



Clinical Practice Guidelines

Metformin Therapy and Lactic Acidosis Risk

Overview: Metformin is an oral antihyperglycemic agent used to treat patients with type II diabetes mellitus. The most significant adverse effect of metformin therapy is the development of metformin-associated lactic acidosis in the susceptible patient. Although the incidence of metformin-associated lactic acidosis is rare, the mortality is high: 50% of patients with metformin-associated lactic acidosis die. Therefore, metformin and drugs containing metformin should be withheld temporarily for patients undergoing radiological studies using intravenous (IV) iodinated contrast.

Target Audience: Imaging Nurses, Radiological Technologists, Radiology Residents, Radiologists, Medical Students and Interns, Radiology Administrators, Healthcare Providers.

Content/Strategies: The administration of IV iodinated contrast to a patient taking a drug containing metformin is a clinical concern since cases of metformin-related lactic acidosis have occurred in this patient population. If acute renal failure or a reduction in renal function were to be caused by IV iodinated contrast in these patients, an accumulation of metformin could occur, with resultant lactic acidosis. The major clinical concern is in patients with known, borderline, or incipient renal dysfunction.

- Make necessary efforts to inform referring physicians of the potential for lactic acidosis in the patient receiving metformin or drugs containing metformin and IV iodinated contrast. Patients should be screened prior to these radiologic studies, and the protocol for withholding metformin or drugs containing metformin should be communicated to referring physicians.
- Discontinue metformin and drugs containing metformin at the time of an examination or procedure using IV iodinated contrast. The examination may proceed even if the patient took a dose of metformin on the morning of the examination as long as metformin or drugs containing metformin are withheld after contrast.
- Withhold metformin and drugs containing metformin for 48 hours after the procedure.
- Evaluate renal function and determine if normal before metformin or drugs containing metformin are resumed. The exact method of reassessment of renal function will vary depending on the practice setting but may be one of the following: serum creatinine and glomerular filtration rate measurement, clinical observation, hydration.
- It is *not* necessary to discontinue metformin or drugs containing metformin prior to gadolinium-enhanced MR studies when the usual dose of gadolinium is being used (0.1-0.3mmol per kg of body weight).
 - Although there are currently no relevant data, the American College of Radiology (ACR) recommends using this same protocol to withhold metformin and drugs containing metformin when large doses of gadolinium are used – as might be the case in MR angiography or CT scanning – since larger doses of gadolinium can potentially cause nephrotoxicity.
- A well-hydrated patient and judicious use of contrast lessen the risk of contrast-induced renal dysfunction.
- Patients should be given a medication information sheet about holding their medication and contacting their physician for follow-up blood work prior to restarting the medication.

Suggested Readings

American College of Radiology. (2008). *Manual on contrast media* [Version 6.0]. Reston, VA: Author.

Jackson, R. (2004). Using metformin safely; X-ray with caution. *Diabetes Self-Management*, 21(2), 1417.

King, J.E. (2004). Why hold the metformin? *Nursing*, 34(7), 20.

Medline Plus Drug Information, <http://www.nlm.nih.gov/medlineplus/druginformation.html>

Rao, Q.A., & Newhouse, J.H. (2006). Risk of nephropathy after intravenous administration of contrast material: A critical literature analysis. *Radiology*, 229, 392-397.

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