GENERAL UROLOGY

Case Report

A rare cause of ureteral injuries; simultaneous common iliac artery and ureter injury during posterior lumbar disc surgery

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ABSTRACT

Major vascular injuries during lumbar disc surgery are rare but well-recognized complications. However, vascular injuries of the branches of the aorta and ureteral injuries are very rare. Although its incidence is not known definitely, it is estimated to be 1/1000. Ureteral injuries comprise less than 1% of all genitourinary traumas. In this article, we report clinical progress of a patient who had simultaneous internal iliac artery and ureteral injury during lumbar discectomy. The patient was managed with primary ureteroureterostomy. To our knowledge, this is the first case reported with simultaneous ureter and iliac artery trauma during lumbar disc surgery.

Keywords: Iliac artery injury; posterior lumbar disc surgery; ureteral injury.

Introduction

Injuries of major vessels during lumbar disc surgery are rarely seen but very well recognized complications. They were firstly reported by Linton and White in the year 1945.^[1] However injuries of the branches of aorta, and ureters are very rarely seen. Their incidence rates are not known for sure. Ureteral injuries comprise less than 1% of all genitourinary traumas.^[2] The incidence of surgical injuries of ureters range between 0.5, and 10% in many series.^[2] Most frequently seen causes of ureteral injuries include in order of decreasing frequency hysterectomy (54%), colorectal surgery (14%), and pelvic surgeries as ovarian tumor resection, and transabdominal ureteropexy (8%), and vascular surgeries (6%).^[2] As far as we know, simultaneous vascular, and ureteral injuries have not been reported previously. In this case report we presented developments during diagnostic process, and follow-up of the patient with intraoperatively detected simultaneous internal iliac, and ureteral injuries who had been referred to our hospital from an external center with the presumptive initial diagnosis of vascular injury characterized by sudden drop in blood pressure, and deterioration of general health state during

lumbar disc surgery in the light of current literature data.

Case presentation

Lumbar discectomy was offered at an external center to a 20-year-old female patient who complained of lumbar pain upon detection of lumbar disc hernia at L4-L5 vertebral level. During lumbar discectomy performed for the hernia at L4-L5 level (Figures 1a, b) through posterior approach, sudden drop in the blood pressure raised the suspicion of arterial injury, and the patient was referred to our hospital (Figures 1a, b). Initial examination, and laboratory test results of the patient were as follows: blood pressure, 80/40 mmHg, Hb: 8.4 g/dL, WBC: $18.5 \times 10^3/\text{mm}^3$, creatinine: 0.71 mg/dL, and INR: 1.17. The patient was urgently laparotomized with the suspicion of arterial injury in collaboration with cardiovascular, and general surgery. During laparotomy, hematoma in the retroperitoneal space was evacuated, and full thickness transection of the right internal iliac artery was seen. Cardiovascular surgeon primarily repaired internal iliac artery, and further exploration revealed full thickness section of the right ureter, so the patient was consulted to us. Ureteroureterostomy was

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applied as a primary repair, and DJ stent was implanted. The patient who was followed up in the postoperative intensive care unit was transferred into the service, and his urethral catheter was removed on the 5th postoperative day, and she was discharged from the hospital on the same day. At postoperative 6. week DJ catheter of the patient was withdrawn. Any complication was not observed during further controls. At postoperative 6. month, because of its noninvasiveness, and time-proven safety, intravenous pyelography (IVP) was performed to search for any evidence of ureteral stricture. Retrograde pyelography was realized for the suspect ureteral stricture seen on IVP (Figure 2a-c), and any ureteral pathology was not encountered (Figure 3).

Discussion

Iatrogenic ureteral, and vascular injuries during lumbar discectomy are seen only in nearly 2% of the cases and mostly (90-95%) observed at L4-L5 vertebral levels. They are serious complications which require rapid diagnosis, and intervention when recognized. Prevention of complications of lumbar surgery requires perfect knowledge of anatomies, and relationships of ureter, and vascular structures, and precautionous surgical approach.

From anatomic perspective, common iliac veins join at the level of the upper edge of L4 vertebral body to form vena cava inferior. Left vena iliaca communis passes in front of L4-L5 intervertebral space before draining into vena cava inferior. Bifurcation of abdominal aorta is situated left side of the midline, and immediately in front of the upper border of L4-L5 intervertebral space. Both common iliac arteries course anterior to L4-L5 intervertebral disc.^[3] Actual incidence of vascular injuries occurring during lumbar disc surgery is not exactly known, however it was estimated to be 1/1000.^[2] While mortality rates range between 40, and 50% dependent on the amount of acute blood loss into retroperitoneal space or intraperitoneal cavity.^[4] Most of the reported cases involve iliac vessel injuries occurring after interventions related to L4-L5 discal space.

However ureter courses immediately anterolateral to L4-L5 intervertebral space, and ureter opposite to the site of discal surgery appears to be more vulnerable to injuries. In addition to this anatomical relationship, prone position during surgery, and cushions supporting pelvis increase intrapelvic pressure, and may push the contralateral ureter against vertebral body or intervertebral space.^[3] Ureteral injuries have been reported to occur secondary to inadvertent perforation of anterior longitudinal ligament during exploration of intervertebral disc space using rongeur type instruments or searching for herniated discal material.^[3] Typically, injured ureter is situated contralateral to the

Figure 1. a, b. Left lumbar hernia (arrow) of the patient

Figure 2. a-c. Suspect ureteral stricture (areas indicated with arrows) as detected in intravenous pyelography

Figure 3. Normal retrograde pyelography

dissectomized side due to the pressure created by the instrument during dissection.^[3] Most frequently ureter is injured at the level of L4-L5.^[5,6] Complete ureteral rupture is rarely seen.^[3] In our case the location of both injured ureter, and internal iliac artery complies with the abovementioned anatomic characteristics, and described pathogenic mechanisms. Early signs, and symptoms of the injury include nonspecific manifestations as fever, abdominal/flank pain, and hematuria.^[7] In the long term symptomatic ureteral stricture is seen in only 1-2% of the cases.^[8]

During operation suspect ureteral injury can be detected by intraureteral injection of methylene blue dye.^[8] Unfortunately most of the ureteral injuries are diagnosed during postoperative period. In this case, IVP, computed tomography, retrograde or antegrade pyelography can aid in diagnosis. In a meta-analysis encompassing 429 post-dissection laparotomized cases recruited from a total of 16 intensive care units, ureteral injury was overlooked in 11% of the cases.^[2] In this meta-analysis overlooked ureteral injuries were related to proximal ureter (59.5%), midureter (11.8%), and distal ureter (29.4%).^[2] In this case hospital stay is prolonged, and incidence of nephrectomy increases.^[2] Although in most of the cases with ureteral injuries the outcomes are favourable, delay in diagnosis also increases the probability of nephrectomy, and sepsis.

For the repair of ureteral injury many alternative treatment modalities ranging from simple stenting to ureteroureterostomy, and autotransplantation are available. However in severely traumatized ureter nephrectomy can be the only alternative. In cases with ureteral trauma, the site of ureteral damage determines the repair procedure to be performed. Some authors reported final success rates as high as 73% in cases where stent implantation is feasible without the need for open surgery.^[8] In cases with injuries of upper two thirds of the ureter, end-to-end anastomosis or ureteroureterostomy is prevalently used with a reportedly high (90%) success rates.^[8] In the injuries of lower one-third of the ureter psoas bladder hitch or Boari flap technique may be more suitable, and they are preferred over ureteroureterostomy. Because, this ureter segment has an independent, but inadequate nutrition source, in cases with complete rupture its nutrient supply may be impaired. This procedure has a higher (nearly 95%) success rate.^[8] Although nephrectomy is rarely indicated in the management of ureteral injury, delayed recognition of an obstructive ureteral injury, severe trauma around ureter or weakening of renal functions as a result of permanent ureter fistula, nephrectomy may be required.^[8] In the management of an ureteral injury, various treatment alternatives are available according to the presence of complete ureteral rupture. In cases with complete ureteral injury frequently end-to-end anastomosis is recommended. If proximal ureter is traumatized other treatment modalities as autotransplantation

should be kept in mind.^[5,7] In our case report since complete full-thickness transection was seen at the middle 1 /3 segment of the ureter, and this complication was detected at no time, primary end-to-end anastomosis was performed without development of ureteral stricture or any other complication in the long term.

In conclusion, during lumbar, and especially L4-L5 discal surgery, vascular or ureter injuries can be seen-tough rarely- on the contralateral side of the procedure. One should focus on more frequently seen vascular injuries, and associated other organ injuries including ureteral traumas should be kept in mind. A meticulous exploration during laparotomy is always important, and life-saving.

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