TREATMENT OF IMPERFECT DESCENT OF THE TESTIS

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AETIOLOGY

As this paper is concerned with the treatment of imperfect descent of the testis, no detailed consideration of the cause of this condition is called for. In a large proportion of cases a deficiency of internal secretion, that of the anterior lobe of the pituitary, probably lies at the root of the trouble, and in the remainder a mechanical obstruction to full normal descent is present in the form of bands and pockets of fascia or fibrous tissue. These mechanical obstructions probably also account for the condition of ectopic testis.

Retractile testes in young children, due to brisk action of the cremaster muscle, must be distinguished from imperfectly descended organs. With gentleness, warm hands, and pressure downwards and inwards along the inguinal canals, these retractile organs can be made to move satisfactorily into the scrotum. They require no treatment.

A further condition must be mentioned, that of post-operative retention of the testis; this is due to the contraction of scar tissue following local operations such as those for varicocele or inguinal hernia. It is caused by errors of technique, and if painful it can be treated by orchidopexy.

SPONTANEOUS DESCENT

The incidence of spontaneous descent is clearly of the first importance when laying down a plan of treatment. It only applies to incompletely descended testes, properly so called, and not to the ectopic organ.

R. E. Smith, who has given this subject detailed attention over a period of years, found that out of 50 cases 27 descended spontaneously, mostly about puberty. He also quoted McCutcheon and Johnson. The former found 9.4% of retained testes in 3,386 boys under the age of 15, but only 0.8% in 1,656 boys over 15. The latter provided direct evidence from 31,609 boys joining a Club in New York. In joining boys there were 544 undescended testes, of which 300 descended spontaneously. Of these 300 descents, 216 occurred between the ages of 11 and 14. These figures show that spontaneous descent is common and usually occurs at puberty. Smith concludes: "Obesity is a favourable accompaniment, and descent usually takes place before puberty. Bilateral non-descended testicles nearly always descend before puberty; approximately half of the unilateral cases descend at about puberty."

HORMONE THERAPY

Treatment with the anterior pituitary-like hormones, is followed by the descent of a considerable number of these testes. However, it is becoming increasingly clear that this result is achieved mainly or even entirely with organs which would descend spontaneously, especially about the time of puberty, when there is an increased output of gonadotropic hormones. In itself the cost of the treatment is not an objection, since a three months' course of 500 rat units intra-muscularly, twice a week, is approximately £3; considerably less than the cost to the hospital of operating on the patient. Nor are the side effects of increased genital development usually sufficiently marked to constitute an objection in themselves. Hormone therapy, however, is valuable as an adjuvant to operation, when it is desired to increase the development of the testicle and cord. It also has its place when operation is refused or is contra-indicated.

DISADVANTAGES OF IMPERFECT DESCENT

(1) Failure of Spermatogenesis.

Before puberty the histology of the imperfectly descended organ shows no significant difference from one that is fully in the scrotum. After this period atrophy sets in, and this may be present at the age of 16. Mimpriss' studies point to the fact that normal spermatogenesis may be recovered when operation is performed as late as 17, and perhaps even 20. Rea concludes from his own investigations that orchidopexy may well be performed on selected patients as late as the third decade.
Malignancy.

Though this is a much discussed point, there is little doubt that an incompletely descended testis is more liable to neoplastic change than one that is fully descended. Opinions of the increased liability vary widely from 20 to 200 times. In a recent paper Campbell has estimated that the liability to malignancy of an abdominal testis is about 1 in 20, whereas for one in the inguinal canal it is 1 in 80.

It has been stated that orchidopexy may increase the liability to the development of malignancy. The reported cases in which malignancy has occurred after orchidopexy amount to 15, or possibly 16. As such an event is of considerable interest, it is unlikely that a large number of cases have gone unreported. The small number of malignancies when compared with the innumerable orchidopexies that must have been performed, hardly provides evidence that operation increases the liability to malignancy, although it clearly does not remove any such tendency.

Pain and Injury.

A few cases complain of attacks of dull pain in the testis, more commonly when it is in the inguinal canal. Repeated injury, due to its position, does not occur often, except in cases with perineal ectopia; this position is not often seen.

Torsion and Infection.

There is no satisfactory evidence to show that these are any commoner in the imperfectly descended organ than in the normal. Torsion, indeed, is probably less frequent, and Smith states that he has never had a case.

Associated Hernia.

Clinical herniae are not uncommon in association with this condition. Smith found the proportion was one in every eight cases. They may first appear during hormone treatment. On the other hand, hernial sacs are often to be found at operation, and the incidence rises in proportion to the interest the surgeon takes in the condition. In Mimpriss' series of 172 cases at St. Thomas' Hospital, 85 % were found to have hernial sacs, and of the last sixteen of my own cases a sac has been present in every one. These are usually small, varying in length from 1/2 inch to 1 1/2 inches. They are genuine peritoneal sacs, with thin walls and a rounded fundus; every care was taken to exclude the possibility of forming a peritoneal diverticulum by traction on the cord, and so creating the artificial appearance of a hernial sac. It would be interesting to know how often patients who had had an orchidopexy performed without any hernial sac being reported developed a clinical hernia later in life.

TREATMENT

Conservative Treatment.

Waiting.

This is indicated if the testis is not ectopic, if there is no clinical hernia, and if there are no other complications. It should continue until the age of 12 to 14, considering the likelihood of spontaneous descent at that time. It should not be carried on beyond this period because of the possibility of atrophy starting in the germinal epithelium.

Hormone Therapy.

This is useful if operation is refused or is contra-indicated, and is also a helpful adjuvant to operation because of the increased development produced. A course consists of 500 rat units intra-muscularly, twice weekly, for three to six months. It can even be continued for a further three months, though without great hope of success.

Operation.

(1) For strangulation of an associated hernia, torsion, pain or suspected malignancy, operation is indicated without delay.

(2) If there is a clinical hernia or if the testis is ectopic, operation may be performed at a convenient age. A clinical hernia will call for treatment sooner rather than later. An ectopic testis that is not giving rise to symptoms can safely be left until nearer puberty because operation will then be made easier by reason of the increased development of the parts.
(3) *Other Cases.*

Operation for these is best performed at the ages of 12 to 14, because this period gives the maximal local development before there is any risk of atrophy.

**Choice of Operation.**

Orchidopexy is the procedure to be preferred. The inguinal canal is opened fully, the cord is freed, and any hernial sac is disposed of. Cremaster fibres, spermatic fasciae, and redundant connective tissue is gently divided and teased away from the cord, but this process can be carried to an extreme. Mimpriss pithily remarks: "What the surgeon gains in length the testis loses in blood supply." A finger is gently passed along the spermatic vessels towards their origin, in front to free them from the posterior parietal peritoneum, then behind to separate them from the connective tissues of the abdominal wall; this is the most valuable single step in attempting to gain increased mobility of the testis. The vas also should be freed, but is rarely the cause of trouble. It is not necessary to divide the inferior epigastric vessels; if thought desirable the cord and testis can be passed deep to them. The position is now reviewed. In a small minority of cases the cord is still too short. In these the testis may be fixed in the region of the external ring and re-operated upon some months later; one or two courses of hormone therapy may be given in the interval to increase development. It is particularly in cases of this last type that a pre-operative course of hormones is helpful. Of the remainder, those that have a cord sufficiently long to let the testis lie freely in the bottom of the scrotum without any tension or tendency to retract will need no further measures. The others require some more elaborate procedure. I am firmly of the opinion that border-line cases should be included in this second group. . . . When in doubt, proceed.

The essential of any more elaborate undertaking is a persistent steady pull upon the cord—a persistent steady pull, not a violent one. There are only two operations which really ensure this: (1) Ombredanne's operation, where the testis is passed through the scrotal septum and placed in the further compartment; (2) the Keeley-Torek operation, whereby the testis is passed through the bottom of its own side of the scrotum and implanted in the thigh for a variable period, usually three months. In spite of appearances it causes no discomfort.

Both these operations are good. The second requires a subsequent minor operation to separate the testis and scrotum from the thigh, but has a rather higher percentage of satisfactory results, and leaves the testis in its proper side of the scrotum. A common error and cause of failure is an attempt to implant the testis as low on the thigh as possible. This leads to tension at the suture line and liability to sepsis, separation of the parts, and failure. It is quite unnecessary, since implantation at a convenient level is sufficient, and the cord is gradually stretched as the patient walks about. Mimpriss found that the passage of stitches through the tunica albuginea appeared to damage the testicular tissue, as judged by microscopical appearances, and suggested turning down a cuff of tunica vaginalis, and suturing this to the deep fascia of the thigh, rather than attaching the testis directly. This has the additional advantage that subsequent separation of the organ is much easier, and it eventually lies in the scrotum free from the operation scar. In various published series, and in my own cases, this operation has given well over 90 % of successful results.

It must be stressed that, except when the cord is quite lax, such procedures as leaving the testis in the bottom of the scrotum, or even passing a suture between it and the skin of the thigh for ten days, are quite inadequate. Mimpriss gives the results of the Bevan type of operation at St. Thomas' Hospital, with or without a ten-day stitch to the thigh, as only 40 % and 44 % of successes respectively. At the Leicester Royal Infirmary, with and without a stitch to the thigh, they were only 50 % and 28 %, even including as successes two cases which could not be followed up. This type of operation is therefore to be condemned. Though I have never used Starr's operation with a temporary wire splint, it would sound on theoretical grounds to be open to the same objection, that the pull on the cord is not kept up for a sufficient length of time; Hamilton Bailey, however, speaks well of it.

In itself the age of the patient makes no difference to the technical difficulty of the operation. Some are easy and some are difficult at any age. I have had quite simple cases at thirty, and even at forty, but some special indication is necessary to make the operation justifiable at these ages.
Orchidectomy.

Orchidectomy is indicated (1) when malignancy is suspected, (2) when orchidopexy is difficult or impossible in a patient beyond the age of puberty, and where the other testis is healthy. It is probably wiser to perform it in any patient over twenty who has an imperfectly descended testis with a normal one on the opposite side.

Abdominal reposition has been advised by some when orchidopexy is not possible. Campbell, in a paper already quoted, considers that the liability to malignant change in an abdominal testicle is four times higher than in one situated in the inguinal canal. This in itself is a strong contra-indication to abdominal reposition. When orchidopexy is impossible and the other testicle is healthy, orchidectomy is indicated. When the other testicle is absent, orchidectomy may be undesirable, since it would remove the internal secretion entirely. In these cases it is justifiable to leave the testis in position, and unless there is some strong reason for not leaving it in the inguinal canal (e.g. attacks of pain or exposure to trauma, as judged by the patient's past experience), it is better not to move it. If malignant change should subsequently occur, it is more likely to be noticed in an early stage if the testis is in the inguinal rather than the abdominal position.

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Practicalities

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THE CLINICAL STUDY OF THE CARDIO-VASCULAR SYSTEM

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PART I

Before discussing the diagnosis of cardio-vascular diseases it would be advantageous first to recall the routine method of clinical examination, second to consider briefly such aetiological factors as are involved in the disease processes, and finally to describe the symptoms of heart disease. It should be possible then to marshal these facts into one comprehensive survey and to discuss the actual diagnosis of heart disease from a purely clinical point of view.

In order to make a complete routine examination it is essential that the patient should be stripped to the waist and given some cover—either a coat or a cape. He should be put at ease and examined, first of all, sitting in a chair. The radial pulse should be palpated and its characteristics noted over a period of one to two minutes. These characteristics include the state of the artery and its wall, the number of pulse beats one feels per minute, the regularity or otherwise of such beats, the volume of the pulse both between beats and at the time of the beat, and the nature of the pulse wave itself.

Normally, the artery should not be palpable except when the beat is present, and the beat should occur regularly and at a rate of about 72 to the minute. The character of the wave so palpated is that of a simple sudden upstroke, with a downstroke following it. But it must be remembered that there are other sites for detecting the pulse wave which may show a marked variation from that felt at the wrist, and which will give useful information as to the normality or otherwise of the cardio-vascular system. For instance, it is often of value to feel both radial pulses at the same time to discover whether or not they correspond to each other, not only in rate but also in volume and type.

The state of the arterial wall may be judged from an inspection of either the brachial or temporal arteries, and information about the patency or otherwise of the more distal arteries may often be obtained from palpation of both the dorsalis pedis and the posterior tibial arteries.