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*ORIGINAL ARTICLE*

# The role of biopsy in differential diagnostics of kidney graft pathology

**Vadims Suhorukovs, Tatjana Tihomirova**
Latvian Transplantation Centre, Pauls Stradins Clinical University Hospital, Riga, Latvia

**Summary**
**Introduction.** Different pathological changes of kidney transplants have similar symptoms, thus differential diagnostic is sometime difficult. The important information that may help to set correct diagnose can be obtained from the kidney transplant biopsy followed by pathohistological investigation.
**Aim of the study.** The aim of this study is to demonstrate the role of biopsy in differential diagnostics of kidney graft pathology.
**Materials and methods.** 109 kidney graft biopsies were performed at the Latvian Transplantation Centre in 2007: 20 were protocol biopsies and 89 were performed according to indications (graft dysfunction). All biopsies were performed under USS control followed by pathohistological investigations of the material obtained. Morphological changes were evaluated accordingly to the Banff 97 classification.
**Results.** The morphological findings were as follows: borderline changes – 8 cases (7.34%); acute cellular rejection – 80 cases (73.4%); acute humoral rejection – 1 case (0,92%); hronic graft nephropathy – 27 cases (24.8%); tubolointersticial nephritis – 36 cases (33%); apostematous nephritis – 1 case (0.92%). We observed mild hematuria in only 2 patients after biopsy which stopped spontaneously in a few days.
**Conclusions.** Kidney graft biopsy followed by pathohistological investigation of the material obtained is a precise and sensitive method in the diagnostic process of pathological changes of the graft with a small rate of complication.
**Key words:** kidney transplantation; kidney graft biopsy; kidney graft pathology.

## INTRODUCTION

Common symptoms – an increase in the creatinine level in the blood, a rise in body temperature, a decrease in diuresis etc. - characterize different pathological changes in kidney transplants, and differential diagnostic based merely on the clinical symptoms and laboratory tests sometimes is difficult. In these cases a kidney transplant biopsy followed by pathohistological investigation of the material obtained is a very important procedure that can help to set the correct diagnosis, choose the correct therapy and to begin the therapy in time. The important information can be obtained from the so called 0-biopsy, a donor kidney biopsy made before transplantation because the post-transplantation problems could be associated to donor kidney pathology (7).

## AIM OF THE STUDY

The aim of this study is to demonstrate the role of biopsy in kidney graft pathology, differential diagnostics and the safety of the method. In order to achieve this aim:

1. All kidney graft biopsies performed from 01.01.2007 to 31.12.2007 were analyzed.
2. All biopsy-related complications were analyzed (number, nature, outcomes).

## MATERIALS AND METHODS

109 kidney grafts biopsies were performed at the Latvian Transplantation Centre in 2007. One patient from this group received the kidney from a living donor, all others from deceased donors (Fig. 1). 20 biopsies (18.34%) were analysed - to kidney grafts with stabile function with aim to diagnose subclinical rejection - and 89 (81.66%) were performed according to the indications (graft dysfunction or delayed graft function) (Fig. 2).
Morphological changes were evaluated accordingly to Banff 97 classification (5).
All biopsies were performed under USS control by means of *Vitesse* biopsy set and 18 G *Vitesse* needle twice for each kidney (Fig. 3, Fig. 4).

## RESULTS

The morphological findings were as follows:

1. Borderline changes– 8 cases (7.34%);
2. Acute cellular rejection – 80 cases (73.4%);
3. Acute humoral rejection – 1 case (0,92%);
4. Chronic graft nephropathy – 27 cases (24.8%);
5. Tubolointersticial nephritis – 36 cases (33%);
6. Apostematous nephritis – 1 case (0.92%).

(Fig. 5).
We observed mild hematuria in only 2 patients (1.84%) after biopsy, which stopped spontaneously in a few days (Fig. 6).

## DISCUSSION

Kidney graft biopsy is one of the main differential diagnostic method of graft pathologies. Normally, the kidney transplant biopsy is done under USS control, in order to avoid surrounding structure damage (kidney vascular system, urethra and intestine). Method precision correlates with the amount of obtained material. An

adequate biopsy is the one where 10 or more glomeruli and at least 2 arteries present. Ideally, the material should be obtained from two separate cortex parts, thus the biopsy is usually done twice, in order to acquire two samples (5). For instance, two samples ensure 99% of method sensitivity in cases of acute rejection whereas one sample ensures 90% (2,6).

The location of the place from where the material is taken is of high importance as well. For instance, in order to diagnose acute rejection reaction, material from the cortex is necessary. If the bioptate generally contains medullar tissues a serious rejection reaction could be missed or underestimated (50% of cases) (1). On the other hand, medullar tissue study can suffice to diagnose other pathologies, for instance, acute pyelonephritis (3), polyomavirus nephropathy (4). For an adequate interpretation of obtained data, it is necessary to provide the pathologist with adequate clinical information. A pathologist should normally know:

- Time posttransplant;
- Donor type (deceased or living);
- Perioperational surgical complications;
- Indications for the biopsy;
- Rapid or slow creatinine level growth;
- Type of immunosuppression;
- Changes in the immunosuppression protocol;
- Use of nephrotoxic drugs;
- Proteinuria;
- Infection;
- Renal artery stenosis;
- US data (hydronephrosis, oedema etc.).

If a pathologist has the above mentioned information he can interpret the pathohistological investigation data more precisely.

Kidney graft biopsy can help to diagnose such pathology as acute humoral and cellular rejection, acute pyelonephritis, polyomavirus nephropathy, CMV infection, calcineurin inhibitor toxicity, *de novo* or recurrent glomerular disease, donor related issues.

## CONCLUSIONS

Kidney graft biopsy followed by pathohistological investigation of the obtained material is a precise and sensitive method in diagnostics of pathological changes of the graft with small rate of complications. However, correct interpretation of its data isolated from the clinical picture and laboratory research is impossible. Only a cooperation of physicians and pathologists can ensure correct and timely diagnostics of pathological conditions of a kidney transplant.

**Conflict of interest:** None

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**Address:**
Vadims Suhorukovs
Pauls Stradins Clinical University Hospital,
13 Pilsonu Street , Riga, LV-1002, Latvia
E-mail: vadim.suhorukov@inbox.lv

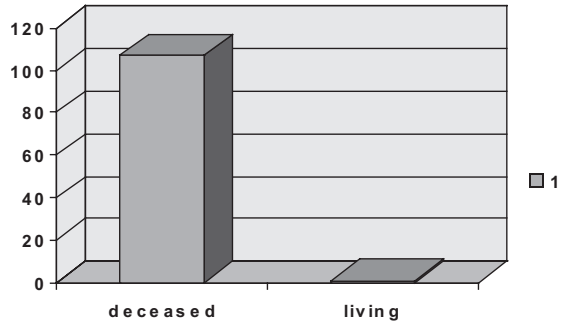


Fig 1. Donor's type

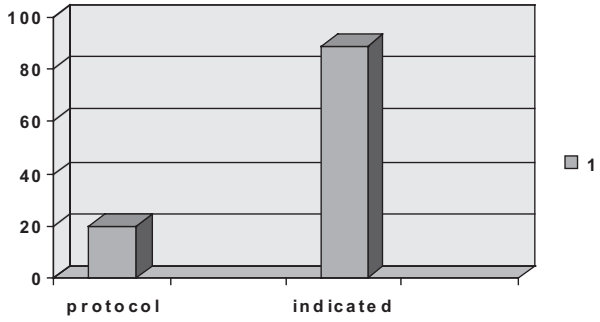


Fig. 2. Aim of biopsy

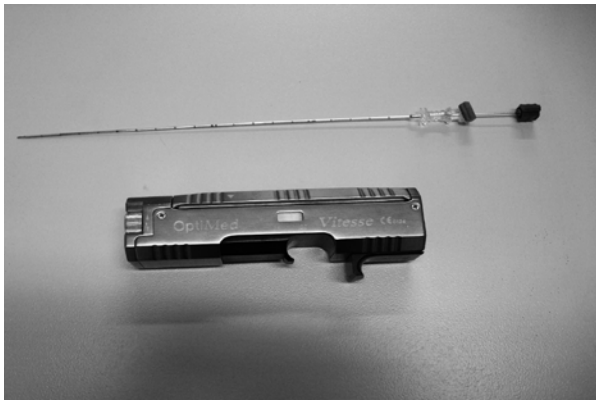


Fig. 3. Biopsy set Vitesse

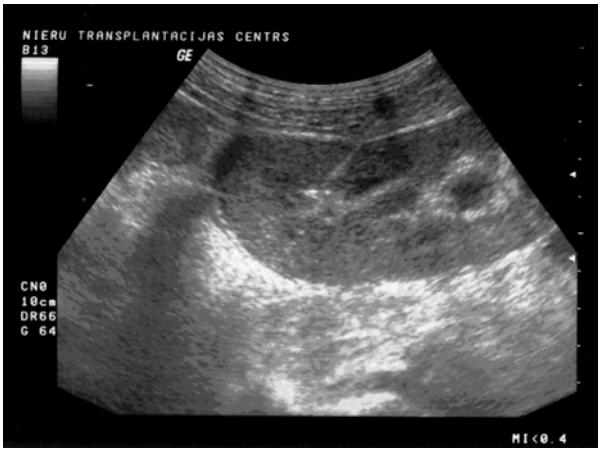


**Fig. 4. Kidney graft biopsy under USS control**
ACR-acute cellular rejection; IN – intersticial nephritis; HGN – hronic grafēt nephropathy; BC – boderline changes; AN – apostematous nephritis; AHR – acute humoral rejection

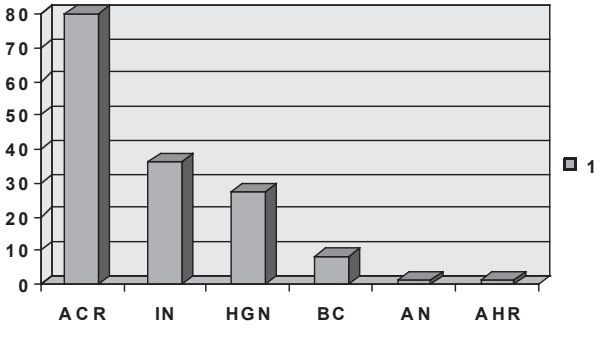


Fig. 5. Morphological findings in the obtained material

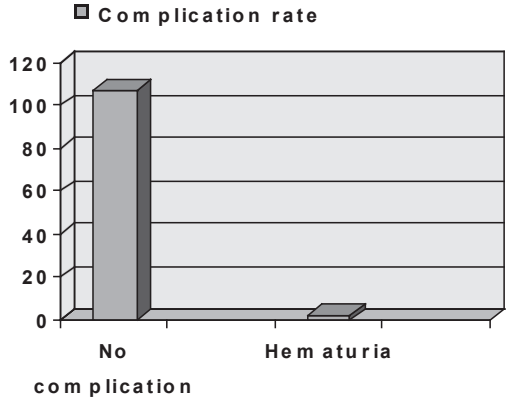


Fig. 6. Complications rate