

Post Kidney Transplant Lymphoceles: Meticulous Ligation of Lymphatics Reduces Incidence in Comparison with Electrocautery Utilization

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ABSTRACT:

BACKGROUND:

Lymphocele is one of the common complications following renal transplantation, and usually present with persistent lymphatic drain in immediate post-transplant period or perigraft (between the kidney allograft and the urinary bladder) collection in post-transplant routine ultrasound⁽¹⁾. Lymphorrhea or lymphorrhea is defined as a lymph leak from the surgical drains or from the abdominal wall through the surgical wound⁽²⁾.

AIM OF STUDY:

To compare between lymphatic's ligation and electrocauterization in reducing post kidney transplantation lymphocele.

PATIENTS AND METHODS:

design: Prospective comparative study. Setting: Kidney Transplant Center in Medical City. Study period: From the 1st August 2017 till 1st August 2019. Sample size: 100 patients with end stage renal disease. Exclusion criteria (Death, graft loss within 4-6 weeks, lack of follow-up).

RESULTS:

In this study, we noticed that lymphocele formation was in 20% of patients who were managed by lymphatic electrocauterization which was significantly higher than that in patients who were managed by meticulous ligation of lymphatics (6%) (P= 0.037). Regarding the mean of duration until drain removal, was significantly higher in cautery group than that in ligation group (7.1 versus 5.8 days, P= 0.02). Intervention needed for symptomatic lymphocele was greater in patients managed by lymphatic electrocauterization which was statistically significant (P= 0.045).

CONCLUSION:

We found that a meticulous surgical technique with ligation of all lymphatics, was significant in reducing the incidence of lymphoceles following kidney transplantation in our recipients.

KEYWORDS: Lymphocele, renal, transplantation, ligation, cautery, Iraq.

INTRODUCTION:

Definitions: Lymphocele is one of the common complications following renal transplantation⁽¹⁾.

Post kidney transplant lymphocele: Lymphoceles are the commonest fluid collections observed after kidney transplantation with an incidence that ranges from 0.6 to 61%⁽³⁾. The peak time of lymphocele formation is 6 weeks' post-transplant, but it may emerge from 2 weeks to 6 months' post-transplant⁽⁴⁾.

Etiology: Lymph may accumulate in response to iliac vessel injuries inflicted during vascular anastomoses, damage to the renal allograft hilum, or micro- or macro- encapsulations of

the renal allograft hilum and lymphatic vessels of the transplanted kidney⁽⁵⁾.

Risk factor for lymphocele formation

Surgical causes

1. Dissection of lymphatics around the iliac vessels of the recipient and donor renal lymphatics.
2. Laparoscopic donor nephrectomy⁽²⁾.
3. Higher incidence of lymphocele with laparoscopic live donor nephrectomy compared to deceased donor transplants⁽²⁾.
4. Donor kidneys with complex arterial anatomy carried a higher risk of lymphocele (12.5%) compared to grafts with single renal artery (3.1%)⁽⁶⁾.
5. Retransplantation⁽²⁾.

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Non-surgical causes

1. The use of diuretics ⁽²⁾.
2. Autosomal dominant polycystic kidney disease (ADPKD) ⁽²⁾.
3. Blood coagulation abnormalities ⁽⁷⁾.
4. The anticoagulation therapy together with the defective coagulation associated with uraemia ⁽⁷⁾.
5. Obesity of the recipients with a body mass index > 30 kg/m² ⁽⁸⁾.
6. Acute tubular necrosis-delay graft function ⁽³⁾.
7. Increase recipient age ⁽⁹⁾.
8. Warm ischemia time more than 30 minutes ⁽⁹⁾.
9. Prolonged pre-transplant dialysis ⁽¹⁰⁾.
10. Immunosuppressive drugs such as rabbit antithymocyte globulin(ATG) ⁽⁹⁾.
11. High dose of mycophenolate mofetil (MMF) (> 2 g/day) and steroids increase the risk of lymphatic complications ⁽⁹⁾.
12. Lymphatic filariasis ⁽¹¹⁾.
13. Acute rejection and mammalian target of rapamycin (mTOR) inhibitors ⁽²⁾.

Diagnosis

Ultrasound (U/S) can determine the collection as well as its dimensions, location in relation to the graft and possible effects on the graft vessels and ureter.

Biochemical analysis of contained fluid allows differentiation from urinoma ⁽⁶⁾.

Complications

1. Pressure effect on the hilar vessels, transplanted ureter and recipient iliac vein can lead to allograft dysfunction and unilateral limb oedema ⁽⁶⁾.
2. Scrotal or vulval oedema and DVT of the iliac veins ⁽⁸⁾.
3. Wound dehiscence can lead to sepsis or lympho-cutaneous fistula ⁽⁸⁾.

Management

- *Intra-operative drain placement* ⁽¹²⁾.
- *Percutaneous aspiration and sclerotherapy* ⁽⁵⁾.
- *Laparoscopic fenestration* ⁽¹³⁾
- *Open surgery* ⁽¹⁴⁾.

PATIENTS AND METHODS:

Study design, setting, data & collection time

This prospective comparative study was carried out in *Kidney Transplant Center* in Medical City; the data collection was completed during the period from 1st August 2017 till 1st August 2019.

Study patients and sample size

A total number of 100 patients divided into 84 male and 16 female of age ranging from 13-63 years, with end stage renal disease who underwent renal transplantation of living donors were enrolled in the study.

Exclusion criteria

Death, Graft loss within 4-6 weeks, Lack of follow-up

Surgical procedure

In the present study, the patients were equally divided into two groups with regards to surgical technique in lymphatic dissection; suture ligation group and monopolar cauterization group.

Standard right or left Gibson incision was performed to the patients in both groups.

The important features of our technique are as follows:

Dissection of iliac vessels: The external iliac vein and either common iliac, external or internal iliac artery were identified and strapped from lymphatic's and lymph nodes. This tissue was lifted off the vessels and in ligation group, two 3/0 silk ligatures were passed and tied on both sides of the artery; while in cautery group the tissue was divided by monopolar cauterization.

Lymph nodes: obscuring the external iliac artery and the external iliac vein were also removed by ligating all tissue before dividing in ligation group; lymph nodes were cauterized in cautery group.

Allograft lymphatic's present in the hilum and along its vessels were carefully ligated in ligation group or cauterized in cautery group to prevent leakage after perfusion.

Drains: At the end of the procedure, two tube drains were inserted in all patients, anteriorly and posteriorly to the allograft, and only removed when drainage is less than 50 mL or within 21 days, which come first.

Ultrasound (U/S): was performed on day 5 postoperatively. Following discharge, a follow up ultrasound was carried out in the clinic 4-6 months afterwards. It was also performed when indicated.

RESULTS:

The total number of study patients was 100. They were equally divided into two Ligation and cautery group.

General characteristics

Study patients' age was ranging from 13 to 63 years with a mean of 38.63 years and a standard deviation (SD) of ± 15.9 years. The proportion of ligation group was aged between 20-39 years (46%) while (48%) of cautery group were aged between 40 – 59 years.

Regarding gender, proportion of males was higher than females in both groups (82% versus 18% in ligation group and 86% versus 14% in cautery group).

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About BMI level, 66% of ligation group and 78% of cautery group had normal BMI.

Clinical information

In this study, hypertension was the most common comorbidity that affects patients in ligation and cautery groups (84% and 78% respectively).

Renal transplantation was done in the right side in 81% of ligation and cautery groups.

Regarding anastomosis, it was done for internal iliac artery in the highest proportion of ligation and cautery groups (62% and 54% respectively).

Lymphocele formation was noticed in 20% of patients who were managed by lymphatic electro cauterization which was significantly higher than that in patients who were managed by meticulous ligation of lymphatics (6%) (P= 0.037).

Regarding duration until drain removal, it was ranging from 3 – 6 days in ligation group and from 5 – 21 days in cautery group and the mean of duration until drain removal was significantly higher in cautery group than that in ligation group (7.1 versus 5.8 days, P= 0.02).

Outcome of operation

Table 1: Distribution of study groups by certain clinical information.

Clinical information	Ligation (%) n= 50	Cautery (%) n= 50	Total (%) n= 100
Comorbidity			
Hypertension	42 (84.0)	39 (78.0)	81 (81.0)
Diabetes mellitus	15 (30.0)	11 (22.0)	26 (26.0)
Idiopathic	8 (16.0)	12 (24.0)	20 (20.0)
Stone disease	4 (8.0)	3 (6.0)	7 (7.0)
Reflux nephropathy	2 (4.0)	4 (8.0)	6 (6.0)
Glomerulonephritis	2 (4.0)	3 (6.0)	5 (5.0)
Polycystic kidney disease	0 (0)	2(4.0)	2 (2.0)
Side of transplantation			
Right	39 (78.0)	42 (84.0)	81 (81.0)
Left	11 (22.0)	8 (16.0)	19 (19.0)
Anastomosis done			
Internal iliac artery	31 (62.0)	27 (54.0)	58 (58.0)
External iliac artery	18 (36.0)	21 (42.0)	39 (39.0)
Common iliac artery	1 (2.0)	2 (4.0)	3 (3.0)
Number of transplants			
First	48 (96.0)	47 (94.0)	95 (95.0)
Second	2 (4.0)	3(6.0)	5 (5.0)

Table 2: Comparison between study groups by lymphocele formation

Lymphocele	Study Group		Total (%) n= 100	P - Value
	Ligation (%) n= 50	Cautery (%) n= 50		
Yes	3 (6.0)	10 (20.0)	13 (13.0)	0.037
No	47 (94.0)	40 (80.0)	87 (87.0)	

Table 3: Comparison between study groups by outcome of operation.

Duration until drain removal (days)	Study Group		P - Value
	Ligation Mean ± SD	Cautery Mean ± SD	
	5.8 ± 2.3	7.1 ± 3.1	0.02

Table 4: Comparison between study groups by intervention needed.

Intervention needed	Ligation (%) n= 50	Cautery (%) n= 50	Total (%) n= 100	P - Value
Yes	2 (20.0)	8 (80.0)	10 (10.0)	0.045
No	48 (53.3)	42 (46.7)	90 (90.0)	

DISCUSSION:

Lymphocele cause increased morbidity and can result in mortality, and every effort should be made to reduce its incidence⁽³⁾.

A lymphocele can disturb proper graft function. Sometimes a lymphocele requires urgent surgical intervention⁽⁸⁾.

In current study, the total numbers of patients were 100, divided into two groups: 50 patients of ligation group, and 50 patient of cautery group, which is comparable to Farouk et al, with total number of 90 patients⁽¹⁵⁾, while the sample size in Lucan et al and Simforoosh et al study was 48 and 60 patients respectively^(16,4).

Regarding anastomosis, our study and Simforoosh et al shared the same method of anastomosis which involved utilization of external iliac vein, internal, external and common iliac arteries⁽⁴⁾. While Farouk et al used the external iliac vein and only external iliac artery for anastomosis in his study⁽¹⁷⁾. The lymphocele formation in our study was 10 patients (20%) in cautery group and 3 patients (6%) in ligation group.

Interestingly, Farouk et al and Khan et al study observed no lymphocele in cauterization group, and one patient had lymphocele in ligation group^(15,3)

While in different study carried out by Lucan et al found that postoperative lymphocele was developed with an incidence of 1 patient (4.16%) in the LigaSure arm versus 5 patients (20.83%) in the conventional ligation group⁽¹⁶⁾. Regarding intervention needed in current study, 80% of those needed interventions were managed by lymphatic electro cauterization and 20% of those managed by lymphatic ligation, this difference was statistically significant. Interventions in our patients with symptomatic lymphocele were including: aspiration under ultrasound guidance in (10) patients, three of them had lymphocele recurrence, then underwent percutaneous drainage and sclerosing agent using povidone iodine 10% , one of them recurred which lastly underwent laparoscopic deroofting, with no recurrence.

The discrepancies observed among the above studies might be attributed to the sample size enrolled in each study, in addition to age, body mass index, living or deceased donors, immunosuppression, site of transplantation (left or right), transplantation and method of surgery using either ligation or mono, bipolar electrocauteriation of lymphatic vessels.

CONCLUSION:

Lymphocele formation was lower in patients who were managed by meticulous ligation of lymphatics.

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