

## Impact of spherical carbon adsorbent on cardiac events and mineral-bone disorder after dialysis

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**Background/Aims:** Oral spherical carbon adsorbents (OSCA) are known to slow the progression of chronic kidney disease (CKD) by inhibiting the absorption of uremic toxins produced in the intestine. In this study, we evaluated the impact of using OSCA in pre-dialysis CKD patients on cardiovascular outcomes and mineral-bone disorder after dialysis therapy.

**Methods:** This study was a retrospective cohort study that enrolled patients who started dialysis at Kangdong Sacred Heart Hospital from 2010 to 2020. A total of 294 patients were included in this study, including 98 CKD patients who were administered OSCA before dialysis (OSCA group) and 196 patients who were not administered OSCA with 1:2 matching by age and sex (control group). The cardiovascular events and mineral-bone disorder after dialysis therapy were compared. The cardiovascular event was defined as non-fatal myocardial infarction, unstable angina, and coronary revascularization.

**Results:** The mean age was  $62.2 \pm 12.7$  years, with 60.2% male, and the most common cause of CKD was diabetes (67.0%). The ejection fraction in the echocardiogram was significantly higher in the OSCA group ( $58.1 \pm 9.1$  % vs.  $55.5 \pm 9.9$  %,  $P = 0.033$ ). The cardiovascular events in the control group were higher than those in the OSCA group, however, there were statistically not significant (26.0% vs. 19.4%,  $P = 0.266$ ). However, the patients who were administered OSCA for more than 113 days showed significantly fewer cardiovascular events after dialysis therapy than those less than 113 days ( $P = 0.032$  by log-rank test), which remained significant in multivariate cox regression analysis (HR 1.48, 95% CI 1.05-2.08,  $P = 0.025$ ). There was no difference in bone mineral density, pulse wave velocity, bone-specific alkaline phosphatase, parathyroid hormone, and 25(OH)vitamin D levels.

**Conclusions:** The administration of OSCA in CKD patients before dialysis tended to reduce the incidence of cardiovascular events after the start of dialysis therapy, and the longer the period of administration of OSCA, the more significant difference was shown. However, there was no association between the administration of OSCA and the mineral-bone disorder after dialysis therapy.

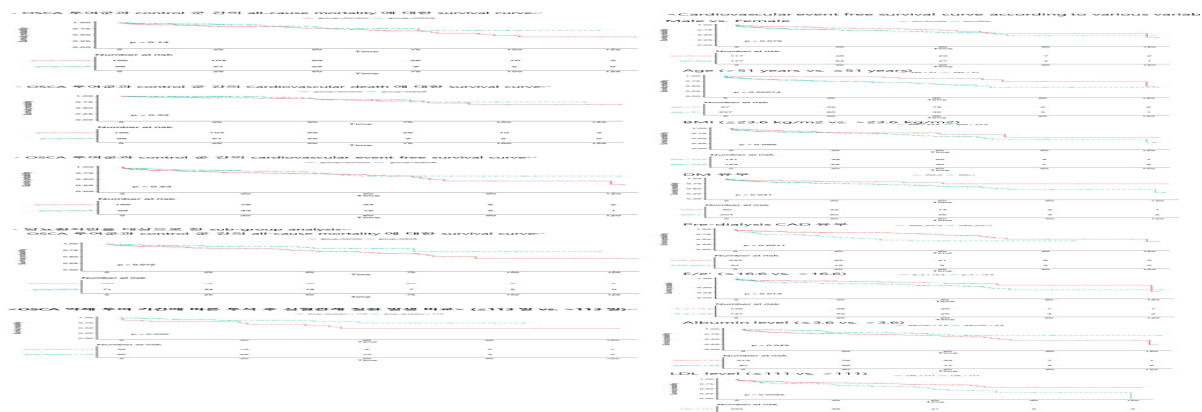


Table. Comparison of mortality between two groups

group	Control (N=196)	OSCA (N=98)	Total (N=294)	P
Cardiovascular death	175 (87.8%)	91 (92.9%)	266 (89.8%)	0.266
All-cause mortality	24 (12.2%)	7 (7.1%)	31 (10.5%)	0.057

Table. Comparison of mortality between two groups in DM sub-group

group	Control (N=133)	OSCA (N=71)	Total (N=204)	P
Cardiovascular death	114 (85.7%)	66 (93.0%)	180 (88.2%)	0.193
All-cause mortality	19 (14.3%)	5 (7.0%)	24 (11.8%)	0.029

Table. Comparison of cardiovascular outcomes between two groups

group	Control (N=196)	OSCA (N=98)	Total (N=294)	P
Cardiovascular event	94 (47.9%)	79 (80.6%)	224 (76.2%)	0.266
Pre-dialysis CAD	31 (15.8%)	20 (20.4%)	51 (17.2%)	0.213
EAF (%)	55.5 ± 9.9	58.1 ± 9.1	56.8 ± 9.5	0.033
BUN (mg/dL)	15.5 ± 3.2	15.9 ± 3.2	15.7 ± 3.2	0.900
BUN ratio	105.4 ± 1304.9	132.5 ± 1061.1	97.6 ± 1202.1	0.555
SCrMB	0.1 ± 0.2	0.1 ± 0.2	0.1 ± 0.2	0.203
Albumin	29.2 ± 4.7	29.7 ± 4.6	29.4 ± 4.6	0.102

Table. Comparison of cardiovascular outcomes in DM sub-group

group	Control (N=133)	OSCA (N=71)	Total (N=204)	P
Cardiovascular event	94 (70.7%)	53 (74.6%)	147 (72.3%)	0.661
Ejection fraction (%)	55.5 ± 9.9	58.1 ± 9.1	56.8 ± 9.5	0.204
BUN (mg/dL)	15.5 ± 3.2	15.9 ± 3.2	15.7 ± 3.2	0.900
BUN ratio	114.0 ± 1200.0	88.1 ± 563.2	105.4 ± 1158.5	0.041

Table. Comparison of mineral-bone disorder parameters between two groups

group	Control (N=196)	OSCA (N=98)	Total (N=294)	P
T score by DXA				
- Femur neck	-1.0 ± 1.5	-1.4 ± 1.5	-1.2 ± 1.5	0.105
- Lumbar	-1.0 ± 1.5	-1.4 ± 1.5	-1.2 ± 1.5	0.105
- Total	-1.0 ± 1.5	-1.4 ± 1.5	-1.2 ± 1.5	0.105
Calcium	9.5 ± 0.5	9.5 ± 0.5	9.5 ± 0.5	0.795
ALP	25.1 ± 12.5	25.0 ± 12.5	25.0 ± 12.5	0.105
PTHrP	2.5 ± 1.5	2.5 ± 1.5	2.5 ± 1.5	0.105
25(OH)D	21.5 ± 10.5	21.5 ± 10.5	21.5 ± 10.5	0.105
PTH intact	204.6 ± 298.2	204.6 ± 298.2	204.6 ± 298.2	0.999