the testicle by suppuration, and, in some cases, the hyperacute, galloping tubercular orchitis (usually due to a mixed infection).

All operations should be performed under general anesthesia, in order that the surgeon may have the opportunity to do his work thoroughly, unhampered by the patient's outcry. When epididymectomy is performed primary union may often be expected. Curetting and cauterizing operations should be terminated by drainage. Fungus may be amputated by the cautery, turned in and covered by the scrotum. If this operation fails castration is necessary. Pousson[1] has recently advocated ligature of the spermatic cord as a cure for tubercular testis. The suggestion is too new to receive calm judgment.

If the seminal vesicle is tubercular the question of operating upon it may arise (p. 788).

[1] Guyon's Annales, 1900, xviii, 356.

CHAPTER X

SYPHILIS OF THE TESTICLE—FUNGUS

There is no disease of the testicle so persistently misunderstood as syphilis. It is habitually mistaken for tubercle and cancer, and more than usually fortunate is that patient whose physician gives antisyphilitic medication the opportunity of making the diagnosis for him. Yet the syphilitic testicle presents quite as characteristic a symptom-complex as does tubercle or cancer, and, while less common than the former, it occurs far more often than the latter.

There are two forms of syphilitic testis: an epididymitis of the secondary period, and an epididymo-orchitis of the tertiary period.

SECONDARY EPIDIDYMITIS

This affection is insignificant. It occurs in connection with other secondary symptoms, and, as it consists merely of a nodule often quite painless in one or both testicles—usually both—it is but rarely discovered. Dron[1] has left a classical account of it. The general coexistence of other secondary symptoms suggests its nature, and it reacts kindly to routine mercurial treatment.

TERTIARY LESIONS

The lesions of tertiary syphilis in the testicle are entitled orchitis. But the epididymis also may be implicated. This involvement has been noted in a desultory way by many authors; yet no one seems ever to have been struck by its frequency and its pathognomonic features. But of these anon.

Morbid Anatomy.—*a. The diffuse form*, like interstitial hepatitis, or nephritis, is an interstitial orchitis, a peculiar sort of chronic inflammation attacking the fibrous envelope and the septa of the organ. Ricord named it albuginitis. The process begins by hyperemia;

[1] Archiv. gén. de méd., 1863, ii, 513 and 724.

a new growth of connective tissue occurs in the stroma of the organ. This new tissue presses upon, and gradually causes atrophy of, the tubular structure. The tunica albuginea becomes thickened, as does also the tunica vaginalis. More or less fluid occupies the cavity of the latter, while many adhesions commonly take place between its free surfaces. In this way the organ reaches double its natural size, rarely more, unless there is a considerable collection of fluid in the tunica vaginalis. Often only a portion of the gland is involved in these changes. Both testicles may be affected, usually consecutively. After a time the newly formed connective tissue contracts, the septa between the lobes of seminal tubules become greatly thickened, composed of dense, fibrous tissue, showing white on section, while the intervening clusters of tubules, after first undergoing a brown pigmentation, become atrophied by pressure, and finally may disappear, lost in the general fibrous metamorphosis of the gland. The contraction may continue, much of the newly formed material being absorbed, and the process going on to wasting of the organ, until but a stump remains. If the gland has been only partially invaded, a depression may be left marking the site of the disease. In this form there is no tendency to suppuration, ulceration, or formation of fungus. This is the slower variety of disease.

b. The gummy form is marked by the formation of nodules, usually multiple, which seem often to take their origin in the external tunic of a vessel or in the wall of a spermatic tubule (Lancereaux). They may be found of all sizes up to that of an egg, and consist of an agglomeration of cells toughly united by fibrous elements into a lump, presenting, on section, a grayish-yellow or distinct dark-yellow colour. As they get larger these nodules tend to soften at the centre. They are surrounded by a grayish areola, traversed by vessels, and are often enveloped by a condensation of tissue somewhat resembling a capsule. These tumours may form near the surface or deep in the gland. They may occur in the epididymis. The latter, however, usually escapes, while the vas deferens is very rarely involved. The tunica vaginalis is usually more or less distended with fluid. In gummy orchitis the testicle may become very large.

The *epididymis* is not apparently involved in the diffuse orchitis; but with the more frequent gummatous process the epididymis is involved in a characteristic manner. I have never been able to obtain a pathological specimen showing this condition, but I have no doubt that the epididymitis as well as the orchitis is gummatous. The practical features I do know. The globus major is commonly involved, the globus minor less often. The inflamed portion of the epididymis forms a solid mass with a sharp edge which I have seen half as large as the palm of the hand. It caps the end of the testicle, separated from it by a distinct sulcus, so that the organ seems to be resting in a clam-shell. There are no nodules, as in tuberculosis, and the cord is uninflamed. The pathognomonic clam-shell is usually seen above the testicle, sometimes below it. At the same time the body of the testicle is usually implicated.

I have never seen double syphilitic epididymo-orchitis.

Symptoms.—True syphilitic orchitis rarely appears until after at least a year has elapsed from the date of chancre. Occasionally it may be more precocious. Ricord and Bumstead have seen it as early as the fourth or fifth month. It may coincide with iritis, with groups of tubercles, with ulcers, or with deeper lesions of bone or cartilage. Not infrequently, however, it comes on long after the patient has ceased to show any evidence of specific disease. The enlargement of the testis takes place gradually and without pain. It is usually first discovered by accident, already quite large, so that the patient affirms that the swelling came on very rapidly, in a day or so. There may, however, be some slight pain at first, especially along the cord and in the groin, with an uneasy sensation in the testicle itself. When first seen, the testicle is usually not more than twice or thrice its natural size. It may be perfectly smooth, and hard as wood, the epididymis not distinguishable. Sometimes the body of the testis is irregular and nodular and very hard, or there may be one or more prominent lumps of gummy exudation. Only a portion of the testicle may be involved, the rest being normal. In such a case the healthy portion may retain the natural testicular sensation. Often, however, the swelling is wholly insensitive, and may be squeezed at will without evoking the least uneasy feeling.

The outlines of the testicles may be obscured by a considerable collection of fluid in the tunica vaginalis. After drawing this off, the hard, nodular, uneven outline of the insensitive syphilitic testis becomes apparent. The vas deferens is nearly always healthy, and the characteristic clam-shell epididymis will be found in a certain proportion of cases.

The general health may appear excellent, but, if both testicles are involved, sexual appetite and power are almost invariably absent. The same impairment of sexual function exists in a less degree where one gland only is involved. There may be, very rarely, a syphilitic fungus, as described farther on. The glands in the groin are not affected.

Exceptionally the cord is involved. I have seen it thickened to

the size of a lead-pencil, smooth, hard, painless. Fournier[1] records a similar case, and Desprès[2] another.

The course of the disease is infinitely slow. It may last thirty years, and commonly terminates in atrophy.

The *hereditary form* of the disease may appear up to the second or the third year. Fournier observed a case in the twenty-fourth year. The disease follows the type of diffuse orchitis in the adult. It is frequently bilateral and associated with hydrocele. It usually terminates in atrophy.

Prognosis.—The prognosis is good. The seminal tubules do not become occluded. They perish only by atrophy from pressure, and some of the canaliculi usually escape. The sooner treatment is commenced the better the prognosis. Under appropriate measures the gummy material melts away, liberating from pressure such of the tubules as have escaped atrophy, and, with a return of the organ to its natural size, erections and sexual appetite reappear. Gosselin has found spermatozoa in the semen of patients cured of double syphilitic orchitis. Relapse is always to be feared, especially if the treatment be not persisted in long enough, or if the testicle is injured.

Diagnosis.—(See Table, p. 752.)

Treatment.—All three forms of syphilitic testis are amenable to treatment. Early syphilitic epididymitis reacts promptly to mercury employed as for the earlier syphilids. Of the other two forms, the purely gummy may be more promptly relieved; but, in any case, the earlier an intelligent treatment is instituted the more speedily does the disease respond. Mixed treatment is most commonly applicable, but, as a general rule, the later the attack after the chancre the more reliance is to be placed upon the iodid and the less upon mercury. With distinct gummy tumours, with syphilitic fungus and in connection with other marked evidences of tertiary disease, the iodid should be used alone, carried rapidly to a high dose. A suspensory bandage should be worn and all hygienic means employed. Local treatment is useless.

Sometimes injections into the buttock of 1 gramme of a 10% solution of mercuric salicylate in benzoinol succeeds better than the iodid. The injections should be employed once or twice a week until the first signs of salivation appear or until the tumour subsides.

FUNGUS OF THE TESTICLE

The term fungus of the testicle is one of those which, though meaning nothing in particular—a relic of days when various pathological conditions were classed as one—cannot yet be discarded. In its widest sense fungus of the testicle is protrusion of that organ, or of its contents, through the skin of the scrotum. Three kinds of fungi may be distinguished:

1. **Malignant Fungus.**—This is nothing else than malignant disease which has broken through the skin (p. 751).
2. **Hernia or Prolapse.**—In this form the entire testicle is protruded through a wound in the scrotum (p. 696).
3. **True Benign Fungus.**—Here the testicle is eviscerated, as it were, and its secreting structure, the seminal tubules, protrude through the tunica albuginea and the scrotum.

This true fungus is rarely seen nowadays. It results most frequently from the breaking down of a gumma, less often from the suppuration of a tubercular focus, rarely from trauma.

The syphilitic fungus is typical, and this only need be described.

The mechanism of its formation is as follows: The tunica albuginea undergoes gummatous degeneration, softens, and permits bulging of the contents of the testicle. The suprajacent skin now inflames and adheres, finally ulcerating and permitting the gummy growth to extrude through the opening, together with the tubular structure, which may be found in little clusters amid the yellow material. The fungus continues to grow, the dartos and skin contract about its peduncle, and the extruded mass becomes covered with granulation tissue and bathed in pus. These syphilitic fungi are rather firm in touch, painless, and do not bleed very easily. If cut off they continue to grow, or, if the disease be not arrested, the sprouting may continue until the whole tubular structure of the testis has been pushed out, after which it may wither and dry up, the testicle going on to complete atrophy. The seminal tubes in the fungus retain some of their activity, as shown by the fact that spermatozoa may be found in the discharge.

Réclus[1] claims that tubercular fungus arises only from lesions situated in the scrotum, not in the testicle itself.

Treatment.—The treatment of syphilitic fungus is primarily medical. Tubercular fungus commonly requires castration. When the fungus is not itself diseased, as in syphilis after a successful mercurial course has been carried out, or as in traumatic cases, every effort should be made to save the testicle. If the fungus is small, tight strapping, so as to turn in the edges of the wound after nitrate of silver has been applied, may succeed. If this

[1] Sarcocèle syphilitique, Paris, 1875, p. 27. [2] Bull. de la soc. de chir., 1875, i, ii, 140.

[1] Semaine méd., 1887, vii, 30.

fail, Syme's operation should be attempted. The fungus is gently scraped to freshen the granulations, the cicatricial collar about the neck of the growth divided, the skin dissected up, the tumour reduced, and the skin sewed over it. Asepsis and primary union are to be aimed at. If this operation fail the testicle must be removed.

CHAPTER XI

TUMOURS OF THE TESTICLE—DIAGNOSTIC TABLE—CASTRATION

Many kinds of morbid growths have been observed in the testicle, although no individual variety is at all frequent. In fact it is impossible clinically to distinguish between the various forms of tumour, and even the pathologists are not agreed. For most tumours of the testicle are mixed tumours, most of them are malignant, and "there's an end to 't," as far as the clinician is concerned. Therefore I shall not strain at giving every particular detail suspected as characteristic of some specific tumour, but, having described the morbid anatomy of each variety, I shall consider their symptoms, diagnosis, and treatment collectively.

Morbid Anatomy

Benign Tumours.—Enchondroma, fibroma, osteoma, and myoma [1] have been observed. If the tumour is small it is often not discovered until after death. If large it cannot be distinguished from beginning malignant disease.

In the *tunica vaginalis* lipoma (Roswell Park) and fibroma have been observed (Jacobson).

Cystic Growths.—Three varieties of cysts are met with in the testicle—teratoma, benign cystic disease, and malignant cystic disease. Clinically they cannot be distinguished from one another.

Both simple *dermoid* cysts and more complex *teratomata* are met with in the testicle. In a personal case of teratoma the cyst contained a malformed mandible bearing several teeth. Teratoma is, doubtless, due to fetal inclusion (Saint-Hilaire), while dermoid cysts probably are merely epithelial inclusions. Lébert accounted for the relative frequency of teratoma of the testis and the ovary by a sort of hermaphroditism, by virtue of which the sexual gland impregnates itself in an imperfect manner, and so evolves certain "odds and

[1] *Cf.* Becker, Virchow's Archiv, 1901, clxiii, 244.