ADDENDUM

When referring to Paragraph 6 of this report, the following should be borne in mind:—

The definition of "live-birth" and "dead-birth" ("still-birth") is different on the Continent from that in England. On the Continent pulmonary respiration is the sign of "live-birth," and if a foetus is born with its heart beating but dies before it has made attempts to breathe, it is counted a "dead-birth." In England, on the other hand, the presence of heart beat is regarded as a sign of "live-birth" and a foetus born with a beating heart is counted a "live-birth" even if it dies before it has attempted to breathe.

The consequence is that the class "neonatal death" is relatively higher in England than on the Continent; for many English neonatal deaths would on the Continent have been classed as dead births.

Somerset House regards "still-birth" and "dead-birth" as synonymous; though many obstetric teachers make a difference, regarding a "dead-born" foetus as one that makes no sign of life, intra- or extra-uterine (i.e. heart-beat movement, or pulmonary respiration) and a still-born foetus as one that shows heart-beat but no pulmonary respiration or other movement.

Practicalities

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THE TREATMENT OF SOME OF THE CARDIO-VASCULAR DISEASES PART II

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It is often impossible to predict the response of a patient with heart failure to treatment. There are, however, certain principles which can be laid down to be followed, not necessarily by rule of thumb, but at some time during the course of treatment. These principles are five in number: (i) of rest and diet, (ii) of the use of digitalis, (iii) of the use of diuretics, (iv) of venesection, (v) of the direct removal of fluid from the body.

The principles of rest and diet.

The result of general rest both physical and mental is often far greater than might reasonably have been expected from one's clinical examination. Therefore, during active treatment the patient should be confined to bed on absolute rest if this can be obtained. In all cases it is useful to give sedatives, either sodium bromide gr. 10 t.d.s. or phenobarbitone gr. $\frac{1}{2}$ mane, together with a stronger hypnotic, e.g. nepenthe m. 20–30, medinal gr. 5–7 $\frac{1}{2}$ or soneryl 2–3 capsules at night. After forty-eight hours on this regime alone appreciable improvement often sets in. In the acute case, the injection of morphine sulphate gr. $\frac{1}{4}$ should not be withheld in the early stages of treatment if the patient is restless.

Dietetic measures include a consideration not only of the energy requirements of the body but also of the fluid requirements, and it is probable that the latter is of even greater importance than the former.

During acute heart failure the intake of fluid should be restricted to a total of one and a half pints in twenty-four hours. At the same time it is useful to keep a record of the total output in the same period. In chronic failure with oedema restriction to two and a half pints a day should be made the rule whenever possible.

The taking of food during the same period may be naturally limited by the gastric congestion and when this is so it will do no harm to withhold solid food for twenty-four hours, offering, say, beef tea, Bovril, chicken broth or other beverages together with very thin slices of toast. After twenty-four hours the diet may be gradually increased until the calorie content is brought up to 1,500. If the patient is obese such a level should be maintained until the weight is reduced to normal proportions after which it may be increased. Lord Woolton's dictum

"Eat more potatoes and less bread" applies particularly well in these cases. Providing no bread is taken, as much potato may be allowed as can be eaten. It is bulky and will prevent that empty feeling. If, however, the patient be thin, especially if hyperthyroidic, then as full and liberal a diet as can be tolerated should be given.

The question of withholding salt from the diet in cardiac oedema is a vexed one, but no extra salt other than that used in cooking should be allowed. Without it food becomes insipid and the patient may become depressed by this lack of taste.

The regulation of the bowels is another important feature. The extremes of diarrhoea and constipation are to be avoided. Because of the fluid restriction the patient tends to constipation and this is further aggravated by the smallness of the diet. Pulv. jalap co. dr. 1 mane is a useful aperient. Another very useful medicament, especially when oedema is present, is the administration, last thing at night in the minimum of water, of mag. sulph. dr. 1-2. The effective dose can soon be found by trial and error and it is instrumental in relieving some of the oedema.

The principles of digitalis therapy.

The pharmacological and therapeutic actions of digitalis have been discussed at some length in the first part of this article and we will merely recall certain points to stress their value in the treatment of heart failure.

When heart failure is due to a functional arrhythmia, digitalis is a most effective diuretic and it must be exhibited as soon as possible. In heart failure with a normal sinus rhythm (e.g. in pure left ventricular failure) the administration of digitalis will not produce the same striking diuresis.

In a case of heart failure with auricular fibrillation seen for the first time, it is essential to bring the disorganised ventricle under the influence of digitalis as soon as possible. The simple formula of 1 cat unit per 10-lb. body weight to be given in twenty-four hours must be remembered. Thus a patient weighing ten stone requires 14 cat units. One cat unit is equal to tinct. digit. m. 17 or dig. folia gr. 1½. Therefore the patient should receive four drachms of the tincture or twenty-one grains of the dig. folia in the first twenty-four hours. Digitalis must be administered not more frequently than every six hours. Hence the patient is given:

Tinct. digit. dr. 1 every six hours for four doses
or Dig. folia gr. 5 every six hours for four doses.

If at the end of thirty hours full digitalisation has not been produced then half of the above doses may be given until the heart is stabilised.

The dosage of digoxin, the various methods of its administration and the indications for its usage have been discussed earlier (January, 1943).

As soon as digitalis begins to act upon the heart, the circulation improves and diuresis sets in.

It is most important, not only after the administration of digitalis but also after the administration of any diuretic, that the patient with heart failure be given a suitable urinal which he can use whilst in bed. Otherwise the constant getting out of bed will do much more harm than the treatment can do good.

Careful watch must be kept for the advent of digitalis toxaemia, details of which have been given earlier. In 1785, William Withering wrote of foxglove: "let it be continued until it acts either on the kidneys, the stomach, the pulse or the bowels; let it be stopped upon the first appearance of any one of them." One can add little to that description of the toxic effects.

Once fully controlled, a suitable maintenance dose is given.

The principles of diuretic treatment.

There are several groups of drugs whose primary actions are diuretic, and we will consider them briefly.

The xanthin group contains the drugs caffeine, theobromine and theophyllin.

Caffeine (2-5 grs. t.d.s.) is a fair diuretic only and has the disadvantage that it causes sleeplessness due to a direct stimulant action on the cerebrum. It cannot therefore be recommended for routine treatment.

Theobromine is a more rapid and powerful diuretic which does not stimulate the cerebrum. It is usually combined with sodium salicylate (diuretin) and given in doses of 10–20 grs. t.d.s. It acts best in cases in which digitalis is given as well for an arrhythmia.

Theophyllin sodium acetate (theocin) is a better diuretic with some slight cerebral stimulant action. It is given in doses of 2–5 grs. t.d.s. and has a place in the treatment of cardiac oedema.

Speaking generally, however, the xanthin group is only of value when the other diuretics are not available or cannot be used for some definite reason.

Urea is useful when given in large doses, such as 120 to 240 grs. t.d.s. The patient, however, must be watched for the approach of any uraemic symptoms if the blood urea was raised before the onset of this line of treatment.

It is, however, the advent of the mercurial diuretics that has produced the greatest strides in the treatment of oedema, although the diuretic action of mercury has long been known, e.g. Guy's pill, which contains mercury, digitalis and squill. The modern mercurial diuretic is mersalyl.

Mersalyl (salyrgan) is an organic mercurial compound containing 36 % mercury, and is dispensed as a 10 % solution in 1 c.c. and 2 c.c. ampoules. It may be given either intramuscularly or intravenously. Providing there are no definite contraindications such as acute nephritis, granular or blood casts in the urine or haematuria, it is the diuretic par excellence in cardiac oedema.

Before beginning a course of treatment, a small test dose of 0.5–1.0 c.c. is given intramuscularly. If the patient develops haematuria, diarrhoea or irritation of the skin, then this form of therapy must be abandoned. If no untoward effects are produced then a course may be given.

Whilst administering mersalyl there are several practical points to remember. Firstly the patient must be provided with a urinal which can be used in the bed. Secondly, the injection should be given as early as possible in the morning so that the night's sleep is not disturbed. Thirdly, the action of mersalyl is enhanced by the giving of ammonium chloride (gr. 30 t.d.s.) for two days prior to the first injection, and this should be continued on the day prior to each subsequent injection or alternatively ammonium chloride gr. 30 may be given 2 hours before the injections. The ammonium chloride can be given either as four stearettets (Martindale) or in a mixture, ammon. chlor. gr. 30, flavour q.s., sp. chlorof. m. 7, aq. ad. oz. 1.

If it is decided to administer mersalyl intravenously, the contents of an ampoule must first be diluted with four times the amount of sterile normal saline and the resulting solution given slowly intravenously. Care must be taken to place the solution within the lumen of the vein otherwise severe pain and sometimes sloughing may occur at the site of the injection.

There is no need to dilute the solution if the injection is to be intramuscular. The best site for the injection is deeply into the upper and outer quadrant of the gluteal region. The piston of the syringe should be withdrawn to make sure that the needle point is not in a blood vessel. If not, the injection is made quickly.

The suggested course, following the test dose, is 1 c.c. on the first day, 2 c.c. on the third and seventh days and thereafter 2 c.c. at weekly or bi-weekly intervals depending upon the subsequent clinical manifestations of heart failure.

The urine should always be tested for albumen prior to each injection. Should albumen or blood appear for the first time during treatment, further injections must be withheld until these have cleared. The presence of albumen before beginning treatment requires some consideration. If granular and blood casts are present as well, mersalyl should not be given, but if the urine is of high S.G. and brick red in colour from the presence of urates, then the albumen is almost certainly due to venous congestion and will disappear with treatment.

Mersalyl is of extreme value in oedema due to right sided heart failure. It is often forgotten that it is almost as *efficacious in failure causing paroxysmal nocturnal dyspnoea* before clinical oedema is manifest.

The value of the drug therapeutically in any given case can be assessed either by keeping an intake and output chart or by weekly weighings. If mersalyl is beneficial the output will be far greater than the intake and the patient's weight will steadily decrease.

Mention must be made of the mercurial preparations dispensed in tablets and suppositories. Their action is not dependable and they often produce diarrhoea, colic and tenesmus. Of the two, the suppository is more satisfactory although in no way comparable to the injected drug.

The principles underlying venesection.

In congestive failure—right sided heart failure, especially in the more acute cases, the withdrawal of blood (say $\frac{1}{2}$ –1½ pints depending upon the size of the patient, the degree of venous congestion, the state of the haemoglobin index, etc.) will often cause rapid and marked improvement in the patient not only objectively but especially subjectively.

The same good results will often appear temporarily in cases of pure left-sided heart failure or in hypertension without failure.

The simplest method is to put a wide-bore needle into the basilic vein in the antecubital fossa and allow the blood to run into a suitable receptacle. But this method has the disadvantages that the patient may object to the sight of so much blood and that it is rather a messy procedure. Whenever possible it is advisable to use some form of apparatus such as a small Potain's aspirator or the Sterivac apparatus produced by Allen & Hanbury. With both of these, the withdrawal of blood is facilitated by the partial vacuum which is present. Especially with the Sterivac apparatus, the blood withdrawn can be typed and used for transfusion purposes if required. This is often the deciding factor with the patient in consenting to the operative procedure.

The principles of direct removal of fluid from the body.

In chronic venous congestion due to heart failure the tissue of the body becomes waterlogged, but the oedema tends to collect especially in the legs, the abdomen and the pleural sac (more often the left side). By the measures already discussed much can be done to relieve this water-logging but it is often necessary to resort to drainage.

The oedema can be removed from the legs either by multiple incisions or by the insertion of Southey's tubes, but this procedure may not reduce the oedema if there is a marked ascites interfering with the venous return by pressure on the common iliac veins, etc. In this case the fluid must be removed from the abdomen as well.

Before embarking on any of these minor operative procedures there are certain factors to which attention must be directed. It is essential that the patient's position be comfortable, not only at the time of operation but subsequently as well. The instruments used must be efficiently sterilised and the part of the patient's anatomy to which these procedures are to be directed must be thoroughly cleansed of bacteria. The bed should be covered with a macintosh sheet and sterile towels or sheets should be placed between this and the patient. Bearing these points in mind, the technique of the various operative procedures will be described.

Multiple incision for crural oedema.

A suitable number of pillows are placed under the knees so that the legs are inclined at an angle of about 45°. The macintosh sheeting is arranged to form a guttering at the bottom of which is placed a pail or large bowl. A lance is then taken and numerous small skin punctures are made on either side of the tendo Achilles extending upwards towards the knees. The legs are then covered with sterile towels and drainage will continue for two or three days.

Insertion of Southey's tubes for crural oedema.

Southey's tubes are really small trocars and cannulae, the latter perforated at the sides by small apertures. Two or four tubes are used. Each is pushed horizontal through the skin so that the cannula lies subcutaneously. The tubes are placed where the oedema is greatest and the rubber tubing may be attached to the ends and led into a bowl or pail. After three or four days the skin around the tubes becomes a little red and the tubes are then removed, sterilised and reinserted if necessary into other sites.

Paracentesis abdomini.

A trocar and cannula of the smallest size usually used for tapping a hydrocele is the most useful instrument for this procedure. There are two sites for the puncture; either in the mid line halfway between the umbilicus and the pubis or a point is chosen on the fibrous septum which separates the rectus abdominis muscle from the abdominalis externus muscle, about two

inches above and internal to the anterior superior iliac spine. The difficulty of this latter point is to avoid damaging the deep epigastric artery.

Having chosen the point of puncture, one must now make sure, by catheterisation if necessary, that the bladder is empty. This done, the skin is now anaesthetised by an injection of $\frac{1}{2}$ % novocain and a small incision is made in the skin with a scalpel. The trocar and cannula is now pushed through this incision directly into the peritoneal cavity. The trocar is withdrawn and the operator's thumb placed over the cannula so as to control the flow of ascitic fluid. Decompression must be slow. Once empty, the cannula is withdrawn, the wound sealed and an abdominal binder applied.

Paracentesis thoraci.

The most satisfactory apparatus for this procedure is a 20 c.c. syringe with a two-way tap and a bayonet fitting on to a fairly large bore needle (Martin type). The patient should be sitting up leaning forward, and resting on pillows. The point of the puncture should be either the ninth or tenth space in the scapular line behind or the eighth or ninth space in the mid-axillary line. The point chosen is anaesthetised with $\frac{1}{2}$ % novocain, raising a small intracutaneous bleb first. The subcutaneous and muscle layers are anaesthetised in turn and then 2-5 c.c. of novocain are infiltrated onto the external surface of the pleura. The needle is then withdrawn slightly and left in position so as to act as a true guide. The large exploring needle is attached to the syringe and after removing the local anaesthetic needle, pushed onwards in the same path. Once the pleura is pierced withdrawal of fluid can be begun and continued until the space is empty. If there is a great deal of fluid, say 1 pint or more, it is better to remove say 300-500 c.c. at first and the rest at a later sitting. The removal of too large an amount may cause marked mediastinal shift with consequent shock. The alternative is to replace some of the removed fluid by air, but this entails the use of another apparatus which is not generally available in practice.

Summary.

Stress has been laid upon the general principles involved in the treatment of heart failure, but no attempt has been made to lay down the actual chronological order to be followed in any particular case. Similarly the differences between the handling of the acute and chronic cases have only been touched upon. One thing, however, stands out: MERSALYL.

Mersalyl can be used when there are clinical symptoms and signs of heart failure but before oedema is demonstrable. Anorexia, restlessness, irritability and nocturnal paroxysmal dyspnoea are all symptoms of heart failure which occur early in the clinical picture. Mersalyl is our weapon as much at this stage as in the stage of generalised anasarca when its effectiveness can be so dramatically witnessed.

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