Editorial

Acute Kidney Injury after Endovascular Procedures: How to Avoid this Old Foe

Since the first use of x-rays, it became necessary to enhance the angiographic image of different tissues and organs in order to separate them from their surrounding anatomic structures, depict in detail the area of interest and ease the diagnosis through the enhanced final image. Iodinated contrast (IC) solutions were both safe and effective in delineating the vascular bed and in the early 20th century, Brooks first reported on the use of such an IC to produce a clear image of lower extremity arteries of patients with severe peripheral arterial disease, in order to determine the proper level of lower extremity amputation.

Despite the advances in medical imaging, fluoroscopy with an IC agent is still considered the gold standard for performing endovascular vascular procedures and angiography with IC is still routinely used to diagnose vascular pathology.

In a number of cases, the intravascular administration of IC is linked to potential risks of adverse reactions. These adverse reactions can be general or renal and their severity varies significantly from minor to life-threatening. The onset of an adverse reaction can be acute (within an hour of administration) or delayed. Minor adverse reactions include self-limiting symptoms such as flushing, nausea, vomiting, pruritus, and mild urticaria. IC-related life-threatening reactions are anaphylactic shock and acute kidney injury (AKI) due to IC nephrotoxicity. The pathophysiological mechanism of the injury to the renal parenchyma is described in detail by Georgalis et al. [1] Special attention should also be given to the interference of IC and other medications, especially if the latter is eliminated through the kidneys.

In order to avoid IC-induced AKI, a number of methods are employed. The volume of IC necessary for angiography of different vascular beds varies significantly, as well as the rate of injection. Therefore, the first method to reduce the risk of AKI during a vascular procedure is to reduce the total dosage and the per injection volumes of IC. This reduction of IC volumes comes to a cost: the reduction of imaging quality. The vascular surgeon or the interventional specialist should employ proper techniques to reduce the use of IC while maintaining the quality of the vascular imaging, especially when it comes to finer structures below the infrainguinal ligament [2, 5]. In the endovascular repair of aneurysms of the infrarenal aorta (EVAR) or more complex aortic procedures, the volume of IC is significantly higher and it is injected at the level of the renal arteries or more proximal. Therefore, these procedures need additional caution and effort in order to lower the risk of AKI [6, 7]. If post-procedural IC-AKI is suspected, then a decrease in glomerular filtration rate should be expected, but other biomarkers indicating that the renal function is impaired exist [8].

A different approach to reducing the risk of AKI in patients undergoing an endovascular procedure is to eliminate the use of IC and perform angiographies using an alternative contrast material, such as carbon dioxide (CO2). The properties and the physiology of CO2 are substantially different from those of IC, therefore, the technique of CO2 angiography and the image produced are not similar to IC angiography [3]. CO2 angiography is a “new” method of vascular imaging during an endovascular procedure, but novel automatic delivery systems make this method safer and more efficient compared to the old manual administration. This could be the revival of this old method of avoiding IC-related AKI [4].

In this special issue on AKI after endovascular therapy, the journal aims at providing the information that a vascular surgeon or an interventional specialist needs in order to minimize the risk of this life-threatening condition in their patients.

REFERENCES


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