Early Surgical Complications After Allograft Kidney Transplantation: Incidence and Management

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ABSTRACT:

BACKGROUND:

Kidney transplantation has been established as the most efficient treatment of end stage renal disease with the advantage for the patient to live a nearly healthy life.

Surgical complications are common in both the immediate postoperative period and later after kidney transplantation. But these complications when managed accordingly had no effect on the graft survival.

OBJECTIVE:

We studied the incidence and management of early surgical complications; that occurred within the first month after transplantation, in 213 kidney transplanted patients.

PATIENTS AND METHOD:

A cross sectional descriptive study including 213 patients with renal failure underwent allograft kidney transplantation from October 2003 to October 2010, in the renal transplant center, medical city teaching hospital, Baghdad. Focusing on the incidence and management of early surgical complications; that occurred within the first month after kidney transplantation.

RESULTS:

213 patients, 144(67.6%) were males, 69(32.4%) were females. The age range of the donors was 18y - 55years (mean 30.39±9.32), While the age range of the recipients was 7y – 66y (mean 31.40±11.35). 121(56.9 %) were unrelated donors, 92 (43.2%) were related donors.

The reported surgical complications were, urinary tract infection in 80(37.5%) patients, Urine leak 8(3.8%), Lymphocele 2(0.9%), Wound seroma 2(0.9%), Wound hematoma 1(0.5%), Wound infection 1(0.5%), Small bowel injury 1(0.5%), Acute pancreatitis 1 (0.5%), acute gastric erosion 1 (0.5%), Postoperative bleeding 1 (0.5%), Deep venous thromboses 3(1.4%), Internal dissection of the renal artery with the formation of internal flap 1 (0.5%), Arterial thromboses 1(0.5%) per-operatively, Venous thromboses 1(0.5%) per-operatively, No mortality, or graft loss happened because of these surgical complications. The one-month patient survival was 98%, and graft survival was 97%.

CONCLUSION:

Surgical complications occur in both the immediate postoperative period and later after kidney transplantation. But these complications had no effect on the graft survival, when managed accordingly.

KEY WORDS:kidney transplantation, surgical complications, iraq.

INTRODUCTION:

Renal transplantation has become the treatment of choice for end-stage renal disease. Despite improvements in peritoneal dialysis and hemodialysis, these patients survive much longer after receiving a kidney transplant. Survival rates have improved because of refined surgical techniques, more effective immunosuppression, improved availability of human leukocyte antigen typing for donor-recipient matching, and establishment of a nationwide coordinating network. 1-year survival rates for grafts are reported to be 80% for mismatched cadaveric renal grafts; 90%, nonidentical living related grafts; and 95%, human lymphocyte antigen–identical grafts. The half-life of grafts from living related donors varies between 13 and 24 years, depending on the match [1,2,3].

Many surgical complications can occur after kidney transplantation, we studied the incidence and management of early surgical complications; that occurred within the first month after transplantation, in 213 kidney transplanted patients.

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PATIENTS AND METHOD:

A cross sectional descriptive study including tow hundred and thirteen patients with renal failure underwent allograft kidney transplantation from October 2003 to October 2010, in the renal transplant center, medical city teaching hospital, Baghdad . They were from different provinces of Iraq (Table 1). And there were different causes for renal failure (table 2).

All the required investigations were done for the recipients and donors; including hematological, biochemical, virological, radiological, immunological, imaging, and angiographic studies. The transplanted kidney was usually placed extraperitoneally in the patient's right iliac fossa, while the left iliac fossa was used in patients with second transplant. The renal artery was anastomosed end-to-end to the recipient internal iliac artery, while end to side anastomosis to the recipient external iliac artery was done when the internal iliac artery was severely etherosclerosed. The donor renal vein was always sutured in an end-to-side fashion to the recipient external iliac vein, with nonabsorbable monofilament sutures. Ureteroneocystostomy for restoring urinary drainage, with direct mucosa to mucosa suturing, and double J ureteric stenting, which was removed after one month. Transuretheral folley's catheter were inserted in the recipient and was removed five days later. Tow tube drains were left in the perinephric area and was removed three to four days later. Peroperetively the kidney was perfused

Table 1: Patient's origin and numbers

aghdad	117	Anbar	16	Wasit	15
Diala	14	Babylon	11	Thi-Qar	3
Suleimaniya	2	Najaf	3	Ta'amem	4
Neneva	9	Maysan	3	Erbil	3
Basra	4	kerbela	4	Salaheideen	1
Dohouk	1	Muthanna	1	Qadisiya	2
TOTAL	213				

Table 2: Causes of renal failure in this study

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1. Unknown	148 (69.5%)
2. Chronic Glomerulonephritis	23 (10.8%)
3. Diabetic Nephropathy	10 (4.7%)
4. Hypertensive Nephropathy	5 (2.3%)
5. Lupus Nephritis	2(0.9%)
6. Obstructive Nephropathy	4(1.9%)
7. Reflux Nephropathy	2(0.9%)
8. Post. Urethral valve	2(0.9%)
9. Road traffic accident	1(0.5%)
10. Acute cortical necrosis	2(0.9%)
11. Chronic UTI	6(2.8%)
12. Polycystic disease	4(1.9%)
13. Rhomatoid arthritis	1(0.5%)
14. Nephrotic syndrome	3(1.4%)

RESULTS:

213 patients, 144(67.6%) were males, 69(32.4%) were females. The age range of the donors was 18y - 55years (mean 30.39±9.32), their body weight range was 50 kg – 110 kg (mean 67.04±13.94). While the age range of the recipients was 7y – 66y (mean 31.40±11.35), (figure 1), their body weight range was 17 kg – 93 kg (mean 59.95±16.67). 121(56.9 %) were unrelated donors, 92 (43.2%) were related donors. Transplantation to the right fossa was done in 205 (96.2%) patients, while transplantation to the left with 200 – 300 cold ringer lactate solution before transplanting it to the recipient. The donor was discharged from hospital in the first or second post operative day, and the recipient was discharged between the sixth to tenth postoperative day.

Left nephrectomy was done in all donors, while right nephrectomy was done in one donor only.

iliac fossa was done in 8(3.8%) patients; 7(3.3) of them were second transplant, and 1(0.5%) because of right nephrectomy.

Anastomosis to the recipient internal iliac artery was done in 204(95.8%) patients; and anastomosis to the recipient external iliac artery was done in 9(4.2%) patients. While anastomosis to the recipient inferior epigastric artery was done in 1(0.5%) patient only.
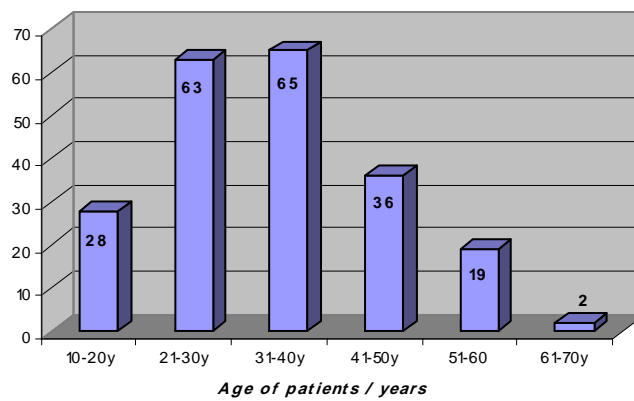
Figure 1: Age distribution of the patients

The incidence of multiple renal vessels was 55(25.8%), 38 (17.8%) were double renal arteries, 2 (0.9%) were triple renal arteries, 14(6.6%) were double renal veins, and 1(0.5%) was triple renal vein. 1(0.5%) of the donor was with double ureter.

Recipient blood transfusion of 1-2 units, was required in 14 (6.6%) patients only.

The reported surgical complications (table 3) were urinary tract infection occurred in 80(37.5%) patients, managed with antibiotics according to culture and sensitivity.

Urine leak occured in 8(3.8%) patients, in 7(3.3%) patients was managed with trans-urethral Foley's catheter insertion, healing occur within seven days in 5(2.3%) patients, and one month in 2(0.9%) patients; while in 1(0.5%) patient conservative one month treatment failed and total urine leak from the wound occur, managed by exploration and re-implantation of the ureter with successful outcome.

Lymphocele occured in 2(0.9%), the amount of fluid collection was 500cc in the first patient, and 350cc in the second patient, and was managed by follow up with abdominal ultrasonography and renal function test every six weeks, no impairment in the renal function occurred, but only mild reversible hydronephrosis, the collection was disappeared within six months in the first patient, and 2 months in the second patient.

Wound seroma occurred in 2(0.9%) patients, was managed by observation, resolution occurred within three weeks.

Wound hematoma occurred in 1(0.5%) patient, was managed by open drainage.

Wound infection occurred in 1(0.5%) patient, was managed by antibiotics according to culture and sensitivity, and laying the wound opened.

Small bowel injury occurred in 1(0.5%) patient during dissection of the bladder, the peritoneum was firmly adherent because of previous

Table 3: The reported surgical complications

Gastro-intestinal complications	No. Pts (%)
Small bowel injury	1 (0.5%)
Acute pancreatitis	1 (0.5%)
Acute gastric erosion	1 (0.5%)
Urinary tract complications	No. Pts (%)
Urinary tract infection	80 (37.5%)
Urine leak	8 (3.8%)
wound complications	No. Pts (%)
Wound seroma	2 (0.9%)
Wound hematoma	1 (0.5%)
Wound infection	1 (0.5%)
Vascular complications	No. Pts (%)
Postoperative bleeding	1 (0.5%)
Lymphocele	2 (0.9%)
Deep venous thromboses	3 (1.4%)
Intemal dissection of the renal artery	1 (0.5%)
Arterial thromboses	1 (0.5%)
Venous thromboses	1 (0.5%)

operations, and small bowel injury occurred while we were trying to open the bladder by diathermy, managed by two layers suturing, nasogastric tube, and nothing by mouth for three days, the outcome was successful.

Acute pancreatitis occurred in 1 (0.5%), and acute gastric erosion occurred in 1 (0.5%) patient also, both of them were managed conservatively.

Postoperative bleeding happened in 1 (0.5%) patient, re-exploration done and the bleeding was from the small vessels in the renal hilum and was ligated.Deep venous thromboses occurred in 3(1.4%)

patients, managed by intravenous heparin 5000 IU every six hours for seven days, the outcome was successful in two patients, while in one mild pulmonary embolism occurred, and was given warfarin for three months.

Intemal dissection of the renal artery with the formation of intemal flap, happened in 1 (0.5%) patient, due to the use of wide bore cannula during cold fluid perfusion of the kidney, diagnosed by selective renal angiography, and managed by Fraxiparine 2850 IU/0.3ml subcutaneously for 10 days with successful outcome.

Arterial thromboses occurred in 1(0.5%) patient per-operatively, because of severe atherosclerosis, the anastomoses was converted from the internal iliac artery to the extrnal iliac artery, with successful outcome.

Venous thromboses occurred in 1(0.5%) patient per-operatively, involving the renal vein and external iliac vein, because of very narrow external iliac vein with multiple valves, managed by thrombectomy with fogarty's catheter, and valvotomy. The outcome was successful.

No mortality, or graft loss happened because of these surgical complications. The one-month patient survival was 98%, and graft survival was 97%.

DISCUSSION:

Kidney transplantation has been established as the most efficient treatment of end stage renal disease with the advantage for the patient to live a nearly healthy life. It is also more costeffective than dialysis if the kidney graft survives more than 1 to 3 years (4,5).

Gastrointestinal (GI) complications happened in three patients in this study. Several factors, such as immunosuppressive medication and infections, can predispose kidney transplantation patients to the development of GI problems. The diagnosis of severe GI complications can be delayed and treatment can be more complicated due to the use of immunosuppressive drugs [6].

Systemic lupus erythrematosus (SLE) and polycystic kidney disease (PKD) predispose patients independently to pancreatitis, diverticulosis and colon perforations [7]. Diabetes mellitus (DM) is known to predispose kidney

transplantation patients to infectious GI complications [8].

Cytomegalovirus (CMV) can cause ulcerations, haemorrhage and perforations in the entire GI tract [9]. Gastric ulcer disease was a frequent and often fatal complication of kidney transplantation in the earlier years [10]. The use of immunosuppressive medication also predisposes to the development of gallstones and pancreatitis [11], The incidence of pancreatitis after kidney transplantation varies from 0.8%11% [12]. The incidence of severe gastroduodenal ulcers has diminished since effective ulcer prophylaxis with H2 blockers and proton pump inhibitors [13]. We do usually give proton pump inhibitors for all patients routinely post-operatively. Nowadays, when effective ulcer prophylaxis is used, the frequency of gastroduodenal ulcers has diminished in the general population as well as after kidney transplantation [14,15].

Urological complications occur in 3%-20% of the patients after kidney transplantation [16,17]. The incidence of urine leakage can rise up to 10%, Symptoms include discharge from the wound, pain, fever, and an increased creatinine. Extravasation of urine may occur from the renal pelvis, ureter, or ureteroneocystostomy site due to ureteral necrosis caused by vascular insufficiency or increased urinary pressures caused by obstruction. Caliceal leakage is an uncommon cause and occurs secondary to segmental infarction in patients with accessory renal arteries or due to ligation of a polar artery. Ischemia may result from harvesting of the graft, anastomotic technique, vascular supply variation, rejection, or medication. Uretral obstruction can be caused by a blood clot, uretral slough, technical problems in surgery, like malrotation or kinking of the anastomosis, and by compression from the outside by a lymphocele [18]. The incidence of urine leakage in our patients was 3.8% and it's comparable to the mentioned results.

Wound infection occurs nowadays in less than 1% of the cases. This is so, because steroid doses are smaller than before and prophylactic antibiotics are used. Also recipient patients are in better general health condition than before [18].

Immunosuppressive treatment predisposes transplantation patients to increased rates of normal and opportunistic, systemic and localized infections of viral, bacterial and fungal origin [19].

Urinary tract infection is the most common infection after kidney transplantation. The sources of infections occurring in the first weeks after kidney transplantation, such as pneumonia, urinary tract infections and wound infections, are similar to those that develop in nonimmunocompromised patients who have undergone surgery. Infections with opportunistic pathogens and cytomegalovirus usually develop 1 to 6 months after the transplantation, and infections that are common in the general population can be seen after 6 months [20].

Perinephric postoperative fluid collections are common following transplantation (50%) and include hematomas, seromas, urinomas, lymphoceles, and abscesses. The appearance of peritransplant fluid collections is nonspecific, but differentiation of the fluid type may be attempted based on the radiologic appearance of the collection and the postoperative interval. The clinical significance of these collections is largely determined by their size, location, and possible growth. Ultimately, the diagnosis can be made by using percutaneous aspiration of the fluid as needed. In the immediate postoperative period, small hematomas or seromas as peritransplant collections are almost expected [21,22].

Postoperative bleeding usually occurs from the small vessels in the renal hilum that are not ligated during the operation. The bleeding can also arise from the vascular anastomoses when a mycotic aneurysm or the graft itself ruptures [23].

Lymphoceles occur within weeks and the first months after the transplantation. They are caused by a leak from severed lymphatic vessels near the iliac vessels during the transplantation or disruption of hilar lymphatics. The incidence varies between 1%-18%. It occurs as an abdominal mass usually located medially to the transplanted kidney, between the graft and the bladder. Can cause uretral obstruction producing hydronephrosis and compress iliac veins leading to oedema of the leg and, in severe cases, even to deep vein thrombosis [20].

Vascular complications occur in approximately 1%–2% (17), includes renal artery stenosis, infarction, arteriovenous fistulas, pseuodaneurysm, and renal vein thrombosis. Renal artery occlusion commonly associated with allografts of disparate vessel size or multiple anastamoses. Graft thrombosis incidence varies from 0.5%-8% [23].

It can be both of arterial or venous origin. Graft thrombosis usually occurs a few days after the transplantation. Renal artery thrombosis may result from hyperacute rejection, anastomotic occlusion, arterial kinking, or intimal flap. Renal vein thrombosis is an unusual complication of transplantation; it occurs in less than 5% of

patients and usually in the first postoperative week. Hypovolemia, venous compression from a peritransplant fluid collection, dysfunctional anastomosis, and slow flow secondary to rejection or other allograft disease can also precipitate renal vein thrombosis. An increased prevalence of renal vein thrombosis in left lower quadrant allografts has also been attributed to compression of the left common iliac vein between the sacrum and the left common iliac artery (silent iliac artery compression syndrome) [23,24].

CONCLUSION:
Surgical complications occur in both the immediate postoperative period and later after kidney transplantation. But these complications had no effect on the graft survival, when managed accordingly.

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