Laboratory Test Results Requiring Clinical Intervention

Patient Case A

A PipelineRx pharmacist received a call from a worried nurse stating that her patient had a digoxin level of 18.6 ng/ml and wanted help in determining the correct dose for Digibind. Digoxin is an antiarrhythmic drug that is used to slow the ventricular rate in tachyarrhythmias, such as atrial fibrillation, atrial flutter and can be used for cardiogenic shock. Digoxin has a narrow therapeutic serum range and must be precisely dosed, otherwise toxicity can occur easily. The normal therapeutic level is 0.5 – 2.0 nl/ml. A level greater than 3.5 ng/ml is considered toxic. Symptoms of toxicity include vomiting, visual disturbances, weakness, hyperkalemia (increased level of potassium), bradycardia which can result in heart block and worsening of tachycardia and fibrillation which may lead to cardiac death if not treat immediately. Digibind (digoxin immune fab) is used to treat life-threatening digoxin intoxication.

After receiving the call from the patient's nurse, the PipelineRx pharmacist calculated the Digibind dose and reviewed the patient's medical profile in detail. The patient's digoxin level indeed was considered toxic. However, the patient did not report any symptoms of digoxin toxicity. He was in normal sinus rhythm based on blood pressure and heart rate. The PipelineRx pharmacist reviewed the drug administration recorded and found that the patient had already received a dose of Digoxin (0.5mg IV x 1 dose) in the emergency room and the blood sample for the laboratory test for the digoxin level was drawn less than 10 minutes after the digoxin was given. Appropriately, therapeutic digoxin levels should be drawn at least 4 hours after an intravenous dose. Levels drawn sooner than 4 hours may result in recording falsely elevated levels which was the case with this patient.

The patient's physician was contacted and the PipelineRx pharmacist was advised to repeat the level test after 4 hours of the digoxin dose. The end result of the repeated level test was that the patient's digoxin level was 1.1 ng/ml, which was as in the normal range.

If Digibind was given to this patient based on the digoxin level and assuming an average weight of 70 kg, this would of required 13 vials of Digibind. An average vial of Digibind cost about $800, thus over $10,000 was saved for the client's hospital pharmacy.

Patient Case B

The patient's physician renewed the current potassium order. Before accepting the renewal, the PipelineRx pharmacist checked the most current potassium level, drawn at 12:05, which was high (K=5.7). Potassium is a mineral that is essential to the body function. Normal level is between 3.5-5.2mEq/L. A serum potassium level of 5.7 is above the normal range and this can lead to muscle weakness, paralysis and ventricular arrhythmias. Upon further review of the order, the patient already had one dose at 08:58 that morning. Looking further back, the serum potassium on the previous day was normal with K= 4.4. Patient was given two doses the previous day, one at 14:17 and the other at 20:33. The patient's serum potassium level on admission, one week prior, was very low, (K=2.8) thus prompting the oral potassium order. The dose that was renewed was for three times the daily dosing. With the serum potassium level that is already high at 5.7, continuation of the order will most likely lead to higher potassium level which will potentially cause harm to the patient and possible resulting in a longer hospital stay and a slower recovery. The PipelineRx pharmacist recommended discontinuing the order and the doctor concurred.