TWENTY-FIVE CASES OF OVARIOTOMY,

WITH SOME

REMARKS ON THE CAUSES AND TREATMENT OF THE
FEVER SO FREQUENTLY FOLLOWING THE
OPERATION.

BY

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IN presenting a record of twenty-five cases of ovariotomy to this Society so soon after Mr. Spencer Wells has enriched our experience by a paper on 300 cases, I should feel some apology to be necessary did I not believe that every addition to our knowledge of this important operation will be welcome to the profession.

To Mr. Wells' kindness I am indebted for many of the cases in the accompanying table, and to the opportunities I have enjoyed of assisting him in the greater number of the cases he lately brought before us is due very much of the knowledge which has enabled me to attain a fair amount of success.

Though dealing with a total of cases so relatively small as mine, it is still impossible even to refer to the points of special interest which the individual cases bring before us. I propose, therefore, to direct the attention of the Society

to the causes of the high temperature which so frequently follows the operation, and to the methods of treatment found most useful in lowering it.

Fever, or high fever, may arise after ovariectomy from several causes, two of the most important being septic changes in the blood and serum effused into the peritoneum immediately after the closing of the abdominal incision, and peritonitis resulting from the exposure and handling of the peritoneal surfaces, or their contamination with blood or ovarian fluid. Peritonitis, if divorced from its connection with the septic condition, is, I believe, much less common than we might expect, less common, indeed, than is generally supposed.

There is, however, I believe, another form of fever frequently becoming quickly high fever, distinct from the two named above. When speaking of fever I mean any condition in which the temperature is over 100° F. and under 103° F. When the latter degree is exceeded I shall call it high fever.

I will now endeavour to define this third kind of fever and then offer, what seems to me, a natural explanation of it, in the hope that a criticism of my views by those Fellows of the Society whose knowledge of the various feverish states is wider and deeper than my own may lead to an extension of our information on this subject.

Frequently after ovariectomy the patient's temperature rises rapidly and steadily, from a few hours after the operation, without this rise of temperature being associated with any of the symptoms which we regard as evidence of the presence of peritonitis or septicæmia—without, in fact, our being able to explain its presence by any recognised pathological condition. Or a similar state arises a few days after the operation, the patient meanwhile having perceptibly suffered more or less from a feverish condition, indicated more by the tense full pulse, flushed face, and urine loaded with urates, than by any very high temperature.

If the temperature continue high, or continue to rise beyond the point I have defined as my fever limit, we

soon have, as the result of it, lesions of important organs, to which our attention is directed often, I think, to the exclusion of their original starting-point. I do not know that I have ever seen a case in which the fever was fatal, because some result of it is sure to step in and hasten the final catastrophe. In other cases, again, nature seems equal to the task of restoring the normal condition, and we have nothing left to show the danger from which our patient has escaped.

So much for what, I fear, is a very imperfect explanation of what I mean when I speak of the fever following ovariectomy. How, then, are we to explain this condition? If we look to our case-books we shall see that this state is much more common after simple uncomplicated operations performed on young or healthy women than after those performed when the ovarian disease has already lowered the vitality of the patient, or when extensive adhesions have led to some loss of blood and a prolonged and severe operation. In this, I think, we have the key to the position. An ovarian tumour is a highly vascular growth, and from its position and surroundings there is little to interfere with its blood-supply. After the tumour has been exposed by the abdominal incision we tap it and empty it more or less completely. Its walls, besides being highly vascular, are very elastic, and though the arteries are provided with unusually thick muscular coats, which give them considerable power of resisting any impediment to their circulation, the veins are often large and have thin walls, hence, when the tumour is empty, or nearly so, and its walls contracted, the calibre of the veins is much reduced, and they oppose the free circulation of the blood. The arteries, already resisting compression, are not equal to this double opposition, and the tumour becomes comparatively bloodless. The more simple the cyst the more markedly is this the case, and but little blood is removed with it after its pedicle is secured. The patient is then, after the operation, in much the same condition as a patient after the operation of transfusion.

She has not really more blood, *always a little* less, but it has a *much* smaller area to circulate in. The arteries and veins of the general circulatory system are fuller of blood, and the tension is increased. The heart has harder work to do ; it acts more forcibly and more rapidly, the blood is circulated more quickly, and the tissue changes are proportionately more rapid. The result is a considerable rise of temperature. The same condition may often be seen after tapping an ovarian cyst, though in a less degree, as we might expect, for the cyst is not emptied of all its blood, nor is the circulation cut off.

Turn, now, to the various organs likely to be affected by this increased rapidity of the circulation with an increased volume of blood. The brain, we know, receives a relatively large portion of the blood circulating through the body. The nerve-centres, then, are stimulated with the other organs or to a greater degree. In some cases the stimulus is not greater than necessary for a response to the greater activity throughout the tissues ; in others it is too great, and we have an improper or irregular action of the nerves of nutrition added to the already high-pressure action in the economy. The balance is destroyed, and we have developed in some organ, less able than the others to bear the strain, a pathological state which we recognise and which is apt to take our attention from the primary cause. We think that its diseased state was the cause of the high temperature and other symptoms which have been causing us some anxiety. It may be the brain itself shows symptoms of giving way, and if this is the case grave, indeed, is the danger ; the lungs, the heart, or the kidneys may be the organs affected. Our treatment, then, in any case should be directed to the control of the circulation and the lowering of the temperature, and we should do this from the earliest symptom of a tendency to steady rise of temperature, or some one important organ may have already suffered, though as yet it has given us no indication of its approaching failure.

If I have made my meaning sufficiently plain it will be

at once seen that, in order to control the circulation and lower the temperature, we must apply our treatment to the most important organ which is concerned, with all the others, in the danger. Fortunately, the brain, which is the most important, both from its large blood supply, and also from its regulating power over the whole system, is also the most easy of access for suitable treatment. If we can keep it cool and regulate its blood supply we may hope that the other organs, with the aid of a healthy nerve-action, will in time overcome the difficulties in which they are placed.

The ice-water cap which we now commonly use at the Samaritan Hospital, and which, I am told, is coming extensively into use on the Continent and America, admirably meets all the requirements of our case. I am not prepared to define exactly its mode of action, *i. e.* whether it is by the general cooling of the whole volume of blood or by its direct action in keeping the nerve-centres cool, and cooling their more immediate blood-supply. I think, when we consider the large quantity of blood passing through the brain, we may fairly suppose that the ice-water cap has some general action in lowering the temperature of the whole blood, but from carefully watching many cases in which it has been used, I am inclined to think that the direct action on the nerve-centres is its most important one. Possibly it may lessen the quantity circulating by causing contraction of the arteries, thus both reducing the volume and cooling it at the same time.

After an ordinary meeting of this Society, held April 27th, 1875, when my colleague, Dr. Day, read a paper on "Chest Complications of Abdominal Tumours," I had the honour, as a visitor, of showing one of these caps, and I afterwards published a short account of it, with an engraving, in the 'Medical Times and Gazette,' May 27th, 1876. I have now placed one of the caps on the table for inspection, and a copy of the engraving named above accompanies this paper (see woodcut, p. 302).

As at present used it was made for me by Messrs.

Krohne and Sesemann, being a modification of one which I had found very useful while I was house-surgeon to Professor Lister, in Edinburgh. The original cap was the invention of a working man connected with some india-rubber works in Glasgow.

The pieces of ice shown in the water are much too small; one large piece answers best.

Before proceeding to point out the advantages which I think it possesses over all other methods in use for reducing temperature, especially in the cases under present consideration, I think it may be of interest to the Society if I briefly trace the history of the use of cold for reducing temperature after ovariectomy. The condition which I have attempted to describe and explain had been noted by Mr. Wells before I was acquainted with his practice and various methods of applying cold had been tried, among them Roberts' pads, Richardson's ice-water collar, and the more common bladder of ice to the head, and cold sponging.

I believe the first introduction of coiled tubing, with a constant stream of water passing through it, is due to Dr. Roberts, of Manchester, who published an interesting paper on this subject in the 'Medical Times and Gazette,'

December 16th, 1871, the same year in which Dr. Wilson Fox read his paper before the British Medical Association on the use of the cold baths in the hyperpyrexia sometimes occurring in rheumatic fever. Dr. Roberts' cases show a much slower fall of temperature than is usual with the ice-cap, his plan being to lay the patient on a pad of coiled tubing, or wrap it round the body. The effect on the pulse and respiration is also, in some of his cases, *nil*, in others but slight, and this is especially worthy of notice in connection with the question of general blood cooling or action on the nerve-centres. He also found the temperature rise to a higher degree than ever after the pad was withdrawn; I have never seen any such results when using the cap.

Dr. W. B. Richardson suggested the employment of a collar of coiled tubing, so as to cool the blood in its passage to the brain. Mr. Wells had used this before I was acquainted with his practice, and we tried it again at the time we were first using the ice-cap. Before trying it, I theoretically objected to it on the ground of the small circulating area it covered, the area being also traversed by large vessels, and the blood passing in considerable volume and rapidly across it. This objection was found sound in practice, for but little effect was produced on the temperature by its use, and it was also found troublesome to keep in place and irksome to the patient.

The first copy of my old Edinburgh friend fully answered my expectations, but from having merely four large chambers partially shut off from one another it was troublesome to manage and often out of order. Once it actually burst while in use, fortunately, without causing any injury to the patient, except some little alarm. While we were thus still not satisfied with our means of treating the pyrexia Dr. Broadbent kindly undertook to pack one of Mr. Wells's cases in the wet sheet on the principle found so successful in fever cases. The result in lowering the temperature was very remarkable, and the patient was undoubtedly rendered much more comfortable,

and had her life prolonged for some days, but the labour, both for Dr. Broadbent, who kindly came frequently to superintend the packing, and for the nurses was great, and the constant moving of the patient very undesirable in a surgical case. The same objection applies to the cold bath found so useful by Dr. Wilson Fox and others in treating hyperpyrexia in medical cases.

The cap, as at present used, is made of tubing, with one flat side, round tubing being a failure, as the air between the coils became warm. The advantages it possesses over other methods of lowering the temperature are its easy application (the size of the patient's head being all the measurement necessary in ordering one), and its giving a steady, dry, cold application, which does not require any movement on the part of the patient when it is applied, and does not tire or weaken her. Frequently the patient falls into her first tranquil sleep since the operation shortly after it is put on, and seldom is any objection raised to it; often a desire is expressed that it may be kept on after the surgeon thinks it no longer necessary. The cap when applied is connected with a pail of water raised a foot or so above the patient's head, a large block of ice being placed with the water in the pail, the other end of the pipe which, coiled, forms the cap, passes into a pan at the bedside, and the water, as it runs through, may be returned to the pail. At the hospital we now have a special supply cistern, with tap at proper level, in each ward.

How far its direct action on the nerve-centres also gives it an advantage over and above the other methods of lowering temperature, I must leave to future experience to decide.

In my own practice I order the nurse always to apply it if the temperature passes 102° , and I frequently order it on with a much lower temperature, if the pulse is hard and full, or if there is flushing, with headache or other cerebral symptoms. Once used I prefer to keep it on till the temperature falls to normal, but generally give both nurse

and patient some latitude, leaving it off for a time, then on again, as the constant filling of the pail is hard work.

In thus giving the first place to the ice-water cap I must not, however, neglect other remedies, which, I think, may in some cases be useful; I refer to blood-letting and aconite.

I think, in some cases, venesection is undoubtedly very useful, as it relieves the heart and circulation generally of the very thing which I have endeavoured to show is the cause of all the mischief, but to be useful it must be employed very early and tolerably freely, and I am inclined to think that with the dry cold, applied efficiently and early, it might be altogether dispensed with. I think aconite, given in very small doses (half a minim every half hour), acts beneficially by steadying the heart's action and lessening the tension of the pulse, but I cannot say that I have ever seen it reduce temperature or have ever felt very sure that its use rendered the skin moist, though I know great authorities would be against me here. I think both venesection and aconite might probably be dispensed with whenever we can secure a full supply of ice and efficient means for applying it.

Having thus considered this form of fever and its treatment at some length, the question very naturally arises, How are we to distinguish it from high temperature due to peritonitis or some form of septicæmia? I am afraid in the majority of cases we cannot do so in the first instance, though we may make a shrewd guess in many cases, if we carefully note the expression of the patient, the comparative rate of the respiration and pulse, and other general symptoms. In the simple fever the patient is usually flushed, has bright eyes and tranquil expression, perhaps complaining of the heat, or of some giddiness, noise or pain in the head, but otherwise expressing herself as quite well. The respiration is seldom hurried, unless the lungs are beginning to suffer, when it may rise rapidly to an extent altogether uncommon in the early stages of septicæmia or peritonitis. The pulse is hard and full, and

incompressible, but often not unduly fast, at least, not so fast as in other conditions causing high temperature.

In both septicæmia and peritonitis the expression of the patient's face helps one much. In the former there is often a wild, startled look, which once seen is not readily forgotten, and the patient answers questions in hurried, jerking, manner; the pinched, anxious face of peritonitis needs no description here. I may remark that I dread a rapid pulse during the first forty-eight hours after ovariectomy more than a high temperature, especially if the former be small and hard, as distinguished from the full hard pulse I have been speaking of.

Of course, peritonitis or septicæmia will be met with as a complication of this simple fever, and in these cases we can only wait and watch the result of our treatment before deciding on what the high temperature depends. Fortunately, the ice-water cap is beneficial in all these fevers, though the same cannot be said of venesection and aconite. Venesection, while it may be useful in peritonitis, I believe to be dangerous in any septic condition, and I do not think the aconite does any good in peritonitis, while I believe it to be dangerous in septicæmia as tending to increase the depression.

I will now endeavour to illustrate this theory from some of the cases recorded in the table which is before the Society, though there is not among them one typical case, because, having had some considerable experience in after-treatment from Mr. Wells' cases before I operated on cases of my own, I always go upon the good old rule of prevention being better than cure, and apply the ice-cap always if the temperature gets up to 102°, and frequently if it reaches 101° with a tendency to rise, and the other symptoms of the fever are present.

Case 1 affords an illustration of those in which the fever rapidly seizes upon the weak point in some important organ and calls away our attention from itself. At the time I operated in this case I did not know the value of the ice-water cap, and I allowed my attention to be

directed to the lungs, imagining that I had an ordinary case of acute bronchitis to deal with. The operation was one of the most simple I have ever seen. For twenty hours the patient seemed to be doing well, though she was flushed, had a full, hard pulse, 120, temp. 101° , and resp. 20. She suddenly began to complain of difficulty of breathing, and in two hours had a pulse of 140 and resp. 32, with dry sounds all over the chest. I treated her as a case of acute bronchitis till the fourth day, when the chest symptoms disappeared, but the temperature was 103.4° and steadily rising. I then bled her from the arm to twelve ounces with some relief, but again the temperature rose and her other symptoms were aggravated; I tried the wet pack and then again bled her, and after eight days of great anxiety she died. I feel sure that had I used the ice-water cap in this case the symptoms would have given me little trouble. Its fatal termination made a deep impression upon my mind, partly, doubtless, from its being my first ovariectomy, but still more because I felt that such cases ought not to die, and that we needed some more efficient treatment for them. I afterwards had the advantage of treating a similar case of Mr. Wells' at the Samaritan, in which the temperature on the morning of the second day after operation was 100.6° , pulse 100, respiration 20; three hours later I saw her with temperature 103.4° , pulse 120, respiration 32, and an exactly similar chest condition to that of my own patient. The ice-water cap was immediately put on; before I left her the breathing was easier, and in a few hours the temperature was falling steadily; the pulse was 112, and the respiration 24, and all chest symptoms had disappeared.

In Case 6, seven hours after the operation, the temperature was 101.6° , pulse 132, respiration 30, with the other fever symptoms; no improvement had taken place after five hours' use of aconite, the cap was put on, and immediate and permanent improvement took place.

In Case 14 there was an unsatisfactory state for forty-

eight hours, but though constantly hesitating whether to begin the cap, I did not do so. The temperature then mounted to 102.8° , and it was at once put on; in the first nine hours afterwards the temperature fell two degrees, in the next three hours another degree, with a more than proportionate improvement in pulse and respiration and general symptoms.

In Case 16 the pulse was, from the first, irregular, full, thrilling, and incompressible. The patient, a young, full-blooded girl. When the temperature reached 101° , eight hours after the operation, the cap was put on; the temperature began to fall at once, and though the pulse remained fast, 120 for twenty-four hours, it then settled down, and the patient made a good recovery, not without my having some suspicion, from the action of the kidneys, that we had had a narrow escape of some serious mischief in them during the short time the pyrexia remained unchecked.

I have not had among my own cases examples of nephritis with albuminuria, but I have seen several such, and in Case 14, already alluded to, there were evidences of kidney irritation, with passage of large quantities of almost colourless urine of very low specific gravity. I have seen one case, after simple tapping, in which the fever ran very high for some days, even though controlled by the ice-cap, and the urine was for some time loaded with albumen. The drawing I hand round was made from the sediment of her urine. She ultimately made a good recovery.

I might multiply examples of the benefit derived from the use of the cap, not only in these cases, but in undoubted cases of peritonitis and septicæmia, but my paper has already exceeded its intended limit, and I am anxious to give a brief analysis of the cases contained in the table.

Before concluding this part of my paper I must, however, state, that since we used the ice-water cap, I have never seen a case, starting as one of simple fever after ovariectomy, pass on to high fever, some other morbid

condition, and death, while I have seen more than one such before, besides my own recorded above.

It will be seen from the table that seven cases out of twenty-five terminated fatally, a mortality of 28 per cent.

One of these, Case 5, would more properly find a place under fatal cases of tapping during pregnancy, for the patient was semi-comatose and moribund when I operated, but rallied afterwards sufficiently to talk to her husband, and lived sixteen hours—longer by several hours than was possible without the operation. This case is fully described in the twenty-seventh volume of the 'Transactions of the Pathological Society,' so I will not refer to it further here.

Cases 2 and 4 were almost hopeless from the reduced state of the patients, with certainty of extensive adhesions, but tapping being no longer useful I thought it right, after explaining to them the great risk, to give them the last chance afforded by ovariectomy.

Cases 11 and 15 were both severe operations performed on not very promising subjects, but I have seen many worse recover well. Both were performed in the same nursing home, both passed through high fever to coma and death on the fifth day. In both cases the wounds healed well, and there was no abdominal distension.

Case 11 was an enormous dermoid tumour of right ovary, the solid part, as removed, weighing nineteen pounds; the other ovary was also removed.

Case 15 was kindly seen with me in consultation, by Sir James Paget, who, while expressing doubt, thought the case one of an irregular form of pyæmia.

Case 18, the other fatal case, was operated on at her own home, in a country town. She was an old and very fat woman, and had been tapped twenty-five years before in St. Bartholomew's Hospital by our present distinguished President and Mr. Stanley. It was also a dermoid cyst. The operation was interesting as being a pure enucleation, no ligatures being required. She died in thirty-seven hours of rapid septicæmia, and I afterwards discovered

that the back of the premises was occupied by a slaughter-house and candle manufactory.

Case 7 was as bad a one as it is possible to conceive; the tumour ruptured into the peritoneum the night before the operation, and was extensively adherent to bladder, uterus, and intestines. The operation occupied two hours, both ovaries being involved in the mass removed. The ice-cap was put on ten hours afterwards; temperature 103.6° ; pulse 134, very feeble; respiration 28. To its use and the method of drainage brought to the notice of the Society in Mr. Wells' paper, I believe she owed her recovery.

Drainage with the glass tube from the first was used in six cases, four of which died and two recovered.

In one case I inserted an india-rubber tube into the peritoneum at the bottom of the incision, about a week after the operation; she recovered.

I think Case 18 would have had a better chance with drainage from the first.

Cases 3, 7, 11, 13, 17, 19, and 21, were all double ovari-otomies, a most unusual proportion.

It will be seen, also, that in the great majority of the cases extensive adhesions were encountered.

Cases 11, 17, 18, and 19, were all dermoid tumours, also an unusually large proportion; in 17 and 19 both ovaries contained dermoid structures, a condition I have only twice before seen in a large number of cases.

No.	Medical attendant.	Place of operation.	Condition.	Date of operation.	Adhesions.	Length of incision.	Treatment of pelvicle.	Weight of tumour.	Result.	Subsequent history or cause of death.
1	Mr. J. K. Thornton.....	Hospital	Married	1874 23 Nov.	None	Inches. 4	Clamp	Pounds 25	Died 8th day	Peritoneal hæmatocele.
2	Mr. Wilcox, Aylesbury..	Hospital	Single	1875 44 Feb.	Parietal, hepatic, and pelvic	6	Clamp	28	Died 37 hours	Exhaustion?
3	Dr. Hardman, Blackpool	Nursing home	Single	32 Aug.	None. Both ovaries	6	Both ovaries Clamp and ligature	9	Recovered	Well Mar., 1877.
4	Dr. Thorburn, Manchester	Hospital	Married	29 Oct.	Parietal, omental, mesenteric, and hepatic	7	Clamp	27	Died 31 hours	Exhaustion?
5	Dr. Parsons, Wimbledon	Hospital	Married	28 Oct.	None. Gangrenous cyst	4	Ligature	6	Died 16 hours	Septic peritonitis.
6	Mr. Edgar Barker	Hospital	Pregnant Married	35 Dec. 1876	Parietal	5	Clamp	32	Recovered	—
7	Dr. Percy Boulton	Hospital	Married	38 April	Parietal, omental, intestinal, vesical, and uterine	5½	Both ovaries Ligatures	13	Recovered	Well Mar., 1877.
8	Dr. Clement Godson ...	Hospital	Married	45 May	Parietal and vesical...	5	Clamp	28	Recovered	Well Mar., 1877.
9	Dr. Ballard, Huntingdon	Hospital	Widow	35 July	None. Ruptured cyst	5	Clamp	20	Recovered	—
10	Dr. C. Bramwell, Nottingham	Hospital	Widow	38 July	None	5	Ligature	10	Recovered	Well Mar., 1877.
11	Dr. Brice Smith, Belfast	Nursing home	Married	26 Sept.	Parietal	8	Both ovaries Ligatures	26	Died 5th day	Congestion of brain.
12	Dr. Archer, Wandsworth	Hospital	Married	39 Oct.	Omental and intestinal	5	Ligature	3½	Recovered	Well Mar., 1877.
13	Dr. Geo. Pearce, Leicester	Hospital	Single	21 Nov.	None	4	Both ovaries Ligatures	26	Recovered	Well Mar., 1877.

Case	Medical attendant.	Place of operation.	Condition.	Age.	Date of operation.	Adhesions.	Length of incision.	Treatment of pedicle.	Weight of tumour.	Result.	Subsequent history or cause of death.
14	Dr. Ferguson, Cheltenham	Hospital	Married		1876 47 Nov.	Omental	Inches. 6	Enucleation and ligature	Pounds 28	Recovered	Well Mar., 1877.
15	Dr. Dove, Stowmarket.	Nursing home	Married		50 Dec.	Intestinal and pelvic	5	Enucleation and ligature	16	Died 5th day	Congestion of brain? pyæmia.
16	Dr. Kidd	Hospital	Single		19 Dec. 1877	Parietal and omental	4	Ligature	22	Recovered	Well Mar., 1877.
17	Dr. Lloyd, Llandilo.....	Hospital	Married		37 Jan.	Parietal, omental, and pelvic	5	Both ovaries Ligatures	26	Recovered	Well Mar., 1877.
18	Dr. Phillips, Bromley ...	Private house	Married		56 Jan.	General to capsule ...	5	Enucleation	6	Died 37 hours	Septicæmia.
19	Mr. Hall, Fleetwood ...	Private house	Single		25 Jan.	Parietal and omental	5	Both ovaries Ligatures	18	Recovered	Well Mar., 1877.
20	Dr. John Murray, Norton, Stockton-on-Tees	Hospital	Single		18 Jan.	Parietal and omental	5	Ligature	38	Recovered	Well Mar., 1877.
21	Mr. Stevens, Hoddeaden	Hospital	Single		24 Jan.	Intestinal	4	Both ovaries Ligatures	9	Recovered	Well Mar., 1877.
22	Mr. Green, Portsmouth.	Hospital	Married		42 Jan.	Parietal, omental, and intestinal	4	Ligature	18	Recovered	Well Mar., 1877.
23	Mr. Palm, Hull	Hospital	Widow		40 Feb.	Parietal, intestinal, pelvic, and uterine	5	Enucleation and ligatures	31	Recovered	Well Mar., 1877
24	Dr. W. H. Day	Hospital	Single		19 Feb.	Parietal, omental, and intestinal	5	Ligature	23	Recovered	Well Mar., 1877.
25	Surgeon-Major Will and Dr. Strother, Sheerness	Hospital	Married		32 March	Parietal and omental	5	Ligature	22	Recovered	Well Mar., 1877.