V. Lange H. M. Schardey G. Meyer W.-D. Illner P. Petersen W. Land

Laparoscopic deroofing of post-transplant lymphoceles

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V.Lange · H. M. Schardey · G. Meyer W.-D. Illner · P. Petersen · W. Land Chirurgische Klinik und Poliklinik, Klinikum Großhadern, Ludwig-Maximilians-Universität, Marchioninistrasse 15, D-81366 Munich, Germany

Introduction

Lymphoceles following renal transplantation have been reported to occur with an incidence between 0.55 % and 18.1% [7]. Nakstad et al. even found them to be the most frequent surgical complication in renal transplant patients [11]. Symptoms can be divided into primary ones, resulting from the direct mechanical pressure of the lymphocele, such as lower abdominal swelling or mass, edema over the allograft or the ipsilateral leg, urinary obstruction, and drainage from the incision [7], and secondary ones that might be misleading, such as deterioration of renal function, weight gain, hypertension, fever without an obvious source of infection, urinary frequency, and ipsilateral thrombophlebitis [7]. It has also been reported that patients with a lymphocele might inappropriately be treated for allograft rejection [13].

The diagnosis can best be found by ultrasound [16] or CT scan [11]. Other methods include intravenous pyelo-

Abstract Lymphocele is a most common surgical complication following renal transplantation. The indication for treatment is given when the lymphocele becomes symptomatic. We succeeded in laparoscopically deroofing large lymphoceles in nine patients that were causing ureter compression in eight and ipsilateral leg edema in six cases. The postoperative course was uneventful, and the surgery-related hospitalization did not exceed 7 days. Severe adhesions and a thick lymphocele wall, which made preparation difficult, resulted in the transection of the transplant ureter in one case.

Techniques and prerequisites that would help to avoid this type of complication are discussed. According to CT scan or sonography, there was no recurrence in any of the patients after a mean follow-up of 11 months. This technique seems to be superior to other methods of treatment because not only is a cure obtained with a single intervention, but there is also a low risk of infection and a short hospitalization.

Keywords Lymphocele, renal transplantation · Laparoscopic deroofing, lymphocele · Renal transplantation, lymphocele

graphy [14], contrast lymphangiography [1], and scintigraphy [5].

The indication for therapy is given when a lymphocele compromises allograft function or survival, is in danger of infection, or causes host morbidity due to leg edema, thrombosis, pain, and discomfort.

Patients and methods

Patients

During a 21-month period beginning in November 1991, we treated nine patients suffering from post-transplant lymphoceles with laparoscopic deroofing (Table 1). These were five women and four men with an average age of 48 years. All but one had had prior abdominal surgery in addition to receiving a renal allograft. Four were retransplantation candidates after subsequent allograft removal. One of them had, in addition, suffered from peritonitis, two had a surgical history of appendectomy, one had been nephrectomized and cholecystectomized, and one had recurrence of a lymphocele after marTable 1Patients with laparos-
copic deroofing of post-trans-
plant lymphoceles (KTX, kidney
transplantation)

Patient	Age (years)	Sex	Surgical history	Date of last KTX
1. W.E.	51	F	KTX 1983 Allograft removal 1986	8.03.91
2. B. M.	42	F	None	11.30.91
3. S. K.	66	М	KTX 1989 Allograft removal 1989	4.14.92
4. M. H.	55	М	Appendectomy for perforated appendicitis	5.21.92
5. L. L.	53	F	None	5.29.92
6. A. R.	40	М	Acute pancreatitis Appendectomy	9.09.92
7. S. E.	52	М	KTX 1980 and 1983 Allograft removal 1980 and 1983 Perforated duodenal ulcer and peritonitis 1983	4.27.93
8. R.G.	51	F	KTX 1988 Allograft removal 1991	4.26.93
9. I. H.	63	F	Nephrectomy right side 1982 Laparoscopic cholecystectomy 1992	6.05.93

Table 2Initial management oflymphoceles

Patient	Postoperative day of diagnosis	Puncture drainage	Fibrin occlusion	Laparotomy and marsupialization
1. W.E.	17	3	_	-
2. B. M.	4	2	-	1
3. S. K.	109	3	_	-
4. M.H.	10	2	_	-
5. L.L.	60	3	-	-
6. A. R.	6	5	1	-
7. S.E.	16	2	1	-
8. R.G.	25	2		-
9. I. H.	46	2	-	-
Mean	32.5	2.6		

supialization by open laparotomy 7 months before the laparoscopic procedure.

The overall incidence of lymphoceles in our renal allograft recipients was 4.5 % (11/244 from July 1991 until December 1992). Lymphoceles were discovered within an average of 32.5 days after the transplantation procedure. In all cases the initial management consisted of repeated puncture drainages (mean 2.6 times), which in two cases was combined with the instillation of fibrin sealant (Table 2).

We saw an indication for laparoscopic intervention on the average 76 days after renal transplantation due to symptomatic recurrence of lymphoceles (Table 3). Renal obstruction was sonographically found in eight patients, while six also presented with lower abdominal pain and ipsilateral leg swelling due to iliac vein compression, as revealed by phlebography or duplex Doppler sonography.

Surgical technique

Pneumoperitoneum is established using a Verees needle for CO_2 gas insufflation at a rate of 6 l/min; the intra-abdominal pressure is maintained below 14 mm Hg. A 45° angle diagnostic laparoscope (Olympus Winther and Ibe) is passed through an umbilical trocar (10 mm in diameter) for initial inspection. One 5-mm trocar is placed in the middle of the left abdomen and another 10-mm port in the right upper abdomen. Adhesions are conscientiously cut with scissors or a monopolar current electric hook. If vision is poor or the identification of structures impaired, dye (methylene blue in NaCl 0.9%) can preoperatively be injected into the lymphocele under ultrasound guidance, as we did in four cases. Absence of dye in the urine allows the identification of the lymphocele by exclusion if the color does not shine through the lymphocele wall. If available, transperitoneal ultrasound sonography may, however, be/the safest way to guide preparation. It is especially helpful in the case of thick-walled lymphoceles because the course of the transplant ureter may also be visualized. When the transplant with the renal pelvis, the bladder, and the lymphocele are clearly identified, the lymphocele is incised with the electric hook and drained. While keeping the wall of the lymphocele taut with a grasper, extensive circular deroofing is performed by resecting a major part of the wall with the electric hook.

Results

Deroofing of lymphoceles was feasible employing the video-endoscopic procedure in all cases (Table 4). Operating time averaged less than 1 h. Problems with the identification of structures were caused by adhesions and thick **Table 3** Indication for laparos-
copic intervention (KTX, kid-
ney transplantation)

Patient	Pain	Leg swelling	Renal obstruction	Interval to KTX (days)
1. W.E.	X	X	X	72
2. B. M.	Х	Х	Х	245
3. S. K.	Х	Х	X	109
4. M. H.		_	Х	22
5. L.L.	_	_	Х	67
6. A.R.	_	_	X	57
7. S. E.	Х	Х	Х	21
8. R.G.	Х	Х	Х	28
9. I.H.	Х	Х	-	65
Mean				76.2

 Table 4
 Laparoscopic deroofing of lymphoceles

Patient	Preoperative dye instillation	Duration of surgery (min)	Hospital stay (days)	Complications	Follow-up CT/US (months)	Recurrence
1. W.E.	No	75	1	None	21	No
2. B. M.	No	55	2	None	12	No
3. S. K.	No	65	26	Ureter lesion	13	No
4. M. H.	No	65	19	None	14	No
5. L.L.	No	60	3	None	12	No
6. A. R.	Yes	55	8	None	10	No
7. S. E.	Yes	45	7	None	3	No
8. R.G.	Yes	25	2	None	3	No
9. I.H.	Yes	35	6	None	0	No
Mean		53.3	8		11 (Pat. 9 excl	uded)

lymphocele walls. In the third patient operated, this led to the accidental transection of the transplant ureter. It was the only complication encountered during the nine procedures. Following laparotomy the lesion was repaired by ureteroureterostomy between the transplant and patient ureters.

Surgical complications were not encountered during the postoperative course in any of the patients. Prolongation of hospitalization beyond the 7th day was caused by problems in dealing with allograft rejection (patients 3, 4, and 6), which were already present before the laparoscopic procedure.

Follow-up was carried out with CT scan and sonography. There has been no recurrence in any of the patients after a mean time of 11 months.

Discussion

Despite advances in the diagnosis and treatment of lymphoceles, their exact etiology has not yeat been completely established. Many investigators, however, believe lymphoceles to be complications of transplant operations that can be avoided by ligation of all lymphatic channels around the iliac artery and vein, as these structures are dissected [7], and by limiting the overall amount of dissection [3]. The lymphatics of the donor kidney might also contribute to lymphocele formation and should, therefore, be ligated before division. Radiation [14] and hematomas [16] are also suspected to play a role in the formation of lymphoceles. Additional factors may include the occurrence of rejection, the use of diuretics, large doses of corticosteroids, and anticoagulants [2].

Modes of treatment are puncture drainage, percutaneous surgical or interventional drainage [4], and drainage combined with instillation of povidone iodine [10]. Yet, these are all associated with a high rate of recurrence and infection [2, 4, 17]. Open surgery and intraperitoneal marsupialization of the lymphocele cavity [6, 7], with or without the additional insertion of a Trenckhoff peritoneal dialysis catheter [12], represent more invasive techniques for definitive treatment. They are associated with a low rate of recurrence. However, a major drawback of these conventional techniques is a prolonged hospital stay.

The laparoscopic procedure presented has several advantages. A major part of the lymphocele wall can be resected just like in open surgery. A wide open drainage into the peritoneal cavity is established, which prevents recurrence. External drainage can be avoided and the risk of infection is, therefore, low. The morbidity of the patient is kept to a minimum, as reflected in the absence of analgetic medication requirements and discharge from the hospital during the early postoperative course, as was accomplished in some of the patients presented here. Our excellent results in laparoscopically deroofing liver cysts [8] was the reason for applying this procedure to post-transplant lymphoceles. The success rate with our patients, as well as the results of other surgeons [9, 15], encourages us to continue its use.

The technique is, however, not without danger or pitfalls. Unfortunately, we transected the transplant ureter

References

- 1. Bear RA, McCallum RW, Cant J (1976) Perirenal lymphocyst formation in renal transplant recipients: diagnosis and pathogenesis. Urology 7: 581–586
- Braun WE, Banowsky LH, Straffon RA, Nakamoto S, Kiser WS, Popowniak KL, Hewit B, Stewart BH, Zelch JV, Magalhaes RL, Lachance G, Manning RF (1974) Lymphocele associated with renal transplantation. Am J Med 57: 714–727
- 3. Burleson RL, Marbarger PD (1982) Prevention of lymphocele formation following renal allotransplantation. J Urol 127: 18–19
- Cohan RH, Saeed M, Sussman SK, Perlmutt LM, Schwab SJ, Bowie D, Dunnick NR (1987) Percutaneous drainage of pelvic lymphatic fluid collections in the renal transplant patient. Invest Radiol 22: 864–867
- 5. Fortenbery EJ, Blue W, Van Nostrand D, Anderson JH (1990) Lymphocele: the spectrum of scintigraphic findings in lymphoceles associated with renal transplant. J Nuc Med 31: 1627–1631

- 6. Greenberg BM, Leonard LJ, Grossman RA, Naji A, Barker CF (1985) Treatment of lymphocele in renal allograft recipients. Arch Surg 120: 501–504
- 7. Howard RJ, Simmons RL, Najarian JS (1976) Prevention of lymphoceles following renal transplantation. Ann Surg 184: 166–168
- Lange V, Meyer G, Rau HG, Schildberg FW (1992) Minimal-invasive Eingriffe bei solitären Leberzysten. Chirurg 63: 349–352
- 9. McCullough CS, Soper NJ, Clayman RV, So SSK, Jendisak MD, Hanto DW (1991) Laparoscopic drainage of a posttransplant lymphocele. Transplantation 51: 725–727
- Montanes Medina P, Torrubia Romera FJ, Marmol Navarro S, Sanchez Gomez E (1989) Late surgical complications in kidney transplantation. Experience and results. Arch Esp Urol 42: 549–551
- Nakstad P, Kolmannskog F, Kolbenstvedt A (1982) Computed tomography in surgical complications following renal transplantation. J Comput Assist Tomogr 6: 286

of the third patient treated during a most difficult operation. We feel that prior abdominal surgery, as well as attempts to treat the lesion with puncture drainage, with or without the application of fibrin sealant, increases the risks of this procedure. Laparoscopic use of transperitoneal ultrasound sonography and pre- or intraoperative puncture instillation of dye, as employed in our last patients, improve visualization and may allow the circumvention of complications in the future.

- Nicholson L, Veitch PS (1990) Treatment of lymphocele associated with renal transplant. Br J Urol 65: 240–241
- Rashid A, Posen G, Couture R, Mackay D, Wellington J (1974) Accumulation of lymph around the transplanted kidney (lymphocele) mimicking renal allograft rejection. J Urol 111: 145–147
- Schweizer RT, Cho S, Kountz SL, Belzer FO (1972) Lymphoceles following renal transplantation. Arch Surg 104: 42–45
- Voeller G, Butts A, Vera S (1992) Kidney transplant lymphocele: treatment with laparoscopic drainage and omental packing. J Laparoendosc Surg 2: 53–55
- Ward K, Klingensmith WC, Sterioff S, Wagner H (1978) The origin of lymphoceles following renal transplantation. Transplantation 25: 346–347
- 17. Zincke H, Woods JE, Aquilo J, Leary FJ, De Weerd H, Frohnert PP, Hattery RR (1975) Experience with lymphoceles after renal transplantation. Surgery 77: 444–450