**Supplementary Table 1**. Predialysis serum electrolytes before and during STS treatment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Control** | | **Treatment** | | **P-value between groups** |
| **Pre-STS** | **During STS** | **Pre-STS** | **During STS** |  |
| **Na (mmol/L)** | 136.6 ± 3.0 | 137.6 ± 3.0 | 135.9 ± 2.9 | 137.7 ± 3.3\* | 0.58 |
| **K (mmol/L)** | 5.3 ± 0.7 | 5.5 ± 0.9 | 5.2 ± 1.0 | 5.7 ± 0.9\* | 0.44 |
| **Cl (mmol/L)** | 98.0 ± 5.2 | 98.2 ± 4.4 | 96.9 ± 2.3 | 96.3 ± 3.8 | 0.36 |
| **HCO3(mmol/L)** | 20.2 ± 1.5 | 20.1 ± 0.7 | 19.8 ± 1.3 | 20.0 ± 0.7 | 0.44 |
| **AGAP(mmol/L)** | 18.7 ± 4.5 | 18.5 ± 4.2 | 19.2 ± 2.2 | 21.5 ± 2.7\* | 0.01\* |

\*P<0.05 when compared with Pre-STS before and during STS treatment.

**Supplementary Table 2.** Subgroup analysis of differences between the treatment and control

groups in the change of CAVI from baseline to 6 months

|  |  |  |  |
| --- | --- | --- | --- |
| **Subgroup** | **Between-group difference in the change of CAVI from baseline, mean (95%CI)** | **P-value** | **Comparison between subgroups, P-value** |
| Age  < 50 years  ≥ 50 years | -0.36 (-1.49, 0.76)  -0.73 (-1.58, 0.12) | 0.51  0.09 | 0.15 |
| Sex  Female  Male | -0.89 (-1.99, 0.22)  -0.03 (-0.75, 0.69) | 0.11  0.93 | 0.11 |
| Presence of DM  DM  No DM | 0.35 (-0.44, 1.15)  -1.41 (-2.34,-0.47) | 0.37  0.005 | 0.006 |
| Dialysis vintage  < 60 months  ≥ 60 months | -0.44 (-1.36, 0.48)  -0.56 (-1.58, 0.45) | 0.33  0.26 | 0.25 |
| Parathyroidectomy  No  Yes | -0.29 (-1.00, 0.43)  -0.94 (-2.71, 0.83) | 0.42  0.27 | 0.67 |
| Dialysis frequency  2/week  3/week | -1.39 (-3.13, 0.35)  -0.24 (-0.98, 0.49) | 0.11  0.51 | 0.60 |
| Dialysate Calcium  < 3 meq/l  ≥ 3 meq/l | -0.07 (-0.82, 0.69)  -1.67 (-3.13, -0.20) | 0.86  0.03 | 0.99 |

**Supplementary Table 3**. Baseline CAC score of the patients in the treatment and control groups

|  |  |  |  |
| --- | --- | --- | --- |
| **Baseline CAC score** | **Control (n=16)**a | **Treatment (n=21)**a | **P-value between group** |
| Agatston method\* (unit)  LnCAC score Agaston method\*\* | 887 (109, 2073)  5.98 ± 2.67 | 440 (104, 1181)  5.81 ± 1.80 | NS  NS |
| Volume method\* (mm3)  LnCAC score Volume method\*\* | 823 (121, 1778)  6.00 ± 2.38 | 395 (115, 989)  5.77 ± 1.69 | NS  NS |

\*Median (IQR1, IQR3); \*\*Mean±SD; NS = non-significant (P>0.05)

aSome data was missing. Three patients in the treatment group and 9 patients in the control group missed the schedule on CT coronary artery calcification.

**Supplementary Table 4.** Changes in hemodynamic parameters in the treatment and control

groups from baseline to 6 months

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Control** | | | **Treatment** | | | **P-value between groups** |
| **0-month** | **3-month** | **6-month** | **0-month** | **3-month** | **6- month** |
| **Brachial BP (mmHg)**  **SBP**  **DBP**  **PP** | 163 ± 28  85 ± 15  79 ± 21 | 160 ± 20  81 ±10  79 ±18 | 155 ± 19  80 ± 11  75 ± 19 | 159 ± 25  86 ± 15  72 ± 21 | 165 ± 23  88 ± 13  76 ± 24 | 161 ± 23  86 ± 15  75 ± 19 | NS |
| **Aortic BP (mmHg)**  **SBP**  **DBP**  **PP** | 144 ± 24  86 ± 15  58 ± 17 | 140 ±18  83 ±11  57 ±15 | 137 ± 16  81 ± 11  56 ± 15 | 142 ± 24  88 ± 15  53 ± 19 | 147 ± 20  90 ± 13  57 ± 20 | 144 ± 21  88 ± 15  57 ± 16 | NS |
| **Heart rate (bpm)** | 76 ± 11 | 79± 8 | 73 ± 11 | 78 ± 12 | 80 ± 14 | 75 ± 14 | NS |

Abbreviation: NS= non-significant (P>0.05); BP = blood pressure; bpm= beats per minute;

DBP= diastolic blood pressure; PP= pulse pressure; SBP= systolic blood pressure

**Supplementary Table 5**. Changes in CKD-MBD parameters in the treatment and control groups from baseline to 6 months

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Control** | | | | **Treatment** | | | **P-value between groups** |
| **0-month.** | **3-month** | **6-month.** | **0-month** | | **3-month.** | **6-month** |  |
| **Ca2+ (mg/dL)** | 8.8 ± 0.3 | 8.8 ± 0.1 | 8.8 ± 0.1 | 8.8 ± 0.3 | | 8.8 ± 0.3 | 8.8 ± 0.1 | NS |
| **PO43- (mg/dL)** | 5.7 ± 1.1 | 5.5 ± 0.8 | 5.8 ± 1.3 | 5.2 ± 1.4 | | 5.5 ± 0.8 | 5.7 ± 1.2 | NS |
| **Ca2+xPO43- (mg2/dL2)** | 49.9 ± 8.9 | 48.3 ± 6.5 | 51.8 ± 11.8 | 45.9 ± 11.6 | | 49.7 ± 6.5 | 50.5 ± 9.9 | NS |
| **iPTH\* (pg/ml)** | 174  (73, 433) | 148  (69, 376) | 215  (115, 381) | 120  (23, 342) | | 109  (51, 324) | 145  (48, 433) | NS |
| **25-OH vitamin D\*(ng/ml)** | 25.1  (17.3,28.7) | 25.7  (20.2, 31.5) | 24.1  (17.8, 27.8) | 19.5  (12.9, 22.3) | | 19.4  (17.9, 22.6) | 19.4  (15.8, 23.5) | NS |

\*Range (IQR1, IQR3), NS = non-significant (P>0.05).

**Supplementary Table 6.** Changes in hsCRP in STS treatment and control groups from baseline to 6 months

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Control** | | | **Treatment** | | | **P-value between groups** |
| **0-month** | **3-month** | **6-month** | **0-month** | **3-month** | **6-month** |  |
| **hsCRP (mg/L)**  **median (IQR)** | 3.0  (1.1, 8.9) | 3.2  (0.8,13.9) | 3.3  (1.1, 8.8) | 1.7  (1.0,5.0) | 1.6  (0.7,3.9) | 1.2  (0.7,6.6) | NS |

Abbreviation: NS = non-significant (P>0.05).

**Supplementary Table 7.** Key clinical trials: sodium thiosulfate treatment in ESRD patients undergoing chronic HD

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Country | Study design | Population | Intervention | Comparator | Primary outcome | Secondary outcome(s) | Side effects |
| Adirekkiat et al 18, 2010 | Thailand | Nonrandomized controlled study | ESRD on HD with CACs ≥ 300 | STS 12.5 g IV over 15-20 min after HD, 2/week, duration 4 months (n=16) | Control group (n=16) | No progression of CACs in STS group but significantly increased in control group | Total hip BMD declined in STS group | Anorexia and poor appetite in 75% resulting in discontinuation 10% |
| Mathews et al  19, 2011 | USA | Prospective cohort | ESRD on HD with CACs ≥ 50 | STS 12.5-25 g IV over 30 min after HD, 3/week, duration 5 months (n=22) | No control group | No progression in the mean annual rate of change of CACs after STS treatment | : No change in L1-2 vertebral BMD  : No change in pulse wave velocity | Nausea and vomiting in all subjects when using 25 g STS IV infusion; no report when 12.5 and 18.5 g was used |
| Yu Yi et al20, 2016 | China | Nonrandomized controlled study | ESRD on HD with CACs > 50 | STS 0.18 g/kg IV in 30 min after HD, after each HD, duration 3 months (n=15) | Control group (n=10) | CACs increased in control group while unchanged in STS group | Significantly decreased hsCRP in STS group | No mention on side effect |
| Our study, 2017 | Thailand | Randomized controlled study | ESRD on HD with AS (CAVI ≥ 8) | STS 12.5 g IV during last hour of HD, 2/week, duration 6 months (n=24) | Control group (n=26) | AS measured by CAVI significantly decreased in STS group while unchanged in control | No progression in the natural logarithm of CAC volume score in STS group, while significantly increased in control group | Anorexia and poor appetite in 12.5% of patient without discontinuation |

Abbreviation: AS= arterial stiffness, BMD= bone mass density, CACs = coronary artery calcium score, CAVI= cardio-ankle vascular index, ESRD= end-stage renal disease, g= gram, HD= hemodialysis, hsCRP= high-sensitivity C-reactive protein, IV= intravenous, min= minutes, STS= sodium thiosulfate.