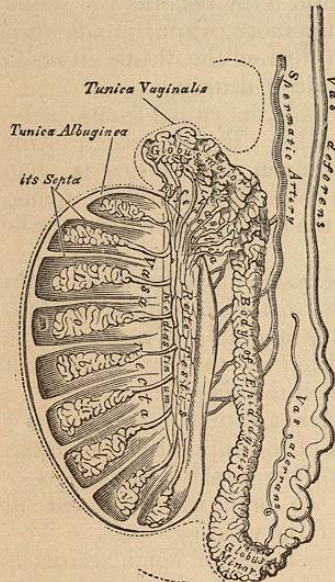


fore the epididymis becomes inflamed,¹ but this is the natural course of the disease when no complication whatever takes place. To prove a metastatic origin of the epididymitis, it would be necessary to show that there is a sudden disappearance or diminution of the running, just preceding the swelling of the testicle; such, however, does not occur. On the contrary, as stated by Ricord, there is often

FIG. 38.



Vertical section of the testis and epididymis. (After GRAY.)

an exacerbation of the urethral disease and a slight increase of the discharge for a day or two preceding. When the disease of the testicle is fairly established, the discharge diminishes as a consequence of revulsive action. These phenomena coincide with what is seen in affections of other parts when acute inflammation is established in their neighborhood. The induration of the epididymis, which frequently remains for some time after an attack of swelled testicle, or which may even become permanent, requires further mention. This induration is commonly situated in the lower part of the epididymis, in or near the globus minor. It will be recollected that the upper portion, or globus major, is composed of the convolutions of the vasa efferentia, which are from ten to thirty in number, but that these minute vessels unite into a single duct, before leaving this portion. Hence the globus major of the epididymis consists of several seminiferous tubes, any one of which would be sufficient to convey the semen, in case the others were obstructed; while the body and globus minor contain but one tube, the obliteration of which must completely cut off the communication between the testis and the penis. But it is in this latter portion, viz., the globus minor, that the induration left by an attack of swelled testicle is almost invariably found; and, as we shall presently see, it generally effects the obliteration of the single duct of the part, and renders the patient impotent upon the affected side.

It now becomes an interesting subject of inquiry, what effect this obliteration has upon the testis; whether it remains in a normal

¹ Gausseil's statistics relative to the discharge are as follows: In 67 of 73 cases, the discharge and the other symptoms of the gonorrhœa had diminished more or less—in other words, the acute stage of clap had passed—when the swelling of the testicle took place; in 6 cases, the gonorrhœa was still at its height.

In 30 of the 73 cases, the discharge gradually diminished and disappeared entirely during the treatment of the epididymitis; in 43 cases, some discharge remained after the disease of the testicle was cured.

condition, and continues to secrete sperm. Again, in those cases in which epididymitis has occurred on both sides, an induration may be left in each testicle, totally obstructing the passage of semen; in such cases does the patient still retain sexual desires? is he capable of sexual intercourse? and, if so, how does his semen differ from that of a perfectly healthy individual? These questions have been ably answered in a paper by Dr. L. Gosselin, published in the *Arch. gén. de méd.* for Sept. 1853.

Dr. Gosselin's conclusions are based upon experiments upon the lower animals, and upon the observation of twenty patients affected with double induration of the epididymis following gonorrhœa. The spermatic cord of one side was exposed in two dogs, the vas deferens isolated from the spermatic vessels, and a portion of it excised. The animals were killed several months after, when it was found that the testicle of the side operated on presented the same volume, color, and general character as that of the opposite side; the only difference was that the convolutions of the epididymis in the former were distended with fluid containing a multitude of spermatozoa. The excision of a portion of the vas deferens had completely cut off the communication with the penis. These experiments proved that isolation of the testicle in the lower animals does not produce atrophy of this organ, which remains in an apparently healthy condition, and continues to secrete semen.

The twenty persons who had had double epididymitis were met with at the Hôpital du Midi, and in the private practice of Dr. Gosselin. The time which had elapsed since the formation of the induration, at the time of the observation, varied from a few weeks to ten years. The symptoms which they presented were in some respects singular and remarkable. In all of them there was a mass of induration in the lower portion of the epididymis of each testicle. In none of them was there any apparent change in the volume of the scrotal organs, and no pain was felt at any time, not even after sexual intercourse. None of them had observed any change in their sexual desires or powers. They were all as capable of coitus as the most healthy individuals. Their erections and ejaculations were complete. Their semen was normal in quantity, in consistency, in odor, and color; it presented the chemical reactions described by Berzelius as characteristic of sperm. Only when examined by the microscope was it found to differ at all from healthy semen, inasmuch as it was entirely destitute of spermatozoa. In the recent cases, most of which were still affected with urethritis, pus and blood-globules were found mixed with the semen; in the older cases these were absent. The entire absence of spermatozoa in all of them was confirmed upon repeated examination by Drs. Gosselin, Robin, Verneuil, and other eminent Parisian microscopists. In two of these cases, treatment, continued in the one case for three months, and in the other for nine, resulted in the disappearance of the induration in one of the testicles, and

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coincidentally with this resolution spermatozoa again appeared in the semen, as shown by microscopical examination.

These cases are of the highest interest, looking at them both in the light of physiology, and of pathology and therapeutics. They show, in the first place, that the quantity of fluid ejaculated is as abundant and presents the same general appearances when the canal of the vas deferens is obliterated as when it is free; also, that in case of obliteration, the secretion of sperm in the testis is not sufficient to distend the vessels to any great extent, or to occasion pain. Probably there is some absorption of the secreted sperm, but if as much of this fluid were secreted by the testicles as is commonly supposed, the effect upon the testicular vessels and upon the feelings of the patient would be more manifest. From these facts Dr. Gosselin concludes that the normal function of the testicle is to furnish the fecundating element of the sperm, viz., the spermatozoa; and that the other components of the spermatic fluid, to which it owes its color, odor, and chemical reactions, and which constitute the medium in which the spermatozoa live, are derived for the most part from the vesiculæ seminales.

But the conclusions from these facts which chiefly interest us at the present time are those bearing on the pathology and treatment of epididymitis. These conclusions, as stated by Dr. Gosselin, are the following:

1. The induration is generally situated in the globus minor of the epididymis, though it may, strictly speaking, be seated in any part of this organ. Since the epididymis below the globus major is composed of but a single vessel, the obliteration of this vessel is sufficient to prevent the passage of the sperm.
2. The presence of the induration excites no pain, provided that the inflammation which produced it has entirely subsided.
3. It does not occasion any change, appreciable by the patient, in the exercise of the genital functions.
4. If the spermatic vessel be obliterated on both sides, the patient is necessarily impotent; if on one only, fecundation is possible, provided that the other testicle is sound.
5. The success of treatment in several of the cases reported affords assurance that the power of fecundation may sometimes be restored by appropriate remedies.

Two additional cases of bilateral induration resulting from epididymitis have been reported by Gosselin, which confirm his previous observations regarding the retention of virile power and the absence of spermatozooids from the fluid emitted.

M. Godard states that he has confirmed Gosselin's observations by microscopical examination of the semen of thirty-five persons affected with double chronic epididymitis, and in every instance except one spermatozoa were wanting.¹

Liégeois² gives twenty-eight cases of double epididymitis, in the

¹ Études sur la monorchidie et la cryptorchidie chez l'homme, Mem. Soc. de biol., Par. 1857, p. 105.

² Ann. de derm. et syph., Par., 1869, p. 410.

sperm of seven of which the microscope showed spermatozooids at periods varying from eight days to five years after the last attack. Five of these cases were not blennorrhagic, leaving two, of undoubted venereal origin, in which there was restoration of the fecundating elements.

Liégeois concludes from his experience that spermatozooids reappear in cases of blennorrhagic epididymitis only after the disappearance of the induration, which, in non-blennorrhagic cases, has its seat outside the canal, and, therefore, may persist without preventing their passage. He claims to have seen, among three hundred cases of epididymitis, not a single genuine case of consecutive atrophy of the testicle, although he has recognized slight diminution in volume in six or seven instances. In only eight cases has he observed any loss of virile power, while, on the contrary, he has several times seen it markedly increased.

He calls attention to the fact of decided increase in the quantity of ejaculated fluid, which, as observed by Gosselin, presents the characters of normal sperm, with the exception of the spermatozooids, and is probably derived from the prostate gland and the seminal vesicles.

If gonorrhœal epididymitis attack a testicle which has been arrested in its descent from the abdomen to the scrotum, the nature of the case may readily be mistaken. If the testis have not left the abdominal cavity, it may simulate peritonitis or iliac abscess; if it be arrested in the spermatic canal, it may counterfeit strangulated hernia or bubo; and the liability to error is especially great when, as often occurs, the tunica vaginalis is still connected with the abdominal cavity, and true peritonitis is set up by extension of the inflammation, attended by its usual alarming symptoms. Numerous cases in illustration of these remarks may be found in the work of M. Godard before referred to.

A still rarer malposition of the testicle is in the perinæum; an anomaly first observed by John Hunter,¹ who met with two instances. Ricord and Vidal² (de Cassis) have each observed two cases; Mr. Ledwich³ met with one in a dissecting-room subject, and Godard⁴ gives the history of another, with a plate of the abnormality. A perineal testicle affected with gonorrhœal epididymitis may simulate a perineal abscess or inflammation of Cowper's glands, as in the two instances observed by Ricord.⁵ "In one, there was a perineal tumor, which was exquisitely painful, fluctuating and about the size of a pigeon's egg. It was at first taken for an abscess, and Ricord was about to open it, when examination of the scrotum led to the discovery that one testicle was absent."

There is another consideration, connected with abnormal position of the testicle, which is worthy of mention. In most cases of this

¹ Curling, op. cit., p. 51.

² Traité de pathologie externe, t. v., p. 432.

³ Dnbl. Q. J. M. Sc., Feb., 1855.

⁴ Godard, op. cit., p. 96.

⁵ Op. cit., page 75, and plate III.

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anomaly, the gland is useless for the purpose of procreation. According to Goubaux and Follin,¹ it undergoes fibrous or fatty degeneration. This is denied by Godard, who, however, has equally shown that the gland, as a general rule, is impotent, by microscopical examination of the contained sperm after death. In eight cases out of nine, spermatozoa were wanting. Now, if the anomaly be confined to one side, and the opposite testicle be in a healthy condition, fecundation is still possible; but if the descended testicle be attacked by epididymitis, obliteration of its vas deferens will deprive the patient of all procreative power, as in the cases of double epididymitis observed by Gosselin. Godard gives the history of a man with one undescended testis, who had a child by a mistress, but who, after an attack of swelled testicle on the opposite side, was twice married without progeny, and his semen, twenty-one years afterwards, was found destitute of spermatozoa.

PATHOLOGICAL ANATOMY.—Since epididymitis, when uncomplicated, is never fatal, opportunities for post-mortem examination are rare, and only occur in case some intercurrent disease produces the death of the patient. The most complete report of such examination with which I am acquainted, is to be found in the *Gaz. d. hôp.*, for Dec. 21, 1854.

CASE.—The patient entered Velpeau's wards at *La Charité* with swelled testicle, of eight days' duration; the epididymitis was situated in front of the testicle, and was swollen and hard; the cord was also involved, while the body of the testicle appeared to be sound, and there was no effusion in the tunica vaginalis.

Eighteen days after his admission, and twenty-six after the commencement of his attack, this patient died of cholera. The post-mortem was made by M. Gosselin, with the following result:

1. The tunica vaginalis contained no fluid and was free from injection of its vessels.

2. The body of the testicle was healthy.

3. The globus major and the body of the epididymis were also healthy; but the globus minor was swollen and formed a hard, uniform mass, the size of a haricot bean. On cutting open this mass, it was found to be destitute of bloodvessels, of a uniform yellow color, resembling tubercle, and of firm consistency. The sections of the convoluted spermatic duct upon the cut surface showed that this vessel had attained three or four times its natural size, and, instead of being hollow, that it was filled with uniform yellow matter; there was none of this matter between the convoluted vessels; it was entirely within, and in the substance of the walls. M. Robin examined this matter

¹ Follin, *Études anat. et path. sur les anomalies de position et les atrophies du testicule*; *Arch. gén. de méd.*, Par., juillet, 1851, p. 262.
Goubaux et Follin, *De la cryptorchidie chez l'homme et les principaux animaux domestiques*; *Mem. Soc. de biol.*, Par., 1855, p. 317.

under the microscope and found pus-globules, mixed with fat-globules and the granular globules of inflammation. He also confirmed the statement that this matter was limited to the interior of the vessels.

4. The vas deferens, which had recovered its normal size, was filled with yellowish matter, containing no spermatozoa, and composed of pus-globules, cylindrical epithelial cells, and granular corpuscles. Its walls exhibited a perfectly normal appearance.

5. The vesicula seminalis on the affected side was healthy. It contained a small amount of fluid, with pus-globules and epithelial cells, but no spermatozoa. Spermatozoa were found in the vesicula seminalis on the opposite side.

M. Gaussail (*Arch. gén. de méd.*, 1831, tom. xxvii, p. 188) has also reported two cases of post-mortem examination of swelled testicle, in which, however, the examination was made with less care than in the case just quoted.

Mr. Curling (op. cit., p. 249) says that he has twice had the opportunity of making a post-mortem examination of swelled testicle, but gives no account of the appearances presented. Mr. Brodie¹ examined the body of a gentleman who had had gonorrhoeal epididymitis twenty years before, and found the testicle smaller than natural and "one-third of the tubuli testis converted into a white substance, having the consistence, but not the fibrous structure, of ligament."

With regard to the changes which take place in the tunica vaginalis, we have ourselves had some opportunities for observation. In one patient under our care the nodules of lymph, perceptible on external examination, were so marked as to simulate the nodules of cancer. This case led us to seek for subjects in the dead-house whose previous history was known to us, or whose remaining induration of the epididymis showed that they had had epididymitis. The number of bodies thus examined was twenty. In some we found nodules of lymph on the testicular surface of the tunica vaginalis; in others, on the outer reflection of the same, and there were also in many cases false membranes stretching from one reflection to the other.

The first case which I have quoted as occurring in the service of M. Velpeau is, I believe, the only one on record in which the examination has been made with all the light which modern science affords, and I would especially call attention to the fact that the fibrinous deposit was found to be situated within the vessel of the epididymis, and not between the convolutions. This fact is in opposition to the statement of Mr. Curling; but it can hardly be called in question in the case here reported, and it strongly favors the opinion of M. Gosselin, that the communication between the testis and the penis is almost invariably obstructed during an acute attack of epididymitis, and also during the continuance of the induration

¹ *Clinical Lecture on Diseases of the Testis*, Lond. M. Gaz., vol. xiii., p. 219, 1834.

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which is often left behind. I would not be understood as asserting, however, that the exudation is always confined to the interior of the vessel; it may also involve the areolar tissue connecting the convolutions, but its deposit in the former situation appears to be the more persistent, and the more important, so far as the procreative powers of the patient are concerned.

The pathological changes produced by epididymitis can be studied to advantage only in recent cases. In the masses of induration which have existed for months or years, the anatomical elements are so confounded that it is impossible to distinguish them.

TREATMENT.—The remedies proposed for the relief of gonorrhœal epididymitis are legion in number, too numerous, indeed, even to be recorded in full in these pages. Some idea of their diversity may be obtained by consulting the columns of the *Lancet* for 1876, when they were called out by a discussion upon the value of puncture of the testicle for this affection. It may be said, in general, that the means now adopted are much less severe and heroic than a few years ago, and, we have reason to believe, are attended with better results. I propose, first, to give briefly my own plan of treatment, and then enumerate a few of the others which have been recommended.

Upon the slightest indication of an attack of swelled testicle, absolute rest in the recumbent posture should be enjoined. The bed is the only place for the patient, since lying dressed upon the lounge will not remove the constriction exercised by the clothes, nor permit of appropriate local applications. The scrotal organs must also be well supported, and this is better done by a handkerchief sling, or by a broad strip of adhesive plaster passed under the scrotum and made to adhere to the thighs, than by a suspensory bandage as found in the shops. It is well to unload the bowels by a free cathartic, as three compound cathartic pills or a bottle of citrate of magnesia. The nauseants and emetics formerly employed are now generally abandoned, except, perhaps, with plethoric subjects, or in cases of general febrile disturbance; and even then the exhibition of aconite may well be substituted. An opiate may be required at night to secure sleep. The diet should, of course, be restricted. Meanwhile the patient has enough to attend to without bothering with the anti-blennorrhagics and injections which he may have been using for the cure of his urethritis.

As to local applications, relief will often be experienced by keeping the part covered with a single thickness of linen constantly wet with a solution of the muriate of ammonia, half an ounce to a pint of water. Better still, especially at night, is to smear the scrotum freely with the following mixture:

R. Ext. Belladonnæ, ℥ij 8
Glycerinæ, ℥ss 19
Aquæ, ℥j 30
M.

Or with this:

R. Pulv. Opii, ℥ij 8
Glycerinæ, ℥j 38
M.

In either case, cover it with a piece of lint moistened in the same, and envelop the whole in oil-silk or india-rubber tissue.

I have also used with very good effect, in some instances, a simple procedure recommended by Dr. Edwin Lloyd, of Worksop, Notts County, England. The testicle is first immersed in water as hot as can be borne, and kept in it from ten to fifteen minutes, immediately to be followed by a stream of cold water poured over it from a height for five minutes. This should be repeated two or three times a day.

Under these measures the epididymitis may subside, but, probably in the majority of cases, the tunica vaginalis becomes involved, and more or less fluid may be detected in this sac. And here, in our experience, comes in the golden opportunity of giving almost instantaneous relief, and cutting off the further progress of the disease. The means we refer to consists in the multiple punctures of the scrotum, so highly recommended by Velpeau. In performing this slight operation, the tumor is rendered tense by grasping it posteriorly with the left hand, as in making the puncture for hydrocele. With the right hand, the surgeon, holding the blade of a common lancet between his thumb and forefinger, at the distance of about one-half an inch from its point, makes from four to six rapid plunges into the tense surface of the scrotum, still retaining his hold with the left hand so as to preserve the parallelism of the incisions in the skin and serous membrane. If there be much fluid in the sac, it will spirt out to some distance; in other instances, only a few drops of serum, mixed with a little blood, escape. In either case, the relief to the sufferings of the patient is most marked, and the further progress of the disease is at once arrested. The pain produced by this operation is so slight as not to require an anæsthetic; but, if the patient be timid, I usually give him a few whiffs of ether, or let him inhale the nitrous oxide gas, which is now put up in a condensed form in small cylinders, and is kept on hand by most surgeons for this and like minor operations. So great is my confidence in the effect of these incisions, that I do not hesitate to tell a patient that if he will submit to them he can be on his feet again in two or three days. I have never seen the slightest ill-effect from them, although Montanier¹ reports a case in which a simple incision into the tunica vaginalis was followed by excessive hæmorrhage very difficult to control, and which even endangered life. Probably some scrotal artery of considerable size was wounded, but this must be a very rare occurrence.

¹ Gaz. d. hôp., Par., 1858, p. 106.

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