

URETERO-URETERAL ANASTOMOSIS.*

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The unintentional division of the ureter during operation in the abdominal and pelvic cavities is not of frequent occurrence. Nevertheless, this accident is apt to occur in cases in which numerous adhesions exist and the anatomical relations are much disturbed. The ureter may so far be displaced from its normal position and so completely embedded in a mass of adhesions as to make its identification practically an impossibility. In the event of such an accident, a decision as to the best procedure to follow is of paramount importance. Several methods of dealing with the condition are at hand.

1. The kidney on the injured side may be removed.
2. The ureter may be passed into the small intestine, colon or rectum, into the vagina or through the abdominal wall.
3. The kidney may be brought down and the extremity of the ureter sutured into the wall of the bladder.
4. An anastomosis may be made between the extremities of the divided ureter.

This classification, while not exhaustive, covers the most important procedures so far devised. Of these methods, the last two are most worthy of consideration. Uretero-ureteral anastomosis, would seem to be the operation of choice.

Uretero-ureteral anastomosis, or uretero-ureterostomy, as the operation is designated by Kelly, may be performed in various ways. Henry Morris gives the following classification:

1. End to end anastomosis by suturing the ends together in a transverse line.
2. The end to end anastomosis.
3. Lateral implantation.
4. End to end anastomosis by suturing the ends together in an oblique line.

The transverse end to end method was used by Schopf (1886) in the first recorded case of uretero-ureteral anastomosis. The objections to the operation are so serious that it is practically never performed to-day.

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Poggi originated the end to end anastomosis. Lateral implantation was devised and described by Van Hook in 1893. Kelly was the first to apply this method to the human subject. The oblique end to end anastomosis was first used by Bovée.

To the cases of uretero-ureteral anastomosis already reported we are able to add another. This case presents points of sufficient interest to merit description. As will be seen later, a modified Van Hook method was used in making the anastomosis.

Case of Ada Christian: aged forty-one years; negress; married; housewife; American by birth.

Family History. Negative.

Previous History. Healthy child. Menstruated at fifteen. Had pertussis and malaria at sixteen. Married at seventeen. Had five children, of whom three are living and in good health. Last confinement sixteen years ago, at which time she gave birth to twins, both now dead. Since the birth of the twins, has suffered with dysmenorrhea and menorrhagia and with leucorrhea at times; also with pain in back and limbs, especially after exertion. She has been subject to sick headache and has had "chills and fever" occasionally. With the above exceptions, her health has been uniformly good.

Present illness. About six years ago the patient noticed on the left side of the abdomen a mass about the size of her fist. For three years the mass grew rather slowly, reaching at the end of that time a size sufficient to distend perceptibly the whole abdomen. During the next three years the growth was much more rapid. At the time when the tumor was first noticed the patient began to experience severe pain at the menstrual periods. The pain was felt for a week before the flow began and it continued throughout the period. The flow lasted for a week or ten days and was profuse. For three years this condition obtained. Thereafter the pain and menorrhagia continued, but with moderated severity. For the past five months there has been considerable flow between the periods. During this same time she has suffered from poor appetite, flatulent dyspepsia, coated tongue, constipation, frequent and painful urination. There has been considerable loss of flesh and strength during the past summer.

Patient admitted to Old Dominion Hospital September 13, 1902, referred by Dr. J. D. Turner, Lanexa, Va. Examination showed a large tumor springing from the pelvis and filling two-thirds of the abdominal cavity. The tumor was generally adherent. Diagnosis, intraligamentous fibromyoma of uterus with adhesions.

Operation; October 1, 1902. Chloroform was administered; later

in the operation ether was substituted. A median incision was made extending from a point midway between the umbilicus and the ensiform cartilage down to within a short distance of the symphysis pubis. The large tumor bulged out through the opening. Examination showed that it was an intraligamentous fibromyoma of the uterus with extensive adhesions to neighboring structures. The anterior abdominal wall, omentum, intestines, broad ligament and bladder were all involved in the adhesions. The bladder was spread out over the front of the tumor and adherent. Numerous very large dilated and tortuous veins could be seen. The anatomical relations were much distorted. As far as possible the adhesions were broken up by blunt dissection. Masses of adhesions including vessels were ligated with heavy silk and cut away; about twenty-five such ligatures were required. After the tumor had been freed, a panhysterectomy was performed. The appendix was found to be in a condition of chronic inflammation and was removed. After delivery of the tumor it was found that the left ureter, embedded in a mass of adhesions, had been ligated and divided transversely about two inches above its entrance into the bladder. Uretero-ureteral anastomosis was then made in a manner presently to be described. The walls of the vagina were stitched together, leaving a sufficient opening for drainage; a gauze drain was passed down from above through this opening. The edges of the vaginal wound were covered with gauze, since the peritoneum could not be stitched over the raw surface. The toilet of the peritoneum was completed and the abdominal incision closed by interrupted sutures. Time of operation, one and a half hour.

Method of Making Uretero-Ureteral Anastomosis.—A longitudinal incision $\frac{1}{4}$ of an inch long was made anteriorly in the distal portion of the ureter $\frac{3}{8}$ of an inch below the free extremity. A small cambric sewing needle, threaded with fine silk, was passed through the anterior aspect of the proximal portion of the ureter $\frac{1}{8}$ of an inch from the extremity. The needle was then carried through the slit in the distal portion, down the ureter $\frac{1}{2}$ inch and out through the posterior wall of the ureter. The other end of the silk was threaded and the needle passed in a similar manner. The proximal portion was drawn through the slit down into the distal portion and held in place by this traction suture. The edges of the slit were united to the wall of the invaginated proximal portion by interrupted sutures of fine silk; these sutures were passed through the fibrous and muscular coats of the ureter. A probe passed through the unclosed end of the distal portion showed that the lumen was patent. Through the distal extremity a

purse-string suture of fine silk was passed and the end closed. The traction suture was then removed and the point of anastomosis covered by a strip of gauze, the end of which was passed into the vagina.

Subsequent History.—The patient left the operating table much weakened and for twenty-four hours was in a critical condition. She was supported by stimulants and infusions of normal saline. Her bowels were kept closed for three days. Thirty-six hours after operation she developed a well marked broncho-pneumonia from which she recovered after seven days.

The morning after operation eight ounces of urine were obtained by catheterization of the bladder; thereafter she voided her urine without difficulty and passed daily about a normal quantity. On the day following operation, 29 ounces of urine were passed and on the next day 26 ounces. Frequent examinations of the urine were made. These examinations showed the presence of a trace of albumen and considerable pus. Urinalysis of a catheterized specimen made Oct. 14 showed the following:

Specific gravity: 1018.

Reaction: acid.

Color: amber and turbid.

Albumin: none.

Sugar: none.

Microscopic findings: a few epithelial cells, pus, neutral calcium phosphate and amorphous urates.

Examination of another catheterized specimen made on Oct. 25 was reported as follows:

Specific gravity: 1008.

Reaction: acid.

Color: light amber, slightly turbid.

Albumin: none.

Sugar: none.

Amount: 28½ oz.

Microscopic findings: small amount of sediment, epithelium, pus and amorphous urates.

On October 26 she passed in twenty-four hours, 28½ ounces of urine.

The patient made a perfect recovery and was dismissed from the hospital on October 29, the urinary tracts functioning perfectly.