TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, April 2, 1894.

The Vice-President, DR. JOHN B. ROBERTS, in the Chair.

FREEDOM FROM RECURRING APPENDICITIS AFTER EVACUATION OF THE ABSCESS AND RETENTION OF THE APPENDIX.

DR. JAMES M. BARTON reported the results of fourteen operations for appendicitis in which the appendix was not removed. These were all cases of ruptured appendix with circumscribed abscess, with no general peritonitis and no symptoms of obstruction.

The operation consisted in opening the abdomen and using sterilized cheese-cloth to hold the movable intestines back and to protect the general peritoneal cavity while the abscess was opened and emptied. Drains were then introduced, some of the cheese-cloth permitted to remain, and most of the wound closed. No attempt was made to find or remove the appendix.

All on whom he had operated in this manner had recovered, and none that he was aware of had had any trouble with the retained appendix since.

The mortality had been much greater when he had removed the appendix. He thought it quite likely, in these cases, that the opening from the appendix into the intestine was closed early in the attack,—closed quite as firmly as any ligature would close it, leaving but little probability that fæcal matters would ever be again able to enter the appendix either to cause a fæcal fistula to follow the operation or to start another case of appendicitis in the future.

If it were not firmly closed, the pus would never have broken through the walls of the appendix, or, having broken through, the resulting abscess would not have increased in size, but would have emptied itself through the appendix into the bowel.

He had observed, in several cases where fæcal fistula followed appendicitis, that in none did the fæces make their exit through the appendix, but through other portions of the intestines, showing that the inflammatory deposit closing the appendix was even stronger than the healthy bowel.

The mortality following operations for appendicitis is mainly due to general septic peritonitis and to intestinal obstruction.

If we will look into the cavity of a fully-developed abscess, such as we have been considering, we can readily see how these complications may follow the search for or removal of the appendix. The cavity of the abscess is lined with a thick layer of grayish, poorly-organized, aplastic lymph, filled with micro-organisms. The appendix lies buried beneath this lymph, and its cavity communicates freely with the general abscess cavity. The opening can occasionally be seen, and is often the only guide by which the position of the appendix can be recognized.

To tear up this fragile and infected lymph, and distribute it through the peritoneal cavity while searching for and liberating the appendix, would greatly increase the probability of establishing a general septic peritonitis.

Intestinal obstruction following operations for appendicitis is probably due to kinking of the recently separated intestines. As they reunite, covered and stiffened as they are by inflammatory deposits, they cannot adjust themselves as readily as at the first formation of the abscess.

It is only in cases of circumscribed abscess that he had been permitting the appendix to remain.

When the appendix is still unruptured, or when it has ruptured and general peritonitis has occurred, or when obstruction is present, he removed it.

DR. THOMAS R. NEILSON had had several cases in which he had followed the practice of not attempting to search for the appendix in a condition of acute abscess. He thought it safer to leave the appendix alone, and if it does not cause further trouble it would be bad surgery to go in and disturb it.

DR. JOHN B. ROBERTS felt inclined, as a rule, not to search for the appendix if there was a large abscess. In some cases he preferred to make the opening in the lateral aspect and drain in that way. Whether or not these cases are permanently cured he was unable to say.

DR. WILLIAM W. KEEN, as a rule, removed the appendix. He thought it bad surgery to leave the appendix unless the adhesions were very marked and could not be separated without the risk of harm. Where there is liability of breaking into the general peritoneal cavity he would not search for the appendix. Where there is a tumor he would make the incision over the tumor, and not go through the peritoneal cavity. It is rare to have an appendicitis going on to a condition of distinct tumor without pus being present. He would much rather operate before any appreciable tumor had formed. In cases of tumor he almost invariably operated even with a normal or a declining temperature.

THE SURGICAL RELATIONS OF THE THORACIC DUCT IN THE NECK.

DR. JOHN H. BRINTON presented dissections illustrating the two most common terminations of the thoracic duct. From the study of several dissections, and especially from the comparison of the descriptions given by various anatomical writers, he had found great diversity as regards the termination of this duct. The general law is that the duct shall discharge its contents into the great veins, jugular and subclavian, at the base of the left side of the neck. This is done in several ways.

The first of the dissections presented exhibited the regular or normal type, the duct curving over the apex of the pleura and terminating exactly in the angle formed by the junction of the subclavian and internal jugular veins. In the second dissection the duct divided into two branches, these forming a circle by their union above. From this circle one trunk arches outward and divides into three branches. Two of these empty into the subclavian at the distance of one-quarter and one-half an inch from the internal jugular junction. The third branch empties into the internal jugular. Between these divisions passes a communicating branch. A large branch is also given off from the right side of the circle. This passes upward, turns to the left, and, deeply seated, crosses the neck transversely. The last portion of this branch was uninjected.

From the examination of these dissections the two typical terminations of the thoracic duct as described by Meckel can be studied. In most cases it empties into the angle of union of the internal jugular and subclavian veins by one trunk; when more than one trunk exists,

the terminations of the thoracic duct are in both the internal jugular and subclavian veins. The duct, as stated by this observer, rarely opens into only one of these two veins.

According to Quain, the thoracic duct often divides into two or three branches, which terminate separately in the great veins, as in the second dissection. Sometimes these several ducts again unite in a common trunk, and occasionally one of the branches may pass across and empty into the veins of the right side of the neck. The duct has also been known to terminate in the vena azygos. According to Sappey, there are many varieties of termination. Professor Harrison Allen states that the thoracic duct may empty into the jugular, azygos, and left innominate vein; infrequently it may be double. Sometimes as many as six terminal vessels are present, which are received into the subclavian, jugular, vertebral, and axillary veins.

The irregular terminations of the thoracic duct are alluded to by Henle and by Breschet. The latter, in his *Système Lymphatique*, describes minutely the many varieties, and instances one case, cited by Haller, from Bartholin, of the communication of a duct branch with the vena cava.

The formation of circles, or insulæ, is also referred to. The multiple termination of the duct is frequently met with in animals.

Hyrtl states that the varieties of termination of the duct are very numerous, and do not in the least interest the practical surgeon. The latter remark is too sweeping, especially in those cases where any portion of an arch formed by irregular terminal branches reaches high into the neck. If drawn upon or stretched by contracting and indurated tissues, and during operation, it might be easily cut or torn. In an instance where a duct branch passes transversely for a considerable distance to empty into the subclavian vein it certainly might be readily endangered. It seems, therefore, that the possibility of irregular and manifold endings of the thoracic ducts must be considered by the practical surgeon, and that in operating in this deep-seated, dangerous region he should bear in mind its normal abnormalities.

OPERATION WOUNDS OF THE THORACIC DUCT IN THE NECK.

DR. WILLIAM W. KEEN said that when we consider the frequency with which operations are done on the left side of the neck,

in the vicinity of the junction of the jugular and subclavian veins, for the removal of enlarged glands, for tumors, for goitre, etc., and of stab and other wounds, it is surprising that there are not a number of instances of wounds of the thoracic duct. The danger of wounding it may be greatly increased by the fact that Dieterich (Henle's *Anatomy*, 1876, III, 453) has found the arch of the duct as much as five and a half centimetres—over two inches—above the top of the sternum, and touching the thyroid gland. Yet so far as his investigations had gone he had only been able to discover two cases of wound of the cervical portion of the duct reported in surgical literature. To these he could add two more, one of his own, and another, the notes of which had been furnished him by Dr. A. M. Phelps, of New York.

Even in war, wounds of the duct in any part of its course are practically unknown. In neither the Italian war of 1859, the Crimean war, nor our own late civil war, is there a single instance recorded.

CASE I.—(Cheever, *Boston Medical and Surgical Journal*, 1875, p. 422.)—Tumor of the neck, during the removal of which "the subclavian vein and a large vessel near the internal jugular were both wounded. A transparent, viscid, coagulable, and colorless fluid ran out from the tumor and from the lower corner of the wound in quantities as large as an ounce at a time, some six separate times." The inner two-thirds of the clavicle were then removed. "The subclavian artery was sought and pushed aside, and an aneurism-needle passed between it and the vein, first out towards the shoulder, and a ligature tied; and second, close to the sterno-clavicular articulations where the needle and ligatures surrounded the venous trunks at or upon their junction in the left vena innominata. The artery was not wounded nor tied. All bleeding ceased, but the transparent fluid still oozed out moderately. The wound was lightly packed with sponges and ferric alum; no hæmorrhage occurred, and the transparent fluid did not soak through the sponges." The patient died from shock and exhaustion, thirty-six hours after the operation. A *post-mortem* examination of the wound showed the subclavian vein tied externally, and also at the junction of the internal jugular and subclavian. The remains of the tumor extended two inches below the clavicle, but were enucleated without piercing the pleura. This fragment of tumor had incorporated into itself several venous trunks or sinuses caught and entangled in the gradual agglomeration of glands. There was

no opening into the pleura, no sac running down into the thorax or axilla, no cyst in any direction. The source of the transparent effusion could not be traced. There would seem to be but little doubt that this fluid was lymph from a large branch of the lymphatics in the tumor, or more probably from the thoracic duct where it arches over to join the left subclavian vein. In contact with, if not surrounded by, the glandular enlargement, its thin and transparent walls were readily wounded in trying to remove the lower part of the tumor. No other source for the clear fluid could be found, there being neither cyst, hydrocele of the neck, nor pleural effusion to account for it. The fluid under the microscope exhibited no cells save a few stray blood-corpuscles. The patient having fasted for twelve hours before the operation, there would be little, if any, of the milky emulsion of chyle in the duct.

"The fluid poured out of this wound coagulated after contact with the air in a firm jelly, just as blood coagulates. This, no doubt, was due to its fibrin. Its large quantity pointed to a considerable duct as its source, although it must be borne in mind that the whole lymphatic system of the neck was probably vastly enlarged, and secreted great quantities of lymph."

CASE II. (Boegehold, *Archiv für klinische Chirurgie*, 1893, Vol. XXIX, p. 443.)—In March, 1880, Wilms extirpated a tumor as large as a fist from the left side of the neck of a stout man, forty-five years of age. In the course of the operation Wilms gradually neared the junction of the subclavian and jugular veins. As he was carefully scraping the tissue with a sharp spoon, suddenly there poured out over the operation field a stream of whitish fluid the diameter of a straw, which mingled with the rather freely-flowing blood. This fluid could not well be anything else than chyle, for a wounded lymph-vessel would have given exit to a clear, or at the most a slightly yellowish, but not whitish, fluid. There was no abscess nor any purulent pleurisy. After this wound of the thoracic duct, the extirpation of the tumor was terminated at once. The milky fluid no longer escaped, and on account of the considerable hæmorrhage the idea of securing it in the depth of the wound was abandoned. The wound was then packed with salicylic wool, and an antiseptic bandage applied. The packing was removed the next day without any further appearance of the chyle. The patient recovered without incident, and six months afterwards died, presumably from pulmonary metastasis of the carcinoma.

CASE III. (A. M. Phelps, of New York; personal communication.)—June 4, 1893, at the Mary Fletcher Hospital, Burlington, Vt., Dr. Phelps operated on a malignant tumor of the left side of the neck. "It was found that the jugular vein passed through the tumor, and this necessitated the removal of three inches of the jugular, near its junction with the subclavian. The tumor extended downward underneath the subclavian vein and involved the deep muscles of the neck. The wound was dressed four days later. There had been a constant profuse discharge, which at first was supposed to be serum, but its color, like that of skimmed milk, and its source from a single point in the wound, as well as its quantity, soon forbade that presumption. He estimated that about three pints a day had been lost. It was sufficient to saturate daily ten or fifteen ordinary bed-sheets folded in a number of thicknesses, in addition to saturating the surgical dressings. The man rapidly lost flesh. The point of a probe, the size of a large knitting-needle, inserted at the point of evacuation entirely stopped the discharge. The point from which the liquid issued was caught by forceps, which were allowed to remain in place three days. The patient gained a pound a day after the discharge was stopped, and made an excellent recovery."

CASE IV.—DR. KEEN, in the course of an operation upon a girl of twenty years for extirpation of a mass of tubercular glands above the left clavicle, had exposed both the left internal jugular and subclavian veins, but not to their junction. While carefully dissecting adhesions away he made a small opening in what was apparently an adhesion, when instantly there welled out from it a perfectly limpid fluid. Since the fluid escaped continuously and with a very evident respiratory rhythm, and apparently flowed from a tear one-fourth of an inch in length, from a tube about one-eighth of an inch in diameter, he concluded that he had opened either one of the dilated left lymphatic ducts just before their entrance into the thoracic duct, or, more likely, the thoracic duct itself. About two ounces of fluid escaped in all. A little of it, sucked up with a hypodermic syringe, coagulated in a few minutes. A grooved director, introduced into the tube from which the fluid was escaping, only entered about one-half to three-quarters of an inch, when it met some obstacle. Having closed the opening by the pressure of one finger, the removal of the glands was completed. Then he seized the two edges of the opening with forceps, and by means of a fine semicircular needle and fine silk closed the wound. Some little leakage still took place. There was

also a little of a similiar fluid from the upper part of the wound, but it seemed a general oozing rather than from any distinct vessel.

A drainage-tube was inserted into the wound, but was removed after five hours. During this time the amount of wound-fluids was very large for so small a wound, amounting to nearly a pint, and its light color showed that the small amount of blood was diluted with a great deal of clear fluid. The dressing the next day was partially saturated by probably an ounce or two, and after that was dry.

On the eighth day after the operation, having made an absolutely uneventful recovery, she went home. Not the slightest evidence of trouble appeared in the wound in the neck, neither swelling, redness, nor pain. Her weight on December 11, four days before the operation, was 106 pounds, and eight days after it, in about the same clothing, 103 pounds. Her highest temperature was 99.8° F., on the evening of the operation.

In the fluid there were many lymphocytes or lymph-corpuscles of different sizes; some few were slightly granular, and there were many fat- or oil-globules, small in size, but large in number. The macroscopic appearance of the fluid was slightly opaque.

Dr. Keen remarked further, as to the anatomy of the thoracic duct, that Verneuil (*Le Système Veineux*, 1853) states that Boullard in twenty-four cases found it to empty by one mouth eighteen times, by two mouths three times, by three mouths twice, and finally once by six mouths, of which two opened into the subclavian, two into the jugular, and one each into the external jugular and the vertebral veins. Lacauchie (Henle, *loc. cit.*) gives an instance of four terminal canals. In twenty-one injections of the duct Boegehold found that in two cases it divided at its anastomosis with the veins into three or four branches, and in one case, about two inches before its termination, a branch as large as a straw passed to the subclavian, the main trunk emptying at the angle between the subclavian and the jugular. It is, therefore, possible in all these cases of wound that not the main trunk, but one of these branches—perhaps, as in Boegehold's case, a branch as large as a straw—was injured. Bayford (Boegehold, p. 447) records one case of dislocation of the thoracic duct from a curvature of the spine, which might increase materially the possibility of its being wounded should an operation have to be done in such a case. Boegehold (p. 455) also quotes a case from Scherb of the partial obstruction of the duct by a calculus. The occasional great height of the final curve of the duct in the neck has already been mentioned.

Secondly, as to the character of the fluid. There could be no possibility that the source of the fluid was other than the thoracic duct in Boegehold's and Phelps's cases, as from its milky color, the fluid was evidently chyle. In the other two cases the fluid has been so clear that it resembled serum. The quantity of the fluid in Phelps's case was very extraordinary, and leaves no doubt that it could only have been from the thoracic duct. In Cheever's case and his own the quantity and character of the fluid made it reasonably certain that it was from the duct, but it was not so demonstrably sure as in the other two cases.

Third, as to treatment. In Boegehold's case packing was sufficient to arrest the flow and the patient recovered. In Phelps's case pressure-forceps arrested it entirely. In his own case the suture of the vessel was perfectly feasible, and the result was most satisfactory. It seemed to him clear that if this procedure can be adopted it should always be done.

Dr. Keen also referred to the experimental researches of Boegehold, who concluded that the complete integrity of the duct for the support of life was not absolutely necessary, giving a number of instances of complete obliteration or compression of the duct without any symptoms. The collateral circulation of the lymph seemed to be established, and Schmidt and Mulheim have shown experimentally that the closure of the duct in dogs, in whom the canal is always single, did not affect either the digestion or the absorption of albuminous matter. An injury followed by closure of the duct, therefore, is not necessarily fatal. The danger is that if the duct is not closed, either compression of the lungs and heart from the constantly augmenting accumulation of chyle in the pleural cavity will prove fatal, or that the loss of nourishment will be lethal if it escapes externally. Wounds of the duct seem to be entirely capable of healing. Should the heart and lungs be compressed, clearly the pleural cavity should be opened in order to avoid the immediate danger of death from compression.