

# FALSELY ELEVATED CREATININE LEVEL IN A PATIENT WITH LYMPHOMA AND A MONOCLONAL IgM KAPPA PARAPROTEINAEMIA

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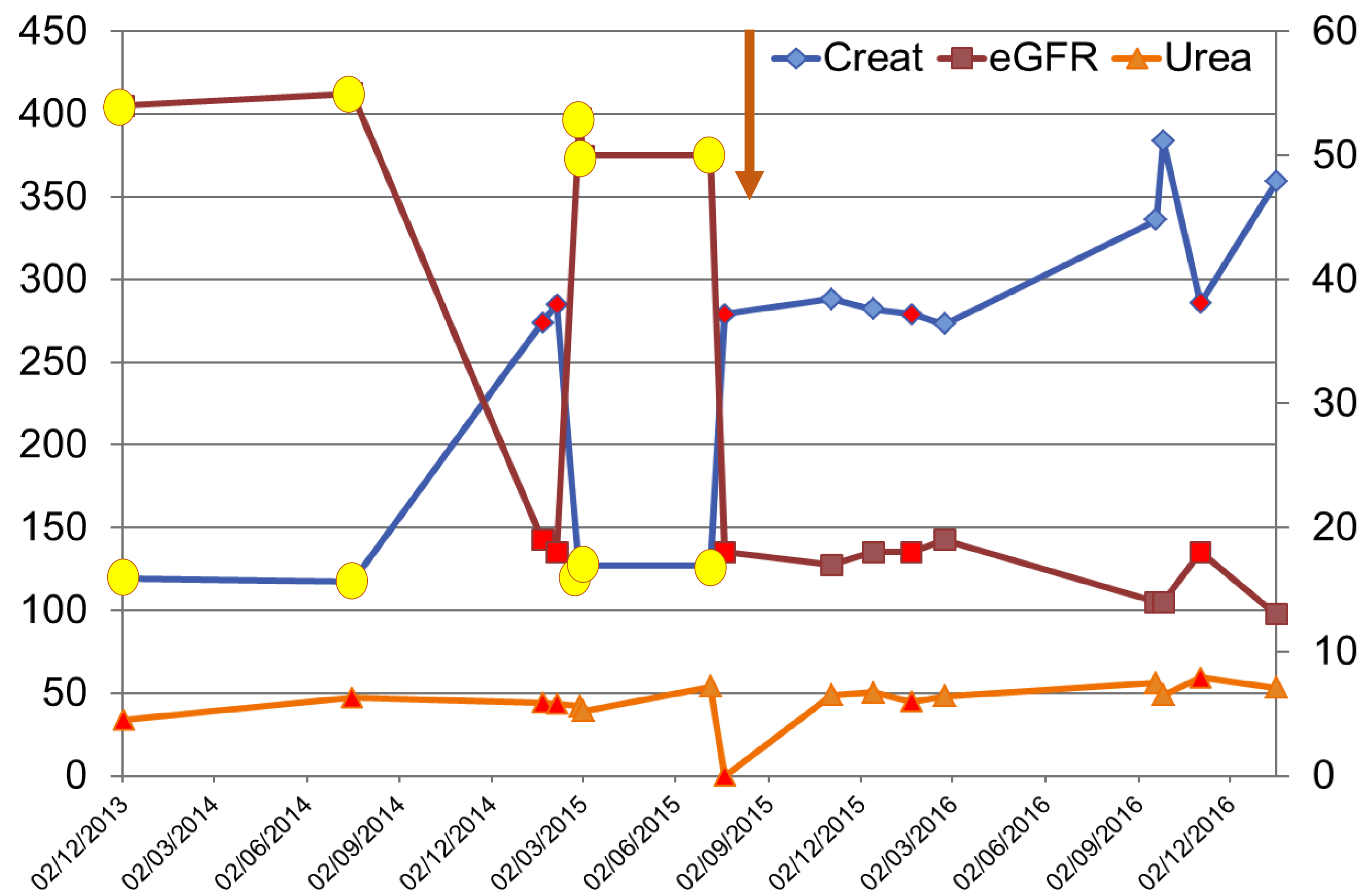
## INTRODUCTION

Renal function is assessed by measuring serum creatinine. We present a case of a 77-year-old gentleman, with a history of hypertension, ileostomy formed following a hemicolectomy secondary to bowel perforation and marginal zone lymphoma with an associated IgM paraprotein. The interaction of the IgM paraprotein caused a falsely elevated serum creatinine when this was measured using the enzymatic method.

## CASE PRESENTATION

A 77-year-old gentleman with a history of hypertension, hemicolectomy with ileostomy secondary to bowel perforation and marginal zone lymphoma with an IgM paraprotein monoclonal was initially referred to the renal out-patients in 2012 with an eGFR of 39 ml/min/1.73 m<sup>2</sup> and was diagnosed with chronic kidney disease stage 3B likely secondary to previous episodes of acute kidney injury related to dehydration from his stoma. At this point he was discharged back to the GP to monitor his renal function every six months. Medication included doxazosin, lansoprazole and amlodipine. Patient was feeling well with no physical complaints.

He was re-referred to the renal clinic again in late 2015 when he was noted to have a rising serum. At the time of referral his creatinine level was 285 µmol/L and the eGFR was 18 ml/min/1.73 m<sup>2</sup> (using the CKD-EPI formula). On reviewing his previous lab results, it was noted that there were discrepancies in his creatinine measurements depending on whether his sample was tested in one lab versus another one (see Figure 1). Moreover, his urea levels were disproportionately low compared to his creatinine levels, despite a BMI of 28 kg/m<sup>2</sup> and there was no rise in his urea levels as there was over the years as compared to his creatinine (see Figure 1). The rest of his lab results were: parathyroid hormone level: 5.3 pmol/L, adjusted calcium: 2.48 mmol/L, phosphate: 0.8 mmol/L, bicarbonate: 28 mmol/L, haemoglobin: 156 g/L despite his advanced CKD as suggested from the serum creatinine. In view of these discrepancies the case was discussed with our Biochemistry Department. The trust where the patient received his care was made of two hospitals at different sites which had two different laboratories and later transpired had used different methods to measure serum creatinine until integration of services in mid to late 2015. One lab was using the Jaffe method and the other lab was using the enzymatic method.



**Figure 1: Measurement of serum creatinine, urea and eGFR over time**

- The graph on the right shows creatinine measurement in blue, eGFR measurement in red and urea measurement in orange.
- Creatinine values are on the right vertical axis and urea and eGFR values on the left vertical axis.
- The yellow circles (●) show results from the lab using the Jaffe method. The rest of the results were obtained using the enzymatic method.
- The arrow (↓) indicates the time when the two laboratories were integrated and all creatinine measurements were done using the enzymatic method.

## RESULTS

A Chromium labelled EDTA GFR measurement found that the patient's absolute GFR was 41 ml/min. This confirmed that the creatinine values obtained from the enzymatic method were falsely elevated. The creatinine level using the enzymatic method was 286 µmol/L (eGFR 18 ml/min/1.73m<sup>2</sup>) in comparison, the creatinine level obtained via the Jaffe method was 131 µmol/L, giving an eGFR of 49 ml/min/1.73m<sup>2</sup>. eGFR measured using cystatin C was 42 ml/min/1.73m<sup>2</sup>.

Investigation into possible interferences in the methods used, uncovered a stated interference in the Siemens enzymatic creatinine method due to monoclonal gammopathies. A literature review found few other case reports of falsely elevated creatinine secondary to an interference by monoclonal IgM.<sup>1,2</sup> As it is positive interference, the presence of IgM must be increasing key product of the reaction steps. This patient had a monoclonal gammopathy of IgM kappa paraprotein, measuring 5.6 g/L.

Review of the results of 48 patients with an IgM paraprotein (range 2.7 to 35 g/L) revealed the possibility of at least one other case with a hypercreatininaemia secondary to an IgM paraprotein.

## CONCLUSIONS & LEARNING POINTS

It is important for clinicians to be aware of the limitations of the tests they use, in this case, that used to measure creatinine. This will avoid unnecessary and invasive procedures. Good communication between different specialities is key when diagnostic results do not add up. In the UK, NICE guidance suggests the use of enzymatic measurement of creatinine, as this has less interference than the Jaffe method. NEQAS data<sup>3</sup> shows that in the UK in April 2017 49.5% of creatinine done by enzymatic methods which is a rise from the rise from 31.5% pre-NICE guidance in July 2014. This means that this scenario is likely to become more common; both the biochemical specialists and the physicians should be aware of this possible interaction.

## REFERENCES

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