New Recent Advances and Adjuncts to Prevent Radiocontrast Nephropathy after Endovascular Treatments Under Fluoroscopic Guidance

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Arteriography is a technique where radiopaque contrast material is injected into the vessels. This allows visualization of the arterial tree during diagnostic or therapeutic interventions. Two principal categories of intravascular contrast agents are 1) Positive contrast: liquids that have greater attenuation than soft tissue due to presence of iodine or gadolinium. 2) Negative contrast: agents which have lower attenuation than soft tissue, such as carbon dioxide gas. Since the iodinated contrast agents are the most common contrast media used in angiography, nephropathy induced by these agents remains the most clinically important complication during angiography. Radiocontrast nephropathy (RCN) is associated with increased morbidity and mortality. As more vascular surgeons perform their own diagnostic and therapeutic endovascular interventions, it is important to develop techniques which could minimize the development of RCN. Use of other non-iodinated contrast agents such as CO2 and gadolinium is technically limited, difficult, and expensive; especially in the hands of vascular surgeons who might be unfamiliar and lacking the proper equipment to utilize these products. Patient at increase risk for development of radiocontrast nephropathy include those with diabetes mellitus, preexisting renal insufficiency, dehydration, congestive heart failure, chronic liver disease, and multiple Myeloma.

Since nephrotoxicity is most commonly due to the iodinated part of the contrast agent, several protective measures may be used to minimize the toxic effect. A combination of these protective measures, with advance use of wires and catheters, can reduce the risk of renal insufficiency without compromising the detail anatomical roadmap needed to pursue endovascular intervention or bypass surgery in a high risk patient. Protective measures to decrease nephrotoxicity include 1) adequate hydration with saline or sodium bicarb 2) dilute contrast agent by 50%. Modifications of the technical procedure help to deliver the diluted contrast to the area of intent without compromising the detail needed to pursue endovascular intervention or bypass surgery.