulmonary artery is one of the consequences, is peculiarly liable to be set up in puerperal women. The fact that I only saw the patient once during life must be my excuse for the particulars of the case being not more detailed than they are.

Case.—A married woman, æt. 24, was delivered of her first child on the 17th of October, 1857, after a lingering labour.

On the 25th both breasts became inflamed, and soon suppurated, and on the 5th of November her right leg swelled, without much pain and without any rigor.

On the 7th, whilst walking up a steep flight of stairs to her bedroom, she was suddenly seized with dyspnœa, which rapidly became extreme, and was attended with a sense of impending dissolution. She then sent for Mr. Robins, who had not previously attended her. On examining the chest he found over the entire posterior part preternatural resonance on percussion, and puerile respiration, nothing else abnormal; the state of the breasts prevented very accurate examination of the front chest, but there was no reason for presuming that it differed from the back part. No abnormal cardiac sounds. The pulse was feeble, the skin cold and clammy, very little cough, no expectoration, no complaint of pain, but the dyspnœa most harassing. Not being able to find any adequate explanation of the dyspnœa, Mr. Robins asked me to see the patient in consultation on the 12th of November. I found the preceding account of the phenomena given to me by Mr. Robins, perfectly accurate. The chest moved fully at each respiratory effort; there was a single loud sonorous rhonchus to be heard in the right

side, but after a little forced coughing this disappeared. The heart-sounds were free from murmur; its beat, and that of the arteries, were irregular in rhythm and force. Her general condition was pretty much as before described, but the nose, tongue, and breath, were cold. The tongue was perfectly clean, pale, and moist. The urine was rather scanty, and loaded with albumen. A semi-reclined dorsal decubitus was most agreeable. She had a sallow, dingy appearance, but no livor or venous distension about the face, neck, or arms. The left thigh and leg were swollen and white; very little tenderness in the line of the vein.

I diagnosed a clot in the pulmonary artery.

She lingered in much the same state for ten days more. The pulmonary signs remained unaltered till four days before death, after which date the lungs were not examined posteriorly in consequence of her exhausted condition. Two days before death the right thigh and leg became swollen, without pain or rigors.

The treatment adopted was a mildly stimulant one.

The post-mortem examination was made after the lapse of twenty-four hours, the weather being cool. The right side of the heart was moderately distended with a currant-jelly coagulum. The pulmonary artery was occupied from its commencement by a very dense, firm, whitish clot, similar to that which lines an old aneurismal sac. This was firmly adherent to the artery all round, and, when peeled off, left the lining membrane pale and to all appearance perfectly healthy. The coagulum was perforated by a small, irregular, tortuous channel. The clot extended to the third or fourth division of the artery, filling the calibre less completely as it advanced.

The left side of the heart was nearly empty. The lungs were pale and full of air; no emphysema. Isolated patches of pneumonia, slightly infiltrated with pus, each about an inch in diameter, were found on the posterior surface of each lung, not extending deeply into their structure. The central portion of the lungs quite healthy; no œdema or pulmonary apoplexy.

Both iliac veins were inflamed and contained clots, that

in the right one being evidently of more recent date than the other. Unfortunately (the examination having to be made rather hurriedly) we omitted to ascertain the exact upper limit of these clots. The kidneys were of a natural size, but congested and mottled.

The elements of the diagnosis in this case are very evident when the symptoms and signs are read by the light of Virchow's doctrines. A patient suffering from phlegmasia dolens was seized whilst going up stairs with sudden and terrible dyspnœa, which was not explained by a careful exploration of the lungs.

It is true that disease of the central portions of the lungs may at its outset fail to present any physical signs of its existence, from the fact that between us and it there is interposed a layer of healthy lung-tissue. I have several times seen persons suffering from heart disease in whom, from their symptoms, I have suspected the existence of pulmonary apoplexy for several days before it had approached sufficiently near the surface to make itself audible. The same may be true of a central pneumonia; but if such great dyspnœa as existed in this case were due to pneumonia, I should certainly expect to hear bronchial breathing at the end of expiration, since a bronchial expiration is more prolonged than a normal expiratory murmur, and would consequently become audible when it had ceased. Furthermore, there was an absence of any symptoms of pneumonia in this case. It seemed, therefore, justifiable to arrive at the conclusion that the dyspnœa was not caused by any interference with the access of *air* to the lungs. I could therefore only attribute it to the other sole cause of dyspnœa, namely, impediment to the access of *blood* to the lungs.

Dyspnœa depends upon an absence of the mutual interchanges between the air and the blood in the pulmonary cells, and may therefore depend upon the non-access of either. The absence of air is practically so much more frequently the cause of dyspnœa than the absence of blood that we are apt to ignore the latter cause altogether.

The whole history of the case supported this view of the etiology of the dyspnœa; the pre-existence of the phlegmasia, the suddenness of the dyspnœa, its commencement under circumstances which were eminently caculated to favour the dislocation of venous clot, the feeble fluttering pulse, the coldness of the breath and tongue, the increased sonoriety of the lungs on percussion, the puerile respiration, were all perfectly consonant with the hypothesis that a venous clot had been detached and lodged by the circulation in the pulmonary artery. The small superficial patches of pneumonia, exactly like those which I have seen on dissecting cases of pyæmia, lend countenance to that view of purulent infection which refers it to the lodgment of small phlebitic clots in the capillary or minute vessels. Nothing is more likely than that the blood, flowing through the irregular and tortuous canal formed in the centre of the clot, should detach small portions of this clot and carry them as far as the size of the vessels would allow them to float. They did not probably commence to exist earlier than four days before death.

Whatever may be thought of this explanation of their origin, the time of their development and their insignificant size, especially taken in conjunction with the healthy, uncongested, and pervious state of the rest of the lungs, forbid us to suppose that they were the cause of the dyspnœa in the first instance. The most important practical conclusion we can draw from this case is the prime necessity of keeping patients suffering from phlegmasia dolens carefully and rigidly in the recumbent position. The painfulness of the disease will commonly enable us to do so without much difficulty; in this case there was but little pain, had there been more her life would probably have been spared.

Denman says that he had seen one fatal case of phlegmasia dolens, and heard of several others, and seems to attribute the result to some extraordinary exertions which the patients were urged to make, for they sank either under some great effort or immediately after. We have now no difficulty in understanding how this could be.

We have no data for determining the fatality of cases of clot in the pulmonary artery; but if a patient can live for more than two weeks with so great an obstruction, surely with a less degree she might survive long enough to allow the clot to be removed by disintegration, which we should endeavour to favour by the use of remedies calculated to produce that result. The researches of Dr. Richardson afford us some, but not conclusive ground, for thinking that the carbonate of ammonia is such an agent.

Nature certainly removes, probably by disintegration, the primary venous clot, and we may assume that the secondary one is also capable of removal in like manner. The experience of ordinary cases of phlegmasia dolens teaches us that pyæmia is not a necessary result of this disintegration, even if we allow that it is an occasional one.

I must again repeat, in conclusion, that the knowledge which we have acquired during the last few years upon this subject is especially valuable in furnishing us with means of prevention, which is proverbially better than cure.

Dr. GREENHALGH stated that cases of fatal embolism after parturition were rare. He had met with but one case in his own practice. It occurred in a very healthy young lady, who had been confined of her first child. She had had a perfectly normal labour, not followed by hæmorrhage or any untoward circumstance beyond some acceleration of the pulse on the third day after delivery. She was suddenly seized during the evening of the sixth day after her confinement with severe dyspnœa, acute agony in the cardiac region, and intense mental excitement, speedily followed by alarming prostration and death in less than three hours. No post-mortem was made.

Dr. BALLARD asked if there had been any febrile disturbance in Dr. Greenhalgh's case.

Dr. BARNES observed that the history of this case and of others, in which embolism followed upon phlegmasia dolens, had an important bearing upon treatment. Thus, it was usual, after the subsidence of the acute symptoms of phlegmasia dolens, to rub the affected limb, with the view of promoting absorption and supplying passive exercise to the muscles and other tissues. It might be that this friction would favour the detachment of a clot from the femoral vein, which being thrown into the circulation

would constitute "embolism." This danger should be borne in mind. He thought the connection between a febrile state and clotting or thrombosis, suggested by the question of Dr. Ballard, was very frequent. He believed in most cases of phlegmasia dolens there was a pre-existent abnormal state of the blood which predisposed to coagulation. He (Dr. Barnes) had gathered up in his memoir on "Thrombosis and Embolia," published in the Society's 'Transactions,' vol. iv, most of the information at that time extant upon the subject. Since then, however, information had been considerably enlarged by the publication of new cases.