ON THE MANAGEMENT OF CASES DURING THE PERIOD IMMEDIATELY FOLLOWING OPERATION.¹

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WHEN I last had the honour of addressing you from this chair, I took occasion to apologise for speaking on a vulgar instead of an obscure or novel subject, and I am again disposed to use my opportunity to a like effect. I do not presume to address myself particularly to the more senior portion of my audience; but there are a large number of the younger members of the Academy present, and to them I venture to say something about a subject which exercised me much in my younger days, which does so still, and which is important because of its very commonness, and worthy of attention because it is sometimes overlooked.

I refer to the management of patients during that oftentimes critical period between the performance of a surgical operation and the moment at which, the risks consequent on it having passed, the patient becomes free from immediate and non-particular danger. This is the period occupied by two conditions of depression common to any or all operations, and therefore to be considered by themselves, apart from special dangers proper to individual surgical procedures. They are (a) shock and (b) exhaustion consequent on vomiting.

They may not be present, or being present, may vary in duration from a few minutes to several days. Their intensity cannot be foretold; it may be but slight or may be grave even unto death, and nothing in the condition of the patient, the nature of disease, or the character of operation can afford any reliable evidence as to their possible severity. They may be serious in those who are vigorous, and unimportant in those who are weak; the very young and the aged may suffer from them but slightly and persons of middle life may be in peril; they may follow the most trivial operation and be absent from the most severe.

Those who have had experience in surgery know how often they meet surprises in the immediate consequences of operation. Sometimes the experience is the pleasant one of finding the treatment borne better than was expected; sometimes it is the sad one of danger following an operation when it was not looked for. The lesson we learn is never to neglect during and after operations every detail which can lessen danger by diminishing the chances of shock or exhaustion, and which can assist subsequent reaction.

The causes which tend to produce shock are numerous, and for the most part obscure. There are many states of enfeebled health, of particular debility, and of other recognised conditions which predispose to it. But there are unseen and often unexpected circumstances which may lend themselves to its production. Operative measures should, therefore, never be approached without the most careful general examination of the patient and the most thoughtful consideration of his physical position. It is impossible to formulate exact laws in this direction; these perceptions are largely matters of experience, and only time and clinical study can develop them. But from long observation we know that such considerations of the general state of a patient about to be submitted to operation are often overlooked or disregarded, and I suppose most of us have had bitter regret of our want of perception.

In addition to general matters concerning the patient there is one particular which is proper to the surgeon, and in which great error is common—I refer to the undue prolongation of operations. Two circumstances have, in our generation, lent themselves to this: one is the facility afforded by the use of anæsthetics; the other the extreme care, conservatism, and attention to detail, begotten by the in-

troduction of antiseptic methods. There is no one circumstance which so tends to the production of shock and to the exhaustion produced by subsequent vomiting as prolonged anæsthesia. I have had this impressed on me by severe lessons, and I am satisfied that we should watch ourselves very closely in this direction, and sacrifice detail and conservative measures in instances where they demand the unsafe prolongation of anæsthesia. I can look back on cases where I regret the time spent on an operation; for instance, the only example of elected operation for the radical cure of hernia which has ever proved fatal in my practice was one in which, in my anxiety to conserve the testis in an extremely complicated rupture, I prolonged the dissection to such an extent as to produce shock from which the boy never rallied. I know now that had I removed the organ I could rapidly have concluded the treatment and saved the patient.

What I have said of the production of dangerous shock is largely true of exhaustion immediately following operation. Given the conditions, known and unknown, which predispose some patients to it more than others, prolonged anæsthesia, with its often attendant vomiting, is its most usual provocative. We will generally see post-operation vomiting proportionate in severity and persistence to the duration of anæsthesia.

So much for causes of shock and vomiting: what of the means of avoiding them, and of relieving them if they occur? It is a truism to say that prevention is better than cure, and it will be seen from what I have said that a due despatch in the performance of operations, and a consequent shortening of the period of anæsthesia is the most important direct measure to attend to. To an audience like this I need not elaborate this part of my subject; indeed, I could not if I would, for there are a hundred various conditions and circumstances which must guide us, and their knowledge and application are among the matters which make the difference between one surgeon and another, and which lend themselves to our successes or contribute to our failures. Shock and vomiting are so much due to the same causes, and so subject to the same remedial measures, that it is difficult to consider them apart. I have learned to rely on three agents only for the relief of shock: (1) Heat; (2) alcohol; and (3) morphine or opium. Concerning the first of these, we generally find that if the surface of the body can, by the use of hot applications, be brought to a wholesome warmth, the danger has been overcome. If to the use of hot water, contained in bottles, or, better still, in small india-rubber bags, we add rubefacient applications of mustard to the extremities, about the region of the solar plexus, or over the heart, we have a valuable armament for the inducement, not only of heat, but also for the production of a physiological stimulation.

If these measures fail, or response to them is too slow, alcohol must be resorted to. It should be given by the rectum, not only because vomiting may exist, or may be induced by the introduction of stimulants into the stomach, but also because when shock is present the stomach has little or no power of assimilation. The possible necessity for rectal stimulation and alimentation after operation is one of the reasons why the bowel should always be thoroughly cleared before any procedure, however slight, in which anæsthesia is to be employed.

Failing by these measures to induce reaction, opium or morphine has to be resorted to. If rapid effect is sought morphine is the most useful agent, and it is also that which best controls vomiting. But where there is no vomiting, and where the stimulating effect of the drug is our chief aim, opium itself is to be preferred; it must be given by the rectum. No rules can be laid down for the dosage in these cases, beyond the two points that are to be borne in mind: first, that opium is tolerated in large quantities by persons suffering from shock, very much as those bear it who have lost much blood; and, secondly, that it must be given intelligently, that is to say, given watchfully, dose following dose, until the due effect is produced. The value of morphine given hypodermically, or of opium administered by enema in all cases of depression due to shock, cannot be overstated. I can look back on lives lost after operation from shock and exhaustion, which greater clinical experience and more courageous use of morphine

¹ Address delivered at the opening of the Surgical Section of the Royal Academy of Medicine in Ireland for the session 1895-96.

or opium would now enable me to save. If it be sought to study the effect of opium as a stimulant, it cannot be better seen than by watching its effects in the shock and collapse following extensive burns. I have to thank the help afforded by modern nursing developments for much wholesome change of opinion in these matters. It has only been since the introduction of trained women to the bedside, with their watchful intelligence and careful skill, that I have learned properly to deal with cases after operation. That intuitive faculty, amounting to what used to be mis-called an "instinct," and which is the special property of women, finds its best expression in the study and management of difficulties like those I speak of.

Of the treatment of the usually more persistent condition of vomiting, with its attendant exhaustion, much need not be added to the limited list of measures employed in the treatment of shock. Warmth, rectal stimulation, and the hypodermic syringe again find their use. If to these I add rubefaction, or occasionally limited blistering over the stomach, I have enumerated all the means I find most excellent. The host of drugs recommended to check vomiting are, in my experience, worse than useless; they are not only ineffectual, but they add seriously to the gastric disturbance. One measure, introduced of late, we are trying in the Richmond Hospital. I mean the use, for some hours after operation, of a mask charged with vinegar. We are not yet in a position to speak definitely about this treatment, but it seems to give promise of success in cases where chloroform has been the anæsthetic. The rationale of its action is simple; the chloroform which is exhaled by the lungs is decomposed during expiration into chlorine and formic acid. The chlorine, by its irritation of the trachea and larynx, is probably the cause of vomiting, and being taken up by the acetic acid, is rendered harmless. But so far as present experience carries us, the hypodermic use of morphine is the cardinal remedy for the species of vomiting of which I speak. It must be used intelligently, fully, and fearlessly, and will exercise its effects both as a stimulant and as a gastric sedative far beyond those of any other remedy.

If it be conceded that it is useless to introduce stimulant or aliment into the stomach of a patient suffering from shock, it will be granted that it is not only useless but improper when vomiting is present; and here a previously cleaned rectum serves its owner well. Stimulants associated with such nutriment as can be readily absorbed should be periodically introduced. It is generally found that vomiting any more than shock does not persist with a warm surface, and therefore the three remedies I have indicated should be employed in the same sequence as in shock; first, heat; second, rectal stimulation and nourishment; and third, morphine.

The distressing symptom of thirst is one which gives great trouble. There is nothing I have learned to discredit more thoroughly for the relief of thirst than ice. It increases thirst both directly and by the induction of vomiting. The emesis it produces is due to the quantity of water the sucking of ice insidiously introduces into the stomach. Nothing should be put into the stomach in these cases, so that ice is not only useless, but hurtful. Thirst is best relieved by frequent rinsing of the mouth with hot water, and by the occasional introduction of two or three ounces of warm water into the rectum.

In what I have said I have avoided speaking of details and methods; I have remembered that, although some of us are younger and less experienced than others, all of us in this room are educated in the factors of surgical science, and I have therefore tried to be suggestive rather than didactic, and to avoid details except in so far as they were necessary to the elucidation of principles.

If I may reduce to formulæ the matters I have referred to, I would put them thus:

1. That the tendency to prolong operations must be carefully guarded against, as it is a grave cause of danger.

2. That in the treatment of shock and vomiting following operation we get no help from the stomach, and must rely on the rectum as its substitute.

3. That heat, alcohol, and opiates are our best remedies; and that the latter are well borne, and must be intelligently used to their full effect.

4. That drugs of the class ordinarily used to check vomiting are of little or no use in the cases under consideration.

5. That ice does not relieve thirst, and does harm by introducing water into the stomach and so provoking vomiting.

THE BRADSHAW LECTURE ON INFECTIVE AND TUBERCULOUS OSTEITIS AS CAUSES OF ARTHRITIS IN CHILDHOOD, AND THE IMPORTANCE OF EARLY TREATMENT.

Delivered before the Royal College of Surgeons of England.

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I PROPOSE in this lecture to consider how it is that the extremities of the long bones entering into the formation of various joints are peculiarly liable during childhood to become the breeding ground of certain forms of micro-organisms, and so to be affected with osteitis, and then to inquire by what means we can best dislodge such parasites before they have destroyed the tissues among which they may have taken root. It will be necessary to confine my remarks to a typical example of acute and of chronic inflammation of bone produced by two well-defined microbes, and to illustrate the subject by reference to disease of the knee; this joint, being one of the largest and most superficial articulations of the body, affords us a favourable opportunity for determining the nature of any morbid action taking place in the bones entering into its formation.

The condyles of the femur at each step we take have to bear the weight of the body, which in like manner is supported on the upper surface of the head of the tibia, so that these opposing portions of bone are constantly subjected to considerable pressure and to concussion. This pressure, in consequence of the comparatively soft condition of the osseous tissue in childhood, is largely distributed throughout the trabecular tissue contained within the extremities of the bones which enter into the formation of the joint. The trabecular network within the extremities of the long bones is also subjected to traction, especially at the point of union between ligaments and tendons with the bones. So intimate is this union that in cases of violence tendons not infrequently tear away portions of the cancellous tissue as well as the compact outer layers of the bone into which they are inserted. It follows, therefore, that the trabeculae contained in the extremities of these bones have to bear their share in the frequent wrenches and strains to which the joints of children are subjected; and it is within the meshes formed by the interlacing of these trabeculae that the red marrow of the bone is contained; red, because it is full of blood, and among the other functions which it has to perform is that of manufacturing the red blood corpuscles. Beyond this the trabeculae are lined with cells from which in childhood the growth of the epiphysis, and at the juxta-epiphysal line the increase in length of the shaft of the bone takes place, necessitating active and extremely complicated physiological changes in the organic matter through means of which growth is effected.

We may form some idea of the activity of the work going on within the bones entering into the formation of the knee-joint from its abundant supply of blood vessels; the four articular arteries, the azygos, and branches of the tibial and femoral vessels all send numerous offsets into the bones; in fact the condyles of the femur and head of the tibia are riddled with openings through which vessels pass into and leave the cancellous tissue. Within the bone the arteries break up into narrow vessels which open into a plexus of peculiarly wide venous capillaries, and these into veins which have to pass out of the bone through unyielding channels which perforate the dense external layers of the bone. The circulation of blood, therefore, through the thin-walled venous capillaries in the marrow of bone is much delayed, and it is in this sluggish stream of blood that the nucleated cells are converted into red blood corpuscles.