Relationship between components of extended criteria donor definition and the first post-transplant kidney graft resistance index, measured by Doppler sonography

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BACKGROUND: Nowadays, the utilization of kidneys procured from expanded criteria donors (ECD) is increasing, despite of their generally worse long-term outcomes. ECD status is usually defined basing on the findings of Port et al. [1] – see Table 1. Except age, little is known about the detailed effects of particular ECD status components, i.e. donor hypertension (HA), higher than 1.5 mg/dl creatinine prior to procurement (HC), and cerebrovascular cause of death (CVD), on the kidney graft Doppler parameters measured after kidney transplantation, which increased values are associated with unfavorable outcome. On the other hand, the prognostic value of those parameters on long-term kidney graft and recipient survival was previously demonstrated [2-4].

Hence, we analyzed the relationship between the above mentioned donor characteristics and resistance index (RI) values measured within first 2-3 days post-transplant.

PATIENTS AND METHODS: The initial post-transplant RI value was studied in 1350 consecutive kidney graft recipients. Patients with primary graft non-function, acute rejection episodes and delayed graft function were excluded from this study. **Finally, we analyzed RI value in 460 patients transplanted with organs from <50 years old donor and in 216 patients transplanted with organs from >50 years old donor.**

RESULTS: In general, ECD status did not influence the initial RI values in a whole study group (p=0.8). In kidneys procured from younger donor, only HC resulted in significantly higher RI values after transplantation (0.76±0.12 vs. 0.73±0.11 in non-HC group, p=0.03), which was not observed in the older donor group (despite similar pre-procurement serum creatinine level in both groups). Unexpectedly, in older donor group both the presence of donor HA and CVD resulted in significantly lower RI in kidney graft recipients (0.73±0.10 vs. 0.76±0.11 in non-HA group, p=0.013 and 0.74±0.11 vs. 0.78±0.10 in non-CVD group, p=0.015, respectively). Additional analysis of causes of donor death revealed that in younger donor group the occurrence of trauma did not result in a significant RI difference, whereas in older donor group it resulted in significantly higher RI values (0.79±0.11 vs. 0.74±0.10, p=0.001).

Table 1. Extended donor criteria according to [1]

1. Donor age >60 years, or
2. Donor age 50-60 years and two out of three following:
   a/ donor hypertension (HA)
   b/ serum creatinine prior to procurement >1.5 mg/dl (HC)
   c/ cerebrovascular cause of death (CVD)

Figure 1. First RI values in kidney transplant recipients, according to donor's age and serum creatinine level prior to procurement

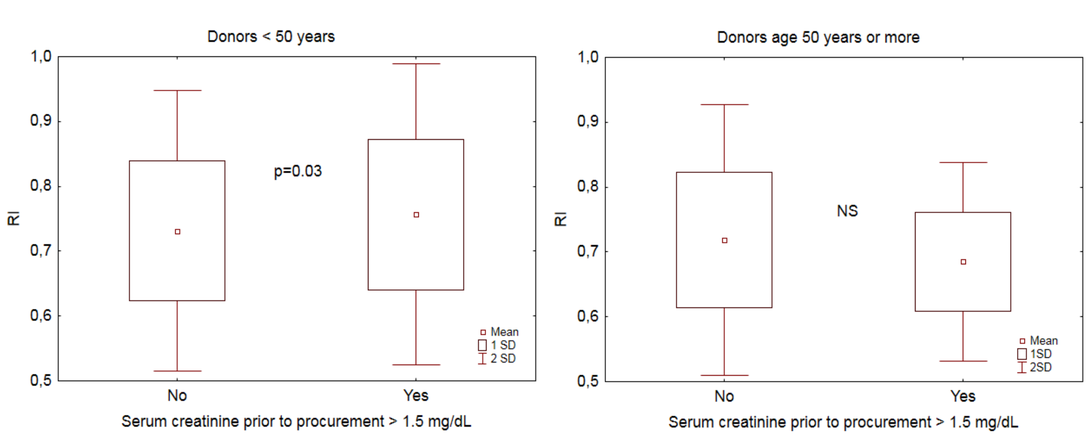


Table 2. Characteristics of donors stratified to subgroups based on ECD status and age

	Non-ECD N=553	ECD N=123	ANOVA chi²	<50 years N=460	≥50 years N=216	ANOVA chi²
Donor age [years]	37.8±11.7	58.0±6.5	<0.001	34.2±10.3	56.1±5.2	<0.001
Serum creatinine [µmol/l]	98±52	110±54	0.02	98±52	103±46	NS
Serum creatinine >1.5 mg/dL [%]	16.3	30.1	<0.001	17.4	21.9	NS
Hypertension [%]	8.6	65.6	<0.001	10.3	35.9	<0.001
CV death [%]	31.4	86.4	<0.001	25.6	71.7	<0.001
First RI	0.74±0.11	0.74±0.10	NS	0.74±0.11	0.75±0.11	NS
CIT	17.9±6.1	18.8±7.1	NS	17.9±6.3	18.7±6.5	NS
HLA mismatch class I	2.3±1.0	2.4±1.0	NS	2.4±1.0	2.3±1.0	NS
HLA mismatch class II	0.67±0.63	0.78±0.69	NS	0.72±0.62	0.75±0.70	NS

Data presented as means ± SD or frequencies. ECD: extended criteria donor; CV death: cerebrovascular cause of death; RI: resistance index; CIT: cold ischemia time; HLA: human leukocyte antigen.

Figure 2. First RI values in kidney transplant recipients, according to donor's age and the presence of hypertension

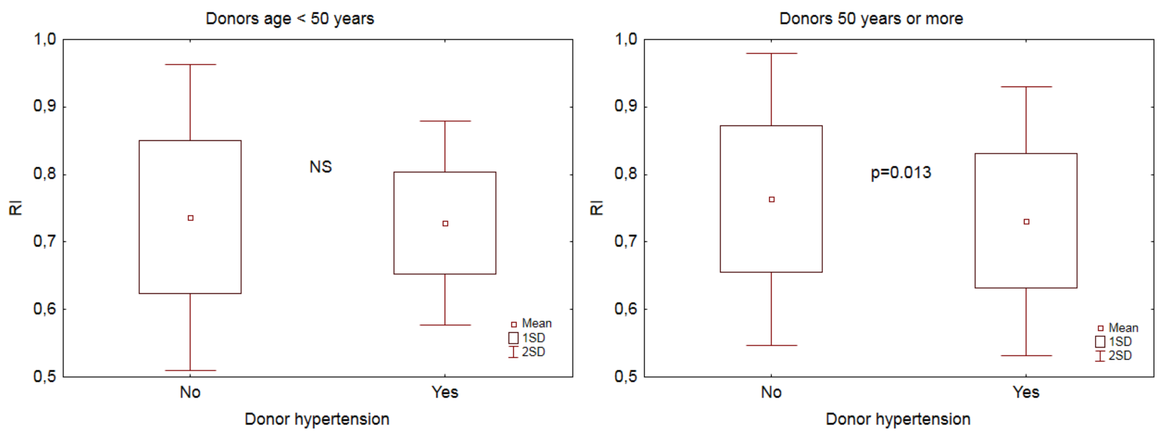


Figure 3. First RI values in kidney transplant recipients, according to donor's age and cerebrovascular cause of death

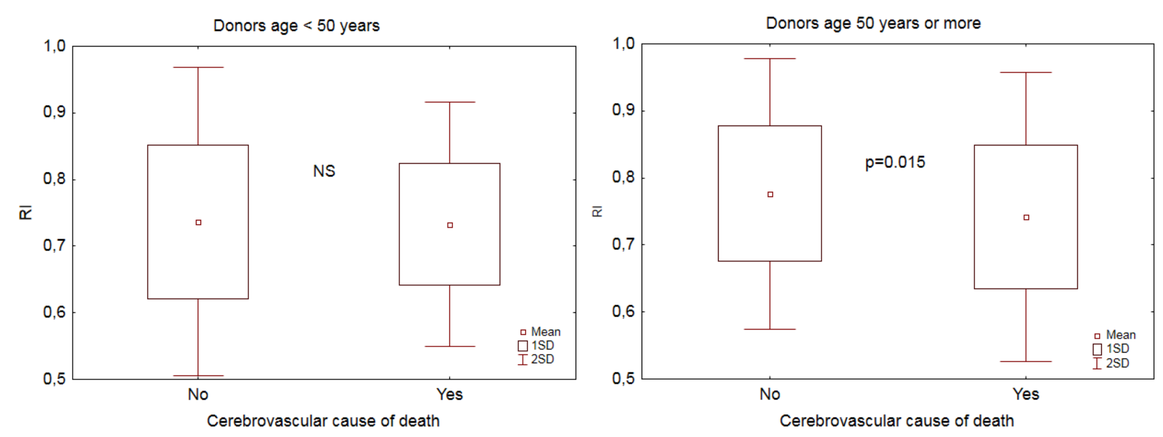
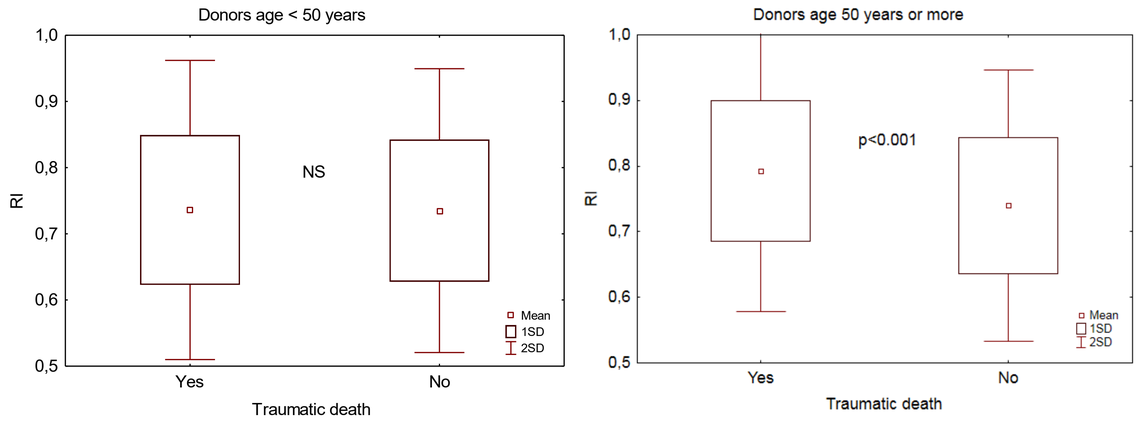


Figure 4. First RI values in kidney transplant recipients, according to donor's age and the trauma as a cause of death



SUMMARY: 1. ECD status only to a limited extend influences a first kidney graft RI value measured 2-3 days after transplantation. 2. In non-hypertensive and non-died from CVD cause donors older than 50 years, increase RI values, may be explained by a high prevalence of post-traumatic donors and subsequent differences in donor care prior to procurement. 3. This fact should be included into the list of factors affecting RI value in transplant recipients who obtained kidney graft from donors over 50 years old.

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