

Contrast-Induced Nephropathy

Introduction

Contrast-induced nephropathy (CIN) is a very serious complication that occurs after contrast media (CM) is injected into the body to help visualize otherwise difficult structures. CIN is an acute failure of the kidneys and their ability to filter out the contrast from the body. CIN is the third most common cause of acute renal failure within the hospital.

Risk Factors

The risk factors for CIN are divided into two categories, patient- and procedure-related. The two most important patient-related risk factors are diabetes mellitus and a preexisting renal insufficiency. Procedure-related risk factors include a high volume of CM, high osmolality of CM, high viscosity of CM, and repeat exposures to CM.

Prevention Methods

There are several options for prevention of CIN but since every patient is different, the same method will not work for every patient. Specific methods to prevent CIN from occurring include hydration and supplementing the patient's oxygen.

Conclusion

In conclusion, contrast-induced nephropathy is a very serious complication that can arise from a routine computed tomography or angiographic procedure. If the technologist is paying close attention to the patient and how they are feeling, the appropriate action can be taken to best take care of the patient. The risk can be reduced by thoroughly screening the patient before the start of the exam. This would include identifying patient risk factors such as whether the patient has diabetes or not, and identify any kind of preexisting renal insufficiency. Reducing the risk for the patient would also include using low-osmolality CM rather than a high-osmolality CM, warming the CM to reduce the viscosity, and using the least amount of CM as possible. Prevention methods for CIN include supplementing the patient's oxygen intake and oral fluids.

Prognosis

The prognosis for patients that develop CIN is generally very good. Less than a third of patients that develop CIN have lasting problems because of it. Normal renal function usually resumes within 7-14 days of the exposure to the contrast. Dialysis is necessary for less than 1% of the patients that are affected by CIN. That number is slightly higher in patients that had an underlying renal impairment, 3.1%. In patients that have diabetes mellitus or a severe renal failure that number can be as high as 12%. Out of all the patients that require dialysis for treatment, 18% will need dialysis for the rest of their life. Many of these patients, however, would have eventually developed the need for dialysis even if they had never experienced CIN.

Treatment

Treatment for CIN is very limited because every patient is different. There is no data showing that treatment will "cure" CIN. There are some treatments that can help improve a patient's condition, but unless the case of CIN is severe, CIN will resolve itself over time. If treatment is needed it typically includes 0.9% saline, oral fluid intake, avoidance of potentially harmful therapeutic drugs such as nonsteroidal anti-inflammatory drugs, and repeat exposures to CM.

Signs and Symptoms

CIN is an acute failure of the kidneys so it has the same signs and symptoms of general kidney failure. Those signs and symptoms include a reduction in urine production, unexplained shortness of breath, drowsiness, excess fatigue, confusion, and pain or pressure in the chest. In rare cases, the patient can experience seizures or a coma. Patients may be outwardly asymptomatic but their creatinine levels may rise and peak in 3-5 days. Once the creatinine peaks it usually takes 14 days to return to normal. In rare cases, patients can develop severe renal failure.

References

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