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Comparison of Three Different Retroperitoneoscopic Approaches for Renal Pedicle Lymphatic Disconnection for Chyluria and its Outcome.

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Abstract

To introduce our experience of three different retroperitoneoscopic surgical method for renal pedicle lymphatic disconnection (RRPLD), and to evaluate the clinical outcomes of patients treated with different methods. Clinical data of 141 patients (56 males and 85 females) with chyluria who underwent surgical treatment in our hospital from 2013-04 to 2018-11 were collected. 34 cases, 64 cases and 43 cases were treated with traditional, modified and simplified retroperitoneal laparoscopic renal pedicle lymphatic ligation respectively. Data of all groups were analyzed by SPSS17.0 software. The data were expressed as ($x \pm s$). One-way analysis of variance was used for comparison between groups, with $P < 0.05$ as the difference. The differences of operation time, intraoperative bleeding volume, bed rest time after operation, bowel recovery time, hospital stay after operation, recurrence rate of follow-up and VAS were compared. All patients underwent surgery successfully. In the aspects of operation time, intraoperative blood loss, postoperative bowel recovery, postoperative hospital stay, postoperative pain score (VAS), the simplified procedure was superior to the traditional and modified surgery, and the difference was statistically significant ($P<0.05$). There were no statistical differences in the three groups between surgical complications and recurrence rates. Compared with traditional and modified procedures, simplified retroperitoneoscopic renal pedicle lymphatic ligation can achieve the same clinical treatment effect in the treatment of chyluria. Simplified operation is a feasible and effective surgical method. The surgical procedure is simpler, with the advantages of short operation time, less intraoperative blood loss, quick recovery after operation, etc. It is easy to grasp and has the promotion value.

Keywords: *Chyluria, Retroperitoneoscopic, Renal Pedicle Lymphatic Ligation, Simplified Surgery.*

Introduction

Chyluria is a typical expression of a high concentration of chyle in the urine to make the urine appear milky white. The prevalence is high in South-Asian countries and low in most of western countries. Chyluria is endemic in south Asian countries like Nepal, China, India, Bangladesh, Myanmar, Malaysia, Indonesia, Philippines, Taiwan and Sri Lanka, and in some parts of Australia and Africa Sinah (2015) and Sunder et al (2014). Patients develop clinical symptoms like as, massive loss of fat and protein leaking into urine may lead to hypo proteinuria, general fatigue, weight loss, systemic edema, and immunologic disorders. . Several treatment modalities are available for treatment of chyluria. The treatment is based on severity and patients' general condition namely individualized therapy, Conservative treatments, including bed rest, more water, and a fat-restricted, high-protein diet are recommended for those with mild chyluria or those who have poor health condition and cannot tolerate surgery Zhang et al (2004). The cause of chyluria can be divided into parasitic and non-parasitic factors and the treatment methods can be divided into conservative treatment and surgical treatment. Sclero-therapy such as, silver nitrate or povidone iodine are Instilled in renal pelvis has been use as second line of treatment if conservative treatment fail to treat chyluria Tan (1990) and Nandy (2004). Sclero-therapy has drawbacks of recurrence, repeated instillation, flank pain, stricture and so on. This procedure is now less adopted. Recently, retroperitoneal renal pedicle lymphatic disconnection is most preferred management of intractable chyluria. This procedure is strategy safe, effective, and less time consuming with better outcome. Retrospectively analyzed 141 cases of retroperitoneal laparoscopy renal pedicle lymphatic disconnection (RRPLD) in the treatment of chyluria clinical results, evaluation of three retroperitoneal laparoscopic renal pedicles lymphatic ligation Mode of clinical efficacy.

Clinical Data and Methods

General Information

From 2013-04 to 2018-11, 141 patients with chyluria who underwent surgery in our hospital, 56 males and 85 females. The age range from 42-82 years old, and the onset time ranges from 1 week to 20 years. Among them, 20 people confirmed as parasite and remaining clinical symptoms of non- parasite. All patients have chyluria, with or without hematuria, back pain, malnutrition and other symptoms. Preoperative cystoscopy was performed in 83 cases on the left side, 53 cases on the right side, and 5 cases on both sides. Patients with bilateral lesions were light on one side and heavy on one side. All patients underwent unilateral ligation.

Continued control of diet and other conservative treatments. Preoperative albumin was 37.1±5.5 g/L. Minimum 20.6g/L, maximum 47.6g/L (normal reference range 40-55g/L), BMI: 22.4±3.5 kg/m2. According to the patient's surgical methods, there were 34 cases (traditional RRPLD) in the traditional group, 64 cases (modified RRPLD) in the improved group, and 43 cases (simplified RRPLD) in the simplified group. The general data of gender, age, BMI and albumin were compared among the three groups. The difference was not statistically significant (P>0.05).

Investigation

(1) Urinary chyle test and cystoscopy

All patients were positive for qualitative diagnosis of urinary chyle test(Sudan). Cystoscopy was performed under local anesthesia after high fatty diet before cystoscopy to conform affected side. If there is no obvious "spraying white", the cystoscopy or the bilateral ureteral stent can be used to select the external urine bag. Identify the lesion.

(2) Surgical Methods

Retroperitoneoscopic renal pedicle lymphatic ligation

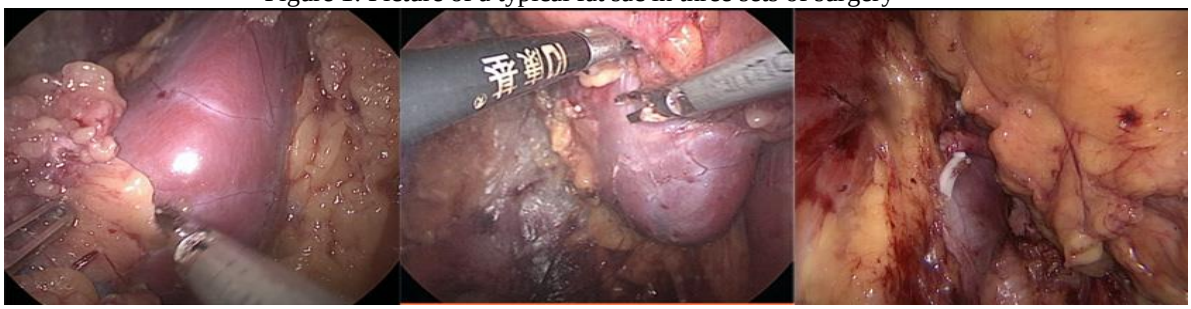
Establishment of the retroperitoneal cavity: Under general anesthesia procedure was performed, the patient was placed in a lateral decubitus position with affected side up. The operative table was flexed to maximize the distance between the costal margin and iliac crest and the kidney rest was raised. Then, proper disinfection and draping. After that a 12 cm incision was made below 12th subcostal margin and posterior auxiliary line. The muscle layer and lumbodorsal fascia was bluntly divided using hemostat forceps and a finger was inserted to create retroperitoneal space and a balloon dissector was placed and maintained dilatation for about 5 minutes with 600 to 800mL air insufflations. A 12-mm trocar was placed instead of the balloon. The two 10 mm trocar second and third trocars were inserted in the midaxillary line above the superior border of the iliac crest and the anterior auxiliary line under the coastal margin, respectively. The skin incision was sutured to prevent air leakage, as well as insufflating CO2 to maintain persistent retroperitoneal pressure of 10-15mmHg. After creation of ports laparoscopic operative instruments inserted via established accesses.

Traditional group: 1. Use the ultrasonic scalpel to cut the Gerota fascia in the longitudinal direction of the psoas muscle, and separate the per renal fat vesicles along the renal capsule in the dorsal, superior, inferior and ventral sequences of the kidney. (Figure 1A). 2, carefully free the upper ureter 3-4cm, renal pelvis, dilated and distorted lymphatic vessels and fibrous tissue. 3, open the renal artery, venous vascular sheath, carefully separate the lymphatic vessels around and in the middle and carefully split the disconnection, in the case of a thicker lymphatic (≥5)mm to Hem-o-lock clipped and cut Fujimoto (2016). The operation process avoids damage to blood vessels leading to bleeding and ureteral ischemia. At the end of the operation, the renal arteries, renal veins, and ureters exhibit "skeletonization." 4. Fix the kidney to the psoas muscle by intermittent suture. Fully stop bleeding, place the retroperitoneal drainage tube, and the operation is over.

Modified group: Compared with the traditional operation, the ultrasonic scalpel was used to cut the Gerota fascia in the longitudinal direction of the psoas muscle, and only the fat sac of the 3/4 kidney surface of the inferior pole was separated. Retaining the upper 1/4 adipose tissue (Fig. 1B), the kidney is not fixed during the operation, and the remaining operation is no different from the tradition.

Simplified group: In order to further simplify the surgical procedure and reduce the damage to the kidney, the perirenal tissue was completely preserved without dissecting the perirenal tissue (Fig. 1C). Use the super-knife to cut the Gerota fascia (Fig. 2A), look for the ureter from the back of the kidney, peel off the upper ureter 3-4cm (Fig. 2B), and find the renal ostium along the ureter, open the renal arteriovenous sheath, and ligature the kidney. The lymphatics of the portal (Fig. 2C) showed "kidney" in the renal hilum and ureter (Fig. 2D), and hemostasis was performed. The retroperitoneal drainage tube was placed and the operation was completed.

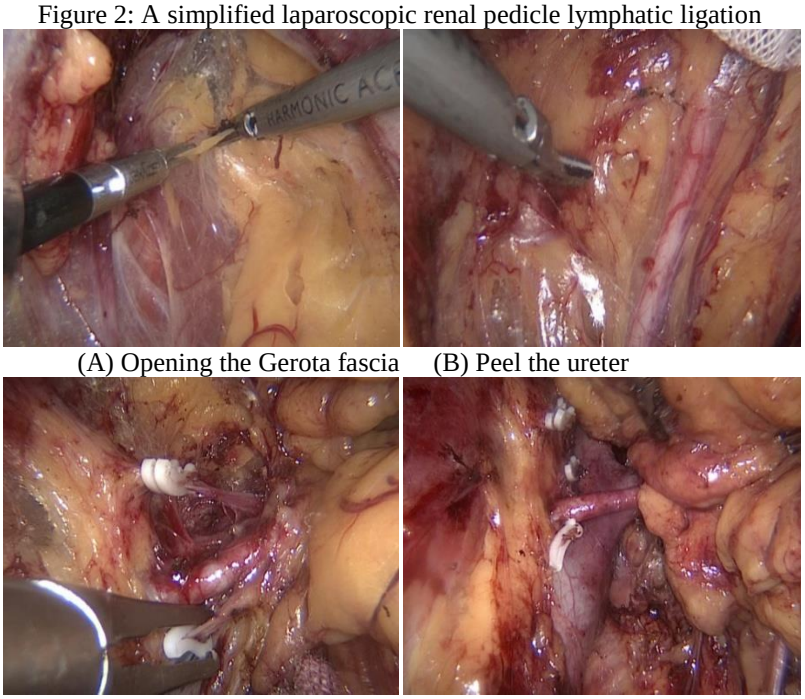
Figure 1: Picture of a typical fat sac in three sets of surgery



A traditional group B improved group C simplified group

The perirenal drainage tube was routinely placed after operation. The urinary chyle test was performed 3-7 days after surgery to evaluate the surgical results. The postoperative pain was evaluated by visual analog scale (VAS). The patients were followed up for 6-24 months.

Figure 2: A simplified laparoscopic renal pedicle lymphatic ligation



(A) Opening the Gerota fascia (B) Peel the ureter

(C) Peeling the renal arteries and veins (D) Renal artery, veins, ureter "skeletalization"

Observed indicators and statistical methods: Perioperative data of all groups were analyzed by SPSS17.0 software. The data were expressed as (x±s). One-way analysis of variance was used for comparison between groups. P<0.05 was considered statistically significance. The center compared the operation time, intraoperative blood loss, postoperative bed time, anal exhaust time, postoperative hospital stay, number of follow-up recurrences, and postoperative pain score (VAS).

Results

All operations were performed smoothly, with no open conversion and blood transfusion required. All patients had clarification of urine color one week after surgery, and the urine chyle test was negative. The operation time, intraoperative blood loss, postoperative bowel recovery, postoperative bed rest time, and postoperative hospital stay in the simplified group were better than those in the traditional group and the modified group (P<0.05). There was no significant difference in postoperative bowel recovery time between the three groups (P>0.05). The postoperative pain score (VAS) was statistically significant in the simplified group compared with the conventional group (P<0.05), and was not statistically significant compared with the simplified group (P>0.05). See Table 1.

In the traditional group and the modified group, one patient had small vena cava damage during operation, and all were repaired under the endoscope. There were 1, 2, and 2 patients with chyle in the traditional group, the modified group, and the simplified group 2-6 days after operation. There was no significant difference (P<0.05). After recurrence, the recurrence rates of the traditional group, the modified group and the simplified group were 2.9% (1/34), 3.1% (2/64), and 2.3% (1/43), respectively. There was no

significant difference (P<0.05). Through the perfusion of silver nitrate and renal pelvis, 3 patients had urinary color clarification, and 1 patient in the modified group was again undergoing cystoscopy to locate the contralateral recurrence, and he was cured after surgery. Three months after surgery, the nutritional status of the patients was improved by monitoring body weight and albumin. There was no significant difference between the three groups.

Table 1. Clinical outcomes of 141 patients with RRPLD

Clinical outcomes	Surgical time (min)	Intraoperative bleeding volume (mL)	Postoperative bed rest time (d)	Intestinal recovery time (d)	Postoperative hospital stay (d)	Postoperative pain score (n)
Traditional group	119.8±41.1#	69.4±33.1#	10.5±3.5#	2.6±0.6	10.3±5.3#	3.8±1.0#
Modified group	81.2±22.5#	67.0±24.4#	3.5±1.5#	2.6±0.5	8.6±3.5#	2.4±0.6
Simplified group	70.6±17.0	46.3±17.6	1.5±0.5	2.6±0.5	5.8±1.8	2.0±0.7

compared with the simplified group P<0.05.

Discussion

Chyluria is usually divided into two types, parasitic and non-parasitic. The majority of patients in this study were over 48 years old, and the proportion of parasitic (20/141, 14.2%) was significantly lower than before (more than 90%) Lazarus (1946). Non-parasitic became the main cause of chyluria. Traditional retroperitoneal laparoscopic renal pedicle lymphatic ligation completely strips the perirenal fat sac, may occur renal ptosis, renal pedicle torsion, etc., need to undergo renal fixation, at least 3 days after surgery, the patient's pain is strong, Postoperative recovery is relatively slow. Assouad J et al (2006) reported that the lymphatic vessels in the surface of the kidney and its fat vesicles first entered the lymphatic vessels of the kidney and then entered the lymphatic circulation, and there was no lymphatic vessel on the surface of the trunk and large blood vessels. Zhang Yingao et al also collected and analyzed the distribution of lymphatic vessels in the perirenal tissues of 6 cases of cadaveric and 15 cases of chyluria. The urinary tract lesions were located in the renal arteries and veins, the upper ureter and the adrenal gland, and the renal fat vesicle lymphatics. No significant impact. Zhang CJ et al (2011) showed no lymphatic vessels between the renal parenchyma and the perirenal fat sac. The modified procedure has been adopted by many surgeon, and has achieved good therapeutic effects, and no complications such as renal ptosis. Chipde SS, Mandhani A (2011) reported on the online video to treat only the renal pedicle and the upper ureter for the treatment of chyluria. No recurrence was observed after 1-3 years of follow-up.

The results of the research show that the traditional, modified and simplified procedures have achieved good therapeutic results, confirming the feasibility and safety of the three procedures, and there is no significant difference in complications and recurrence rates. The simplified group was better than the traditional group and the modified group in terms of operation time, intraoperative blood loss, postoperative bed rest time, and postoperative hospital stay. It indicated that the simplified procedure can ensure the surgical treatment while simplifying the surgical procedure and less surgical hazards. The effect is beneficial to the development of laparoscopic techniques and the recovery of patients, and its clinical efficacy is generally superior to traditional and modified group. Considering the small number of cases in this paper, a large sample of statistical arguments is needed. By summarizing the surgical experience, preoperative CTA examinations can identify the renal vasculature of the patient and reduce the complications associated with vascular injury. Lymphatic ligation around the renal pedicle is the focus and reduce surgery difficulty Zhang et all (2011). Imaging examination before operation to understand the

distribution of blood vessels, paying special attention to the presence or absence of arteriovenous branches, and avoid excessive stretching of the kidneys to avoid vascular tears while treating renal blood vessels. The right angle forceps gently separate and pulls the blood vessels, exposes the ventral lymphatic vessels from the vascular space on the dorsal side of the kidney and ligates, minimizes blunt dissection, and uses an ultrasonic knife to bite the lymphatic vessels to pull away from the blood vessels and then disconnect. Reduce the risk of intraoperative bleeding and postoperative chyle. For patients with abundant perirenal fat and difficulty in exposing the visual field, it is feasible to improve the possibility of lymphatic leakage and accidental injury to organs Sand et all (2011) and Fettouh (2003). In study conducted by hemal and gupta on 9 patients, reported accidental clipping of branch of posterior segment artery which lead to renal atrophy and renal function but in study on renal scan do not show focal deficit Zhang et al (2012) and Hemal (2002). In this study we encounter some minor complication such as subcutaneous emphysema, post-operative hematuria which sub-sides in 24 -36 hours' post-operative. in our experience possible cause of hematuria is due to endo vasculature injury of renal vessel due to excessive stretching of the kidneys can be managed by gently handling of renal vasculature which cause postoperative hematuria. subcutaneous emphysema is usually encounter in older patient. subcutaneous emphysema is directly proportion to increase in pressure of co2 insufflation increase and duration of surgery which can be minimize by low insufflator pressure low Smith et all (2003).

In summary, compared with the traditional, modified retroperitoneoscopic, simplified retroperitoneoscopic renal pedicle lymphatic ligation can achieve the same clinical treatment effect in the treatment of chyluria. Simplified operation is a feasible and effective surgical method. The surgical procedure is simpler, with the advantages of short operation time, less intraoperative blood loss, quick recovery after operation, etc. It is easy to grasp and has the promotion value.

References

Assouad J, Riquet M, Foucault C, Hidden G, Delmas VJL. Renal lymphatic drainage and thoracic duct connections: implications for cancer spread. 2006;39(1):26-32.

Chipde SS, Mandhani AJIjouIjotUSoI. 'Medial Pyelolymphatic Disconnection with preservation of peripheral lymphatics': A new concept in the surgical management of recurrent chyluria. 2011;27(4):559.

El Fettouh HA, Herts BR, Nimeh T, Wirth SL, Caplin A, Sands M, et al. Prospective comparison of 3-dimensional volume rendered computerized tomography and conventional renal arteriography for surgical planning in patients undergoing laparoscopic donor nephrectomy. 2003;170(1):57-60.

Fettouh HAJJoe. Laparoscopic donor nephrectomy in the presence of vascular anomalies: evaluation of outcome. 2008;22(1):77-82.

Hemal AK, Gupta NP. Retroperitoneoscopic lymphatic management of intractable chyluria. The Journal of urology. 2002;167(6):2473-6.

Lazarus JA, Marks MSJTJou. Non-parasitic chyluria with special reference to traumatic chyluria. 1946;56(2):246-58.

Nandy P, Dwivedi U, Vyas N, Prasad M, Dutta B, Singh PJU. Povidone iodine and dextrose solution combination sclerotherapy in chyluria. 2004;64(6):1107-9.

Sinha RK, Ranjan N, Singh N, Amit KJBcr. Chyluria: a scourge of our region. 2015;2015:bcr2014209188.

Smith I, Benzie R, Gordon NL, Kelman G, Swapp GJBMJ. Cardiovascular effects of peritoneal insufflation of carbon dioxide for laparoscopy. 1971;3(5771):410-1.

Sunder S, Jayaraman R, Mahapatra HS, Sathi S, Venkataramanan K, Prabhu K, et al. Analysis of case series of milky urine: A single center and departmental clinical experience with emphasis on management perspectives: A prospective observational study. 2014;6(4):340.

Tan L-B, Chiang C-P, Huang C-H, Chou Y-H, Wang C-JJTJou. Experiences in the treatment of chyluria in Taiwan. 1990;144(3):710-3.

Tomisaki I, Hamasuna R, Fujimoto NJJoecr. An Effective Case for Chyluria by Retroperitoneoscopic Lymphatic Disconnection. 2016;2(1):78-80.

Zhang C-J, Chen R-F, Sun X-Q, Zhu H-T, Wen R-M, Wang J-Q, et al. Comparison of two approaches to retroperitoneoscopic renal pedicle lymphatic disconnection for chyluria. 2011;25(7):1161-5.
Zhang X, Zhu Q-g, Ma X, Zheng T, Li H-z, Zhang J, et al. Renal pedicle lymphatic disconnection for chyluria via retroperitoneoscopy and open surgery: report of 53 cases with followup. 2005;174(5):1828-31.
Zhang Y, Zeng J, Zhang K, Jin F, Ye J, Wu G, et al. Surgical management of intractable chyluria: a comparison of retroperitoneoscopy with open surgery. Urologia internationalis. 2012;89(2):222-6.