Contrast medium-induced nephropathy (CIN) is a rare event and occurs almost exclusively in patients at risk, e.g. those having pre-existing renal damage. Nonetheless, since the number of contrast media applications so far has been estimated to exceed 80 million/year, CIN is a major cause of in-hospital renal failure, and clearly contributes to overall morbidity and mortality.

In spite of its clinical relevance, our understanding of how CIN comes about is poor. The mechanisms believed to mediate CIN include cytotoxic effects on the renal tubules and perturbed renal haemodynamics leading to regional hypoxia.

It is the outer medullary region that is most vulnerable to CIN, mainly because significant transport takes place in this segment although the tissue oxygenation is already significantly lower than in the renal cortex.

In the face of our lack of knowledge with regard to the development of CIN, it is not surprising that many different attempts have been made to avoid this kidney disorder. Most of the clinical studies aiming at CIN prevention have yielded conflicting results, with the exception of the beneficial effects of hydration.

The present supplement is the result of a symposium held at the European Renal Association and the European Dialysis and Transplantation Association Meeting in Lisbon, 2004.

The aim was to bring together basic scientists and clinicians to enhance the exchange of mechanistic experimentation and clinical findings. As a result, four articles appear in this supplement. The first article summarizes the current knowledge of CIN pathophysiology and offers an explanation for the importance of hydration in the prevention of this form of renal impairment. A detailed presentation of the particular physiological situation of the different kidney vascular beds is then presented, with a particular emphasis on the effects of contrast agents. An outline of the main conclusions that can be drawn from the vast number of clinical studies is then presented, before going into the specific recommendations of how to prevent CIN, as offered by the European Society of Urogenital Radiology.