and grown backwards, pushing the periosteum, ligaments, and membranes of the cord before it, and thus causing compression and softening of the cord at that spot. The cord and membranes were not, however, directly involved in the growth. The brain was healthy.

Clearly there was nothing discovered in the condition of the heart or pericardium to explain the murmurs heard over the front of the chest. And I think, therefore, I am justified in concluding that the view I took of the auscultatory phenomena during life was the true one—namely, that the murmurs were due to the vessels of the tumours, and, for reasons already stated, to the arteries rather than to the veins. I was inclined at the time to attribute the loudness of the murmur at the acromion process and about the clavicle and sternum to its conduction from its seat of development in the scapula along the continuous chain of bones. I think this explanation is adequate.

(To be continued.)

ON THE NON-MALIGNANT TUMOURS OF THE SPERMATIC CORD, AND THEIR DIAGNOSIS FROM HERNIA.

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(Concluded from p. 793.)

So much, then, for the fluid tumours of the spermatic cord. I now come to the much more difficult subject of the solid tumours of this organ. My difficulty here arises, not so much from the want of cases in point as from the want of cases with definite and demonstrable results. The indubitable facts of ordinary anatomy, however, help us in our understanding of these cases; for it reveals to us that mixed with the common areolar tissue of the pelvis and of the cord are numerous small masses of fat. These are more abundant within the pelvis, but are also sometimes found in the cord itself. Now this is true for subjects of all ages and free from morbid affection of these parts; but it is well known that at and about the middle period of life fat naturally increases in the body, and especially in the abdomen. Nothing, then, is more likely than that these nodules of fat should at that time increase so as to deserve the name of tumours. Hence we are well prepared to receive the statement of pathologists that non-malignant tumours of the cord are either fatty or fibrous (areolar), or a mixture of both, and my experience, so far as it goes, confirms this statement; but I have not more than one actual dissection¹ to contribute to those already on record, for most of my cases are still alive, and therefore perhaps still doubtful. A good example is the following:—

A middle-aged man from the country called at Mr. Hilliard's shop to get a truss for what he thought was an inguinal hernia; but Mr. Hilliard, on examining it, differed from him, and at least thought it was so unusual in its characters as to induce him to advise the patient to see a surgeon when in Glasgow. He therefore consulted me, when I found a small soft inelastic tumour passing from the right inguinal opening. It could not be separated from the cord when the patient was standing up. It gave a distinct but slight impulse on coughing, and entirely disappeared in the recumbent position. It was noticed, however—and this I think important,—that whenever the patient stood up the tumour was there in its old place, as if it simply hung forward again owing to the patient's change of position. When the patient coughed while in the recumbent position the impulse given to the tumour could be both felt and seen, but whenever the cough ceased, or in the intervals between his coughs, the tumour disappeared. This would not likely be the case with a recent oblique inguinal hernia, which, when coughed down, generally remains down until put back by the hand. Of course the tumour in this case had no gurgling as if it contained bowel, but felt smooth and soft, and slipped readily from

the fingers to either side of the inguinal opening, into which it could be easily pressed in any position of the body. It had existed probably for a long time, and the man could not tell how his attention had been drawn to it, but when he discovered it he at once consulted his doctor in the country, who advised him to wear a truss, but it had not kept it up rightly, and hence his visit to Mr. Hilliard. I did not think this a hernia, even of omentum, but a small portion of fat—a lipoma, in short, connected with the upper part of the cord, or possibly an instance of what Cloquet actually found on dissection, and described in his work on Hernia—viz., a portion of fat belonging naturally to the areolar tissue of the pelvis, which had increased unduly and protruded through the inguinal canal. This would no doubt better account for the impulse on coughing and the disappearance of the tumour in the recumbent position. I therefore did not press the continuance of the truss; but as it relieved the man's mind to wear it, I advised that it should be of the slightest power of spring. It is nearly two years since I saw this man, but I have heard from Mr. Hilliard that he lately saw him, much improved in health, but with the little tumour quite unchanged in size or appearance.

I could relate, if necessary, the details of other two cases, which I still occasionally see, of precisely similar kind, only they have to my knowledge continued much longer without appreciable change. In one of these cases a slight truss has long been worn, in the other no artificial support has been employed, and both patients are very active in their habits, and enjoy quite good health. It may be worth mentioning that in the latter of these cases a truss was at first applied by the advice of another surgeon, but it was found that the little tumour constantly slipped to one side of the pad, and caused a disagreeable sensation of pinching to the patient. He therefore gave up using it, and without any increase of the tumour, though it is nearly ten years since he first accidentally noticed its presence.

I believe that these are cases regarding which there may be much difference of opinion, especially when stated in writing without examination of the patients, or unless those who read them have had experience of some such cases for themselves. I can only say that these tumours differ from omental herniæ, with which they are alone comparable, in that they are absolutely painless and quite destitute of that dragging feeling characteristic of true epiploceles. They are quite smooth, of a regular oval shape, almost fluctuant, and slide about more widely than herniæ. These characters of tumours of the cord may be so far definitely given and appreciated without further explanation. It is not so, however, with the other two, which are perhaps the most important of all—viz., the impulse on coughing and the disappearance in the recumbent position. Let us, therefore, consider these a little more particularly.

1. When the tumour is situated high up the cord, and indeed belongs partly to the abdomen, the impulse on coughing may be as distinct as that of an omental hernia, because in such an act pressure is made equally on all the contents of the abdomen, and must tell on the tumour as it would on an omental protrusion; but as the tumour grows and descends towards the scrotum, which it naturally does by its own weight, this impulse on coughing greatly diminishes, and so it happens that in most cases, before a surgeon is consulted at all, that sign is absent, or at all events quite distinguishable from the direct and forcible impulse given to a hernial protrusion, for it is then easily perceived that the tumour only partakes of the general succussion given to the whole side of the abdomen.

2. In like manner, when the patient lies down, the tumour, if small and soft and partly contained in the abdomen, may entirely disappear into the loose areolar tissue above the internal inguinal opening; but when it grows larger it cannot wholly disappear, and must remain partially in the canal, where it may be felt rolling under the surgeon's finger, and whence it falls out apparently by its own weight, more quickly than a hernia, whenever the patient stands upright. In this, perhaps, it is assisted by the elastic reaction of the posterior wall of the inguinal canal, and the tension of the conjoined tendon produced by the action of the abdominal muscles; for it is only by weakness, or at least, relaxation of that tendon, that the tumour is permitted to conceal itself in the canal. It must be remembered, too, that the spermatic cord slips up or is pulled up by the cremasteric muscle much higher in some subjects than in others;

¹ When operating in a case of strangulated hernia, on May 3rd, 1885, I found a small fatty tumour, about the size and thickness of one's thumb, connected with the outside of the hernial sac. I excised it before introducing a suture into the inguinal opening.

and of course any tumour of its substance, if soft and yielding like lipoma, would go along with it, and this has suggested to me to try if traction on the cord would make the tumour descend. I think this manoeuvre, if done very gently, does somewhat change the position of these tumours, and I am quite certain that it greatly diminishes the impulse given to them on coughing. Of course this arises from the traction freeing the tumour from contact with the posterior wall of the canal, and would afford good corroborative evidence of its real nature in a doubtful case. In some of these cases, however, the tumour grows both a great deal harder and larger in time, and loses many of the above characters, becoming much like incarcerated omental hernia, as in the following example:—

A man, aged forty-four, was admitted into the Glasgow Royal Infirmary on March 19th, 1884, and told us that he believed he had had a rupture on the right side for many years. It was small and reducible at first, but about seven years ago it greatly enlarged in the groin and gradually descended into the scrotum, where it still further enlarged. He averred that even then it was reducible in bed. He wore a truss, which did not at all keep it up, and seemed only to have pressed on the neck of the tumour. For the last eighteen months it had been quite irreducible and almost quite hard, but was painless to the touch. Such was the state of matters when on March 13th, six days before admission, the man was seized with violent pain in the lower part of the abdomen, but not any in the tumour. His bowels were easily and freely moved with medicine, and he had no sickness. Fomentations were applied and opiates given, so that when he came to the hospital the pain had been very greatly relieved. But the tumour is thus described in the ward journal: "It is about the size and shape of a large Duchess pear, the thin end passing up into the inguinal canal, while the bulk of it occupies the right side of the scrotum. It is at present painful to the touch, because the skin over it is red and cedematous. It is quite irreducible, and gives no impulse on coughing." His bowels had been freely opened the day before admission. Fomentations were applied, and next day castor oil was administered, and acted freely. The pain of the abdomen had ceased, but the tumour was unchanged, and remained so until April 2nd, when I explained to the man that without an operation he could not be relieved. To this he consented, and next day, having put him under chloroform, I cut down upon the tumour, and found it covered by the sheath of the cord, and closely adherent to it and to the testicle. There was not a particle of fluid in the sheath, and it was with difficulty separated from the surrounding parts; this was, however, effected by dissecting from beneath upwards. It was then seen that the narrow part of the tumour was enclosed in the inguinal canal, and adherent to it all round, and giving no sign of its passage into the abdomen. I incised fully one-half of the canal to make sure of this, and then, being quite satisfied that I had simply the fibrous neck of the tumour to deal with, I pierced it with a needle armed with a long chromatised catgut ligature, both ends of which I tied so as to surround the trans-fixed part, and then I cut it off below the ligature, having succeeded in saving both cord and testicle from injury. Lastly, I made a free opening through the lowest part of the scrotal cavity, which had contained the bulk of the tumour, and, having inserted a drainage-tube, stitched up the main wound. The usual antiseptic dressings were applied. On cutting into the tumour, it was found to be fibrous in its nature, and quite hard and solid throughout its entire extent; but on submitting sections of it to microscopical examination, it was found that the fibres were here and there separated by small masses of fat. In the future progress of the case nothing remarkable occurred. For a few days there was some swelling of the soft parts on the wounded side of the scrotum, and very little discharge of pus. Nevertheless, the wounds healed slowly, and it was not till April 26th, twenty-three days after the operation, that it was noted that they had quite closed up. The scrotum had then regained very nearly its natural size, and there was no hernial protrusion to be detected on the most violent coughing, whatever the position of the body. The patient was kept under observation in the hospital for some weeks longer, and then dismissed cured.

I must remark on this case that its early history does not seem to me quite reliable, but it is clear enough that the truss did not and could not do any good. Nay, I believe it rather increased the irritation

and hastened the growth of the tumour by pressing on its neck. Of course it would, in some respects, have been better had the patient applied earlier for surgical assistance, for the tumour would then have been smaller and less adherent to the sheath of the cord. Indeed, one feels amazed that the very weight of the tumour did not cause him to seek its removal; but the truth is that these tumours seem to be so devoid of pain, and to affect the health so little, that few patients would submit to an operation even if proposed to them at an earlier period in the history of the growth, and such growths naturally increase so slowly that, unless irritated by wearing a truss, they may never cause trouble or inconvenience at all (even by their weight and bulk), and therefore may be safely let alone, especially if the patient is at or beyond middle age. Nevertheless, all such cases ought to be watched from time to time, and if there should occur pain or much increase of size, or any decided fixation of the tumour as from adhesions between it and the parts of the cord, an operation may then be considered desirable for its removal; but I do not, as a general rule, advocate a too ready recourse to the knife in such cases.

The only question which remains for consideration is the advisability of the patient's wearing a truss at the first. Now, take the case—and a rare one it must be—where one sees a patient while the tumour can be completely reduced above the internal opening of the canal. It may well be asked, What good could it do to keep the tumour inside the abdomen? and would its increase there not do more harm than if allowed to pass out of the canal? Then, in the commoner case, in which part of the tumour remains in the canal, it is obvious that the pressure of a truss may do harm, especially if the patient is a working man. But if it is allowed to remain there, it may next be asked, Will there be no danger of permitting the descent of a real hernia by the dilatation of the internal inguinal opening and of the canal itself caused by the presence of the tumour? Now, for my part, I think this fear unnecessary, for the tumour rather protects from such an occurrence by its presence and by the consolidation of the infundibuliform fascia which it naturally causes, and which was abundantly evident to me when operating in the case last related in this paper. Besides, there is, in all such cases, the unimpaired form and saccular continuity, if I may so call it, of the peritoneum, which we have good reason to think is in itself a protection against a hernial protrusion. On the whole, then, I do not recommend the use of a truss in these cases unless it relieves anxiety in the mind of the patient; but I should certainly forbid it if it caused any irritation or pain in the tumour. I need hardly add, in conclusion, that whenever symptoms of strangulation are present, it is the duty of the surgeon, without delay, to cut down on any tumour in the inguinal region, however doubtful he may be of its exact nature, and then to deal with it according to what he finds it to be.

A CONTRIBUTION TO THE CLINICAL STUDY OF THE LIVER VIEWED THROUGH THE URINE.¹

BY GEORGE OLIVER, M.D. LOND.

NO. II.—THE PHYSIOLOGICAL AND CLINICAL ASPECTS OF THE BILE SALTS IN THE URINE.

At the last meeting of the Leeds and West-Riding Medico-Chirurgical Society I demonstrated the capacity of an acidified solution of peptone as a practical test for the detection and quantitative observation of the biliary salts in the urine; and I showed how well adapted it is to serve clinical requirements in this direction. I now propose to bring forward such physiological and pathological data as this new instrument of clinical observation has brought within my grasp.

1. *The Renal Elimination of Biliary Salts in Normal Urine.*

Bile salts in healthy urine indicated by the peptone test.—Some few years ago that sagacious observer, the late Dr. Murchison, remarked that "not only in jaundice, but in health, a portion of the bile pigment, as well as of the bile

¹ Read before the Leeds and West-Riding Medico-Chirurgical Society, May 1st, 1885.