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Caso Clínico

High serum creatinine after intravenous dexamethasone administration

Creatinina sérica alta después de la administración de dexametasona intravenosa

José Pereira, Anabela Leão, Luis Araújo, Nuno Gonçalves, Gabriela Martins
Serviço de Patologia Clínica. Instituto Português de Oncologia do Porto Francisco Gentil. Porto, Portugal

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Correspondence: José Pereira. Serviço de Patologia Clínica. Instituto Português de Oncologia do Porto Francisco Gentil. Rua Dr. António Bernardino de Almeida. 4200-072 Porto, Portugal
e-mail: jose.duarte.pereira@outlook.com

CASE REPORT

In this case report, we present three situations of spuriously raised creatinine after the administration of intravenous dexamethasone.

The first case about 62 years old male patient with lung cancer. On a routine blood sample, we noticed a fivefold increase on the creatinine value, in under 24 hours, with no clinical evidence that could justify it. Because of that, we repeated the analysis using another equipment that confirmed the results. After, we asked for a new sample that was processed 6 hours after the first one. This time creatinine value was back to its basal.

A few days later, a similar situation occurred. A male patient, 59 years old, with stage IV lung adenocarcinoma, had a steep increase on the values of serum creatinine, from one day to another. Again, there was no direct cause for this. After confirming the values with another equipment, we asked for a new sample. This time, after only 3 hours, creatinine returned to its basal value.

The same situation occurred a third time. A male patient, 75 years old, with multiple myeloma, had a similar creatinine variation as to our first two patients. We repeated the same steps and creatinine value returned to the basal value.

The first samples were initially processed with Beckman Coulter® AU5800 equipment, that uses Jaffe method for creatinine measurement, and the results were confirmed with Atellica® CH analyzer, that uses an enzymatic method.

These results are illustrated on table 1, alongside urea and ion values, for the three patients and for the three-time stamps.

DISCUSSION

These sudden creatinine variations, alongside non-variable urea, and ionic values, and with the absence of clinical evidence that could justify it, led us to believe that some methodology interference was causing these variations.

After some intense investigation, repetitions of the analysis in different equipment, researching for possi-

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Table I.
Serum creatinine, urea and ionic values

		24 hours before first sample	First sample	Second sample
Patient 1	Creatinine (umol/L)	115	582	123
	Urea (mmol/L)	19,9	20	19,4
	Sodium (mmol/L)	139	143	143
	Potassium (mmol/L)	4,1 (Moderate hemolysis)	3,2	3,3
Patient 2	Creatinine (umol/L)	58	1222	63,5
	Urea (mmol/L)	4,9	6,2	6,1
	Sodium (mmol/L)	135	135	136
	Potassium (mmol/L)	4,6	4,3	3,9
Patient 3	Creatinine (umol/L)	248	707	237
	Urea (mmol/L)	22,7	17,6	20,1
	Sodium (mmol/L)	138	136	136
	Potassium (mmol/L)	3,4	2,6	3,5

ble methodology interferences, and various talks with the nurses searching for a possible common denominator between our three patients, we then concluded that the three of them had received, at some point before the first blood sample collection, intravenous dexamethasone.

After inspecting the used formulation, we observed it consisted of an injectable solution of dexamethasone 4 mg/mL from the laboratory Fresenius Kabi Pharma Portugal, Lda. According to the manufacturer, it contains creatinine, among other substances, as an excipient.

With this information, we learnt that, indeed, little time has passed between drug administration and the blood sample collection.

A couple of clinical reports have already described similar cases where creatinine was spuriously increased, with other brands of dexamethasone, also containing creatinine as part of the formulation, as an excipient (1,2).

Excipients are added to parenteral formulations to enhance or maintain active ingredient solubility and/or stability, to assure safety, minimize pain, irritation and control or prolong drug delivery. As well as various components such as sodium chloride or sucrose, creatinine is sometimes used as a stabilizing agent in, for example, dexamethasone acetate formulations (3).

We concluded that the increase in creatinine values was not caused by methodology interference nor renal failure. As an excipient, creatinine was thus correctly measured.

Since we were not aware of the situation at the time of the dexamethasone administration and blood collection, it was not possible for us to measure the precise time that went between the two events, nor the precise location where the punctures were performed. This could help us give a better understanding on the duration of the distribution phase of intravenous creatinine.

With this case report, our aim is to alert and remind how various substances can be used as excipients in different medications, and how blood samples analysis can be affected if collected too soon after drug administration.

Our findings warn clinicians to consider exogenous creatinine and other drugs that influence creatinine measurement as a possible cause of pseudo-elevation of serum creatinine.

POINTS TO REMIND

- Creatinine is used as an excipient is some intravenous dexamethasone formulations.
- The elevated value was indeed the real creatinine value. It was not a falsely altered value caused by a methodology interference.
- Blood samples should not be taken from the same line used to administer the formulation, or too soon after it, as this can condition the results.
- One must always keep in mind possible pre-analytical, analytical, and post-analytical factors that may have an impact on the accuracy of the results.

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