**Table 1. General characterization of recipient, donor and transplant (Chi-square, *T*-student)**

| | Total $N = 210$ | $D < 60$ $N = 181$ (86%) | $D \geq 60$ $N = 29$ (14%) | *P* |
|---|---|---|---|---|
| **Recipient** | | | | |
| Age, mean ± SD | 41.3 ± 13.3 | 40.3 ± 13.1 | 47.5 ± 12.7 | 0.006 |
| Female gender, *n* (%) | 62 (30) | 53 (29) | 9 (31) | 0.848 |
| **Donor** | | | | |
| Age, mean ± SD | 48.0 ± 10.6 | 45.6 ± 9.3 | 63.1 ± 2.6 | <0.001 |
| Female gender, *n* (%) | 152 (72) | 130 (72) | 22 (76) | 0.652 |
| Predonation eGFR, mean ± SD | 100.1 ± 14.2 | 101.7 ± 14.0 | 90.2 ± 11.0 | <0.001 |
| Hypertension, *n* (%) | 32 (15) | 19 (11) | 13 (45) | <0.001 |
| **Transplant** | | | | |
| HLA-incompatible, *n* (%) | 24 (11) | 19 (11) | 5 (17) | 0.341 |
| ABO-incompatible, *n* (%) | 7 (3) | 7 (4) | 0 | 0.597 |
| HLA ABDR mismatch, mean ± SD | 3.06 ± 1.71 | 3.04 ± 1.75 | 3.17 ± 1.49 | 0.709 |
| Induction IS, *n* (%) | | | | 0.109 |
| No | 7 (3) | 7 (4) | 0 | |
| Basiliximab | 182 (87) | 159 (88) | 23 (79) | |
| Anti-thymocyte globulin | 21 (10) | 15 (8) | 6 (21) | |
| Acute Rejection first year, *n* (%) | 20 (10) | 19 (11) | 1 (3) | 0.322 |

SD: Standard Deviation

## MO955 SERUM CYSTATIN C IN RENAL TRANSPLANTATION: BEYOND GFR ESTIMATION, A PROGNOSIS MARKER?

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**BACKGROUND AND AIMS:** In renal transplantation, death with a functioning graft remains one of the main causes of graft loss. In the general population, renal function impairment is strongly associated with cardiovascular and all-cause mortality. Whether this association holds true for kidney transplant recipients (KTR) is unclear. This uncertainty is likely to be due, in part, to the fact that glomerular filtration rate (GFR) estimation based on serum creatinine (SCr) does not always provide an accurate evaluation of the graft function in KTR. As compared to SCr, we have previously shown in a large cohort of KTR that serum cystatin C (SCysC) is a much better marker of GFR.

Herein, we sought to study the ability of the 1-year-post-transplant renal function to predict all-cause mortality according to the methods used to assess GFR.

**METHOD:** Four hundred and ten consecutive KTR for whom a measurement of GFR by inulin clearance was available at 1 year post-transplant were included. SCr and ScysC were measured with standardized methods. The association of the 1-year inulin clearance value the 1-year MDRD Study equation value and the 1-year CKD-EPI ScysC equation value with all-cause mortality was studied by ROC analysis and Cox model.

**RESULTS:** During a median follow-up of 17 years, 131 KTR died. Mean (±SD) inulin clearance at 1-year-post-transplant was 47 (±13) mL/min/1.73 $m^2$. Areas under the ROC curves were similar for inulin and CKD-EPI ScysC equation values (0.62 for both), and were both significantly superior to that of the MDRD equation (0.54, $P < 0.01$). In Cox analysis, while all types of GFR evaluations were significantly associated to graft loss, only an inulin and a CKD-EPI ScysC equation values below 45 mL/min/1.73 $m^2$ were associated with an excess risk of mortality (HR of 1.55, 1.45 and 1.01 for inulin, CKD-EPI ScysC and MDRD, respectively).

**CONCLUSION:** We conclude that ScysC-based GFR estimation might better predict KTR outcome as compared with a traditional SCr-based estimation. The one year-post transplant GFR value given by the CKD-EPI ScysC equation should be further evaluated as a potential surrogate marker for both graft and patient survival.

## MO956 SARCOPENIA PREDICTS MORTALITY IN RENAL TRANSPLANT CANDIDATES

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**BACKGROUND AND AIMS:** Sarcopenia is common in chronic kidney disease (CKD) and is associated with increased mortality and morbidity. Sarcopenia in CKD can be defined as a decreased muscle mass, mainly due to the catabolic state caused by the uremic environment. Malnutrition and inflammation are also common in sarcopenic patients. In this study, we aimed to investigate the prevalence of sarcopenia defined as low muscle mass determined by Psoas Muscle Index (PMI) in waitlisted end-stage renal disease (ESRD) patients and its association between 'Prognostic Nutritional Index (PNI)', 'C-reactive protein (CRP) to Albumin Ratio (CAR)' and mortality.

**METHOD:** ESRD patients registered to national kidney transplant waiting list and had abdomen CT at admission were included in the study. Kidney donor candidates were constituted as healthy controls. PMI ($cm^2/m^2$) were calculated by proportioning the psoas muscle area detected in the abdomen CT with the square of the height. The PMI of the controls at the fifth percentile according to gender was accepted as the limit value for sarcopenia. PNI and CAR were calculated using albumin, CRP and absolute lymphocyte count. The associations between PMI, PNI, CAR and all-cause mortality were investigated.

**RESULTS:** A total of 162 ESRD patients and 87 age matched healthy controls were included in the study. The mean age of the patients was 44.7 ± 14.2 years and follow-up time was 3.37 (0.35–9.60) years. The mean PMI were similar between the groups (5.24 ± 1.71 versus 5.48 ± 1.87 $cm^2/m^2$, $P = 0.302$). While prevalence of sarcopenia (16.7% versus 3.4%, $P = 0.002$) and CAR [1.47 (0.12–37.10) versus 0.74 (0.21–10.20), $P < 0.001$] was higher; PNI [40 (20.4–52.2) versus 44 (36.1–53.0), $P < 0.001$] was lower in ESRD patients than controls. When ESRD patients compared according to sarcopenia PMI [3.45 ± 0.9 versus 5.59 ± 1.6, $P < 0.001$] and PNI [39 (20.4–51) versus 41 (23–52.2), $P = 0.005$] was significantly lower and CAR [2.03 (0.28–34.65) versus 1.28 (0.12–37.1), $P = 0.041$] was higher in sarcopenic ESRD group than non-sarcopenic ESRD group (Table 1). In the correlation analysis, PMI was positively correlated with PNI ($r = 0.246$, $P = 0.002$), no correlated with CAR ($r = -0.061$, $P = 0.445$). In the follow-up, 67 waitlisted patients had been transplanted. In the five-year survival analysis, the non-sarcopenic transplant group [95% CI: 4.612–5.123 versus 95% CI: 2.721–5.413, $P = 0.001$] had better survival than sarcopenic transplant group (Figure 1). Mortality rates were similar in both sarcopenic transplant group and non-sarcopenic-non-transplant group. Multivariate regression analysis showed that sarcopenia (HR: 10.277, 95% CI: 3.912–27.000, $P < 0.001$), not having a transplant (HR: 3.949, 95% CI: 1.301–11.993, $P = 0.015$), low PNI (HR: 3.532, 95% CI: 1.303–9.574, $P = 0.013$) and duration of renal replacement therapy (HR: 1.009, 95% CI: 1.002–1.015, $P = 0.008$) were independent risk factors for mortality in all ESRD group.

**CONCLUSION:** In this study we observed that sarcopenia, as defined by low muscle mass, is almost seen five times more frequent in ESRD patients than controls and positively correlated with PNI. Sarcopenia is an independent risk factor for mortality in waitlisted patients.

**Table 1. Clinical and laboratory data of the patients according to sarcopenia**

| | Sarcopenic Patients ($N = 27$) | Non-Sarcopenic Patients ($N = 135$) | $p$-value |
|---|---|---|---|
| **Age (years)** | 48.1 ± 14.8 | 44 ± 14 | 0.166 |
| **Gender, Female (*N*%)** | 12 (%44.4) | 60 (%44.4) | 1 |
| **Duration of RRT (months)** | 8 (0–168) | 6 (0–284) | 0.258 |
| **Smoking (*N*%)** | 11 (%40.7) | 52 (%38.5) | 0.829 |
| **Body mass index (kg/m$^2$)** | 24.3 ± 4.4 | 25.6 ± 4.8 | 0.223 |
| **Psoas muscle index (cm$^2$/m$^2$)** | 3.45 ± 0.9 | 5.59 ± 1.6 | **<0.001** |
| **CRP to albumin ratio** | 2.03 (0.28–34.65) | 1.28 (0.12–37.1) | **0.041** |
| **Prognostic nutritional index** | 39 (20.4–51) | 41 (23–52.2) | **0.005** |
| **Total cholesterol (mg/dL)** | 194.5 ± 42.7 | 198 ± 57 | 0.727 |
| **Follow-up time (Years)** | 2.25 (0.35–7.93) | 4.1 (0.5–9.6) | **0.031** |
| **Transplantation (*N*%)** | 7 (%25.9) | 60 (%44.4) | 0.089 |
| **Mortality (*N*%)** | 13 (%48.1) | 8 (%5.9) | **<0.001** |

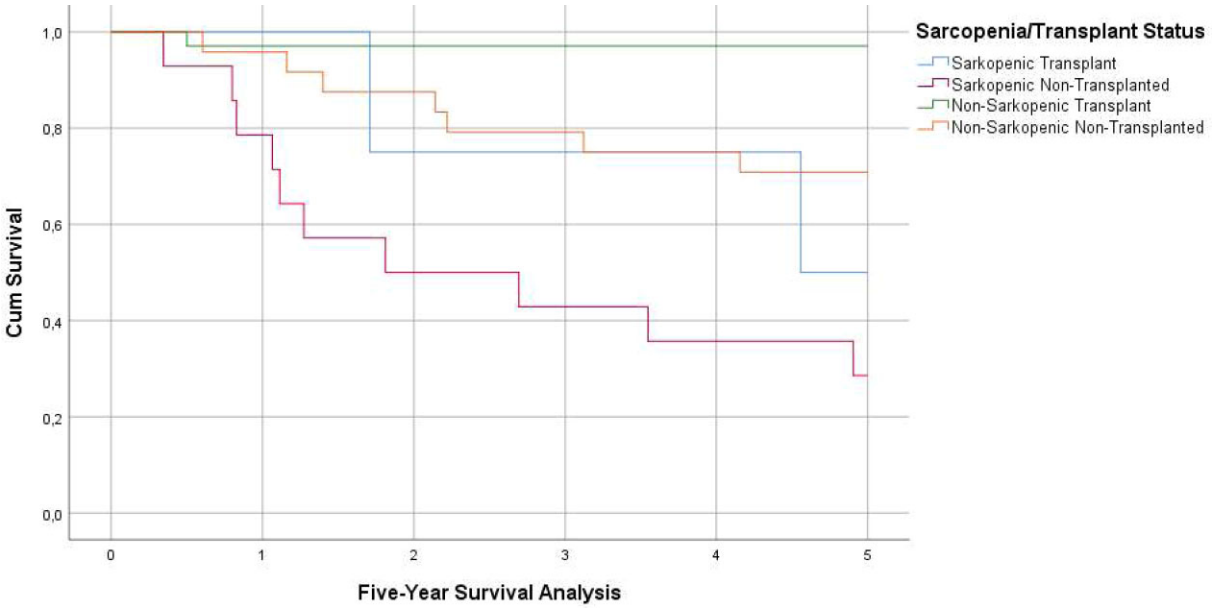


**FIGURE 1:** Five-year survival analysis of the patients.

MO957 **BREAKTHROUGH INFECTIONS FOLLOWING MRNA SARS-COV-2 VACCINATION IN KIDNEY TRANSPLANT RECIPIENTS**


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**BACKGROUND AND AIMS:** The clinical effectiveness of COVID-19 vaccination in kidney transplant (KT) recipients is lower than in the general population. However, the evidence reported is limited so far. Our purpose is to analyze the characteristics and outcomes of a large series of KT with COVID-19 breakthrough infection and compare them with unvaccinated patients. As a secondary objective, we analyzed the evolution according to the type of mRNA vaccine administered.

**METHOD:** From April to October 2021, KT recipients with COVID-19, included in the Spanish Society of Nephrology COVID-19 Registry, were analyzed. Data regarding vaccination status and type of vaccine were collected and outcomes of unvaccinated patients were compared with fully vaccinated patients. Univariable and multivariable Cox proportional hazard regression analyses were assessed for independent risk factors of COVID-19-related death. To avoid bias as much as possible, a sensitivity analysis was done exclusively in hospitalized patients.

**RESULTS:** During the period of the study, 481 KT recipients with COVID-19 were included in the registry: 351 fully vaccinated and 130 unvaccinated. Age, gender, KT vintage, diabetes as primary kidney disease, induction and maintenance immunosuppression and anti-COVID therapy were similar between both groups.