**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Abizaid, 1999[1](#_ENREF_1) | Symptomatic coronary artery disease and renal insufficiency (SrCr ≥1.5 mg/dL) | Total |  | 60 | NR | NR | NR | NR | NR | NR |  |
|  |  | 1 | 0.45% IV Normal Saline (1 ml/kg/hour) only | 20 |  | 6(30) | 75 | NR | NR | NR |  |
|  |  | 2 | Dopamine (2.5 ug/kg/min) plus 0.45% IV Normal Saline (1 ml/kg/hour) | 20 |  | 7(35) | 74 | NR | NR | NR |  |
|  |  | 3 | Aminophylline (4 mg/kg followed by a drip of 0.4 mg/kg/hour) plus 0.45% IV Normal Saline (1 ml/kg/hour) | 20 |  | 7(35) | 75 | NR | NR | NR |  |
| Acikel, 2010[2](#_ENREF_2) | General: excluded CRF | Total |  | 240 | 48 Hours | NR | 59.8 +/- 9.7 | NR | NR | NR |  |
|  |  | 1 | Control | 80 |  | 29 (36.2) | 60.8 +/- 10.8 | NR | NR | Current: 30 (37.5) | Excluded CRF |
|  |  | 2 | Atorvastatin | 80 |  | 29 (36.2) | 58.7 +/- 8.5 | NR | NR | Current: 32 (40) |  |
|  |  | 3 | Chronic statins | 80 |  | 30 (37.5) | 59.8 +/- 9.6 | NR | NR | Current: 32 (40) |  |
| Adolph, 2008[3](#_ENREF_3) | Two Cr concentration levels >106 m mol/l (>1.2mg/dl) within 12 weeks before coronary angiography | Total |  | 145 | 48 Hours | 32(22) | NR | NR | NR | NR |  |
|  |  | 1 | NaCl + 5% dextrose | 74 |  | 14(19) | 72.7 +/- 6.6 | NR | NR | NR |  |
|  |  | 2 | NaHCO3 + 5% dextrose | 71 |  | 18(27) | 70.1 +/- 8.4 | NR | NR | NR |  |
| Alessandri, 2013[4](#_ENREF_4) | Heart Disease, Ischemic heart disease | Total |  | 296 | 72 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Sodium Chloride infusion | 158 |  | 46 | 64.25 | NR | NR | NR |  |
|  |  | 2 | Sodium Bicarbonate + NAC | 138 |  | 46 | 64.25 | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Allaqaband, 2002[5](#_ENREF_5) | Creatinine ≥ 1.6 mg/dl | Total |  | 123 | 48 Hours | 52 | 71 | NR | NR | NR |  |
|  |  | 1 | 0.45% Saline | 40 |  | 16 | 70 | NR | NR | NR |  |
|  |  | 2 | 0.45% Saline + NAC | 45 |  | 17 | 70 | NR | NR | NR |  |
|  |  | 3 | 0.45% Saline + Fenoldopam | 38 |  | 19 | 71 | NR | NR | NR |  |
| Aslanger, 2012[6](#_ENREF_6) | STEMI, ST-segment elevation myocardial infarction, | Total |  | 312 | 72 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Placebo | 99 |  | 26(26) | 56.1 | NR | NR | NR |  |
|  |  | 2 | IV NAC | 108 |  | 22(20) | 56.1 | NR | NR | NR |  |
|  |  | 3 | IA NAC | 105 |  | 23(22) | 55.9 | NR | NR | NR |  |
| Bader, 2004[7](#_ENREF_7) | SCr level between 0.6 and 1.2  Mg/dl | Total |  | 39 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | IV Saline infusion before and after procedure | 19 |  | 3 | 64 | NR | NR | NR |  |
|  |  | 2 | IV Saline infusion during procedure | 20 |  | 4 | 65 | NR | NR | NR |  |
| Baskurt, 2009[8](#_ENREF_8) | Moderate degree chronic kidney disease with estimated glomerular filtration rate (eGFR) between 30 and 60 mL min1.73 m2 | Total |  | 217 | 12 Months | 87 | 67.4 | NR | NR | NR |  |
|  |  | 1 | Hydration | 72 |  | 31 | 67.1 | NR | NR | NR |  |
|  |  | 2 | Hydration + N-acetylcysteine | 73 |  | 27 | 67.9 | NR | NR | NR |  |
|  |  | 3 | Hydration + N-acetylcysteine + theophylline | 72 |  | 29 | 67.1 | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Brar, 2014[9](#_ENREF_9) | eGFR >60 ml/min/1.73 m2 | Total |  | 396 | 6 Months | 151 (38.1) | 71 | NR | NR | NR |  |
|  |  | 1 | IV Normal Saline | 200 |  | 81 (41) | 72 | White: 113 (57)  Black: 28 (14)  Latino: 24 (12)  Asian: 29 (15) | NR | NR |  |
|  |  | 2 | LVEDP-guided IV hydration | 196 |  | 70 (36) | 71 | White: 111 (57)  Black: 27 (14)  Latino: 17 (9)  Asian: 28 (14) | NR | NR |  |
| Briguori, 2004[10](#_ENREF_10) | Impairment of renal function: serum creatinine >1.5mg/dl and/or creatinine clearance <60ml/min | Total |  | 192 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 2 | NAC + saline | 97 |  | 13 (13) | 68 | NR | NR | NR |  |
|  |  | 3 | Fenoldopam mesylate + saline | 95 |  | 16 (17) | 69 | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Briguori, 2004[11](#_ENREF_11) | CKD Cr >1.5 mg/dl and or creatinine clearance <60ml/min | Total |  | 223 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 2 | NAC single dose | 109 |  | 23 (21) | 67 | NR | NR | NR |  |
|  |  | 3 | NAC double dose | 114 |  | 28 (16) | 66 | NR | NR | NR |  |
| Briguori, 2007[12](#_ENREF_12) | CKD with stable Cr at  2.0 mg/dL and/or estimated glomerular filtration rate 40 | Total |  | 326 | 7 days | NR | NR | NR | NR | NR |  |
|  |  | 1 | IV Normal Saline + oral NAC | 111 |  | 21 (19) | 71 | NR | NR | NR |  |
|  |  | 2 | IV NaHCO3 + oral NAC | 108 |  | 13 (12) | 70 | NR | NR | NR |  |
|  |  | 3 | IV Normal Saline + IV ascorbic acid + oral NAC | 107 |  | 27 (21.5) | 69 | NR | NR | NR |  |
| Briguori, 2011[13](#_ENREF_13) | Estimated glomerular filtration rate (eGFR) | Total |  | 292 | 7 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | IV Sodium bicarbonate + oral NAC | 146 |  | 43 (29.5) | 75 | NR | NR | NR |  |
|  |  | 2 | RenalGuard: IV 0.9% saline + IV NAC + RenalGuard System + IV furosemide | 146 |  | 58 (39.5) | 76 | NR | NR | NR |  |
| Chen, 2008[14](#_ENREF_14) | Myocardial Ischemia | Total |  | 936 | 6 Months | 149 (16) | NR | NR | NR | NR |  |
|  |  | 1 | Normal renal function-Non hydration | 330 |  | (15) | 60 | NR | NR | NR | 15% female refers to combined Arms 1 and 2, same with mean age 60 |
|  |  | 2 | Normal renal function-0.45% saline | 330 |  | NR | NR | NR | NR | NR |  |
|  |  | 3 | Abnormal renal function-NAC + Non hydration | 188 |  | (18) | 63 | NR | NR | NR | 18% female refers to combined Arms 3 and 4, same with mean age 63 |
|  |  | 4 | Abnormal renal function-NAC + 0.45% saline | 188 |  | NR | NR | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Cho, 2010[15](#_ENREF_15) | Serum creatinine ≥1.1 mg/dL or CrCl ≤60 mL/min | Total |  | 91 | NR | 46 (50.5) | 78 +/- 8 | NR | NR | NR |  |
|  |  | 1 | IV 0.9% saline | 27 |  | (37) | 77 +/- 8 | NR | NR | Current: 8 |  |
|  |  | 2 | IV sodium bicarb + IV 0.9% saline | 21 |  | (47.6) | 78 +/- 9 | NR | NR | Current: 9 |  |
|  |  | 3 | Oral fluids (water) | 22 |  | (55) | 81 +/- 7 | NR | NR | Current: 9 |  |
|  |  | 4 | Oral fluids (water) + oral bicarb | 21 |  | (62) | 79 +/- 2 | NR | NR | Current: 7 |  |
| Demir, 2008[16](#_ENREF_16) | Patients with renal insufficiency | Total |  | 97 | 3 Days | 43 (44) | NR | NR | NR | NR |  |
|  |  | 1 | Saline | 20 |  | 5 (25) | 58.2 +/- 11.3 | NR | NR | NR |  |
|  |  | 2 | NAC + control (NAC) | 20 |  | 9 (45) | 62.0 +/- 15.8 | NR | NR | NR |  |
|  |  | 3 | Misoprostol + control (M) | 20 |  | 11 (55) | 56.5 +/-13.0 | NR | NR | NR |  |
|  |  | 4 | Theophylline + control (T) | 20 |  | 9 (45) | 56.3 +/-13.0 | NR | NR | NR |  |
|  |  | 5 | Nifedipine + control (N) | 17 |  | 9 (53) | 60.1 +/-10.7 | NR | NR | NR |  |
| Erol, 2013[17](#_ENREF_17) | serum creatinine >1.1mg/dl, cardiac catheterization/intervention | Total |  | 159 | 96 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Saline hydration | 80 |  | 54 (68) | 65 | NR | NR | Current: 21 (25) |  |
|  |  | 2 | Saline hydration + allopurinol | 79 |  | 61 (77.5) | 65 | NR | NR | Current: 20 (25) |  |
| Firouzi, 2012[18](#_ENREF_18) | Non-emergent coronary angiography with creatinine < 2.0 mg/dl | Total |  | 286 | 48 Hours | NR | NR | NR | NR | Current: 31 (21.23) |  |
| Firouzi, 2012[18](#_ENREF_18) (continued) |  | 1 | Control | 146 |  | (30.83) | 57.9 (SD 10.16) | NR | NR | Current: 31 (21.23) |  |
|  |  | 2 | Pentoxifylline | 140 |  | (23.58) | 56.8 (SD 10.69) | NR | NR | Current: 41 (29.28) |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | | **Race** | **Education** | **Smoking status** | **Comments** |
| Frank, 2003[19](#_ENREF_19) | Patients with a known chronic renal insufficiency, not yet dialysis dependent | Total |  | 17 | NR | NR | NR | NR | | NR | NR |  |
|  |  | 1 | 0.9% saline volume expansion | 10 |  | 1 | 57.6+/-12.4 | NR | | NR | NR |  |
|  |  | 2 | 0.9% saline volume expansion + high-flux HD | 7 |  | 2 | 66.8+/-9.2 | NR | | NR | NR |  |
| Gu, 2013[20](#_ENREF_20) | General | Total |  | 859 | NR | 239 (27.8) | NR | Other: 859 (100) | | NR | NR |  |
|  |  | 1 | Control--saline | 437 |  | 110 (25.2) | 59.0 +/- 14 | NR | | NR | NR |  |
|  |  | 2 | Furosemide | 422 |  | 129 (30.6) | 58.0 +/- 14 | NR | | NR | NR |  |
| Gunebakmaz, 2012[21](#_ENREF_21) | Coronary angiography with creatinine ≥ 1.2 mg/dl | Total |  | 120 | 5 Days | NR | NR | NR | | NR | NR |  |
|  |  | 1 | Saline | 40 |  | 15 | 66.4 +/- 10.7 | NR | | NR | NR |  |
|  |  | 2 | Saline + Nebivolol | 40 |  | 11 | 64.1+/- 9 | NR | | NR | NR |  |
|  |  | 3 | Saline + NAC | 40 |  | 11 | 64.7 +/- 11.9 | NR | | NR | NR |  |
| Hafiz, 2012[22](#_ENREF_22) | Serum creatinine >1.6 mg/dl in non-diabetics and >1.4 mg/dl in diabetics or an estimated glomerular filtration rate (eGFR) of <50 ml/min/1.73 m2 | Total |  | 320 | 48 Hours | 138 (43.1) | Median: 73;Range: 63-80 | Black: 151 (47.2) | | NR | NR |  |
|  |  | 2 | Normal Saline with or without NAC | 161 |  | 69 (42.9) | Median: 73;Range: 63-80 | Black: 80(49.7) | | NR | NR |  |
|  |  | 3 | Sodium Bicarbonate with or without NAC | 159 |  | 69 (43.4) | Median: 74;Range: 65-80 | Black: 71(44.7) | | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Hans, 1998[23](#_ENREF_23) | Defined as SrCr of at least 1.4 mg/dL (of note, the abstract mentions the range of 1.4 to 3.5 mg/dL, but the actual inclusion seemed to be based on the SrCr of at least 1.4 mg/dL) | Total |  | 55 | 4 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | Placebo | 27 |  | 3 | 71 | NR | NR | NR |  |
|  |  | 2 | Dopamine | 28 |  | 3 | 75 | NR | NR | NR |  |
| Hashemi, 2005[24](#_ENREF_24) | General | Total |  | 88 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Placebo | 46 |  | 13 (28) | 55.1 | NR | NR | NR |  |
|  |  | 2 | Captopril | 42 |  | 12 (29) | 55.1 | NR | NR | NR |  |
| Heguilen, 2013[25](#_ENREF_25) | General | Total |  | 0 | 3 Days | NR | NR | NR | NR | NR |  |
|  |  | 2 | NaHCO3 + dextrose | 47 |  | 15 | 67.7 | NR | NR | NR |  |
|  |  | 3 | NaHCO3 + NAC +dextrose | 44 |  | 11 | 64.8 | NR | NR | NR |  |
|  |  | 4 | NaCl + NAC+dextrose | 42 |  | 8 | 69.3 | NR | NR | NR |  |
| Holscher, 2008[26](#_ENREF_26) | General | Total |  | 412 | 30 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | Hydration only | 139 |  | 68 (16.5) | 67.1 | NR | NR | NR |  |
|  |  | 2 | Hydration plus dialysis | 134 |  | 58 (15.5) | 66.8 | NR | NR | NR |  |
|  |  | 3 | Hydration plus NAC | 139 |  | 10 (26.3) | 70.5 | NR | NR | NR |  |
| Huber, 2006[27](#_ENREF_27) | General | Total |  | 91 | 48 Hours | 31 | 58.5+/-14.8;Range: 21-89 | NR | NR | NR |  |
|  |  | 2 | Theophylline | NR |  | NR | 59.6 | NR | NR | NR |  |
|  |  | 3 | Acetylcysteine | NR |  | NR | 55.4 | NR | NR | NR |  |
|  |  | 4 | Theophylline + Acetylcysteine | NR |  | NR | 60.6 | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Kimmel, 2008[28](#_ENREF_28) | Mild to moderately impaired kidney function: serum creatinine ≥ 1.2 mg/dl or a creatinine clearance < 50 ml/min | Total |  | 54 | 2 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | Placebo | 17 |  | (30) | 66.8 | NR | NR | NR |  |
|  |  | 2 | NAC | 19 |  | (21) | 71.5 | NR | NR | NR |  |
|  |  | 3 | Zinc | 18 |  | (28) | 67.2 | NR | NR | NR |  |
| Kinbara, 2010[29](#_ENREF_29) | Stable coronary artery disease | Total |  | 45 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Hydration | 15 |  | 6 (40) | 70 | NR | NR | NR |  |
|  |  | 2 | Hydration and aminophylline | 15 |  | 5 (33) | 71 | NR | NR | NR |  |
|  |  | 3 | Hydration and N-acetylcysteine | 15 |  | 6 (40) | 70 | NR | NR | NR |  |
| Klima, 2012[30](#_ENREF_30) | >93 umol/L for women and >117 umol/L for men or estimated glomerular ﬁltration rate (eGFR) <60 mL/min/1.73 m2 | Total |  | 258 | 48 Hours | 92(36) | 77;Range: 69-81 | NR | NR | NR |  |
|  |  | 1 | 0.9% saline | 89 |  | 39(38) | 75;Range: 70-82 | NR | NR | NR |  |
|  |  | 2 | Long term sodium bicarbonate | 87 |  | 30(34) | 78;Range: 70-82 | NR | NR | NR |  |
|  |  | 3 | Short term sodium bicarbonate | 82 |  | 28(34) | 75;Range: 65-81 | NR | NR | NR |  |
| Koc, 2012[31](#_ENREF_31) | Serum creatinine (SCr) ≥ 1.1 mg/dL or creatinine clearance ≤ 60 mL/mi | Total |  | 220 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | IV 0.9% saline | 60 |  | 14(23) | 64 | NR | NR | Current: 17(28) |  |
|  |  | 2 | IV NAC plus high-dose IV 0.9% saline | 80 |  | 19(24) | 62 | NR | NR | Current: 13(17) |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Koc, 2012[31](#_ENREF_31) (continued) |  | 3 | High-dose IV 0.9% saline | 80 |  | 17 (21) | 65 | NR | NR | Current: 15 (19) |  |
| Kong, 2012[32](#_ENREF_32) | Coronary artery disease | Total |  | 120 | 6.1 Months | NR | NR | NR | NR | NR |  |
|  |  | 1 | IV 0.9% saline | 40 |  | 18 (45) | 55.7 ± 11.9 | NR | NR | NR |  |
|  |  | 2 | Oral hydration before and after procedure | 40 |  | 19 (47) | 57.2 ± 9.2 | NR | NR | NR |  |
|  |  | 3 | Oral hydration after procedure | 40 |  | 16 (40) | 54.9 ± 10.8 | NR | NR | NR |  |
| Kooiman, 2014[33](#_ENREF_33) | CKD (eGFR < 60 mL/min/1.73m2) | Total |  | 138 | 2 Months | 69 (50.0) | NR | NR | NR | NR |  |
|  |  | 1 | No hydration | 67 |  | 32 (47.8) | 70 | NR | NR | NR |  |
|  |  | 2 | IV 1.4% NaHCO3 | 71 |  | 37 (52.1) | 71 | NR | NR | NR |  |
| Kotlyar, 2005[34](#_ENREF_34) | Serum creatinine concentrations ≥0.13 mmol/l | Total |  | 60 | 30 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | IV hydration | 19 |  | 2 (10) | 69 | NR | NR | NR |  |
|  |  | 2 | NAC 300mg | 20 |  | 5 (25) | 66 | NR | NR | NR |  |
|  |  | 3 | NAC 600mg | 21 |  | 3 (14) | 67 | NR | NR | NR |  |
| Krasuski, 2003[35](#_ENREF_35) | Moderate renal insufficiency with serum creatinine from 1.6mg/dl to 3mg/dL | Total |  | 0 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | overnight hydration dextrose plus saline | 26 |  | (27) | 69 | NR | NR | NR |  |
|  |  | 2 | Bolus normal saline | 37 |  | (11) | 68 | NR | NR | NR |  |
| Kumar, 2014[36](#_ENREF_36) | Coronary block | Total |  | 275 | 5 days | 110 (22) | 65 | NR | NR | NR |  |
|  |  | 1 | IV NS | 90 | NR | NR | NR | NR | NR | NR |  |
|  |  | 2 | Oral NAC + IV NS | 90 | NR | NR | NR | NR | NR | NR |  |
|  |  | 3 | Allpurinol + IV NS | 95 | NR | NR | NR | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Lawlor, 2007[37](#_ENREF_37) | Preexisting renal impairment. Stable , chronic renal insufficiency | Total |  | 78 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | IV Hydration | 25 |  | 8 (32) | NR | NR | NR | Current: 6 (24) |  |
|  |  | 2 | IV Hydration + oral NAC | 25 |  | 6 (24) | NR | NR | NR | Current: 19 (76) |  |
|  |  | 3 | Oral Hydration + oral NAC | 28 |  | 10 (36) | NR | NR | NR | Current: 8 (28) |  |
| Li, 2009[38](#_ENREF_38) | Planned coronary angiography | Total |  | 205 | 3 Days | NR | NR | NR | NR | NR | +/- SD |
|  |  | 1 | Control | 103 |  | 37 | 63 +/- 11 | NR | NR | NR |  |
|  |  | 2 | Probucol | 102 |  | 52 | 62 +/- 11 | NR | NR | NR |  |
| Li, 2011[39](#_ENREF_39) | Mild and/or moderate renal insufficiency: ≥60 to ≤89 ml·min^-1·1.73 m^-2 and ≥30 to ≤59 ml·min^-1·1.73 m^-2 in eGFR | Total |  | 114 | 72 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Control | 62 |  | 27 (44) | 61.8 +/- 9.4 | NR | NR | NR |  |
|  |  | 2 | Benazepril | 52 |  | 22 (42) | 60.7 +/- 9.2 | NR | NR | NR |  |
| Li, 2014 [40](#_ENREF_40) | CIN Risk Score >11 | Total |  | 163 | 3 Days | 54 (33.1) | 65.4 | NR | NR | NR |  |
|  |  | 1 | IV Normal Saline | 81 |  | 29 (35.8) | 63.6 | NR | NR | NR |  |
|  |  | 2 | IV Prostaglandin E1 | 82 |  | 25 (30.5) | 64.7 | NR | NR | NR |  |
| Liu, 2013[41](#_ENREF_41) | Mild to moderate kidney disease (eGFR 60-89 ml/min/1.73 m2) | Total |  | 156 |  | 62 (39.7) | NR | NR | NR | NR |  |
|  |  | 1 | Statin | 80 | 6 Months | 31 (38.7) | 65.4 | NR | NR | NR |  |
|  |  | 2 | Statin plus alprostadil | 76 |  | 31 (40.8) | 66.3 | NR | NR | NR |  |
| Ludwig, 2011[42](#_ENREF_42) | Chronic renal impairment | Total |  | 100 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Control | 51 |  | 9 (19) | 68 | NR | NR | NR |  |
|  |  | 2 | MESNA | 49 |  | 15 (29) | 68 | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Maioli, 2008[43](#_ENREF_43) | Patients with chronic kidney dysfunction undergoing planned coronary angiography or intervention | Total |  | 502 | 10 Days | NR | NR | NR | NR | NR |  |
|  |  | 2 | IV Isotonic Saline plus oral NAC | 252 |  | 99 (39) | Median, 74 ; Range, 70-79 | NR | NR | NR |  |
|  |  | 3 | IV Sodium Bicarbonate plus oral NAC | 250 |  | 107 (43) | Median, 74 ; Range, 67-79 | NR | NR | NR |  |
| Maioli, 2011[44](#_ENREF_44) | STEMI, ST-segment elevation-myocardial infarction | Total |  | 0 | 3 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | No hydration | 150 |  | 40 (26.6) | 64 | NR | NR | NR |  |
|  |  | 2 | Late IV 0.9% saline | 150 |  | 41 (27.3) | 66 | NR | NR | NR |  |
|  |  | 3 | Early IV sodium bicarbonate | 150 |  | 35 (23.3) | 65 | NR | NR | NR |  |
| Manari, 2014[45](#_ENREF_45) | Cardiovascular: STEMI meeting inclusion criteria | Total |  | 592 | 72 hours CIN; 1 year for death outcomes | 149 (25.2) | NR | NR | NR | NR |  |
|  |  | 1 | IV normal saline | 151 |  | 38 (25.1) | 65 | NR | NR | Current: 47 (37) |  |
|  |  | 2 | High-dose infusion of IV normal saline | 142 |  | 32 (22.5) | 65.2 | NR | NR | Current: 44 (31) |  |
|  |  | 3 | IV standard bicarbonate | 145 |  | 41 (28.5) | 63.9 | NR | NR | Current: 49 (34) |  |
|  |  | 4 | High-dose IV bicarbonate | 154 |  | 38 (24.7) | 65.2 | NR | NR | Current: 44 (29) |  |
| Marenzi, 2006[46](#_ENREF_46) | Acute MI, ST segment elevation acute MI | Total |  | 354 | NR | NR | NR | NR | NR | NR |  |
|  |  | 1 | Placebo | 119 |  | 22 (18) | 62.5 | NR | NR | Current: 60 (50) |  |
|  |  | 2 | Standard dose NAC | 115 |  | 28 (24) | 62.5 | NR | NR | Current: 57 (50) |  |
|  |  | 3 | High dose NAC | 118 |  | 18 (15) | 62.2 | NR | NR | Current: 77 (65) |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Marenzi, 2012[47](#_ENREF_47) | CKD-eGFR <60 ml/min/1.73 m 2 ,General | Total |  | 170 | 72 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Saline Hydration | 83 |  | 18 (22) | 73 +/- 7 | NR | NR | Current: 7 (13) |  |
|  |  | 2 | Furosemide plus matched hydration | 87 |  | 19 (22) | 73 +/- 7 | NR | NR | Current: 4 (7) |  |
| Marron, 2007[48](#_ENREF_48) |  | Total |  | NR | 48 Hours |  | NR | NR | NR | NR |  |
|  |  | 1 | Isotonic 0.9% saline | 36 |  | 10 | 64 | NR | NR | NR |  |
|  |  | 2 | Hypotonic 0.45% saline | 35 |  | 13 | 68 | NR | NR | NR |  |
| Mueller, 2002[49](#_ENREF_49) | General | Total |  | 1383 | 30 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | Isotonic Saline hydration | 685 |  | 178 (26) | 64 | NR | NR | NR |  |
|  |  | 2 | .45% sodium chloride plus 5% glucose | 698 |  | 176 (25) | 64 | NR | NR | NR |  |
| Ng, 2006[50](#_ENREF_50) | Stable renal disease Cr >1.2 | Total |  | 95 | 72 Hours | (24.8) | 68 +/- 10 | NR | NR | NR |  |
|  |  | 2 | NAC | 48 |  | (18.8) | 67 +/- 10 | NR | NR | NR |  |
|  |  | 3 | Fenoldopam | 47 |  | (29.8) | 69 +/- 11 | NR | NR | NR |  |
| Oguzhan, 2013[51](#_ENREF_51) | Coronary angiography with serum creatinine <2.1 mg/dl | Total |  | 90 | NR | NR | NR | NR | NR | NR |  |
|  |  | 2 | AVH (amlodipine valsartan hydration group) | 45 |  | (40) | 66.38 | NR | NR | Ever: (48.9) |  |
|  |  | 3 | H (hydration group) | 45 |  | (33.3) | 62.07 | NR | NR | Ever: (53.3) |  |
| Ozhan, 2010[52](#_ENREF_52) | General | Total |  | 130 | 48 Hours | 53 | 54 +/- 10 | NR | NR | NR |  |
|  |  | 2 | NAC | 70 |  | 30 | 55 +/- 8 | NR | NR | NR |  |
|  |  | 3 | NAC + Atorvastatin | 60 |  | 23 | 54 +/- 10 | NR | NR | NR |  |
| Pakfetrat, 2009[53](#_ENREF_53) | General | Total |  | 286 | 48 Hours | 111 (39) | 57.9 | NR | NR | NR |  |
|  |  | 1 | sodium chloride | 96 |  | 34 (35) | 58.5 | NR | NR | NR |  |
|  |  | 2 | sodium bicarbonate in dextrose solution | 96 |  | 40 (42) | 57.8 | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Pakfetrat, 2009[53](#_ENREF_53) (continued) |  | 3 | sodium chloride plus oral Acetazolamide | 94 |  | 47 (50) | 57.5 | NR | NR | NR |  |
| Ratcliffe, 2009[54](#_ENREF_54) | Renal insufficients, Cr  Men >132.6 mg/dL  Women >114.9 mg/dL  and/or diabetics | Total |  | 78 | 7 Days | 32 (40) | 66 | White: (13) Black: (33) Latino: (36) Asian/Pac: (19) | NR | NR |  |
|  |  | 1 | IV normal saline | 15 |  | 6 (40) | 64 | White: (20) Black: (27) Latino: (33) Asian/Pac: (20) | NR | NR |  |
|  |  | 2 | IV normal saline + IV/oral NAC | 21 |  | 10 (48) | 65 | White: (10) Black: (33) Latino: (33) Asian/Pac: (24) | NR | NR |  |
|  |  | 3 | IV NaHCO3 | 19 |  | 8 (42) | 67 | White: (6) Black: (44) Latino: (33) Asian/Pac: (17) | NR | NR |  |
|  |  | 4 | IV NaHCO3+ IV/oral NAC | 23 |  | 7 (30) | 65 | White: (14) Black: (29) Latino: (43) Asian/Pac: (14) | NR | NR |  |
| Recio-Mayoral, 2007[55](#_ENREF_55) | Acute coronary Syndrome, acute coronary syndrome (ACS) patients who were admitted coronary care unit | Total |  | 111 | 7 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | Saline + NAC after procedure | 56 |  | 16 (29) | 64 | NR | NR | NR |  |
|  |  | 2 | IV Bolus+ NAC before procedure +NAC after procedure | 55 |  | 18 (32) | 65 | NR | NR | NR |  |
| Reinecke, 2007[56](#_ENREF_56) | General | Total |  | 424 | Median 553 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | Hydration only | 140 |  | 24 (17.1) | 67.9 | NR | NR | Ever: 80 (57.1) |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Reinecke, 2007[56](#_ENREF_56) (continued) |  | 2 | Hydration + Dialysis | 138 |  | 24 (17.4) | 67.9 | NR | NR | Ever: 74 (53.6) |  |
|  |  | 3 | Hydration + NAC | 146 |  | 25 (17.1) | 66.7 | NR | NR | Ever: 75 (51.4) |  |
| Rosenstock, 2008[57](#_ENREF_57) | Chronic kidney disease (CKD) stages 3–4 (glomerular filtration rate 15–60 ml/min/1.73 m2 | Total |  | 283 | 72 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Naive to angiotensin blockade | 63 |  | 23 (37) | 71.8 | NR | NR | Current: 15 (24) |  |
|  |  | 2 | Continue angiotensin blockade during and after procedure | 113 |  | 52 (46) | 71.8 | NR | NR | Current: 25 (22) |  |
|  |  | 3 | Discontinue angiotensin blockade morning of procedure and 2hrs after procedure | 107 |  | 41 (38) | 71.8 | NR | NR | Current: 24 (22) |  |
| Schmidt, 2007[58](#_ENREF_58) | General | Total |  | 96 | NR | NR | NR | NR | NR | NR |  |
|  |  | 2 | NAC plus sodium bicarbonate | 47 |  | 14 (42) | 67 | NR | NR | NR |  |
|  |  | 3 | NAC plus standard hydration | 49 |  | 11 (29) | 68.3 | NR | NR | NR |  |
| Shehata, 2014[59](#_ENREF_59) | Diabetic and mild to moderate CKD (eGFR 30-90 ml/min/1.73 m2) | Total |  | 100 | 10 Days | 68 (68) | 59 | NR | NR | NR |  |
|  |  | 2 | IV Normal Saline + Oral NAC | 50 |  | 17 (34) | 59 | NR | NR | Current: 34 (68) |  |
|  |  | 3 | IV Normal Saline + Oral NAC + Oral Trimetazidine | 50 |  | 15 (30) | 58 | NR | NR | Current: 35 (70) |  |
| Solomon, 1994[60](#_ENREF_60) | Cr >1.6mg/dl - CrCl <60 | Total |  | 78 | 24 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Saline | 28 |  | 5 | 67 +/- 11 | NR | NR | NR |  |
|  |  | 2 | Mannitol + Saline | 25 |  | 6 | 60 +/- 13 | NR | NR | NR |  |
|  |  | 3 | Furosemide + Saline | 25 |  | 13 | 63 +/- 13 | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Stevens, 1999[61](#_ENREF_61) | Baseline serum creatinine greater than 1.8 mg/dl | Total |  | 98 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | IVF alone | 55 |  | 21 | 69.6 | NR | NR | NR |  |
|  |  | 2 | IVF + Furosemide + Dopamine + Mannitol | 22 |  | 5 | 72.3 | NR | NR | NR |  |
|  |  | 3 | IVF + Furosemide + Dopamine | 21 |  | 6 | 67.0 | NR | NR | NR |  |
| Tamura, 2009 | General | Total |  | 144 | 7 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | Normal saline | 72 |  | 12 (16.7) | NR | NR | NR | NR |  |
|  |  | 2 | Normal Saline + NaHCO3 | 72 |  | 5.98 (.83) | NR | NR | NR | NR |  |
| Talati, 2012[62](#_ENREF_62) | Coronary procedures | Total |  | 104 | 72 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | No Fenoldapam | 52 |  | 17 (33) | 69.4 | NR | NR | NR |  |
|  |  | 2 | Fenoldopam | 52 |  | 13 (25) | 69.4 | NR | NR | NR |  |
| Trivedi, 2003[63](#_ENREF_63) | Coronary artery disease | Total |  | 53 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | Oral hydration | 26 |  | 0 (0) | 67.2 +/- 11.2 | NR | NR | NR |  |
|  |  | 2 | IV Hydration (0.9% saline) | 27 |  | 1 (3.8) | 68.5 +/- 8 | NR | NR | NR |  |
| Weisberg, 1994[64](#_ENREF_64) | Stable plasma creatinine concentration greater or equal to 1.8 mg/dL | Total |  | 26 | : | NR | NR | NR | NR | NR |  |
|  |  | 1 | Saline | 8 |  | NR | NR | NR | NR | NR |  |
|  |  | 2 | Dopamine | 8 |  | NR | NR | NR | NR | NR |  |
|  |  | 3 | ANP | 4 |  | NR | NR | NR | NR | NR |  |
|  |  | 4 | Mannitol | 6 |  | NR | NR | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Wolak, 2013[65](#_ENREF_65) | General | Total |  | 94 | 48 Hours | 32 (34.0) | 65 | NR | NR | NR |  |
|  |  | 1 | Continued ACE/ARB | 33 |  | 15 (45.5) | 67.6 | NR | NR | Current: 4 (12.1)  Former: 5 (15.2) |  |
|  |  | 2 | Short delay of ACE/ARB | 30 |  | 7 (25.8) | 64.8 | NR | NR | Current: 8 (25.8)  Former: 12 (38.7) |  |
|  |  | 3 | Long delay of ACE/ARB | 31 |  | 10 (30.0) | 61.0 | NR | NR | Current: 7 (24.1)  Former: 8 (27.6) |  |
| Xinwei, 2009[66](#_ENREF_66) | Acute Coronary syndrome: ACS was defined as any one of the following: (1) unstable angina pectoris; (2) ST-segment elevation myocardial infarction; and (3) non–ST-segment elevation myocardial infarction | Total |  | 228 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 2 | Simvastatin 20 | 115 |  | 67 (58) | NR | NR | NR | NR |  |
|  |  | 3 | Simvastatin 80 | 113 |  | 79 (70) | NR | NR | NR | NR |  |
| Yavari, 2014[67](#_ENREF_67) | baseline serum creatinine ≤132.6 mol/l (1.5 mg/dl) | Total |  | 199 | 48 Hours | NR | NR | NR | NR | NR |  |
|  |  | 1 | 0.9% IV Normal Saline | 102 |  | NR | 53.7 | NR | NR | NR |  |
|  |  | 2 | 0.9% IV Normal Saline + Oral Pentoxifyllline | 97 |  | NR | 54.4 | NR | NR | NR |  |

**Evidence Table I-1. Participant Characteristics for studies comparing interventions to prevent development of CIN (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year** | **Study Population** | **Arm\*** | **ARM define** | **N** | **Follow-up Period** | **Sex, N female (%)** | **Age, mean unless otherwise specified** | **Race** | **Education** | **Smoking status** | **Comments** |
| Yin, 2013[68](#_ENREF_68) | Coronary Care Unit, acute STEMI and acute (NSTEMI) requiring urgent coronary intervention due to ongoing ischemic symptoms | Total |  | 204 | 3 Days | NR | NR | NR | NR | NR |  |
|  |  | 1 | No probucol | 108 |  | 34 (31.5) | Median: 12.5;Range: 65.1 | NR | NR | NR |  |
|  |  | 2 | Probucol | 96 |  | 29 (30.2) | 65.1;Range: 10.5 | NR | NR | NR |  |

ACS=Acute Coronary Syndrome, AVH= amlodipine valsartan hydration group, CCS=Canadian Cardiovascular Society, CHF=Chronic Heart Failure, CIN=Contrast Induced Nephropathy, CKD=Chronic Kidney Disease, CK-MB=Creatine Kinase MB, CPK=Creatine Phosphokinase, Cr=Creatinine, CrCl=Creatinine Clearance, CRF=Chronic Renal Failure, eGFR=Estimated Glomerular Filtration Rate, GFR=Glomerular Filtration Rate, H=hydration group, HD=Hemodialysis, ICU=Intensive Care Unit, IU=International Units, IV=Intravenous, IVF=Intravenous Fluid, Mg/dl=milligram per deciliter, Mg/kg/hour=Milligram per kilogram per hour, Mg/kg=milligram per kilogram, MI=Myocardial Infarction, ml/min/1.73m2=milliliter per minute per 1.73 meter squared, Ml/min=milliliter per minute, Mmol/l=millimole per liter, N=Sample Size, NAC=N-acetylcysteine, NR=Not Reported, NSTEMI=non-ST-segment elevation-mycordial infarction, OHT=Orthotopic Heart Transplantation, PCI=Percutaneous Coronary Intervention, SCr=Serum Creatinine, SD=Standard Deviation, SrCr=Serum Creatinine, STEMI= ST-segment elevation-mycordial infarction, UA=Unstalbe Angina, Ug/kg/min=microgram per kilogram per minute, Umol/l=micromole per liter

\* if there is no “Arm 1” there is no control group.