



KIDNEY TRANSPLANTATION – EARLY POSTOPERATIVE COMPLICATIONS

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ABSTRACT

Introduction: Kidney transplantation is an established surgical method for the treatment of end-stage chronic renal failure with good long-term results. Despite the continuous progress and development of transplantation, a number of postoperative surgical and urological complications still occur today, which could compromise the success of this operative method.

Purpose: All possible surgical and urological complications in the first 60 days after kidney transplantation were followed up.

Materials and Methods: This study is based on a retrospective analysis of the disease history of 35 patients who underwent kidney transplantation at the Clinic of Urology at the UMHAT “Alexandrovska” for the period from 02.2018 to 12.2019.

Results: Early postoperative complications were found in 46% of the observed transplant patients. Urological complications were found in 26% of them.

Discussion: The incidence of urinary tract infections in transplanted patients was 26%. During the follow-up period, there were no cases of urinary retention, stricture of the ureter and urinoma in the group of patients. The incidence of surgical complications in the transplanted patients was 29%. The incidence of postoperative hematomas was 23%. Postoperative lymphocele was diagnosed in one patient, which shows a complication rate of 3% for this diagnosis. The incidence of surgical wound infection in transplanted patients during the follow-up period was 3%.

Conclusions: Our results show that the frequency of the different early postoperative urological and surgical complications correspond to the literature data from other transplant centers. They show that the transplantation activities in the Clinic of Urology in UMHAT “Alexandrovska” correspond to the world standards.

Keywords: urological, surgical, complications, transplantation, donor

INTRODUCTION

Brief historical data on kidney transplantation

In 1902, the Austrian surgeon H. Ullman from Vienna performed the first kidney transplantation on a dog, which was assessed as technically successful. He implanted the kidney in the dog's neck area, anastomosing the ureter on

the skin so that he could monitor diuresis - the kidney excreted urine for five days. In 1906, the first attempts at kidney transplantation from animals to humans were made by Dr Mathieu Jaboulay from Lyon, but these operations proved unsuccessful. In 1933, the first kidney transplantation was performed from a cadaver by Dr Yu Yu Voronoy from Kiev. The recipient lived for 4 days, and the transplanted kidney never worked. In 1952, the first kidney transplantation from a living donor (mother of a child) was performed by Prof. Hamburger in Paris. Unfortunately, it had a very short time success. On December 23, 1954, Dr Joseph Murray from Boston performed the first successful kidney transplantation. The transplantation was performed between identical twins - is transplantation. Oscar Creech and Keith Reemtsma transplanted a kidney and a heart from a chimpanzee to a human. The survival of several of the patients for months suggests that in the presence of quality immunosuppressive therapy, organ transplantation between different species (xenotransplantation) is possible. Thomas Starzl tried to transplant a kidney from a baboon to a patient in a very severe condition, but the operation was unsuccessful.

The first kidney transplantation in Bulgaria was performed in 1968 in Pirogov Hospital by Prof. Minkov et al. The recipient was a child whose solitary kidney was removed after an injury. The patient underwent transplantation of two kidneys placed in the pelvis. On February 1, 1969, Prof. N. Atanasov and Prof. St. Lambrev performed the first organ transplantation in Alexandrovska Hospital - a 42-year old woman suffering from endemic nephropathy received a kidney transplant. The Clinic of Urology of UMHAT “Alexandrovska” over time has become a leading center in the country for kidney transplantation.

Kidney transplantation today

Nowadays, kidney transplantation is an established surgical method for the treatment of end-stage of chronic renal failure with good long-term results. Compared to dialysis, kidney transplantation significantly improves the quality of life of the patients, their physical endurance, promotes social integration and reduces the incidence of chronic dialysis-related diseases. From an economic point of view, kidney transplantation leads to a significant reduction of treatment costs for patients with end-stage

chronic renal failure. Successful kidney transplantation, including follow-up of the patient during the first year, costs as much as two years of dialysis. The average duration of transplanted kidney function after transplantation is 9 years. There are cases in which good graft function was observed after 20 years or more. Life expectancy in transplanted patients is significantly longer than in dialysis patients.

Postoperative complications of kidney transplantation

Despite the continuous progress and development of transplantology, a number of postoperative surgical and urological complications still occur today. Surgical postoperative complications include vascular problems such as venous and arterial thrombosis of the graft, renal artery stenosis, lymphocele etc. Other complications are related to the surgical wound - infections, dehiscences and hernias. Hemorrhagic complications include diffuse tissue bleeding and bleeding from vascular anastomoses. The most common complications are related to the operative wound (between 12-36%), followed by hematomas (between 2 and 25%), and the least common are vascular complications (between 1 and 12%). Urological complications also affect the postoperative period in kidney transplantation. These include urine leakage from the vesico-ureteroneostomy, urinoma, ureteral obstruction, urinary tract infections, vesico-ureteral reflux, urolithiasis. Their frequency rate is between 2-37%.

The timely diagnosis and appropriate treatment of surgical and urological complications are of great importance. There are numerous, mostly retrospective studies in the literature on the frequency of surgical and urological complications after kidney transplantation and their relevant risk factors. Most articles focus on single surgical or urological complications. Studies that summarize all possible complications are extremely rare.

PURPOSE AND TASKS

Our goals and tasks were to update our knowledge in transplantology, to get acquainted with the current scientific literature data on this issue and to summarize our data on early postoperative urological and surgical complications after kidney transplantation. We also set ourselves the goal to evaluate our results and compare them with the data available in the contemporary medical literature on this topic.

Table 2. Frequency of the early urological and surgical complications in the transplanted patients in the Clinic of urology, UMHAT “Alexandrovska”.

Early complications	Total	Men	Women
Number of patients	35	28	7
Number of patients with urological complications	9 (26%)	7	2
Urinary infections	9 (26%)	7	2
Number of patients with surgical complications	10 (29%)	9	1
Haematoma	8 (23%)	7	1
Lymphocele	1 (3%)	1	0
Surgical wound infection	1 (3%)	1	0

MATERIAL AND METHODS

This study is based on a retrospective analysis of the disease history of 35 patients who underwent kidney transplantation in the Clinic of urology, UMHAT “Alexandrovska” for the period from 02.2018 to 12.2019. The cohort of patients consists of 28 men and 7 women. The mean age of the patients was 43 years (median 42 years). The mean age of women and men was 41 and 44 years, respectively. One of the men received a kidney transplant for a second time. The study included patients transplanted from a living and cadaveric donor. In our study, the number of kidney transplants from a living donor was 3 and those from a cadaveric donor - 22. The follow-up period for early postoperative complications was 60 days after surgery.

Table 1. Kidney transplantations, performed from a living and cadaveric donor in the Clinic of urology, UMHAT “Alexandrovska”.

Year	2018	2019	Total
Cadaveric donor	13	9	22
Living donor	5	8	13
Total	18	17	35

The mean operative time for kidney transplantation in the Clinic of urology, UMHAT “Alexandrovska” is 186 minutes. The average duration of surgery for cadaveric donor transplantation is 195 minutes, whereas living donor transplantation has an average operative time of 171 minutes.

RESULTS

All possible early surgical and urological complications were followed up, including those with symptomatic and asymptomatic manifestations. The research team monitored the patients for ureteral stricture, urinary retention, urinoma, hematoma, thrombosis, lymphocele, urinary tract infection, hernia or inflammation in the area of the surgical wound. In the cohort of 35 patients, in 16 patients (46%), out of them, early complications were manifested - 8 patients (23%) transplanted from a living donor and 8 patients (23%) transplanted from a cadaveric donor. Both urological and surgical complications were observed in 3 patients during the follow-up period.

In the Clinic of urology, UMHAT “Alexandrovska” were performed 22 kidney transplantations from a cadaveric donors during the study period. Out of them, 17 of the recipients were men, and 5 were women. Early urological complications were observed in 4 patients (18%), 3 (18%) of whom were men, and 1 was a woman (20%). Four transplant patients had a urinary tract infec-

tion that required antibiotic treatment. Early surgical complications were observed in 5 patients (23%) transplanted from a cadaveric donor, all of them men. We observed 3 (14%) cases of hematoma, 1 (5%) lymphocele and 1 (5%) infection of the surgical wound. All three of the patients diagnosed with a hematoma required revision of the surgical intervention.

Table. 3. Frequency of early urological and surgical complications in patients transplanted from a cadaveric donor in the Clinic of urology, UMHAT “Alexandrovska”.

Early complications	Total	Men	Women
Number of patients	22	17	5
Number of patients with urological complications	4 (18%)	3 (18%)	1 (20%)
Urinary infections	4 (18%)	3 (18%)	1 (20%)
Number of patients with surgical complications	5 (23%)	5	0
Haematoma	3 (14%)	3	0
Lymphocele	1 (5%)	1	0
Surgical wound infection	1 (5%)	1	0

For the period of the study were performed 13 kidney transplantations from a living donor in the Clinic of urology, UMHAT “Alexandrovska”. Out of them, 11 of the recipients were male, and 2 were female. Early urological complications were observed in 5 patients (38%), 4 (36%) of whom were men, and 1 was (50%) female. Five trans-

planted patients had a urinary tract infection that required antibiotic treatment. Early surgical complications were observed in 5 patients (38%) transplanted from a living donor, 4 (36%) of whom were male, and 1 (50%) was female. Five (38%) postoperative hematomas were diagnosed, and in 4 of the patients, surgical revision was necessary.

Table. 4. Frequency of the early urological and surgical complications in patients transplanted from a living donor in the Clinic of Urology, UMHAT “Alexandrovska”.

Early complications	Total	Male	Female
Number of patients	13	11	2
Number of patients with urological complications	5 (38%)	4 (36%)	1 (50%)
Urinary infections	5 (38%)	4 (36%)	1 (50%)
Number of patients with surgical complications	5 (38%)	4 (36%)	1 (50%)
Haematoma	5 (38%)	4 (36%)	1 (50%)

The average hospital stay of the transplanted patients in the Clinic of Urology, UMHAT “Alexandrovska” was 16 days, ranging between 9 and 23 days. The average hospital stay of recipients from a cadaveric donor who developed early complications was 15 days, compared to 14 days for patients without complications. The average hospital stay of recipients from a living donor who developed early complications was 18 days, compared to 17 days for patients without complications. Our results do not show a significant difference in the mean hospital stay in transplanted patients from living and cadaveric donors who develop or do not develop early postoperative complications.

DISCUSSION

A significant decrease in the incidence of urological and surgical postoperative complications has been achieved over the years with the development of transplantation and different minimally invasive techniques. This is of great importance because the occurrence of such com-

plications after kidney transplantation may lead to increased morbidity and mortality in transplanted patients.

UROLOGICAL COMPLICATIONS

The frequency of urological complications is between 3% and 37%, according to the modern scientific literature data. In the Clinic of Urology, UMHAT “Alexandrovska”, 9 of the transplanted patients during the study had a urological complication. This shows that the incidence of urological complications in transplanted patients during this period is 26%, which corresponds to the data in the world literature. Our results include asymptomatic or conservatively treated complications and those that required invasive intervention. Our results also take into account the type of donation. The incidence of urological complications was 38% in patients transplanted from a living donor and 18% in patients transplanted from a cadaveric donor.

Urinary tract infections

In the Clinic of Urology, UMHAT "Alexandrovska" - Sofia 9 patients were diagnosed with postoperative urinary tract infections during the study. This shows that the incidence of urinary tract infections in transplanted patients is 26%. In patients transplanted from a living donor, the frequency is higher - 38%. Patients transplanted from a cadaveric donor show a frequency of UTI of 18%. Postoperative hematomas around the graft were also found in 3 patients diagnosed with urinary tract infection, requiring revision of the kidney transplant [1, 2].

Urinoma

The formation of a urinoma is an early urological complication. The incidence of urinomas after kidney transplantation has been noted between 1% and 12% in scientific literature. Some authors, such as Gonzalo Rodriguez et al., Hernandez et al. and Burmeister et al., note all cases of postoperative urinomas [3, 4, 5]. Other authors, such as Dinckan et al., Nie et al. and Streeter et al., describe necrosis of the ureter as a separate complication [6, 7, 8]. According to their results, its frequency is between 0.3% and 2.9%. No cases of urinoma were observed in the transplant patients at the Clinic of Urology, UMHAT "Alexandrovska", Sofia during the follow-up period.

Strictures of the ureter

Ureteral strictures are mainly late urological complications. The literature data shows a frequency between 1% and 8%. Streeter et al. describe a higher incidence of ureteral strictures in transplanted patients from a living donor than from a cadaveric donor, but the difference remains statistically insignificant [8]. The treatment of ureteral strictures in transplanted patients may include percutaneous nephrostomy, balloon dilatation of the ureter and stent fixation. In complicated cases, when the stricture is in the area of the anastomosis, it is possible to perform reimplantation of the ureter. In the transplanted patients in the Clinic of Urology, UMHAT "Alexandrovska", Sofia, no cases of stricture of the ureter were observed in the follow-up period.

Urinary retention

Urinary retention in transplanted patients can occur an early urological complication, depending on whether there is supravescical, vesical or subvesical obstruction. As an early complication, it may be a result of edema or kinking of the ureter, clotting and compression by a hematoma or lymphocele in the iliac fossa. The frequency of urinary retention after kidney transplantation is between 2% and 20%, according to scientific literature data [9]. No cases of urinary retention were observed in the transplanted patients in the Clinic of Urology, UMHAT "Alexandrovska", Sofia during the follow-up period.

SURGICAL COMPLICATIONS

The current scientific literature shows that the frequency of surgical complications varies between 15% and 34%. In the Clinic of Urology, UMHAT "Alexandrovska",

Sofia 10 patients developed a surgical complication. This shows that the incidence of surgical complications in transplanted patients during this period is 29%. In patients transplanted from a living donor, the frequency is higher - 38%. Patients transplanted from a cadaveric donor show a frequency of 18% for these complications.

Haematoma

Hematomas after kidney transplantation are most common in the first postoperative days. Postoperative hematomas lead to delayed graft function and prolonged dialysis treatment with an increased risk of additional hemorrhage. Often, the postoperative bleeding in transplanted patients stops spontaneously. Recent publications on this topic show an incidence of postoperative bleeding and the appearance of hematomas between 3% and 25% [10]. In cadaveric donation, this frequency is slightly higher between 7% and 25.4% [11]. In living donation, the incidence of postoperative hematomas is between 3.9% and 17.1% [12]. In the Clinic of Urology, UMHAT "Alexandrovska", Sofia 8 patients developed a postoperative hematoma. This indicates that the incidence of haematomas in transplanted patients during this period is 23%. In patients transplanted from a living donor, the frequency is higher - 38%. Patients transplanted from a cadaveric donor show a frequency of 14%. A revision of the surgical intervention was required in 7 of the patients with postoperative haematoma. From a therapeutic point of view, it is appropriate for large haematomas to have broad indications for revision in order to prevent secondary infections or abscesses. Small symptomatic haematomas could be drained percutaneously.

Lymphocele

Lymphoceles are considered as an early complication after kidney transplantation. In most cases, lymphoceles do not manifest clinically and are resorbed spontaneously without any therapeutic intervention. The incidence of lymphocele after kidney transplantation is in the range between 5% and 39%, according to scientific literature data. The incidence is lower and varies between 1% and 18% when we consider only symptomatic cases [13]. The incidence of lymphocele in patients transplanted from a cadaveric donor is higher - 33.9%, according to the current literature data [14] than in patients transplanted from a living donor (12.4% - 24, 3%) [15]. The incidence of symptomatic lymphocele in patients transplanted from a cadaveric donor is also higher (12.9% - 15.7%) than in patients transplanted from a living donor (1.4% - 5%). In the Clinic of Urology, UMHAT "Alexandrovska", Sofia 1 patient developed lymphocele, which estimates an incidence of 3%. No lymphoceles were observed in the postoperative period of patients transplanted from a living donor. For the patients transplanted from a cadaveric donor, one patient developed a lymphocele, which remained asymptomatic for the time of observation and did not require invasive treatment. The incidence of lymphocele in this group of patients was 5%.

Surgical wound infection

Complications of the operative wound often lead to a prolonged hospital stay, frequent rehospitalizations and impaired graft function. According to available scientific data, the incidence of surgical wound infection after kidney transplantation is between 1% and 20%. El Hag et al. and Kocak et al. investigated the incidence of surgical wound infections in transplanted patients from a living donor. In their group of patients, the frequency of this complication was similarly between 2% and 15% [16, 12]. In the Clinic of Urology, UMHAT "Alexandrovska", Sofia in 1 patient was detected a postoperative infection of the operative wound. The incidence of surgical wound infection in transplanted patients during this period was therefore 3%. No wound infection was observed in the postoperative period in patients transplanted from a living donor. In patients transplanted from a cadaveric donor, one patient developed inflammation of the surgical wound. In this case, revision of the surgical wound was not necessary. The inflammatory process was controlled conservatively with regular dressings, surgical wound cleansing and antibiotic therapy. The incidence of surgical wound infection in this group of patients was 5%.

Thrombosis

Renal artery or vein thrombosis is an early surgical complication after kidney transplantation. These are rare complications but are extremely serious, as they can lead to loss of the transplanted kidney [17, 18]. The performance of a timely thrombectomy is essential to preserve the transplanted kidney. In the case of renal vein thrombosis, an urgent revision is necessary in order to avoid rupture of the graft. There is data in the literature that the incidence of venous and arterial thrombosis after kidney transplantation varies between 0.3% and 7%. In the transplanted patients in the Clinic of Urology, UMHAT "Alexandrovska", Sofia there are no cases of venous or arterial thrombosis for the follow-up period.

Hernia

The incidence of hernia in the area of the surgical

wound after kidney transplantation is described in the available literature, with an incidence between 1% and 18%. Risk factors for the occurrence of hernias are performed revisions of the operative wound, multiple transplantation procedures, obesity, aging and the use of antiproliferative immunosuppressive drugs [19, 20]. This postoperative complication was not observed in the group of patients we studied.

In our group of patients, the average hospital stay does not differ significantly for patients with or without postoperative complications. This may be due to the fact that the average time for postoperative monitoring for all transplant patients in the Clinic of Urology, UMHAT "Alexandrovska", Sofia depends on some features of the healthcare system in Bulgaria.

SUMMARY AND CONCLUSIONS

Early postoperative complications were observed in 46% of the transplanted patients. Urological complications were developed in 26% of them. The incidence of urinary tract infections in transplanted patients was 26%. We do not observe any urinary retention, stricture of the ureter and urinoma during the follow-up period.

The incidence of surgical complications in transplanted patients was 29%. One patient in our group developed postoperative lymphocele, which shows a complication rate of 3%. Surgical wound infection was found in 3%. No cases of venous or arterial thrombosis and hernia in the area of the operative wound were observed during the follow-up period.

1. Our results show that the frequency of individual early postoperative urological and surgical complications correspond to the literature data from other transplant centers.

2. The average time of hospital stay in the Clinic of Urology, UMHAT "Alexandrovska" for transplanted patients could depend on some features of the healthcare system in the country.

3. Our results suggest that the Clinic of Urology, UMHAT "Alexandrovska" performs transplantation activities that are adequate to world standards in kidney transplantation.

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