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## The Role of Oxidative Stress in Contrast-induced Acute Kidney Injury

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**Objectives :** Contrast-induced acute kidney injury (CI-AKI) is an important cause of hospital-acquired AKI. Though studied extensively, the complete pathogenesis is not clear. The iodinated molecule causes direct cytotoxicity and renal ischemia leading to reactive oxygen species (ROS) formation.
The objectives of the study are to induce CI-AKI by using Iohexol, a non-ionic, monomeric radiocontrast agent and to understand the role and significance of oxidative stress in this setting.

**Methods :** Thirty out of 36 male Wistar rats were injected with Iohexol intraperitoneally at a concentration of 3 g I/kg body weight; remaining 6 rats served as the control. From the Iohexol group, 6 animals were sacrificed each at 2nd, 4th, 6th, 12th and 24th hour after contrast injection to observe biochemical and renal histological changes.
Lipid peroxidation and the levels of antioxidants including total thiol, catalase and superoxide dismutase (SOD) were determined in kidney tissue samples. Neutrophil gelatinase-associated lipocalin (NGAL), a tubular renal injury marker was analysed in urine.

**Results :** Serum creatinine and urinary NGAL levels (Figure 1) increased significantly along with proteinuria. Light and electron microscopy demonstrated findings of renal tubular injury. There was an increase in lipid peroxidation peaking at 6th hour ($p < 0.001$) whereas the total tissue thiol concentration reduced significantly along with catalase and SOD (Figures 2,3,4). Being an oxidant-scavening protein, the decrease in thiol content denotes ROS formation and is a measure of oxidative stress.

**Conclusions :** AKI was induced by Iohexol as evident by raised serum creatinine and urinary NGAL levels, proteinuria and both light and electron microscopic findings of renal tubular injury. Increase in lipid peroxidation occured along with a concomitant decrease in the antioxidant levels indicating the generation of ROS. These findings lend further support in implicating oxidative stress in the pathogenesis of CI-AKI.

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Keywords :
Acute kidney injury; radiocontrast; Iohexol; oxidative stress; antioxidant; thiol; catalase; superoxide dismutase; NGAL