



## CURRENT IMMUNOLOGICAL PROBLEMS IN KIDNEY TRANSPLANTATION

Ismoilov Ibodjon Imomjonovich

Bukhara State Medical Institute, Department of Urology

Arashova Gulnora Amirkulovna

Bukhara State Medical Institute, Department of Infectious Diseases

### Abstract

Organ transplantation has won a confident position in the world as an effective method of treating patients with terminal stages of a number of serious diseases. Organizational and legal procedures for intravital and posthumous organ donation have been developed, a coherent system for determining indications for placing on a waiting list has been created, approaches to surgical intervention and immunosuppressive therapy are being improved.

**Keywords.** Kidney transplantation, program, histo-immunological suitability.

It is now clear that kidney transplantation has an advantage over renal replacement therapy in patients with end-stage renal disease. Thus, in patients after kidney transplantation, the life expectancy increases by 2 times and mortality is reduced by more than 4 times in comparison with patients undergoing hemodialysis treatment. Transplantation provides the most complete social rehabilitation, which is expressed in a significant improvement in the quality of life and an increase in the recipient's ability to work in a short time after the operation.

The problem of treating patients with end-stage kidney disease is one of the most pressing modern medical and social problems [1]. At the same time, according to international and Russian studies, kidney allotransplantation (ATP) is the most adequate method of renal replacement therapy in comparison with dialysis (hemodialysis or peritoneal dialysis) [1-3]. Kidney transplantation provides a higher quality of life for patients, and is also the preferred method of renal replacement therapy from an economic point of view [4, 5]. Despite the obvious advantages of this type of renal replacement therapy, there are numerous restrictions on the availability of kidney transplantation across the globe: social, cultural, economic [6].

Kidney transplantation (LT) is one of the first disciplines of transplant medicine to be established clinically as the standard of care for patients with end-stage renal disease. The significant advantages of TP compared with hemodialysis in terms of life expectancy and its quality, as well as in the economic aspect, make it the method of





choice, especially in relatively young patients. Indications for TP are established jointly by a transplant surgeon and a nephrologist or urologist (or / and a pediatrician). These patients are usually chronic dialysis patients. After LT, the one-year graft survival rate is over 95%, and the probability of its rejection within 3-6 months after transplantation is less than 7-10%. There are also opportunities for TP without or before hemodialysis - the so-called preventive TP from a living donor. The advantages of this method are the planned surgical intervention and much better results in terms of the function and survival of the graft. TP from a living related donor significantly reduces the deficit of donor organs. In addition, comparatively recently, a diversified ABO TP system from a living related donor was also introduced in clinical practice. After TP, the selection of the regimen of immunosuppressive therapy is carried out, which corresponds to the main and concomitant diseases of the recipient. Particular attention is paid to this nephroprotection. The development of new less toxic and nondiabetic immunosuppressive drugs that are free of side effects on the gastrointestinal tract is promising and important for further improving the results of treatment of patients after LT.

Over the past decades, great strides have been made in the field of kidney transplantation. This was facilitated by the improvement of the technique of collecting the donor kidney, the careful selection of the appropriate donor, and the solution of a number of technical aspects of transplantation. Improving the effectiveness of treatment of patients with end-stage chronic renal failure (CRF) is largely due to the introduction of physiological direction into clinical practice with an in-depth study of the structural and functional state of the kidneys and urinary tract [1]. At the same time, urological complications after kidney transplantation are still one of the main reasons for the deterioration of the results of operations [7, 8]. As a rule, from the moment of the onset of hemodialysis, the functional activity of the urinary tract is significantly reduced or completely absent. As shown by the research of N. Treivish in 1991, 79.5% of patients have persistent oligoanuria, daily urine output is on average 50-100 ml. The number of acts of spontaneous urination does not exceed twice a day. Dystrophic processes develop in the wall of the bladder, due to the fact that in most of them it does not function for a long time. This is also facilitated by changes caused by the CRF itself [6]. In addition, long-term glucocorticoid therapy, which patients undergo, leads to massive desquamation of the urothelium, pronounced stromal edema in the bladder wall, and in the preserved epithelium - to the emergence of a large number of vacuoles [2]. Perlin D.V. [3] noted that the occurrence of most urological complications is associated with the peculiarities of the blood supply to the graft ureter, as well as the morphological and physiological characteristics of the





bladder wall after prolonged anuria against the background of uremia and immunosuppression. Thus, the need for urological examination of patients preparing for kidney transplantation is obvious. Any violation of the passage of urine, including those associated with functional insufficiency of the lower urinary tract, is a predisposing factor for the occurrence of an inflammatory process in the transplanted kidney and may underlie the failure of transplantation. Timely diagnosis and correction of urodynamic disorders is the main preventive measure to prevent the development of pyelonephritis in the graft [3].

According to the well-known multicenter studies of F. Debruyne [5], which included the results of 4787 kidney transplants, urological complications were observed in almost 10% of recipients, but their true number may be greater [6]. Urological complications after kidney transplantation are up to 7-20%. Urological complications of kidney transplantation are still the cause of unfortunate transplant losses, and sometimes even death of patients. The method of kidney transplantation into the iliac region with the formation of ureterocystoanastomosis has become a generally accepted method, which made it possible to reduce the total number of urological complications from 15-20% to 7-12%. In the process of kidney transplantation, general urology widely recommends various methods of urinary tract anastomoses, Leadbetter and Politano, E. Anderson, F. Debruyne, etc. leading to insolvency. The use of immunosuppressive drugs that promote engraftment of the graft is often accompanied by the development of a vesicoureteral anastomosis failure, serious infectious complications, and the almost complete suppression of the body's defenses creates favorable conditions for the generalization of foci of infection up to the development of sepsis. The incidence of complications is often determined not only by the methods of restoring the urinary tract, but also by the peculiarities of organ removal operations. Of great importance is the most careful relationship with the vessels supplying the ureter, because ureteral ischemia remains one of the unsolved problems of kidney transplantation, which often leads to necrosis of its distal section and anastomotic failure.

Urological complications in kidney transplantation include: urinary leaks and fistulas; obstructive complications; reflux in the graft; infectious and inflammatory complications. All these complications are associated with the functional and histological state of the graft ureter tissue, the recipient's bladder wall tissue, and the initial bacteriological status in the urinary tract.

All of the above complications can develop already in the early postoperative period, which are also provoked against the background of aggressive initial immunosuppression, which entails the addition of a wound infection. All this creates





significant difficulties in treatment and is often accompanied by the loss of the graft, which is noted 2 times more often when complications occur in the first 3 weeks after kidney transplantation. The incidence of urinary fistula or leakage ranges from 1-17% [9]. The following main causes of occurrence can be distinguished: failure of the formed anastomosis between the urinary tract of the graft and the recipient; incompetence of the seams of the bladder wall (when using transvesical techniques of ureterocystoanastomosis); necrosis of the urinary tract graft. In the early postoperative period (the first week after kidney transplant), the most common urological complication is anastomotic leakage, which is observed in 0.5-13% of recipients and is more related to the method of its formation [7]. According to most researchers, from 60 to 80% of urinary fistulas and leaks after kidney transplantation are caused by ischemic necrosis of a part of the ureter and dystrophic changes in the walls of the bladder in the recipient [4]. In the fundamental work A. Shafik [3] showed that approximately 76% of people have a longitudinal variant of blood supply with the main vessels running parallel in the adventitia along the entire length of the ureter from its lateral, anterior and posterior sides, or a bilateral variant - with two main vessels passing from opposite sides of the ureter. In 24% of people there is a so-called loose type of arterial blood supply with segmental arteries, anastomosed with each other in the form of a plexus in the adventitia, from which the own vessels of the ureter emanate [5].

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