Comparing the Frequency of Lymphoceles Which Needed Intervention in Recipients of Living Donor Versus Deceased Donor Kidney Transplants

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Purpose: In this study, we aimed to compare the frequency of lymphoceles that needed intervention in recipients who received kidneys from living versus deceased donors.

Materials and methods: The records of all patients who underwent kidney transplantation at the Labbafinejad Hospital from 2012 to 2021 were retrospectively reviewed to determine the incidence of lymphoceles that needed intervention for management.

Results: From March 2012 to April 2021, 1752 patients received kidney transplantation in Labbafinejad Hospital including 975 transplantations from living donors and 777 transplantations from deceased donors. Symptomatic lymphoceles were observed postoperatively in 23 patients. Symptoms included compressive effect on the ureter, hydroureteronephrosis of the transplanted kidney, frequency, urinary retention, infection, abdominal discomfort, or rise in serum creatinine. Out of 23 patients who needed intervention for symptomatic lymphocele, 15 patients were recipients of living donors and 8 patients were recipients of deceased donors [1.53% versus 1.03%, $P = .40$]. Intervention consisted of open surgical drainage in 6 patients [4 recipients of living donors and 2 recipients of deceased donors], and nephrostomy insertion in 17 patients. Open operation was necessary for 5 (47%) patients in whom arterial anastomosis was made to the internal iliac artery versus 1 (9%) patient in whom the anastomosis was not made to the internal iliac artery ($P = 0.15$).

Conclusion: Symptomatic lymphoceles which needed intervention were observed at a low frequency (1.31%). Most cases can be managed by endoscopic drainage without relapse. Type of donation had no relationship with the need for open or endoscopic intervention in lymphoceles. A higher proportion of open surgeries to control lymphocele were observed in recipients in whom the internal iliac artery was used for arterial anastomosis however the difference was not statistically significant.

Keywords: lymphocele; kidney transplantation; living donor; deceased donor; postoperative complications

INTRODUCTION

The prevalence of clinical lymphoceles after kidney transplantation varies from 0.6 to 18%. The cause of lymphocele is the disruption of lymphatic vessels without ligation when releasing the recipient's iliac vessels. Also, secretions from transplanted kidney lymphatic vessels, especially during rejection, can cause lymphocele. A normal kidney has well-developed lymphatic drainage that is generally left unligated when transplanted. However, studies of injected radiopaque dyes and radiolabeled substances showed that most lymphoceles originate from the iliac lymphatics of the recipient.[1] It is estimated that 300 mL of lymph per day passes through the external iliac lymph channels. Why the transplant kidney lymphatics contribute so little, if any, to the presence of a lymphocele remains unexplained[1]. Traditional teaching suggests that meticulous ligation of even the smallest lymphatic trunk with nonabsorbable or slowly absorbed ligature material during mobilization of the iliac vessels is crucial in the prevention of lymphoceles. However, the utilization of newer energy delivery devices such as the harmonic scalpel and Ligasure, and even judicious use of diathermy, may be as effective and less time consuming.[2,3] The use of bipolar cautery to occlude lymphatic vessels and prevent lymphocele formation in kidney transplantation is feasible, safe, and easy to perform. Therefore, bipolar cautery could be a valuable tool instead of the use of silk suture ligature.[4] Another less important source of lymphatic leakage after kidney transplantation is the graft itself as indicated above and occasionally this may be the case.[2,3] On the contrary, surgical dissection technique was not a factor in the development of post-renal transplant lymphocele in one study while young age, living donor transplantation, and repeat transplantation were found to be predictive variables for symptomatic lymphoceles requiring drainage.[5] Based on their own experience, Sansalone et al. proposed that lymphoceles could be preventable if the vascular anastomoses were to the common iliac vessels, where fewer lymphatics and lymph nodes are encountered during dissection.[6] This recommendation has not been adopted by many authors.

Symptomatic lymphoceles especially the smaller ones are first approached by endoscopic drainage. Open or laparoscopic surgical drainage is indicated in cases of large lymphoceles or when endoscopic drainage fails.[7]

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Table 1. Characteristics of studied patients

	Gender	Age (years)	Donor Type	Volume(mL)	Symptom /Sign	Time since Tx (weeks)	Side	Lymphatic vessel control [recipient]	Arterial anastomosis	Venous anastomosis	Intervention	Cause of CRF
1	F	56	Dd	700	Pain	4	RIF	Bipolar cautery	Common iliac	External iliac	PCN	HTN
2	F	53	Dd	120	Creatinine rise	6	RIF	Bipolar cautery	Common iliac	External iliac	PCN	Nephrotic syndrome
3	M	35	Ld	1300	Pain	3	RIF	Bipolar cautery	Aorta	IVC	PCN	Unknown
4	M	67	Ld	130	Fever	4	RIF	Silk suture	External iliac	External iliac	PCN	HTN
5	M	59	Dd	500	Creatinine rise	3	RIF	Bipolar cautery	Common iliac	External iliac	PCN	HTN
6	M	45	Ld	300	Frequency	3	LIF	Bipolar cautery	Internal iliac	External iliac	PCN	HTN
7	M	65	Ld	250	Creatinine rise	6	RIF	Silk suture	External iliac	External iliac	PCN	DM
8	M	40	Ld	300	Pain	3	RIF	Bipolar cautery	Common iliac	External iliac	PCN	Unknown
9	F	53	Dd	500	Creatinine rise	4	RIF	Silk suture	Internal iliac	External iliac	PCN	DM
10	M	56	Ld	175	Pain	4	RIF	Silk suture	Internal iliac	External iliac	PCN	DM
11	M	50	Ld	200	Fever	26	RIF	Silk suture	Internal iliac	External iliac	PCN	Unknown
12	M	39	Dd	200	Pain	3	RIF	Silk suture	Internal iliac	External iliac	PCN	Unknown
13	M	27	Ld	250	Creatinine rise	4	LIF	Silk suture	Common iliac	External iliac	PCN	VUR
14	M	60	Dd	300	Pain	3	RIF	Silk suture	Common iliac	External iliac	OSD	HTN
15	F	59	Ld	600	Creatinine rise	6	RIF	Bipolar cautery	Internal iliac	External iliac	OSD	ADPKD
16	F	64	Ld	300	Creatinine rise	6	RIF	Bipolar cautery	Internal iliac	External iliac	OSD	HTN
17	F	60	Ld	100	Fever	8	RIF	Silk suture	Internal iliac	External iliac	PCN	HTN
18	F	52	Ld	150	Frequency	26	RIF	Silk suture	Internal iliac	External iliac	OSD	DM
19	M	36	Dd	300	Pain	3	RIF	Silk suture	Internal iliac	External iliac	OSD	Unknown
20	F	15	Ld	150	Pain	3	RIF	Silk suture	Internal iliac	External iliac	PCN	Nephrotic syndrome
21	F	48	Ld	260	Creatinine rise	10	RIF	Silk suture	Internal iliac	External iliac	OSD	ADPKD
22	F	37	Ld	500	Creatinine rise	9	RIF	Silk suture	Common iliac	External iliac	PCN	Unknown
23	F	29	Dd	170	Frequency	3	RIF	Silk suture	Common iliac	External iliac	PCN	Nephrotic synndrome

Abbreviatoins: Dd=deceased-donor; F=female; M=male; Ld=living-donor; VUR=vesicoureter reflux; RIF=Right iliac fossa; OSD= open surgical drainage; LIF=Left iliac fossa; PCN= percutanous nephrostomy; IVC=Inferior vena cava; DM=diabetes mellitus; ADPK-D=Autosomal dominant polycystic kidney disease

We aimed to study the frequency of lymphoceles which need intervention after kidney transplantation and to explore the factors which will necessitate the adoption of open or laparoscopic drainage for lymphoceles.

MATERIALS AND METHODS

The records of all patients who underwent kidney transplantation at the Labbafinejad Hospital from March 2012 to April 2021 were retrospectively reviewed to determine the incidence of lymphocele that needed intervention. Lymphoceles were diagnosed primarily by sonographic imaging which was ordered 2 weeks and 6 months after transplantation or when needed based on patients' symptoms or signs. Intervention consisted of nephrostomy insertion, drainage of lymphocele through an open operation, or drainage into the abdominal cavity by connecting the lymphocele cavity to the intraperitoneal space through an open or laparoscopic operation. Our study also included donor kidneys with multiple arteries. Donor nephrectomy was performed by the laparoscopic method as explained previously.[8] In the recipients, a standard right or left lower pararectal incision was made and the renal bed was prepared extraperitoneally. External or common iliac vein and common, external, or internal iliac arteries were selected for allograft anastomosis. Lymphatic vessels were tied by silk sutures or cauterized by bipolar cautery. Lymphatics of the donor kidneys were also ligated by silk sutures and by the use of bipolar electrocautery. Immunosuppressive medications were administered in accordance with

the standard kidney transplant method in our center as described earlier[9]. Apart from programmed ultrasound exams in follow-up that was explained above, further ultrasound examinations were performed only in symptomatic patients or if serum creatinine levels increased. Other radiological procedures such as CT scan and isotope scan were performed if necessary. We treated symptomatic patients first with nephrostomy insertion. If recurrence occurred, open extraperitoneal drainage of fluid or intraperitoneal drainage of lymphocele through open surgery or laparoscopy was performed.

Statistical methods

Data were entered into the Statistical Package for Social Sciences (SPSS) ver. 21. Comparison of categorical variables over two groups of different treatments for lymphocele was performed using Fisher exact test.

RESULTS

From March 2012 until April 2021, 1752 patients received a kidney transplantation in the Labbafinejad Hospital including 975 transplantations from living donors and 777 transplantations from deceased donors. Postoperatively, symptomatic lymphoceles were observed in 23 patients (1.31%; CI95%:0.88-1.96). Symptoms included compressive effect on the ureter and hydroureteronephrosis of the transplanted kidney, frequency, urinary retention, infection, abdominal discomfort, or rise in serum creatinine. Out of 23 patients who needed intervention for symptomatic lymphocele, 15 patients were recipients of living donors and 8 patients were recipients of deceased donors ([1.54%; CI95%: 0.93-2.52] versus [1.03%; CI95%: 0.53-2.02], $P = .40$). Details of patients in whom intervention for lymphocele was necessary are presented in Table1. Open surgical drainage was performed in 6 patients, and nephrostomy insertion in 17 patients. Opens surgery was necessitated in 4 patients (27%) from living donors versus 2 patients (25%) from deceased donors ($P = 1.0$). 21 cases of lymphoceles were observed on the right side and 2 cases on the left side. Left side lymphoceles were managed by nephrostomy insertion. Open surgery was necessary in 2 cases (25%) in whom bipolar cautery was used to control recipient lymphatics versus 4 patients (27%) in whom silk sutures were used to control recipient lymphatics ($P = 1.0$). Open surgery to control postoperative lymphocele was necessary for 5 patients (42%) in whom arterial anastomosis was made to the recipient's internal iliac artery. However, open surgery was necessary only in one patient (9%) in whom arterial anastomosis was made to arteries other than internal iliac including aorta, common and external iliac arteries ($P = 0.15$).

DISCUSSION

The findings of the current study reveal a low frequency of need for intervention due to lymphocele after both living and deceased kidney transplantation without any statistically significant difference between the two groups. The mode of intervention (open surgery versus nephrostomy insertion was not statistically different in recipients of living versus deceased donors. The failure of nephrostomy insertion and need for treatment was not related to donor type (living versus deceased), side of donation, method of lymphatic control in the recipient, and type of arterial or venous anastomosis. Open surgery for lymphocele was necessary for 5 patients (47%) in whom the arterial anastomosis was made to the internal iliac artery versus 1 patient (9%) in whom the arterial anastomosis was not made to the internal iliac artery, however, this large difference was not statistically significant due to the low cumulative number of lymphoceles (N = 23).

There has been an increase in the frequency of lymphocele detection after kidney transplantation due to more frequent use of ultrasound examinations and the use of mTOR inhibitors.[10] Lymphoceles are usually innocuous and asymptomatic but can occasionally cause complications as a result of external pressure on the transplant and its adjacent structures, when complicated by infection, or causing edema or thrombosis by pressure on the lymph nodes and veins of the lower extremities. In some cases, large lymphocytes cause frequent urination or urinary retention. Macrophage function is adversely affected by steroids, and there is some evidence that the incidence of lymphoceles has decreased since the introduction of low-dose steroid regimens. The more recent strong association of mTOR inhibitors with problematic lymphoceles is attributed to their powerful antifibroblastic activity, particularly in obese patients being treated for rejection.[3-6,10,11]

In the study of Golriz et al., various factors contributed to lymphocele formation, such as surgical technique, recipient co-morbidities, immunosuppression, and delayed graft function.[7] Lymphoceles were reported more frequently among grafts with multiple arteries.[12] Saeedi et al. reported more lymphatic leakage in recipients of living donor kidneys that were operated through laparoscopic donor nephrectomy compared with recipients of deceased donor kidneys.[13] Likewise, Fakhryasseri et al. reported a higher frequency of lymphoceles in recipients of living donor kidneys that were removed through open donor nephrectomy versus deceased donors.[14] On the contrary, Lima et al. reported a higher frequency of lymphocele in recipients of deceased donors.[15]

Based on their own experience, Sansalone et al. proposed that lymphoceles could be preventable if the vascular anastomoses were to the common iliac vessels, where fewer lymphatics and lymph nodes are encountered during dissection.[6] In the study of Lucewice et al., the majority of lymphoceles were asymptomatic and self-limiting. The rate of symptomatic lymphoceles requiring interventions has been reported to be around 5.6% of the total cases.[16]

The limitations of this study include the low number of lymphoceles that needed intervention during the study period which makes statistical analysis relatively weak and the retrospective nature of the study.

CONCLUSIONS

In this study, we observed that postoperative lymphocele that needed intervention for treatment is not common. Most cases of lymphocele (74%) were treated by nephrostomy insertion without a further need for another intervention. Open surgery was necessary in a limited number of patients and there was no difference in the need for open surgery between recipients of living versus deceased donor kidneys. A higher proportion of open surgeries to control lymphocele were observed in recipients in whom the internal iliac artery was used for arterial anastomosis however the difference was not statistically significant.

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