

Randomized clinical trial to compare the nephrotoxic effects of iso-osmolar vs. low-osmolar contrast medium in patients with impaired renal function undergoing PCI

CONTRAST

(COntrast media and NephroToxicity following coronary Revascularization by Angioplasty)

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- Patients with chronic renal failure (CRF) have an increased incidence of coronary artery disease.
- In these high risk patients, PCI is often complex and associated with increased application of contrast medium.
- However, patients with CRF are at increased risk for contrast medium induced nephropathy (CIN) that is associated with adverse outcomes.
- Therefore, a strategy to reliably decrease the occurrence of CIN following PCI in these high risk patients is warranted.



Aim of the **CONTRAST** study

To compare nephrotoxicity between the
iso-osmolar contrast medium **IODIXANOL**
and the
low-osmolar contrast medium **IOMEPROL**
in patients with impaired renal function undergoing PCI.

Inclusion criteria

- Indication for coronary angiography with intention for PCI
- Chronic renal failure (eGFR¹ ≤ 60 ml/min or S-creatinine ≥ 1.5 mg/dl)
- Age ≥ 18 years, no pregnancy
- Informed, written consent

¹ estimated glomerular filtration rate (eGFR)
calculated according to MDRD formula
(Levey et al., Ann Int Med 1999)

Exclusion criteria

- Prior hemodialysis
- Cardiogenic shock
- Concurrent intake of nephrotoxic medication (e.g. metformin, NSAID, aminoglycosides, etc.) ≤ 48h prior contrast exposure
- Prior kidney transplantation
- Contra-indications for the use of Iodixanol or Iomeprol
- Prior or planned intravascular administration of iodine-containing contrast medium at least 7 days before or after catheterization

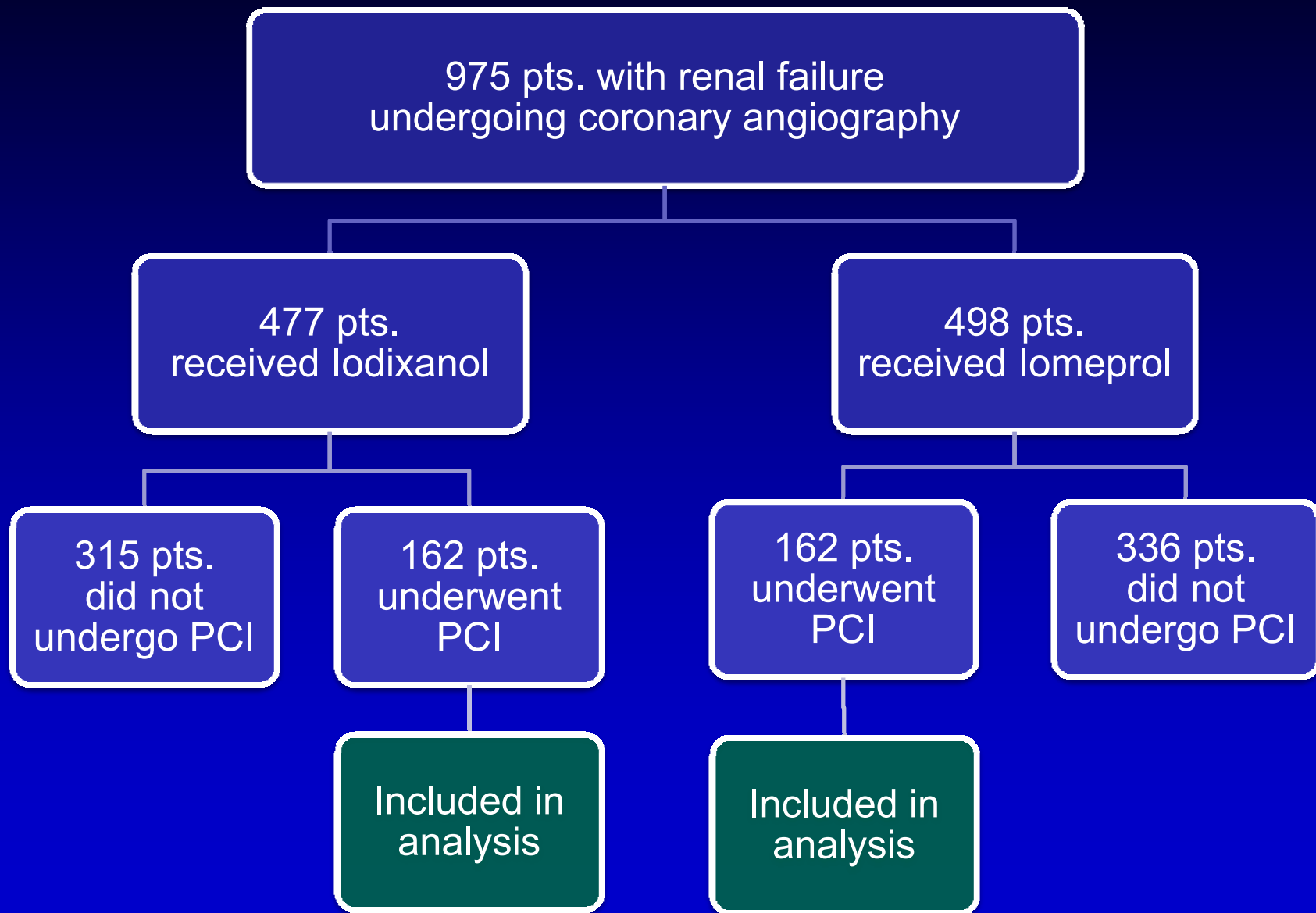
Primary endpoint:

Rise of S-creatinine as a measure of contrast medium induced nephrotoxicity during hospitalization for PCI

Secondary endpoints:

- Duration of hospitalization
- Incidence of severe acute kidney failure (creatinine increase by more than 1mg/dl and/or dialysis)
- Reassessment of the primary endpoint 6 months after PCI
- Mortality within 12 months
- Cardiovascular events within 12 months (death, myocardial infarction, TLR)

Study flow chart



| | Iodixanol 320 | Iomeprol 350 | <i>P</i> |
|------------------------|----------------------|---------------------|-----------------|
| S-creatinine prior PCI | 1.36 ± 0.51 | 1.37 ± 0.33 | .74 |
| S-urea prior PCI | 55.6 ± 23.7 | 57.8 ± 27.4 | .44 |
| eGFR prior PCI | 46.4 ± 9.3 | 47.1 ± 9.0 | .44 |

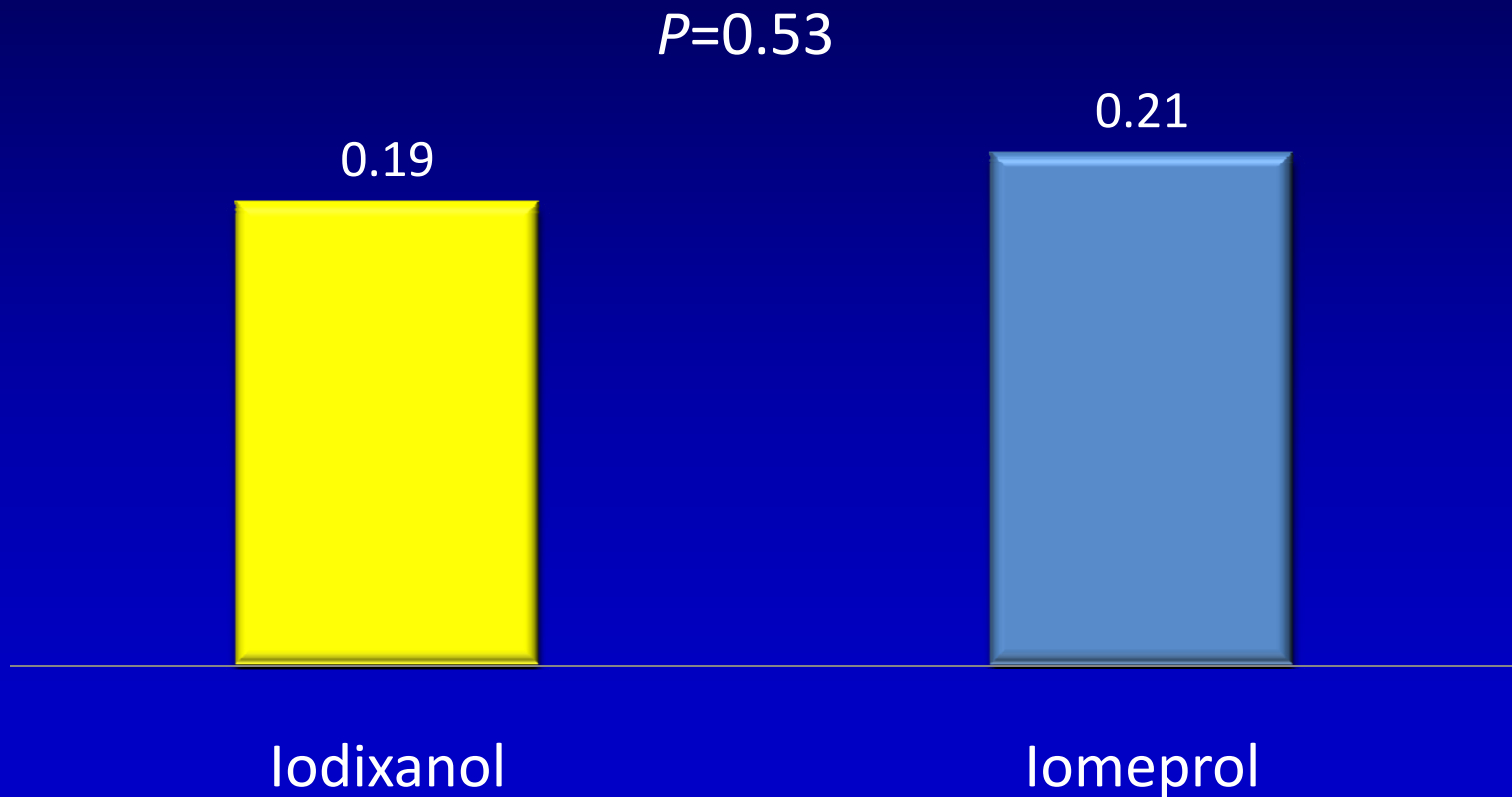
S-creatinine [mg/ml]; S-urea [mg/ml]; eGFR [ml/min/1.73m²]

Results – renal function post PCI

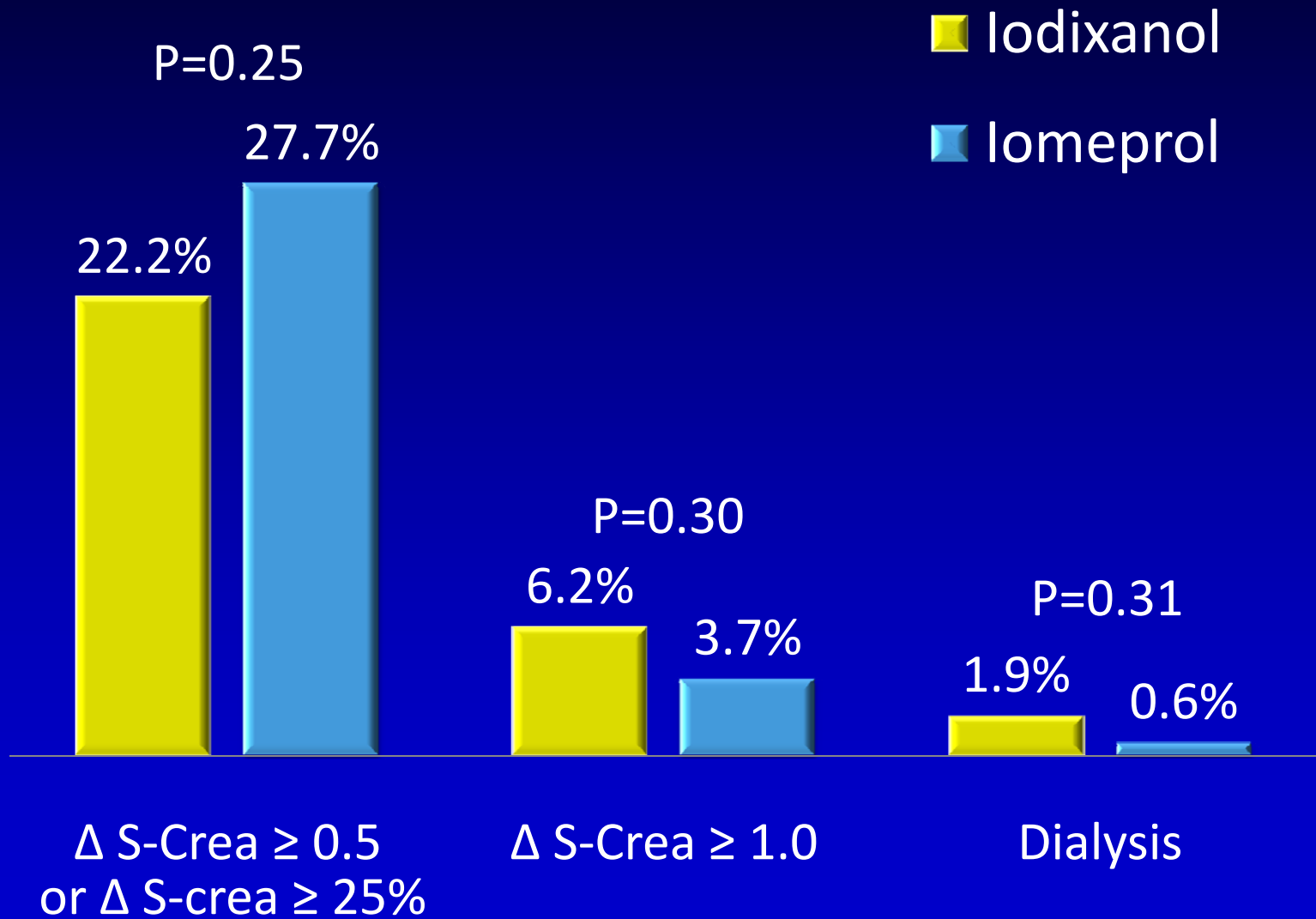
| | Iodixanol 320 | Iomeprol 350 | <i>P</i> |
|----------------------------|---------------|--------------|----------|
| Max. S-creatinine post PCI | 1.55 ± 0.58 | 1.59 ± 0.48 | .51 |
| Max. S-urea post PCI | 59.4 ± 30.8 | 61.2 ± 30.0 | .59 |

S-creatinine [mg/ml]; S-urea [mg/ml]

Maximal rise in S-creatinine post PCI [mg/dl]



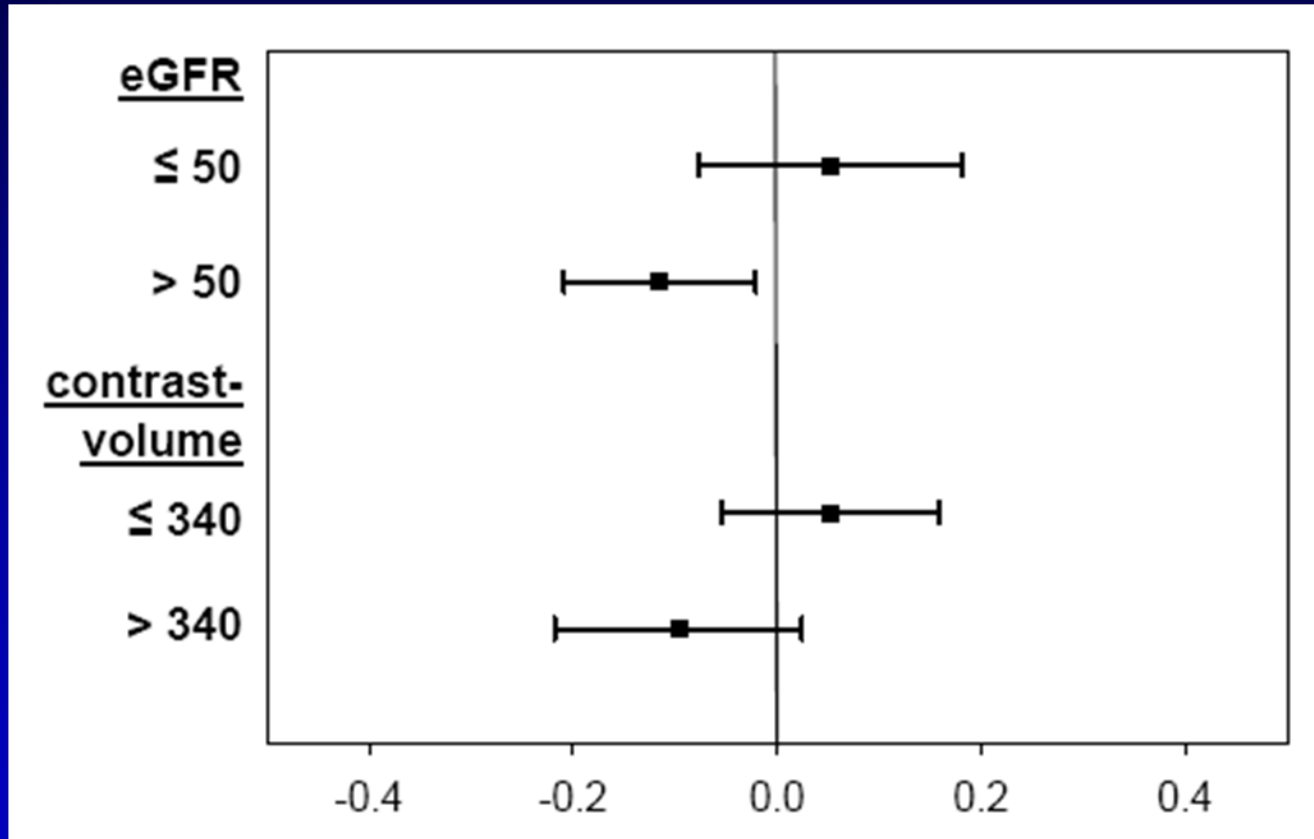
Contrast-induced nephropathy



Subgroup analysis: eGFR and contrast volume

Iodixanol better

Iomeprol better

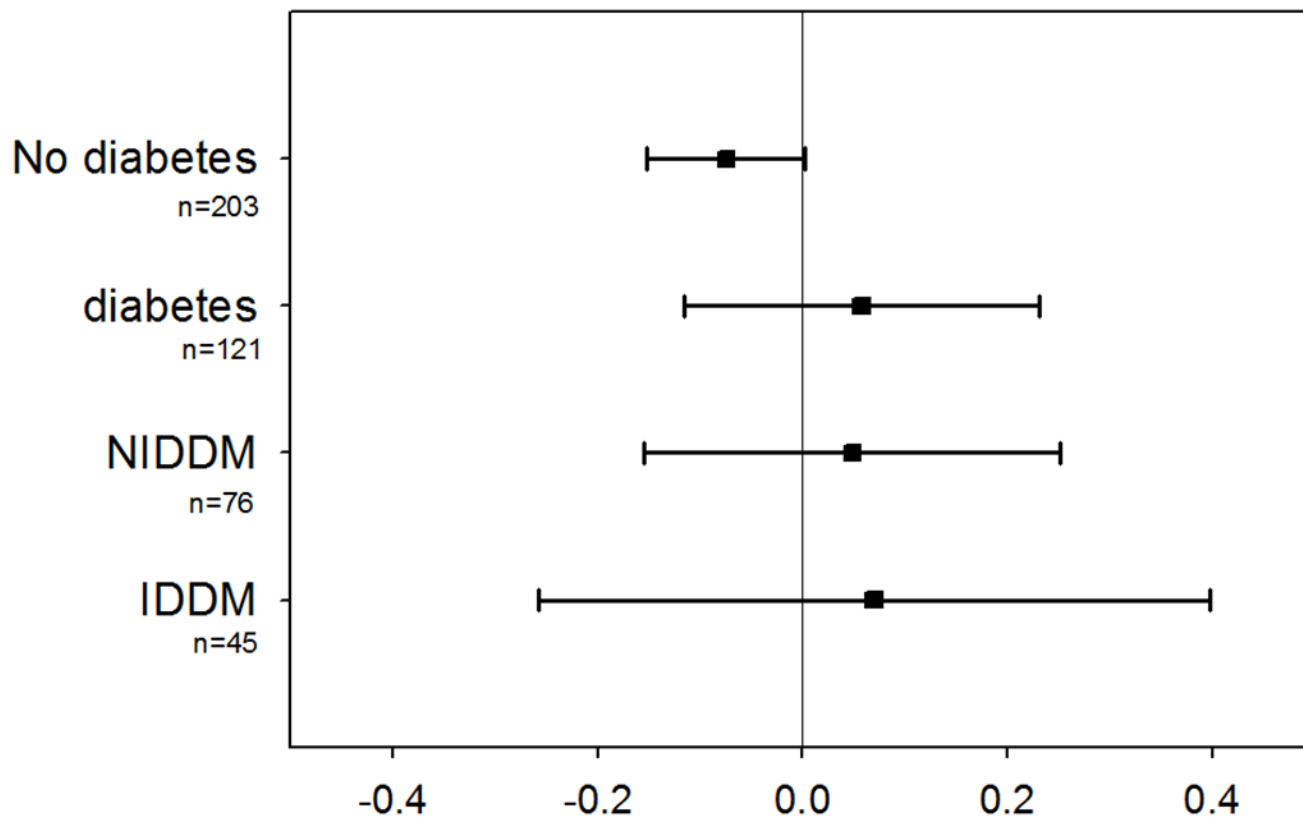


eGFR [ml/min/1.73m²];
contrast volume [ml]

Δ S-creatinine

Subgroup analysis: diabetes

Iodixanol better Iomeprol better



Δ S-creatinine

Clinical 90-day follow up

| | Iodixanol 320 | Iomeprol 350 | <i>P</i> |
|--------------------------|----------------------|---------------------|-----------------|
| Target lesion revasc., % | 2.5 | 2.5 | 1.00 |
| Myocardial infarction, % | 3.7 | 4.3 | .77 |
| Stent thrombosis, % | 0 | 0 | N/A |
| Death, % | 1.2 | 1.8 | .65 |
| MACE, % | 6.2 | 6.8 | .82 |

Conclusion

In patients with impaired renal function undergoing PCI following appropriate i.v. hydration, the iso-osmolar contrast medium Iodixanol revealed similar nephrotoxicity compared to the low-osmolar contrast medium Iomeprol.