



False laboratory results after a routine blood test: To be cautious

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False laboratory results after a routine blood test: To be cautious

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Abstract

Around 40% of laboratory errors are committed during the preanalytical phase (at the time of the specimens' collection or labeling, transport or centrifugation) and this justifies the relevance of being cautious to keep the integrity of the sample as the reliability of the results could be damaged.

Normal levels of potassium (K^+) range between 3.6-5.2 millimoles per liter (mmol/L) in adults and symptoms with higher levels can vary from weakness and fatigue to more serious symptoms such as chest pain, dyspnea, palpitations or even frank paralysis.

Unfortunately errors in K^+ measurement exist and this can mislead clinical decisions and produce adverse results.

Similar errors can occur with sodium (Na^+) and calcium.

Physicians should be aware of this possibility when combined electrolytical disturbance are reported in the absence of an explanatory clinical etiology.

Introduction

Normal levels of potassium (K^+) range between 3.6-5.2 millimoles per liter (mmol/L) in adults. Though many patients may not experience any symptoms with higher levels, some of them will present weakness and fatigue (the most common complaints) whereas others will suffer more serious symptoms such as chest pain, dyspnea, palpitations or even frank paralysis.

Unfortunately errors in K^+ measurement exist and this will cause pseudohyperkalemia (K^+ falsely elevated) which if not suspected, will mislead clinical decisions and may produce adverse results.

In fact, having a blood K^+ level ≥ 7.0 mmol/L could have detrimental consequences and requires immediate treatment.

It has been described that around 40% of laboratory errors are committed during the preanalytical phase (at the time of the specimens' collection or labeling, transport or centrifugation) and this justifies the relevance of being cautious to keep the integrity of the

sample as the reliability of the results could be damaged.

Some cases have been published in which the sample was contaminated during phlebotomy with ethylenediaminetetraacetic acid (EDTA), causing a combination of pseudohyperkalemia and pseudohypocalcemia. This led in one of the cases to an unnecessary admission to the hospital. In the second case, the figures were dismissed as history of very difficult phlebotomy process had been recorded.

Moreover, it has been described that around 25 % of blood samples recovered from patients admitted to intensive care and 8 % of those taken from all other hospitalised patients will show higher figures of plasma sodium (Na^+) than the real ones (pseudohyponatremia).

We have performed a careful literature review and not found any article showing a combination of pseudohyperkalemia, pseudohypocalcemia and pseudohyponatremia.

Brief case report

We report here a case of a patient diagnosed with a breast carcinoma receiving adjuvant chemotherapy through a Hickman line. She attended to her prechemotherapy appointment completely asymptomatic and having had a good tolerance to the previous cycle. The blood was collected from her line and sent to the laboratory and the specimen did not have any features to be rejected.

When the results were received, these were as follow: Na^+ 175 mmol/L (132-146 mmol/L), K^+ 7.2 mmol/L (3.5-5 mmol/L) and calcium levels of 1.55 mmol/L (2.2-2.7 mmol/L).

As the patient was asymptomatic the blood test was repeated with the suspicion of an error. The second blood test showed completely normal results.

Brief Discussion

With these results, we spoke to the staff nurse taking the bloods. She recalled having had difficulties with bleeding the line though not flushing it. She aspirated back with difficulties small volume of blood and

discarded it. Then, she flushed the line again with saline and repeated the same procedure. Finally, she changed the syringe and took a small volume of blood (8 mls) and entered the needle into a tube emptying part of the content. Later she attached the second tube and emptied the syringe.

When we saw the false results, the only explanation we could think of was that inadvertently the syringe was primarily attached to a K3EDTA Vacutainers and secondly to a SST tube. And probably she did not discard enough blood at the beginning of the procedure. These errors could have explained the false results.

Conclusion

The integrity of specimens submitted to the laboratory will influence the accuracy and reliability of results. Preanalytical errors should be considered and although rare, clinicians should be aware of this possibility when combined hyperkalemia and hypocalcemia are seen, especially in the absence of an explanatory clinical etiology. In our case, hypernatremia was also seen, probably explained by not having discarded enough blood after having flushed the line with saline.

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