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RESULTS OF FINE NEEDLE ZERO PUNCTION BIOPSY IN A RELATED RENAL TRANSPLANT

Bakhritdinov F.Sh., Akhmedov A.R., Mardonov Zh.N.
Republican Specialized Scientific-Practical Center of Surgery named after acad. V.Vakhidov , Vascular surgery and kidney transplantation department.
10 St. Farhod , city Tashkent, Uzbekistan. 100115

Objectives: was the study of the relationship between the results of a fine-needle biopsy of the related kidney transplant with age and body mass index.

Material and methods: A comparative analysis of the results of a fine-needle biopsy of a kidney graft in 36 related donors operated at the Department of Vascular Surgery and Kidney Transplantation of the RSSPMCS na V. Vakhidov from 2020 to 2021 is presented. All patients were divided into three groups depending on age. Group I - 15 patients (41.67%) donors aged 19-35 years. Group II - 13 patients (36.11%) donors aged 36-49 years. Group III - 8 donors (22.22%) donors aged 50 and over. Of these donors, male accounted for 52.78%, female - 47.22%. A comparative analysis of the results of a morphological study with the body mass index and sex of donors was also carried out.

Conclusions: The results of a fine needle biopsy of a closely related kidney transplant showed that in elder donors there is an increase of inflammatory processes and subsequent sclerotic changes of various forms . T hese processes are more common in women and manifest as pathomorphological changes in the transplant. The process of pathological changes in the kidneys is more common in overweight donors (BMI>25), and more common in overweight female donors (BMI>25)

Keywords: biopsy, kidney transplantation, morphological examination of transplantat.

Introduction: According to ERA-EDTA data for 2014, 15-20 primary patients with terminal chronic renal failure (CRF) are registered annually in the world per 1 million population. To save the lives of these patients, about 90 thousand kidney transplants are performed annually in the world . In Europe and the USA, the main number of kidney transplants are performed from cadaveric donors, however, related transplants are especially actively performed in the USA, Norway, Israel, Greece (from 30 to 60%), and their share tends to increase. In Asia, the situation is different: in Japan, India, Pakistan, and South Korea, the proportion of related transplants ranges from 70 to 100% [1,2,9]. According to the statistical materials of the Republican Information and Analytical Center and the Institute "Health" of the Ministry of Health of the Republic of Uzbekistan , as of the 2016 rstructure of the general morbidity of the population of Uzbekistan, diseases of the genitourinary system are annually among the leading forms of pathology, and the average long-

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term level of these diseases is 1948.2 per 100,000 population . Today more than 2000 patients require chronic program hemodialysis. More than 2,000 people receive hemodialysis. More than 3,000 people need kidney transplantation as of 2016 [5,7] . Currently, organs from cadaveric and living donors are used for these purposes. Cadaveric organs are widely used in many countries [4,7,9]. Adoption of regulatory documents in 2017 widely opened the possibility of using a closely related kidney transplant. A study of the literature on enlightened kidney transplantation shows that good immediate and long-term results are observed in patients after closely related transplantation. The initial state of the graft is one of the main criteria affecting the functional state of the kidney. This was revealed and summarized in the analysis of the results of postoperative clinical observations, molecular biological and morphological studies [1,3,6].

To date, the selection of a suitable donor is based on biocompatibility, but this criterion should include a number of indicators of the study of the initial state of the graft. Observations show that although no additional diseases were found in the donor as a result of examinations, the age, sex, body mass index (BMI) of donors play an important role in the function of the transplant.

In connection with the above, **the aim of the study** was to study the relationship of the results of a fine-needle biopsy of a closely related kidney transplant with age and body mass index.

Material and research methods. The results of fine-needle graft biopsy in 36 donors for closely related kidney transplantation , operated in the Department of Vascular Surgery of the RSSPMCSH named after Academician V.I. Vakhidov from 2020 to 2021 (Table 1). To achieve the goal, a comparative assessment of the results of a morphological study of a biopsy from a donor kidney was made and compared with other laboratory parameters. All patients were divided depending on age into three groups : Group I - 13 donors (36.11%) aged 19-35 years. Group II - 13 donors (36.11%) aged 36-49 years. Group III - 10 donors (27.78%) aged 50 and over. Of these donors, 19 (52.78%) were men and 17 (47.22%) were women.

Table #1

Distribution of donors by BMI, sex and age

Options (age, BMI)		**Men**		**Women**		**Total**	
		abs .	**%**	**abs .**	**%**	**abs .**	**%**
19-35 years old	BMI<24.9kg/ m^2	3	8.33	2	5.56	5	13.89
	BMI> 25 kg / m^2	four	11.11	4	11.11	8	22.22

36-49 years old	BMI<24.9kg/ m2	3	8.33	3	8.33	6	16.67
	BMI> 25 kg / m ^{2}	four	11.11	3	8.33	7	19.44
50 years or more	BMI<24.9kg/ m2	one	2.78	2	5.56	3	8.33
	BMI> 25 kg / m ^{2}	four	11.11	3	8.33	7	19.44
Total		**19**	**52.78**	**17**	**47.22**	**36**	**100**

The obtained biopsy material for the study was divided into subgroups according to the donor's BMI (BMI<25 and BMI>25) and the results were compared (Table 1).

During the morphological evaluation of histological preparations of the donor kidney, the following were evaluated: glomeruli, tubules, arteries, arterioles, interstitial tissue, a comparative assessment of their condition was performed.

Light-optical micrographs were taken on a Biolam I microscope coupled with a digital camera and a computer. All microphotographs were processed and saved on a computer using Microsoft applications - " Windows 10 pro ".

Results . When examining male donors aged 19-39 years with BMI <25, there were practically no pathological changes, mainly in the glomeruli, tubules, arteries, arterioles and interstitial tissue. When studying all the main samples, they did not differ from the norm (Fig. 1A).

Biopsy data from male donors aged 19-39 years with BMI>25 did not differ significantly from biopsy data from donors with BMI<25. Mainly in the glomeruli, tubules, some arteries, thickening of the walls of arterioles and fatty granular inclusions in the cells of the interstitial tissue were detected. In these characteristics, they differed from the group of men who had a BMI <25 (Fig. 1B).

In the age group of 40-44 years with BMI <25 in male donors, mainly in the field of view, the relative number of glomeruli decreased, and the shape of the tubules began to expand. The walls of arteries and arterioles were relatively thickened, and edema and initial sclerotic changes were detected in the interstitial tissue (Fig. 2A).

However, in male donors in the age range of 40–44 years with a BMI > 25, the above symptoms mostly manifested with significant development. Another feature is that fatty granular inclusions are also detected in the cytoplasm of tubular cells (Fig. 2B).

In male donors, in the age group over 45 years, with a BMI <25, the onset of sclerotic changes in the glomeruli in the field of view was revealed, the relative

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number of glomeruli in the field of view decreased significantly, the shape of the tubules was chaotically expanded, the walls of the arteries and arterioles were thickened, sclerotic changes and edema interstitial tissue. This was also manifested by significant sclerotic changes (Fig. 3A).

Biopsies of male donors over the age of 45 with BMI>25 also revealed that the above symptoms were more pronounced, tubules were chaotically enlarged, and cytoplasmic fat cells were more pronounced. The walls of the arteries and arterioles were thickened, with sclerotic changes, as well as a pronounced edema of the interstitial tissue and pronounced sclerotic changes (Fig. 3B).

When examining female donors with BMI <25, it was revealed that in the age group of 19-39 years, the glomeruli were almost normal, there were areas of slight uneven expansion in the tubules, swelling of varying degrees in the arteries, arterioles and interstitial tissue. Female donors differed from male donors in this group in these characteristics (Figure 4A).

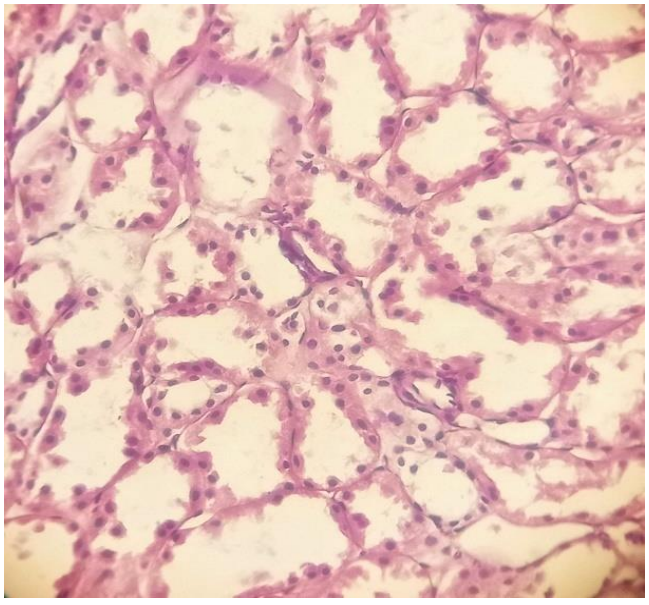

Figure 1A. Normal appearance of renal tubules and arteries. BMI<25. G-E 10x4.

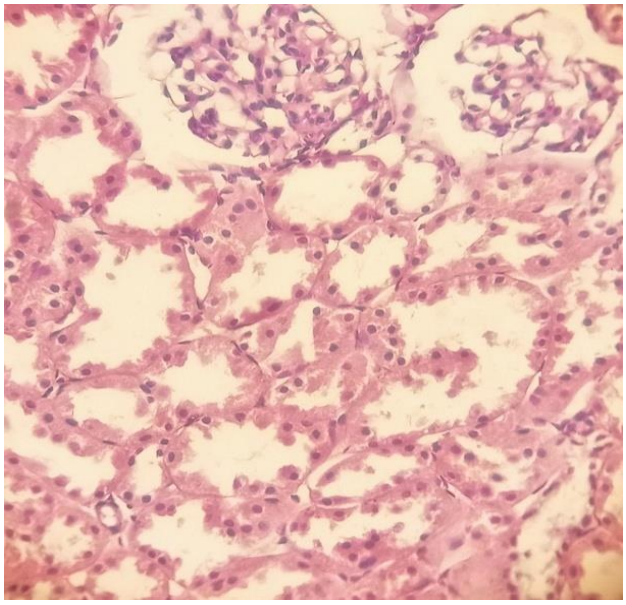

Figure 1B. Normal appearance of the renal glomeruli and tubules. The walls of the arteries, arterioles are slightly thickened, fatty granular inclusions in the cells of the interstitial tissue. BMI>25. G-E 10x4.

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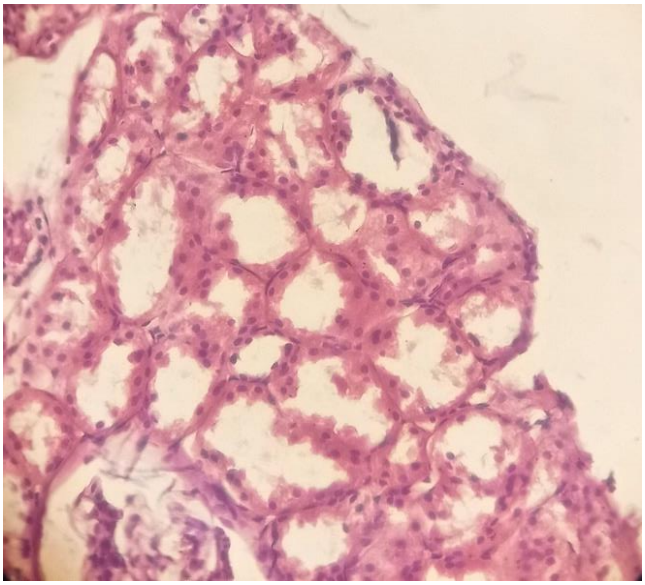

Figure 2A. The relative number of glomeruli in the field of view decreased, the shape of the tubules became enlarged. Relative thickening of the walls of arteries and arterioles and edema of the interstitial tissue. Early sclerotic changes. BMI<25. G-E 10x4.

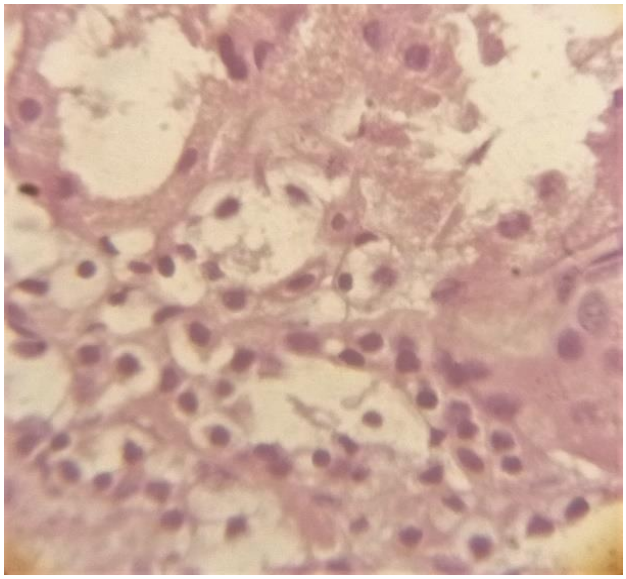

Figure 2B. The walls of arteries and arterioles are relatively thick. Fat granular inclusions and edema of interstitial tissue in the cytoplasm of tubular cells. Early sclerotic changes. BMI>25. G-E 10x6.

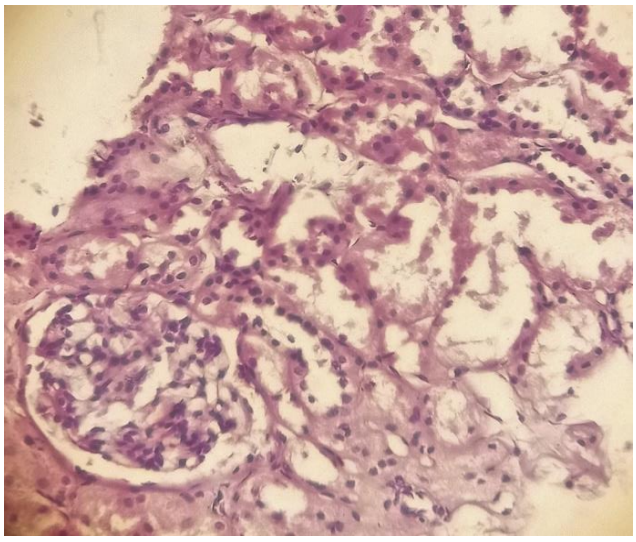

Figure 3A. Sclerotic changes in the glomeruli in the field of view. The shape of the tubules is chaotically dilated, the walls of the arteries and arterioles are thickened, sclerotic changes and edema of the interstitial tissue, as well as significant sclerotic changes. BMI<25.

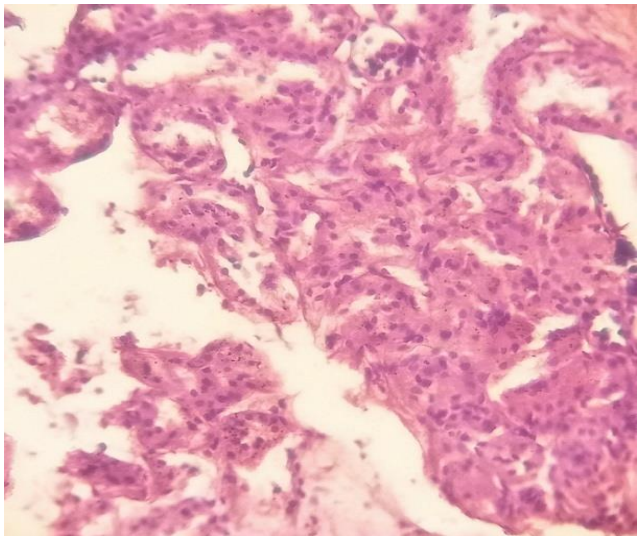

Figure 3B. The shape of the tubules in the field of view is chaotically expanded and covered with cytoplasmic fatty inclusions. The walls of arteries and arterioles are thickened and have sclerotic changes. Edema of the interstitial tissue with significant sclerotic changes.

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G-E 10x4.

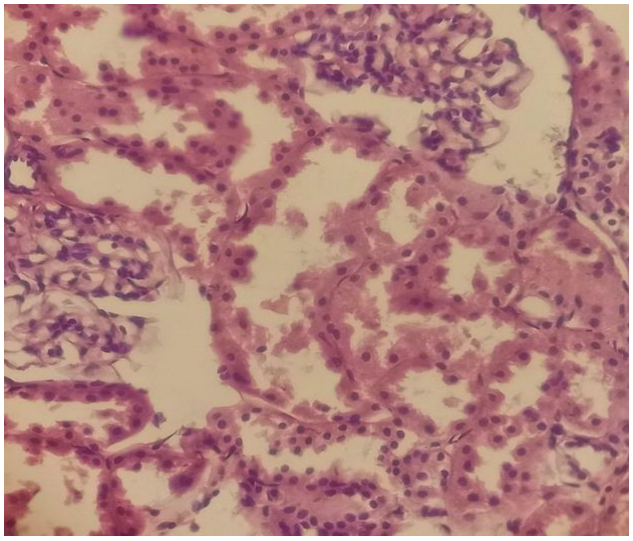

Figure 4A. Normal glomeruli, uneven expansion of the tubules; in the arteries, arterioles and in the interstitial tissue of varying degrees of edema. BMI<25. G-E 10x4.

BMI>25. G-E 10x4.

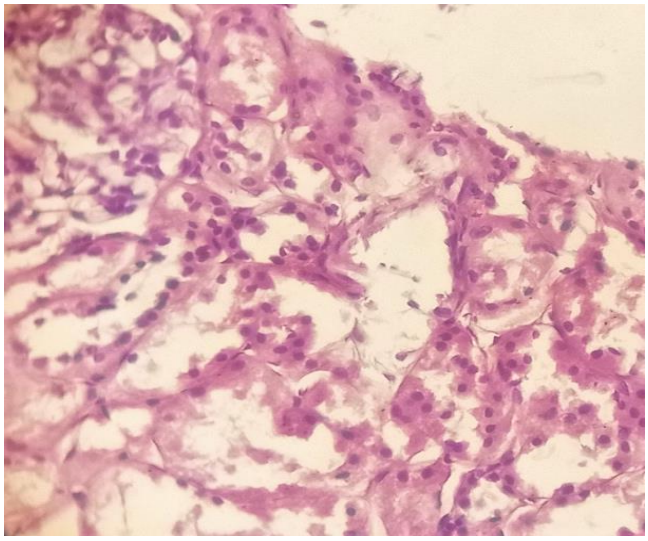

Figure 4B. The number of glomeruli in the field of view is reduced, the tubules are randomly expanded zones. Drainage at various levels. Fat granular inclusions in arteries, arterioles and interstitial tissue. BMI>25. G-E 10x4.

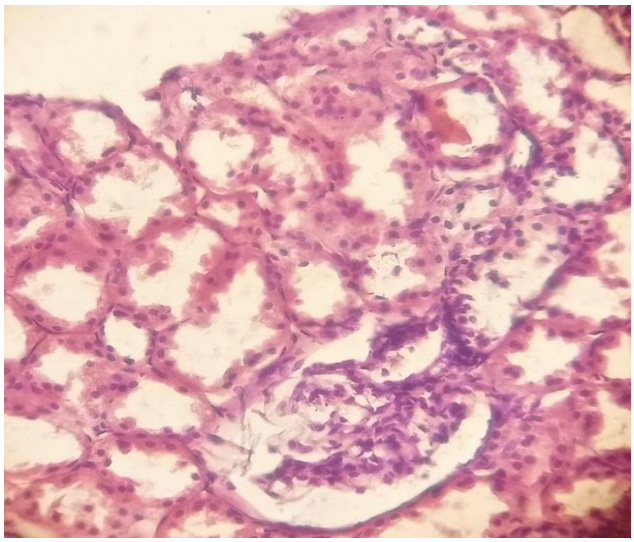

Figure 5A. The relative number of glomeruli in the field of view decreased, the zones of chaotic expansion of the tubules increased. Sclerotic thickenings in the walls of arteries and arterioles. Sclerotic changes and edema of the interstitial tissue. BMI<25. G-E 10x4.

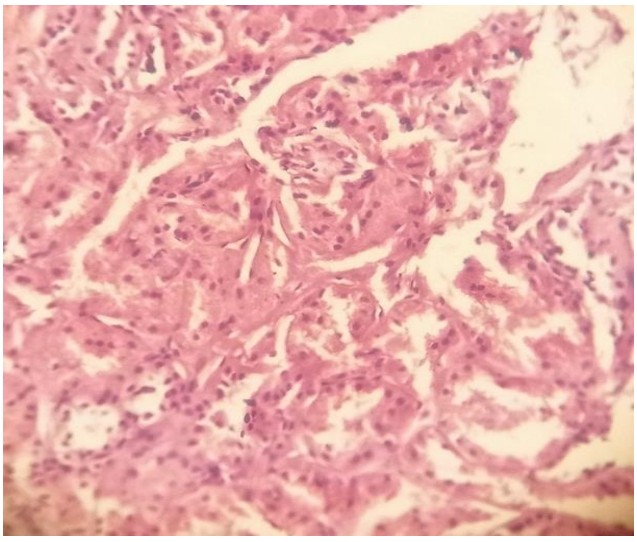

Figure 5B. In the cytoplasm of tubular cells, the number of various fatty granular inclusions, zones of chaotic expansion is increased. Signs of relative sclerotic thickening of the walls of arteries and arterioles, edema and more pronounced sclerotic changes in the interstitial tissue. BMI>25. G-E 10x4.

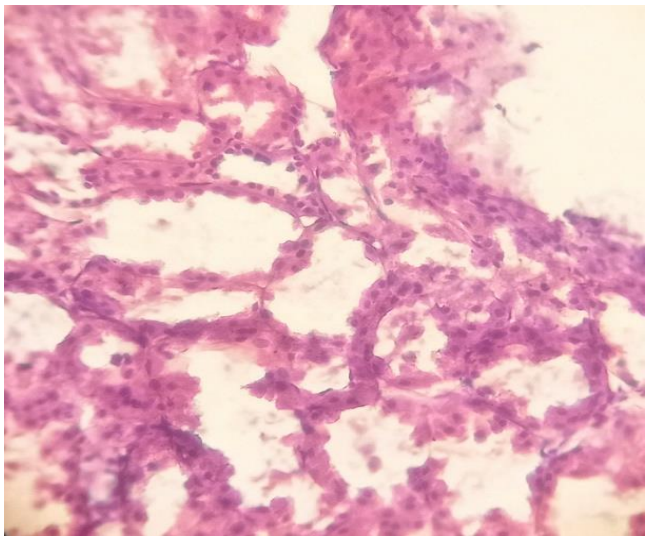

Figure 6A. The shape of the tubules is chaotically expanded, the walls of the arteries and arterioles are thickened, sclerotically changed, edema and sclerotic changes in the interstitial tissue. BMI<25. G-E 10x4.

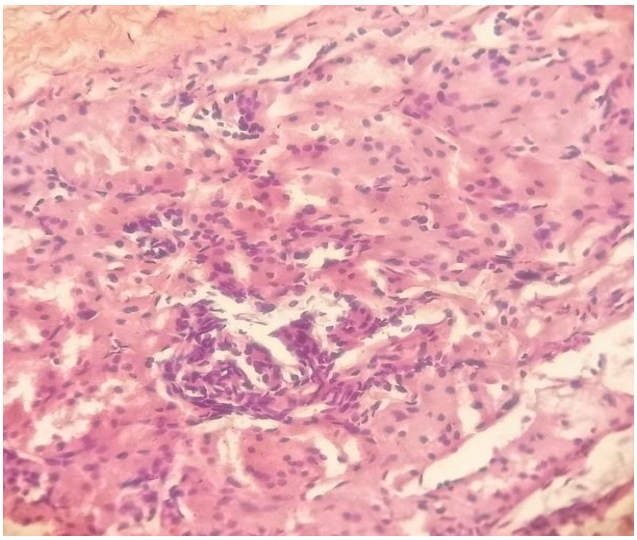

Figure 6B. The beginning of sclerotic changes in the tubules, the shape of the tubules is different, as if in an oppressed form. The walls of arteries and arterioles are sclerotically thickened. Significantly more pronounced edema of the interstitial tissue and fatty deposits, sclerotic changes. BMI>25. G-E 10x4.

Examination of female donors in the age group of 19–39 years with BMI>25 revealed a slight decrease in the number of glomeruli in the field of view, the presence of slightly uneven dilated areas in the tubules, edema of various levels, and fatty granular inclusions in the arteries, arterioles, and interstitial tissue. Male donors in this group differed in these characteristics (Figure 4B).

In female donors aged 40-44 years with a BMI <25, there was a significant decrease in the relative number of tubules, an increase in the number of zones of chaotic expansion of tubular forms, the presence of sclerotic thickened zones in the walls of arteries and arterioles, edema and sclerotic changes in the interstitial tissue were detected (Fig. 5A).

In female donors in the age group of 40–44 years with a BMI>25, the above symptoms were more pronounced. Various fatty granular inclusions in the cytoplasm of tubular cells, an increased number of zones of chaotic expansion of the tubules, relatively sclerotic thickenings in the walls of arteries and arterioles, edema and more pronounced sclerotic changes in the interstitial tissue were revealed. (Fig. 5B).

In female donors in the age group over 45 years with a BMI <25, a biopsy revealed pronounced sclerotic changes in the glomeruli, a significant decrease in their relative number in the field of view, chaotic dilatation of the tubules, thickening of

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the walls of arteries and arterioles, sclerotic changes and edema of the interstitial tissue. (Fig. 6A).

Analysis of the study of kidney biopsy specimens from female donors in the age group over 45 years with BMI>25 showed that the above signs were more pronounced in female donor biopsy specimens. Significant sclerotic changes were revealed in the glomeruli, the shape of the tubules was different, as if in a collapsed state. Sclerotic thickening of the walls of the arteries and arterioles and significant edema, sclerotic changes and fatty deposits of the interstitial tissue. (Fig. 6B).

Discussion . Kidney transplantation from expanded criteria donors (DRK) increases the risk of increasing the number of transplants with reduced or delayed function due to pre-existing pathology of the donor kidney (KD). In this regard, in recent years, there has been a close attention to the study of biopsy specimens of the DP (zero biopsies - NB) and intraoperative biopsy samples of ATP (one-hour biopsy - CB). The expediency of implementing NB and PB is increasingly recognized. These biopsies provide information about the pre-existing pathology of the DP, which is especially important in the context of using organs for transplantation from suboptimal donors. The donor kidney may have glomerulosclerosis , hypertensive vascular changes, interstitial fibrosis, and tubular atrophy, which, according to many authors, is a predictor of worse renal graft survival. Based on these studies, many transplant centers do not use kidneys with severe sclerotic changes for transplantation [1,3] .

Most of the studies related to the study of morphology on the material of NB and BP are aimed at identifying preexisting structural changes that could predict the long-term function of grafts. However, the long-term function of ATP depends not only on the factors associated with the donor (age, sex and cause of death of the donor, the time of warm and cold ischemia of the kidneys), but also on many other factors (the degree of coincidence in HLA , age, sex and underlying disease of the recipient and etc.) [1,3,7] .

An analysis of the results of our study showed that donors belonging to the same group, but of different sexes, have differences in their organs. In our opinion, the functional state is also affected by various metabolic processes in the body and the rhythms of biological processes. This, in turn, can manifest itself in the form of various changes in these organs. As you know, the activity of all organs and tissues is controlled by two main ways: the nervous and hormonal systems. For example, the fact that the hormonal background of female donors is constantly changing from fertile age to menopause can have a direct proportional effect on kidney function, changes in interstitial tissue, morphofunctional state of blood vessels and lead to their initial pathological changes [7,8,10] .

Another aspect is that the anatomical structure of the urogenital organs differs in representatives of different sexes, they have different inflammatory processes. That is, inflammation of the lower urinary tract is more common in women than in men. For this reason, traces remain in the organs, like various sclerotic changes after infectious and inflammatory processes (including in the kidneys). This figure will increase with age [2.9] .

Changes in BMI, increased lipid metabolism in the body lead to atherosclerotic changes in blood vessels, as well as their accumulation in organs and tissues, including the kidneys, which causes physiological and morphological changes.

Conclusions. The results of a fine needle biopsy of a closely related kidney graft showed:

- in elderly donors, there is an increase in inflammatory processes and subsequent sclerotic changes of various forms;
- various inflammatory processes are more common in women than in men, and therefore, they manifest themselves in the form of pathomorphological changes in various organs;
- the process of pathomorphological changes in the kidneys is more common in donors with overweight (BMI>25) than in donors with normal body weight (BMI<25);
- accordingly, pathological changes in the kidneys are more common in overweight female donors (BMI>25) than in overweight male donors (BMI>25).

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