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Development of a new treatment for acute kidney injury caused by contrast media

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Objectives: With the increasing prevalence of chronic kidney disease, contrast media are used with increasing frequency to diagnose and treat the disease. Patients with chronic kidney disease are at high risk of developing acute kidney injury (contrast nephropathy) due to contrast media administration, which further shortens kidney life, but is only recommended to be rehydrated. Contrast studies are essential in the diagnosis of fatal diseases such as acute myocardial infarction, aortic dissection, pulmonary embolism, and acute abdomen, but the dilemma is that the urgency of the situation is so great that there is not enough time to adequately rehydrate the patient and no measures can be taken to combat contrast nephropathy.

Methods: Under these circumstances, we have demonstrated that inhalation of hydrogen gas inhibits the progression of acute kidney injury caused by contrast-induced nephropathy in an animal model of contrast-induced nephropathy.

Results: We concluded that molecular hydrogen inhibited the increase of reactive oxygen species in the kidney induced by contrast media, thereby suppressing the activation of caspase-3 and the apoptosis of renal tubular cells, which was one of the reasons for the suppression of the progression of acute kidney injury.

Conclusions: Hydrogen gas inhibits acute kidney injury induced by contrast administration.
Since the handling of hydrogen gas cylinders required for hydrogen gas inhalation is complicated, we pondered over a solution, and since hydrogen gas inhalation was effective enough only for a short time when the contrast agent was administered, we came up with the idea that if the contrast agent itself contains molecular hydrogen to a saturated state, it can be expected to be effective without any difference in handling during normal examinations, and the results are also reported.