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The Impact of the Visceral-to-Subcutaneous Adipose Tissue Ratio on Renal Function Assessment after Nephrectomy in Kidney Donors

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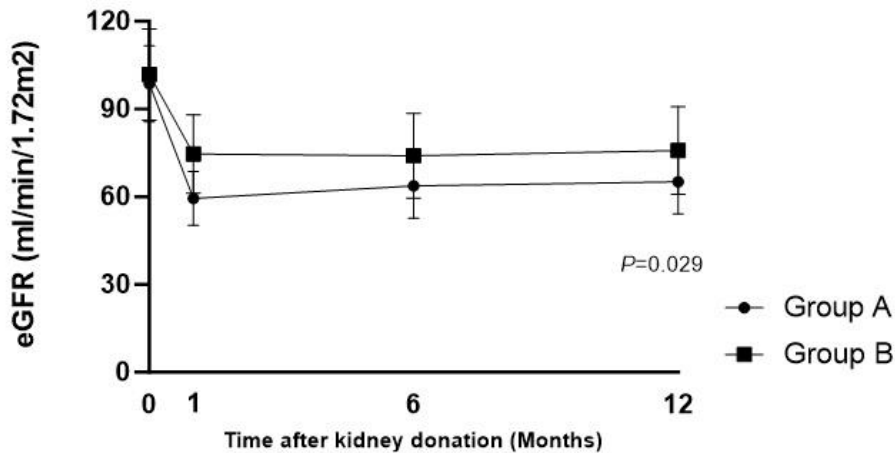
Objectives : The Visceral-to-Subcutaneous Adipose Tissue Ratio (VAT/SAT ratio) serves as a metric for fat distribution, with higher values being associated with worse kidney function. In this study, we aimed to investigate whether the baseline CT-derived metric (VAT/SAT) can predict renal function in kidney donors after nephrectomy.

Methods : A retrospective study was conducted on 628 kidney donors from Seoul St. Mary's Hospital between 2019 and 2022. We observed renal function changes within the first year post-nephrectomy. The VAT/SAT ratio was measured using baseline CT scans, and the impact of adipose tissue on changes in kidney function was evaluated through multivariate regression analysis.

Results : Within the first month post-nephrectomy, the estimated glomerular filtration rate (eGFR) reached its lowest point, showing an average decrease of 33% (Figure 1). The cohort was divided into two groups: Group A (n=327) experienced a renal function decline of 33% or more within the first 30 days after kidney donation, while Group B (n=301) had a decline of less than 33% during the same period. Notably, this significant decline in eGFR persisted in both groups throughout the first year following nephrectomy (p=0.029). VAT/SAT ratio was divided into tertiles. In univariate and multivariate analyses, the increase in VAT/SAT ratio was identified as a factor influencing the deterioration of renal function post-nephrectomy. (Tertile 2; OR 1.595, 95% Confidence interval (CI): 1.060-2.401, Tertile 3; OR 2.164, 95% CI: 1.419-3.300) (Table 1.)

Conclusions : After nephrectomy, renal function experiences the most significant decline within the first month, and this decline persists throughout the first year. A higher VAT/SAT ratio is associated with a more pronounced deterioration in renal function, suggesting the potential role of the VAT/SAT ratio in predicting renal function decline following nephrectomy.

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Group A = 327 327 327 271
 Group B = 301 301 301 244

Figure 1. Renal Function Changes in Kidney Donors within 1 Year After Nephrectomy

The cohort was divided into two groups : Group A (n=327) with a renal function decline of 33% or more and Group B (n=301) with a decline of less than 33% within the first month after kidney donation. (Abbreviation: eGFR, estimated glomerular filtration rate)

KSN_Figure1.jpg

Table 1. Univariate and multivariate analyses for the patient group with eGFR reduction of 33% or more after 1 month kidney donation

| Variable | Univariate | | | Multivariate | | |
|-----------------------------|------------|--------------|-------------|--------------|--------------|-------------|
| | P value | OR | 95% CI | P value | OR | 95% CI |
| Age | 0.000 | 1.028 | 1.015-1.042 | 0.006 | 1.020 | 1.006-1.035 |
| BMI (continuous) | 0.000 | 1.131 | 1.073-1.191 | 0.000 | 1.103 | 1.046-1.163 |
| DTPA CT (continuous) | 0.600 | 0.998 | 0.989-1.006 | | | |
| Waist (continuous) | 0.000 | 1.035 | 1.019-1.052 | 0.103 | 0.97 | 0.936-1.006 |
| VAT/SAT ratio% | | | | | | |
| - Tertile 1 (<44.94 %) | 0.000 | | | 0.002 | | |
| - Tertile 2 (44.94-78.78 %) | 0.001 | 1.967 | 1.330-2.911 | 0.025 | 1.595 | 1.060-2.401 |
| - Tertile 3 (>78.78 %) | 0.000 | 2.921 | 1.965-4.342 | 0.000 | 2.164 | 1.419-3.300 |

Abbreviation: eGFR: estimated glomerular filtration rate; BMI, body mass index; DTPA, Diethylenetriamine pentaacetate; VAT/SAT, Visceral to Subcutaneous Adipose Tissue ; OR, odd ratio; CI, Confidence interval.