



A lot of controversial donors are becoming real donors and many of problems and diseases are no longer contraindications to procured organs for transplantation.

Is there a limit for expanding criteria of kidney donors? How far can we go?

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RUNNING TITLE Is there a limit for expanding criteria of kidney donors? How far can we go?

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ABBREVIATIONS

CIT - cold ischemia time, CHPP - continuous hypothermic pulsatile perfusion, CVA - cerebrovascular accident, DCD - donation after circulatory death, ECD - expanded criteria donor, HBV - hepatitis B virus, HCV - hepatitis C virus, PSA - prostate specific antigen

ABSTRACT

Introduction: The lack of organs for transplantation has forced the transplant community to expand the pool of donors. Using expanded criteria donor (ECD) organs is one of the strategies. Although there are organs that do not fit into definition of ECD and remains controversial for transplantation. The aim of this paper is to report the criteria of discharging kidney from transplantation.

Material and methods: 704 patients received cadaveric renal transplants between January 1, 2010 and August 31, 2015. In this time 181 kidneys were discharged from the transplantation – 125 kidneys (63 referred potential donors) were disqualified before organ procurement and 56 kidneys were rejected from transplantation during organ storage. Data on donors and preservation parameters were collected. Causes of organ refusal were analysed.

Results: The most common causes of kidney rejection from transplantation was poor donor kidney parameters with probability of kidney irreversible injury (84 kidneys - 46,4%) and malignancy or strong suspicion of malignancy in donor body (44 organs - 24,3%). The next causes of kidneys disqualifications were unsatisfactory parameters during machine perfusion (20 kidneys - 11%) and hepatitis C virus (HCV) or hepatitis B virus (HBV) infection in donor body with no recipients with negative crossmatch (7 kidneys – 3,9%). The less common causes of kidney rejection from transplantation were anatomical abnormalities (6 organs), nephrolithiasis (5 kidneys) and the others less frequent causes.

Conclusion: Careful kidney selection is recommended in cases of expanded criteria donor kidneys in order to diminish factors that can negatively affect graft function and survival.

INTRODUCTION

The lack of organs for transplantation has forced the transplant community to expand the pool of donors. The waiting time for transplantation is for many people too long. Every day many patients on the waiting list for transplantations [1] and a lot of patients on dialysis before being report to the waiting list are dying. Using expanded criteria donor (ECD) organs is one of the strategies for making more transplants available. ECD kidneys are kidneys from donors at age 60 years and older, or from donors aged 50–59 years with two or more of three following: serum creatinine concentration above 1.5 mg/dl, cerebrovascular accident (CVA) as cause of death or a history of hypertension [2]. Although there are organs that do not fit into definition of ECD and remains controversial for transplantation. There is a lot of strategies to enlargement the pool of kidney donors e.g. kidneys from living donors, kidneys from donors after cardiac death, kidney from very old donors or from donors with additional diseases and problems. Therefore, every donor and every kidney should be carefully assessed and considered before transplantation. The aim of this paper is to report the criteria of discharging kidney from transplantation.

MATERIAL AND METHODS

Seven hundred and four patients received cadaveric renal transplants between January 1, 2010 and August 31, 2015. 444 (63%) kidneys in this time were stored by hypothermic machine perfusion, the remaining 260 (37%) in cold storage. In this time 181 kidneys were discharged from the transplantation – 125 kidneys (63 referred potential donors) were disqualified before organ procurement and 56 kidneys were rejected from transplantation during organ storage (Figure 1, Figure 2). Data on donors and preservation parameters were collected. Causes of organ refusal were analysed.

RESULTS

The most common cause of kidney rejection from transplantation was poor donor kidney parameters with probability of kidney irreversible injury - 84 kidneys (46,4% all disqualifications). Mostly causes of disqualification in this group were high serum creatinine and urea concentration, low GFR, anuria or significant proteinuria usually in an older donors or in donors with additional diseases like diabetes or hypertension.

31 kidneys were disqualified in our center due to lack of cassettes used in perfusion pumps. Those kidneys were procured by other centers and 29 of them were transplanted (Table 1).

Malignancy or strong suspicion of malignancy in donor body was the second cause of kidney rejection from transplantation - a group of 44 kidneys. In the

most cases it was prostate cancer or elevated PSA (prostate specific antigen) - 59% of kidneys in this group. Among other the most popular were kidney cancer (13,6%) and elevated tumor markers (13,6%) e.g. Ca 125, Ca 19-9 (Table 2).

The third cause of kidneys disqualifications were unsatisfactory parameters during machine perfusion (11%).

The next problem which was cause of kidney rejection from transplantation was hepatitis C virus (HCV) or hepatitis B virus (HBV) infection in donor body. There is allowed to transplant infected kidneys to recipients with the same virus infection but in case of 7 kidneys there were no suitable recipients with negative crossmatch.

Anatomical abnormalities of kidneys were causes of disqualifications of 6 organs. The most common reasons were horseshoe kidneys or vascular abnormalities in donor's kidneys. In case of one donor with horseshoe kidney disqualified by our center some other center procured and transplanted this kidney to one recipient.

The less common causes of kidney rejection from transplantation were nephrolithiasis (5 kidneys), donor cardiac arrest before organ procurement (2 donors), too long cold ischemia time (CIT) (2 kidneys) and the others less frequent causes.

DISCUSSION

Criteria of kidney donors are still expanding. There is a lot of papers which reported a kidneys transplantations from controversial donors which would be disqualified a few year ago. Using expanded criteria donors is the most important strategy for making more transplants available. There is a lot of papers describe good outcome of transplantation of kidney procured from ECD donors. Most of them emphasize pretransplant evaluation which should include some donor parameters, machine perfusion parameters and histological findings [3].

The next strategy of expand the pool of kidney donors is use of kidneys with acute renal dysfunction. De Matos refers in her paper that the results of graft and patient survival after transplant are very similar when the kidney is collected from donor with and without acute renal dysfunction [4]. More important than high terminal creatinine concentration are chronic histological findings in the biopsy of donor's kidney which are associated with worse outcomes [5]. Acute renal dysfunction due to rhabdomyolysis shouldn't be criterion of kidney discharging from transplantation however it may cause slow or delayed graft function [6]. Even renal transplantation from deceased donors with acute renal failure requiring dialysis can give good results and is additional way to decrease the number of patients which are waiting

for transplantation [7].

Some infections of organ donor can be sometimes causes of organ refusal. Probability of severe infection in recipient after transplantation is sometimes cause of donor disqualification. Outerelo describes in his paper that transplantation of organs collected from infected donors is not associated with higher risk of complication when antibiotic therapy is used on donor and recipient [8].

The next strategy, which is used in some centers is dual kidney transplantation. This method is mostly used in case of older expanded criteria donors with reduced renal function and can provide good outcomes [9].

The concept of donation after circulatory death (DCD) is the next way to enlarge pool of kidney donors [10]. The proportion of DCD donors is increasing every year [11] and this strategy of organ donation became more and more accepted. In that case storage by machine perfusion is the method of choice because of more severe ischemic injury [12]. Hypothermic machine perfusion (HMP) has the advantage over cold storage. This advantage is possibility of pretransplant evaluation of kidneys. The most important parameters during machine perfusion are tissue flow and renal resistance [13]. There are no guidelines which refer the exact threshold but the most of authors describe renal resistance 0.4 mmHg/mL/min as that point [14]. In the study of Matsuno, perfusion flow more than 0.4 mL/min/g was the criterion for acceptable kidney for transplantation [15]. Poor parameters of machine perfusion should not be the only method of evaluation of organs before transplantation. Sonnen-day describes the series of transplantation of kidneys with poor parameters of perfusion which gives satisfactory results [16].

Very important and still growing pool of kidneys for transplantation are kidneys procured from living donors. Transplant community try new strategies in this area to increase the pool of organs. One of them is ABO-incompatible living donor kidney transplantation [17]. In that case very important is to use special immunosuppressive therapy including four components: extracorporeal immunomodulation to remove serum anti-A, anti-B antibodies before transplantation, pharmacological immunosuppression, splenectomy and anticoagulation therapy. This method of treatment gives also good outcomes. Other strategy to use more kidneys from living donors is paired kidney donation. This way is useful when two or more pairs of living kidney donor and recipient are not compatible with each other. Then this pairs can exchange the organs to give recipients compatible kidneys [10].

CONCLUSION

The lack of organs for transplantation is one of the most important problems for the transplant commu-

nity and cause expanding criteria of donors. A lot of controversial donors are becoming real donors and many of problems and diseases are no longer contraindications to procured organs for transplantation. A proper evaluation need to be done before transplantation of kidneys collected from that controversial donors. Not every kidney should be procured from deceased donor and not every kidney which was procured should be transplanted. Careful kidney selection is recommended in cases of expanded criteria donor kidneys in order to diminish factors that can negatively affect graft function and survival of graft and recipient.

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TAB 1. THE CAUSE OF KIDNEYS DISQUALIFICATIONS

The cause of kidneys disqualifications	Frequency
Poor donor kidney parameters with probability of kidney irreversible injury	84 (46.4%)
Malignancy or strong suspicion of malignancy in donor body	44 (24.3%)
Unsatisfactory parameters during machine perfusion	20 (11%)
Lack of recipients according to HCV or HBV	7 (3.9%)
Anatomical abnormalities of kidneys	6 (3.3%)
Nephrolithiasis	5 (2.8%)
Cardiac arrest before organ procurement	4 (2.2%)
Too long cold ischemia time (CIT)	2 (1.1%)
Other	9 (5%)

TAB 2. TYPE OF CANCER OR SUSPICION OF MALIGNANCY

Type of cancer or suspicion of malignancy	Frequency
Prostate cancer or elevated PSA	26 (59%)
Kidney cancer (carcinoma clarcocellulare)	6 (13.6%)
Elevated other tumor markers	6 (13.6%)
Lung tumor	2 (4.5%)
Other	4 (9%)

FIG 1.

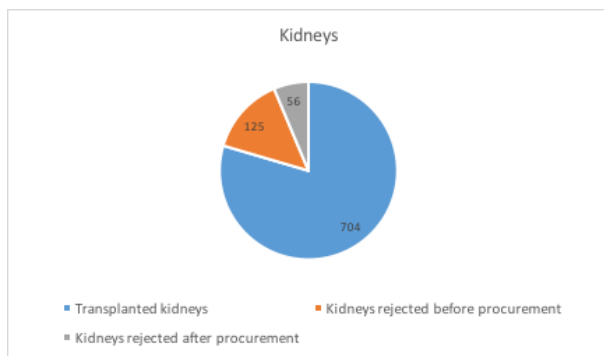


FIG 2.

