LECTURES ON THE PRACTICE OF MEDICINE.

BY

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LECTURE IV.—DROPSY.

1. *Definition.*—2. *Pathology.*—3. *Varieties and Diagnosis. General and Local Dropsy. Anasarca. Hydrothorax. Hydropericardium. Ascites. Hydrocephalus. Spurious Dropsies: a. Ovarian; b. Dropsy of Gall-bladder; c. Hydrocele; d. Hydronephrosis; e. Hydrometra; f. Acute Edema of Glottis. Classification of true Dropsies: a. Local; b. Partial at first, but having a tendency to become general; c. General from first.*—4. *Prognosis.*—5. *Treatment.*

1. *Definition.*—Dropsy is an accumulation of serous fluid in the connective tissue, or in one of the normal serous cavities of the body, occurring independently of inflammation.

The word dropsy is a contraction for that formerly in use—viz., hydropsy, which is derived from the Latin word *hydrops*, or from the two Greek words *ὕδωρ*, water, and *ὄψις*, appearance. Dropsy of a serous cavity is designated by the name of the cavity, with the prefix *hydro*; and thus we have the terms hydrothorax, hydropericardium, and hydrocephalus, to denote dropsy of the pleura, pericardium, or ventricles of the brain. When the connective tissue in any part of the body is infiltrated with serum, there is said to be *œdema*; and when the connective tissue throughout the body is œdematous, we say that there is *anasarca*. Anasarca, in fact, is a general œdema. What is called *general dropsy* is a combination of anasarca with dropsy of one or more of the serous cavities.

It is scarcely correct to speak of dropsy as a distinct disease; for, like jaundice or diarrhoea, it is a symptom of many diseases which are widely different; and in practice, whenever you meet with a case of dropsy, your first object ought to be to find out the primary disease. There are, however, several reasons for studying dropsy as a malady in itself. It is very often the most prominent symptom, without which the presence of its various causes would not be suspected. There may be a complexity of causes at work in the same case. The mere accumulation of fluid in the connective tissue or in a serous cavity may derange important functions, and may even be a source of danger; and, lastly, it often happens that by treatment we can remove the dropsy and the danger depending upon it, although the primary malady remains untouched.

II. *Pathology.*—All dropsies result from an exhalation into the connective tissue or serous cavities of the body in excess of absorption.

In order that you may understand my meaning more clearly, it is necessary that I should briefly refer to the importance in the animal economy of the osmotic circulation, derangements in which furnish an explanation of many other morbid conditions than dropsy. A circulation is constantly taking place between the blood on the one hand and the free surfaces of the mucous and serous membranes and the tissues on the other, the existence of which till within the last few years was unknown, and which even now is too little heeded. With regard to the circulation which goes on between the blood and the mucous surfaces of the alimentary canal, I may quote the following paragraph from Dr. Parkes's *Gulstonian Lectures on Pyrexia*.

"It is now known that, in varying degrees, there is a constant transit of fluid from the blood into the alimentary canal, and as rapid reabsorption. The amount thus poured out and absorbed in twenty-four hours is almost incredible, and of itself constitutes a secondary or intermediate circulation never dreamt of by Harvey. The amount of gastric juice alone passing into the stomach in a day, and then reabsorbed, amounted, in the case lately examined by Grünwaldt, to nearly twenty-three imperial pints.* If we put it at twelve pints, we shall certainly be within the mark. The pancreas, according to Kröger, furnishes twelve and a half pints in twenty-four hours; while the sali-

vary glands pour out at least three pints in the same time. The amount of the bile is probably over two pints. The amount given out by the intestinal mucous membrane cannot be guessed at, but must be enormous. Altogether, the amount of fluid effused into the alimentary canal in twenty-four hours amounts to much more than the whole amount of blood in the body; in other words, every portion of the blood may, and probably does, pass several times into the alimentary canal in twenty-four hours. The effect of this continual outpouring is supposed to be to aid metamorphosis; the same substance, more or less changed, seems to be thrown out and reabsorbed until it be adapted for the repair of tissue or become effete."

This circulation is partly carried on by a process of cell-growth, but is mainly explicable on the principles of endosmosis and exosmosis, or by the laws which are now known to regulate the diffusion of fluids through animal membranes. A similar circulation goes on between the blood and the various serous surfaces. In health, these surfaces are kept moist by a constant serous exhalation from the blood, which is reabsorbed into the blood as fast as it is thrown out. Lehmann made an opening into the pericardium of a healthy criminal, and found that the fluid which ran from it in three and a half minutes amounted to 9½ fluid-drachms (33.8 *grammes*) which is equivalent to 488 fluid-ounces in twenty-four hours (Lehmann's *Physiol. Chemie*, ii, 309). In health, this enormous quantity of fluid is immediately reabsorbed. As a proof of the extreme rapidity with which fluid in a serous sac can be taken up into the blood, I may refer to some experiments of Dr. Richardson. He injected four pounds of water into the peritoneum of a dog which weighed twenty-three pounds. Twelve hours afterwards, the animal died, and the body was examined an hour after death. Not a drop of fluid was found in the peritoneum; it had all been taken up into the veins, and had caused death by diluting the blood. The experiment was thrice repeated with a like result (*On Coagulation of the Blood*, 1856, Exper. 36, 37, 38, 39.) Lastly, with regard to the tissues of the body, fluid is constantly transuding into them from the blood-vessels, and passing back from them into the vessels.

In a healthy state of the body, the exhalation referred to is exactly balanced by the absorption; but when, from any cause, this balance is deranged, one of two things happens—either a flux from some mucous surface, or a dropsical accumulation of fluid in the connective tissue or in some serous cavity.

The fluid of dropsy is not liquor sanguinis. It contains no flakes of lymph, proliferating cells, or pus-corpuscles, such as we find in inflammatory effusions; and, when removed from the body, it does not undergo spontaneous coagulation. It is clear, either limpid or more or less straw-coloured, and of alkaline reaction; and it has a specific gravity of 1008 to 1014; that of blood-serum being 1029.5. In composition, it resembles the serum of the blood, except that the proportion of solid matter is much less, scarcely more than one-third or one-fourth. It always contains much albumen, and in this respect it differs from the fluid of a hydatid cyst. In addition, it contains extractive matter; salts, of which the chlorides preponderate over the phosphates and carbonates; alkaline earths; and, in rare cases, cholesterine. It is a fact also of some practical importance, that, when the dropsy is connected with disease of the kidneys, the fluid sometimes contains urea. The precise composition of the fluid varies with the part of the body where it is found. That of hydrothorax is said to be lighter than that of dropsy of the pericardium or peritoneum; while that of hydrocephalus is the lightest of all, having a specific gravity of about 1006.5.

The chief circumstances under which the balance of the osmotic circulation becomes deranged, so as to lead to dropsy, are the following.

1. *Venous Repletion from Obstructed Circulation.* The watery exhalations from the mucous and serous surfaces and into the tissues are reabsorbed by the small veins, and not by the lymphatics, whose function it is to take up the elements of food and the more solid detritus of the tissues. When the minute veins become gorged with blood, owing to some impediment in the circulation, the thinner portion of their contents transudes through the coats of the vessels, and absorption is diminished. The result of this is dropsy. This can be proved experimentally by placing a ligature around one of the large veins in the body of a living animal; and you will have constant opportunities in the wards of the hospital of observing similar results from occlusion of the large vein of one of the limbs, from obstructions to the systemic circulation caused by diseases of the heart or lungs, or from obstruction to the portal circulation caused by diseases of the liver or portal vein.

2. *A Diminished Exhalation in one part of the Body, inducing a Compensatory Exhalation in Excess in another.* The water which is taken into the body is eliminated by the kidneys, the skin, and the lungs, but mainly by the two former channels, which stand in a vicarious relation to one another. In warm weather, when there is free transpiration

* Grünwaldt's observations were made at Dorpat, on a robust woman, 35 years of age, who had a fistulous opening through the abdominal parietes into the stomach. An account of these observations, abstracted by me from Grünwaldt's Latin Memoir, will be found in Beale's *Archives of Medicine*, 1858, vol. i., p. 270. The quantity of gastric juice secreted was equivalent to 14.016 *kilogrammes* (30.27 lbs. avoirdupois) in twenty-four hours.—C. M.

from the skin, the quantity of urine is diminished; whereas cold weather, which checks the transpiration of the skin, increases the flow of urine. These vicarious discharges are constantly occurring in the healthy state of the body. But when transpiration by the skin is suddenly arrested in consequence of a chill, as when a man, drenched with perspiration from working in a close heated room, goes out without his coat to cool himself in a frosty atmosphere, or, when similarly heated, he is exposed to a heavy rain which wets him to the skin, or lies down and goes to sleep upon the damp grass, the quantity of fluid which is repressed from the surface may be greater than the kidneys can get rid of, and the result is either an undue flux from the mucous membrane of the alimentary canal, or the effusion of serum into the areolar tissue or into a serous cavity. These are the cases which some writers have designated *active* or *febrile* dropsy, but which, so far as my experience goes, are invariably associated with acute congestion or inflammation of the kidneys. The results of a chill just referred to are all the more likely to occur if the eliminative powers of the kidneys have been already impaired by disease. For example, in the third and fourth weeks of convalescence from scarlet fever, the kidneys are congested, and their secreting tubes are crammed with desquamating granular epithelium-cells. These organs are not in a condition to respond to any sudden stimulus to increased function, particularly if the stimulus produce increased congestion, which deranges still further their secreting power. When, then, under these circumstances, increased work is thrown upon the kidneys in consequence of a chill, they do not respond, and the patient is attacked with diarrhoea or with dropsy. Similar results may ensue from a chill, independently of scarlatina; but even then there will be reason to suspect the existence of some organic change in the secreting structure of the kidney antecedent to the chill. When a large number of persons are exposed to the same chill, comparatively few are attacked with acute nephritis and dropsy; and in these the existence of some antecedent mischief in the kidneys may usually be inferred from their intemperate habits, or from some other facts in their previous history. But, irrespectively of any check to the cutaneous functions, diseases of the kidneys furnish other illustrations of dropsy produced in the manner we are now considering. The scarlatinal and other poisons may excite inflammation of the kidneys without any chill of the surface, or the secreting epithelium may undergo a chronic fatty degeneration, the starting-point of which may, or may not, be inflammation. In both of these morbid states—the one acute, and the other chronic—the uriniferous tubes become gorged with epithelium; the elimination of water by the kidneys is impeded; the quantity of urine diminishes; and what may be called a compensatory dropsy is a common result, the transudation of serum through the walls of the vessels being facilitated in the more chronic cases by the impoverished or anæmic condition of the blood. On the other hand, there are chronic diseases of the kidneys (the contracted or granular, and the waxy kidney), in which the uriniferous tubes remain patent, or (in the granular kidney) are even abnormally so from the denudation of the lining epithelium; and where, therefore, there is no obstacle to the escape of the water discharged by the Malpighian tufts. As might have been expected, we find that in these forms of renal disease there is no diminution in the quantity of urine, which, on the contrary, is often greatly increased; that, consequently, dropsy is rarely observed, except in the very last stages, when a large proportion of the uriniferous tubes have been destroyed; and that the skin also is often abnormally dry.

3. *Abnormal Conditions of the Blood* may assist in the production of dropsy, but it is not very certain that alone they can produce it. There can be no doubt that dropsy is a common result of anæmia and hydræmia, and that, when the blood is in an attenuated state, its liquid portion will pass through the capillary walls with increased facility. This is probably one reason why dropsy is so common a symptom when the blood is in an impoverished state, as happens after malarious and other fevers, or from starvation, hyperlactation, hæmorrhages, etc. But it must be remembered that, under these circumstances, not only is the blood altered in quality, but the propelling power of the heart is weakened, and that perhaps the chief cause of the dropsy is the one first considered—viz., venous repletion. Again, it is commonly taught that in renal diseases the dropsy is due to an altered state of the blood consequent on the imperfect elimination of the nitrogenous detritus of the blood and tissues; and it has recently been suggested by Dr. Owen Rees, that the retention in the blood of the urinary salts and urea (which may be regarded as the crystalloids of the urine) may favour the diffusion of the blood-serum through membrane, and may thus possibly assist in explaining the dropsical state in Bright's disease (*Harveian Oration*, 1869, p. 31). But there has always appeared to me to be one very important objection to this view; viz., that dropsy does not occur in that form of kidney-disease in which of all others there is the

greatest tendency to fouling of the blood by retention of the urinary salts and urea: I refer to what is known as the contracted, granular, or gouty kidney, the peculiarity of which disease is, that the epithelium-cells lining the uriniferous tubes, whose function it is to excrete the urinary salts, are destroyed, and that the patients often die with convulsions, or other uræmic phenomena, but with little or no dropsy. I am inclined, therefore, to think that the explanation of the dropsy of renal diseases already offered is more satisfactory, although, in the more chronic cases, the great anæmia which results from the protracted drain of albumen and often of blood from the system may, like anæmia from other causes, contribute to the maintenance of the dropsy.

4. *Nervous Influences*.—Dr. Laycock of Edinburgh has endeavoured to show that the nervous system exercises a powerful influence on the production, as well as on the removal and inhibition, of dropsies. He refers to cases of anasarca assuming a paraplegic or hemiplegic distribution, or still more restricted in their area, and in which no renal disease nor obstruction to the circulation in the heart, lungs, or elsewhere, could be discovered, but in which the dropsy was associated with hyperæsthesia or paralysis.* Cases of this sort, however, are rare. At all events, although I have been on the outlook for them since reading Dr. Laycock's memoir when it appeared in 1866, I have never met with an example. Dr. Laycock also claims for the nervous system a strong influence over the dropsies which occur in connection with obstructions of the circulation and renal diseases; and he refers to instances of those diseases in which the dropsy was distributed, not in accordance with the laws of gravitation, but in certain neuro-vascular areas, such as both lower extremities, one side of the body, or one side of the face. When you remember the control exercised by the vaso-motor nerves on the capillary circulation, it is not difficult to understand how dropsy may be occasionally influenced in its distribution by the condition of the nervous system; but even in those rare cases where an abnormal condition of the nervous system is said to be the sole cause of dropsy, a state of venous stasis in the part is probably induced in the first instance.

What is important for you to remember is this, that in a large majority of cases dropsy is traceable to one of two causes—either venous repletion from obstructed circulation, or diminished exhalation from one of the natural outlets of the body, inducing a compensatory exhalation in excess in the connective tissue or in one or more of the serous cavities, this exhalation being perhaps facilitated by an attenuated state of the blood.

III. *Varieties and Diagnosis of Dropsy*.—Certain varieties of dropsy which have received distinct names depend upon the situation and extent of the serous effusion. To some of them I have already referred.

In the first place, dropsy is said to be *general*, when serum is infiltrated into the subcutaneous connective tissue throughout the body and into one or more of the serous cavities; or *local*, when there is a partial oedema, or effusion into one serous sac.

By *Anasarca* is meant a general oedema of the connective tissue throughout the body. The effusion in these cases is not equally distributed in every part. In the first place, it generally preponderates in the feet and legs, and this even when the patient constantly maintains the recumbent posture; the obvious explanation being, that the circulation is weakest in the parts of the body most distant from the heart, and that there venous stasis is most apt to occur. Secondly, the fluid gravitates to the most dependent parts, and accordingly shifts its position with that of the body. When the patient gets up during the day, the feet and legs always become swollen towards evening, while in slight cases the swelling may have quite disappeared from these parts by morning. When the patient lies constantly on his back, the dropsy preponderates in the loins, in the back of the thighs, in the calves, and behind the ankles. And lastly, when he lies much upon one side, the dependent arm and side are often much more swollen than the corresponding parts of the opposite side of the body. Thirdly, independently of gravitation, there are certain localities of the body in which the fluid is particularly prone to collect in consequence of the looseness of the subcutaneous connective tissue; such are the prepuce, the scrotum, the connective tissue of the lower eyelids and adjacent portions of the cheeks, and the substance of the lungs. "Oedema of the lungs" is rarely altogether absent in cases of general dropsy, but the lungs are the only viscera liable to dropsy. Simple anasarca is distinguished from swelling due to other causes by the absence of redness or tenderness, by the fact that the swelling shifts its place in obedience to the law of gravitation, and by the circumstance that pressure displaces the swelling, a pit remaining for some time after the pressure is removed.

* On the Influence of the Nervous System and of Diathetic Tissue-Changes in the Production and Treatment of Dropsies. (*Edinburgh Medical Journal*, March and April, 1866.)

Anasarca is not uncommon without fluid in any of the serous cavities; but true dropsy of any of the serous cavities rarely occurs without more or less oedema of the subcutaneous connective tissue. The cavities in which dropsical fluid mainly collects are four; viz., the two pleuræ, the pericardium, and the peritoneum.

Dropsy of the pleuræ is called *Hydrothorax*. It is characterised by the physical signs of fluid in the pleural sacs, which I shall have to describe to you in a future lecture, occurring in conjunction with the signs of dropsy elsewhere, but without pain, pleuritic friction, or pyrexia. Moreover, it is a peculiarity of hydrothorax, that the signs of liquid effusion are not confined to one pleura, but that the upper level of the fluid rises to about the same height on both sides. In this respect it differs from the effusion resulting from inflammation. In exceptional cases, however, of hydrothorax, where adhesions over one lung prevent the accumulation of fluid in the pleura, or where the patient lies constantly on one side, the dropsy may be confined to, or preponderate in, one pleura. Fluid in the pleuræ compresses the lungs and impedes the entrance into them of air: as a rule, the respiratory functions are further embarrassed by the circumstance that hydrothorax is usually associated with more or less oedema of the pulmonary tissue. The combination of these two morbid conditions is a common cause of death by asphyxia in cases of dropsy. Hydrothorax, however, differs from inflammatory effusion in this respect, that as soon as the fluid is removed from the pleura there is no obstacle to the complete re-expansion of the lung, in the shape of bands of organised exudation.

Hydropericardium is the term applied to dropsy of the pericardium. Its presence is denoted by the physical signs of fluid in the pericardial sac, which we shall have to study when we come to discuss diseases of the heart, in conjunction with signs of dropsy elsewhere, but without pain, pericardial friction, or pyrexia. This, however, you must remember, that inflammation of the pericardium leading to effusion is an occasional complication of both renal and cardiac dropsy. Hydropericardium embarrasses the action of the heart and contributes to a fatal result by asthenia. In fact, the rapid effusion of dropsical fluid into the pericardium is far from being an uncommon cause of death in cases of dropsy.

Dropsy of the peritoneum is sometimes designated *Hydroperitoneum*, but more commonly *Ascites* (*Ἀσκιτις*, from *ἄσκος*, a leather bottle). I shall have much to say hereafter on the clinical characters of ascites; but here I may observe that it differs from hydrothorax and hydropericardium in this respect, that, although often associated with evidence of dropsy in other parts, it very often exists independently. A considerable quantity of fluid may accumulate in the peritoneum without causing the patient much inconvenience, except from its weight. But when the accumulation is so great that the abdominal walls are pressed out in every direction, ascites is the source of other evils than those arising from its mere bulk or weight. The pressure of the peritoneal fluid on the iliac veins causes venous repletion of the lower extremities, followed by oedema; its pressure upon the renal veins leads to a diminished flow of urine and albuminuria; and, what is the greatest danger of all, the pressure upwards against the diaphragm resists the due contractions of that muscle, and displaces the lungs and heart, so as seriously to embarrass the functions of these organs.

Dropsy of the cerebral ventricles or of the arachnoid space constitutes the disease known as *Chronic Hydrocephalus*. This, with rare exceptions, commences in intra-uterine life, or soon after birth. It is a purely local dropsy, unassociated with dropsy in any other part of the body. The quantity of fluid is sometimes enormous; it has been known to amount to ten or even twenty pints; and its specific gravity (about 1007) is unusually low, even for a dropsical fluid. The cause of the dropsy has been traced in some instances to pressure on the veins of Galen which return the blood from the ventricles, or on one of the cerebral sinuses, by a cancerous, cystic, or other tumour, or to obliteration of these vessels; the dropsy, in fact, being the result of venous repletion, in the same way as ascites results from any obstruction of the portal circulation. But in a large proportion of cases no such cause can be discovered; and it may be doubted if the disease have not been inflammatory in its origin, as Rokitsky thinks, rather than a true dropsy. West observes that each year leads him to estimate more highly the share exercised by inflammation of the lining membrane of the ventricles in the production of chronic hydrocephalus. In six out of forty-five cases collected by him, the enlargement of the head succeeded to an attack resembling acute hydrocephalus; and in one it seemed to be induced by an injury of the head (*Diseases of Children*, 5th ed., 1865, p. 121).

There is another form of accumulation of serous fluid within the cranium which calls for notice. In examining the bodies of patients who have died of general dropsy, it is not uncommon to find a few drachms, or even ounces, of serum in the lateral ventricles and in the arachnoid

space. This is commonly regarded as merely part of the general dropsical effusion; but there are good grounds for thinking otherwise. Similar intracranial accumulations of serum are common when there is no dropsy elsewhere; as, for example, after death from protracted fevers, or from the contracted granular kidney, or in old age. In all of these instances, the brain first becomes atrophied, and, the firm unyielding skull-cap being unable to accommodate itself to the reduced size of the viscus within, a local venous repletion, followed by effusion of serum to fill up the vacant space, is the result. When death occurs in the early stage of acute general dropsy, even when preceded by cerebral symptoms, little or no fluid may be found in the cerebral ventricles. In most of the text-books you will find it stated that the fluid found in the cerebral ventricles in cases of dropsy may exercise a dangerous degree of pressure upon the brain-substance, so as to cause drowsiness, coma, and even death; and in practice these symptoms are constantly referred to serous effusion upon the brain, while efforts are made to relieve the symptoms by remedial measures supposed to have the power of removing the effusion. This opinion, although widely prevalent and endorsed by high authority, has long appeared to me to be a pathological error. It is quite true that patients, whether suffering from general dropsy or not, often die comatose; and that on *post mortem* examination no cerebral lesion can be found, except effusion of serum on the surface of the brain and into the ventricles. But a similar amount of cerebral effusion is not uncommon where death has not been preceded by coma; and in most instances the coma may be traced to a morbid state of the blood, resulting from renal diseases or other causes, and interfering with the proper nutrition of the brain. A large proportion, for example, of the cases of fatal coma which were at one time set down to what was called "serous apoplexy" are really instances of uræmic coma, consequent on destruction of the secreting tissue of the kidneys. In some cases, cerebral symptoms are no doubt to be accounted for by the atrophy of the brain consequent on its imperfect nutrition. When, however, the cranium has once become firmly ossified, if we exclude cases of an inflammatory nature, it is very doubtful if more serum is ever thrown out than suffices to fill the space vacated by the atrophied brain, or that such serum exercises an injurious pressure upon the remaining brain-substance.

[To be continued.]

CLINICAL MEMORANDA.

PARACENTESIS THORACIS.

JOHN HURST, aged 32, a boiler-smith, residing in Newcastle-upon-Tyne, caught cold on 19th April, 1871, at Barrow-in-Furness. He returned home on the 24th. His journey homewards by rail brought on an attack of double pneumonia; all the symptoms of an aggravated form had set in on my arrival. I could not, however, then detect any inflammation of the pleura. The usual antiphlogistic remedies were applied by me until the virulence of the symptoms had subsided, and he had so far recovered as to be able to go to the Prudhoe Memorial Convalescent Home at Whitley. After a week's residence at the seaside, he became very ill with purging and profuse night-sweats. He returned to Newcastle, where he gradually became very weak and emaciated. He coughed up about a pint of thin purulent matter every day, until he had decreased in weight from 11 stone 6 lbs. to 9 stone.

Upon my examination of his chest, I found the whole of the right pleural cavity blocked up with fluid; a loud splashing was heard on succussion. The respiration in the left lung was 35; pulse 130; his feet were very cedematous. To ascertain the nature of the fluid, I passed an exploring needle. Dr. G. H. Philipson kindly visited the patient with me, and confirmed my opinion as to the necessity for paracentesis. In his presence, I therefore introduced a large-sized trocar into the fifth intercostal space, and six pints of pus flowed out. We gave him two grains of opium immediately, and prescribed a mixture of bark and dilute hydrochloric acid. A drainage-tube was retained in the cavity of the chest for nine days, during which time we allowed him to go out for a short walk every day. The discharge gradually diminished in quality and quantity, until it finally disappeared on February 24th. The lung quickly regained its healthy action; so much so, that we could scarcely distinguish any difference between the diseased and the healthy side of the chest. He improved every day, and has regained his original weight. He returned to his employment on March 4th. The wound closed in a few days after the tube had been withdrawn.

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