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The effects of high fat and high salt diet on early renal outcome in ischemic AKI

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Objectives:

Intrarenal immunologic micromilieu was reported to affect renal outcome in ischemic acute kidney injury (AKI). We hypothesized that diet may change intrarenal immunologic micromilieu and alter renal outcome in ischemic AKI. The effects of high salt or high fat diet on hypoxic HK-2 cells and early renal injury in a murine ischemic AKI model were investigated.

Methods: HK-2 cells were treated with NaCl, lipid or cholesterol before or after hypoxia. Four different diet regimen (control, high salt, high fat, and high fat & high salt diet) was provided to each group of 9-week male C57BL/6 mice for 1 week or 6 weeks (n=5-10 in each group). Thereafter, bilateral ischemic-reperfusion injury (BIRI) was induced by laparotomy approach. A cohort of mice was sacrificed at day 2 or day 3 after BIRI surgery.

Results: Lipid treatment increased proliferation of hypoxic HK-2 cells, however NaCl or cholesterol treatment decreased proliferation of hypoxic HK-2 cells depending on the concentration. High salt and high fat diet decreased intrarenal vascular endothelial growth factor expression and increased activated CD4 T cells at 6 weeks of diet modification. Renal function deterioration after BIRI was more prominent in the high fat and high salt diet group fed for 6 weeks and these effects were consistent in the high fat and high salt diet group fed for only 1 week.

Conclusions: High salt or high fat diet may aggravate renal injury in ischemic AKI by exerting adverse effects on intrarenal immunologic micromilieu.