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Comparing the Effect of Electrocutery versus Suture-Ligation of Iliac LymphaticVesselson the Appearance of Lymphocele around the Transplant Kidney

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ABSTRACT

Objective: The End-Stages of Renal Disease or ESRD require kidney replacement therapy.The amount of ESRD prevalence is ever increasing and is growing at 11 to 15 percent in Iran.The best therapy is the replacement of kidney transplantation. The appearance of urologic complications is an important cause of morbidity in patients with kidney transplantation. To prevent the formation of postoperative lynphocele, researchers have suggested that the ligation of lymphatic vessels is effective.
Materials and Methods: the primary aim of this study isto study the effect of performing ligation of lymphtic vessels in patients receiving kidney. The patients were divided into two ligation and electrocutery groups and the rate of urological complications in both related groups were evaluated through frequent visits and examination of patients and performing urine, biochemistry and ultrasonography tests during the hospital stay and then, as outpatients for six months after transplant and obtained results were compared with each other .
Results: In our study, there was not observed any significant difference between groups in terms of sex, BMI and also the mean age of patients. The amount of hydronephrosis had almost no difference in both groups in the second week, the second and sixth months. In every three times of weekly and monthly control of collection, there was not observed any significant differences between groups again. In this study, 6.9% patients in the electrocutery group and 10.7% patients in Ligation group required draining the fluid around the kidney and this difference does not show statistically significant differences. In terms of wound infection, no case of wound infection was observed in the electrocutery patients but in Ligation group, there was 1 patient suffering from wound infection (1.8 %), however, there were no significant differences between groups in terms of infection.
Conclusions: the electrocoagulation of iliac lymphatic vessels can be expressed as an alternative method in the ligation of lymphatic vessels. It seems that this method is accompanied withthe reduction of surgicaltime butit was not related to postoperative complications, increasing in incidence of lymphocele and needing for drainage.
KEY WORDS: electrocutery, Ligation, lymphocele, kidney transplantation

INTRODUCTION

Organ transplant specifically of the kidney has had technically andimmunologically a significant progressin the past three decades in the way that kidney transplantation is today the preferred treatment for ESRD. Despite a lot of problems involved in organ transplantation, there is a bright future for it (1).In 1902, the surgical techniques for vascular anastomoses(the new way of stitching vessels together)which were used later in human transplantwere experimentally conducted at first onanimals by Carrel in 1906. He moved from France to America and pursued his research onkidney transplantation thereandfor this reason, he accomplishedthe Nobel Prize in 1912 (1).

Surgical problems following kidney transplantation is mainly related to vascular and urologic complications.Improvement in surgical techniques and accuracyofthe way ofoperating the donor and recipient lead to reduction in these complications.Considering the complications of the procedure,quickaction plays an effective role in reducing themorbidity of thecomplications.Surgical complications have been evaluated as about 10%in the kidney recipients; however, it hardly leads to the loss of the transplant.

Lymphoceles are created due to the leaking accumulation of damaged lymphaticson the iliac vessels. There is a high contraversy about the rate of its occurrenceafter transplantationin the literature. Some

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lymphoceles are small and asymptomatic and some are large and with symptoms. Usually, whatever they are greater, their chance of being symptomatic or requiring to treatment will be more. Deep vein thrombosis and leg swelling can appear with ureteral obstruction symptom, pressure on the iliac and secondary vein. Or even it isappearedas an abdominal mass. Sometimes it leads to urinary incontinence due to pressure on the bladder or drainage sclerotomy or obstruction and its Nakav, it shows itself as scrotal mass (36).

With the closure of iliac lymphatics, its amountcan be minimized and the amount of its incidence brings about 18-38% by use of sirolimuson the onset of transplantation. Lymphocelesare usually diagnosed byultrasonography. The feature of itsultrasonography is a round and wall Sonoloscent mass. Hydronephrosis may be seen with it. Internal complex echo canrepresent infectious lymphocele. Given the clinical symptoms and ultrasonography characteristics, it can usually be differentiated from hematoma or urinary lake.Needle aspiration determines diagnosis under sterile conditions. The obtained liquid is crystal and with high protein content and its creatinine concentration is equal to serum.

Typical cases of lymphocele being small and asymptomatic do not require any treatment.Aspiration is performed through skin in the case of urinary lake, obstruction and infection.The most common indication is the treatment of ureteral obstruction. If the cause of obstruction is only due to the simple lymphocele pressure, only drainage will solve the problem.Ureter is often narrow and sometimes due to its involvement, the inflammatory process of lymphatic wall may require to be re-implanted (37).Repeated percutaneous drainage is not recommended because it rarely makes the problem disappear and it often leads to infection. Infectious or obstructive lymphocele can be drained out through open or close system.Closesystem is preferred to the open one because it controls the fluid and is less prone to infection (38).Researchers have suggested that lymphatic vesselLigationis effective to prevent the formation of postoperative lymphocele. Our aim of this study is to study the effect of performinglymphatic vesselLigationin patients receiving kidney.

MATERIALS AND METHODS

The studied population isthe patients referred to thetransplant ward of Imam Khomeini Hospital in Urmia, Iran whom all have been ESRD and requiredkidney transplantation.All people who were candidates for kidney transplantation after hospitalization place under routine paraclinic investigation before transplantation including general tests of blood and urine, urinary tract ultrasonography, VCUG, heart and lungs examination.

Exclusion criteria from study include those who had a history of kidney transplantation.Patientsare randomlydivided into two groups of Ligation- and electrocutery lymphatic vessels during surgery. Thus, when a patient underwent the Ligation of lymphatic vessels, electrocutery lymphatic vessels was performed for the next patient in the next transplant.

The time of surgery to the preparation of vascular beds was separately calculated for both groups conducted by one surgical team.

After surgery, patients were monitored in transplant ward and the necessary tests such as urine analysis and culturewere performed on the seventh day after surgery and ultrasonographyfrom urinary system and transplanted kidney in the second and fourteenth day after surgery. Allultrasonographies were performed by a radiologist and in ultrasonography, cases such as hydronephrosis of transplanted kidney and fluid around the kidney were considered.Also, the wound infection was checkedthroughexamining the wound in terms of pain, erythema and secretion around the wound on two to seven days after surgery.

The amount of fluid was controlled by wardpersonnel. Routinelyand if there was no problem in the fourteenthpostoperative day (if having the stent after removing stent), the patients would be discharged.Ifthere was lake, the infection of surgical area, resistance urinary tract infection (UTI) or fluid around kidney, hospitalization of patients would continue.If the patient is discharged, the calculated cost is notedby the unit of revenue and then, the patient is monitored as an outpatient with ultrasonography and tests until 6 months. Finally, the obtained results are comparedwith each other in the groups.

Data analysis

The SPSS 16.0 software was used to analyze data.$P<0.05$ was considered statistically significant.After entering the data, information was expressed as mean and standard deviation (SD). To analyze the data, chi - square test was used for the univariate analysis of qualitative variables and Student test in continuous variables.

RESULTS

In the current study, patients with kidney failure undergoingkidney transplantationwere studied in two groups of 30 electrocutery and 60 ligation patients from 2010to2011.Meanwhile, one patient of electrocutery group was undergone nephrectomy and ofligation patients, 3 patients underwent the nephrectomy of

transplanted kidney and one person died due to cardiac arrestand the study continued with 29 patients in the electrocutery group and 56 patients in Ligation group.The mean age of patients in the iliac lymphatic vessels electrocutery group was38.9±14.51 years old and in the lymphatic vessels ligationgroup 40.46 ±17.08 years old.There was no significant difference between both groups in terms ofthe age of patients.

The BMI mean in the electrocutery group was 23.88±4.88 andin the Ligation group 23.13±5.60.According to P=0.5, there is no significant difference between both groups in terms of BMI.Of 29 patients in the electrocutery group, 15 patients (51.7%) were men and 14 patients(48.3%) women and Of56 patients in the ligation group 32 patients (57.1 %) were men and 24 patients (42.9 %) women.Given Chi-square test with P= 0.63, there is no significant difference between both studded groups in terms of sex. The mean surgical time for 29 patients in the electrocutery group was36.44 ± 2.5 minutes and in the ligation group 37.80 ± 2.77 minutes. With P=0.03, there are significant differences between the mean surgical timeof both groups.

The meantimeof hospitalization in hospitalfor the electrocutery group was 22.96±6.47 days and in theLigation group, it was 27.35±10.9 days. Giventhat P=0.05,there is no significant difference between both groups in terms ofthe duration of hospitalization in the hospital.2 patients (9.6%) of the electrocuterygroup required collection drainage and in the Ligationgroup, 6 patients (10.7%) Of 56 patients required collection drainage.Considering chi square test, there is nosignificant differences between bothgroups in terms of needing to collection drainage P=0.5.

Table 1: relative and absolute frequency distribution and needing for collection drainage in both studied groups

Group	Need to Collection Drainage		Total
	Yes	No	
Electrocoetry	(%6.9)2	(%93.1)27	(%100)29
Ligation	(%10.7)6	(%89.3)50	(%100)56
Total	(%9.4)8	(%90.6)77	(%100)85

Of 29 patients in the electrocutery group, in 12 patients (41.4%) the type of anastomosis were internal, 15 patients (51.7%) external and 2 patients (6.9%) common.

Of 56 patients in the ligation group, 22 patients (39.3%) were internal, 31 patients (4/55%) external and 3 patients (5.4%) common.According to the chi-square test with P=0.9, there is no significant difference between anastomosis in both groups.

Table 2: relative and absolute frequency distributionof anastomosisbetween bothstudied groups

Group	Anastomosis Type			Total
	Internal	External	Common	
Electrocutery	(%41.4)12	(%51.7)15	(%6.9)2	(%100)29
Ligation	(%39.3)22	(%55.4)31	(%5.4)3	(%100)56
Total	(%40)34	(%54.1)46	(%5.9)5	(%100)85

In examining wound infection in patients inthe electrocutery group, no case of wound infection was reported,however,in the ligation group, 1 patient (1.8 %) with wound infectionOf 56 cases was reported.But, there was no significant difference between both groups in terms of wound infection P=0.4.

Table 3:relative and absolute frequency distribution of wound infection in both studied groups

Group	Wound infection		Total
	Yes	No	
Electrocutery	0	29	29
Ligation	1	55	56
Total	1	84	85

Of 29 patients in the electrocutery group in the second week, 4 patients (13.8%) suffered from hydronephrosis and Of56 patients in theLigationgroup, 9 patients (16.1%) suffered from hydronephrosis.Of29 patients inthe electrocutery group, 28 patients referred to control in the second month which of these, 2 patients (7.1 %) had sufferedfrom hydronephrosis and in theLigation group,two patients did not refer which of54 patients,5 patients (9.3 %) had suffered from hydronephrosis (p=0.28).

Of 29 patients in the electrocutery group, 28 patients came for control in the sixth monththat no case of hydronephrosis had been reported and in the ligation group inthe sixth months,of51 patients, 2 patients (3.9%) sufferedfrom hydronephrosis and according to the statistical Chi-square test; there wasno significant differencesbetween both groups in terms of hydronephrosis in the sixth month.

Of 29 patients in theelectrocutery groupin the second week, 7 patients (24.1 %) and of 56 patients in the Ligation group,12 patients (21.4 %) had suffered from collection.There is no significant difference between both groups and collection P=0.7.

Of 29 patients in the electrocoagulation group, 29 patients came for control in the second month,ofwhich, 3 patients (10.3%) suffered from collection and inthe Ligationgroup,2 patients had not referred andof 54 patients, 7 patients (13%) had suffered from collection (P=0.76).

Of 29 patients in the electrocoagulation group, 26 patients camefor control in the sixth month, in this group, 2 patients (7.7 %) had suffered from collection and ofthe ligation group in the sixth months,51 patients cameand 4 patients (7.8 %) suffered from collection.

Given the statisticalChi-square test,there is no significant differencebetween both groups in terms of collection in the sixth month (P=0.9).

DISCUSSION

Chronic kidney failure is said to be the reduction of progressive function of the kidney which is stretched over three months.The end stages of chronic kidney failure are called ESRD requiring kidney replacement therapy.The amount of ESRDprevalenceis ever increasing and has been growing about 11 to 15 percent in Iran (2).

To survive and reduce the amount of uremic toxins these patients need kidney replacement. The bestalternative treatmentiskidney transplantation. Another alternativetreatment isdialysis.The appearance of urologic complications is an important cause of morbidity in the patients with kidney transplantation.Major urologic complications of kidney transplantationare associated with the adapted technique of transplantation. The risk of urologic complications has been significantly reduced by changing surgical techniques and using new immunesupperessive protocols, in the waythat its twenty percent rate,in 1970 have reached less than ten percent in 1990 (1).

The related complications include urinary tract infection, deep vein thrombosis, hematuria, urinary fistula, ureteral obstruction, symptomaticlymphocele, fluid accumulation around the transplant kidney; prolonged wound secretionsand increasing the amount of hospital stay.The related patients suffering from complications had hospitalized significantly more than other patientswithin a year after transplantation. Also, these patients had spent more hospital costs (43).

Pelvic lymphoceleis considered as a cystic structure thatdue to secondary lymphatic damage, it usuallyleads to pelviclynphadnectomyand kidney transplantation(15).The formation of lymphocele is a common complication after kidney transplantation(28).Surgical complications are still consideredasa challenge in increasing morbidity and mortality in the recipients of kidney transplantation(29).Iliac vessels are surrounded by dense lymphatic pathways that these lymphatic vessels are removed before anastomose from the surface of these vessels (14).

The performance of sutur-ligation and separation oflymphatic vessels has been commonlyconductedand it has also been suggested by researchers (13).However, the electrocoagulation of lymphatic vessels can be considered as an alternative technique, although some researchers'beliefs on increasingthe prevalence of lymphocele.Given the above contents, we decided tostudy the effect of electrocoagulation of lymphatic vessels in patients with kidney transplantation in the way that the patients weredivided into two groups ofligationand electrocoagulation, and we studied the complication rate in both relatedgroups.In our study, the mean age of patients in ligation and electrocoagulation groupwas 38.9 and 40.46 years old, respectivelythat its difference was not statistically significant.In terms of sex, the rate of male and female had no statistical differences in both groups.In this study, BMI was 23.88 in the electrocoagulation group and 23.13 in the Ligation group thatdoes not show statistically any significantdifferencesand it states that BMI cannot be considered as a variable.In the previous studies, BMI has been considered as a risk factor of lymphatic formation (42 and 46).

Examiningthe accumulation rate of fluid around the kidney after transplantation

The accumulation rate of the graft in patients was controlled 3 times, the second week, the second and sixth month after kidney transplantation. In all 3 times of controlling the collection, no statistically significant differences were observed.In our study, this rate was 7.8% in the electrocoagulation group compared to 7.7% in the Ligation group at the end of the sixth month.Although this conclusionis consistent with the most of the previous studies, in those studies,an accurate ligationof lymphatic vessels despite the lack of such connectionhad been recommended (43).

Examining the need for Collection Drainage within 6 months after transplantation

In the present study, 6.9% in the electrocoagulation and 10.7% patients in the ligation group required collection drainage thatis not statistically significant. This issue has not been examined in the previous studies.

Wound infection was not observed in the electrocoagulation patients and it was reported as 1.8% in the ligationgroupthat was not significant and was consistent with most previous studies (42, 43).

The surgical time (the onset was from the beginning to the end of the vascular bed preparation) was 36.44 in the electrocoagulationand 37.8 minutesin the Ligation group.This difference shows statistically significant figureand it was consistent with a study conductedpreviously (40).In the electrocoagulationgroup, it was 22.51 days andin the ligationone that was 27days. In this study, this figure is not statistically significant.

Considering the studied cases in previous studies based on the appliedimmunological regime intervention and occurrence ofallograt rejection as the main factor involved in the occurrence oflymphocele, in our study, both groups underwent the same immunotherapy regimen and the patientswho underwentnephrectomydue to rejection were excluded from the study (44, 45).In our study, when results are compared between both groups,it appears that we are not faced with higher lymphoceleoccurrence and postoperative complications. However,shorter time is spent on thepreparation of the vascular beds that can be done for recipients of the kidney transplantation.

Conclusions

ESRD patients are chronically ill, have low hemotocrit and sufferfrom water and electrolyte disorders. Thus,the reduction of surgical time and less exposure to anesthetic drugs can be beneficial for these patients and as an alternative procedure, conducting electrocoagulation of lymphatic vessels in our study was a safe method and it can be expressed in closing lymphatic vessels.

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