

## USING POLYETHYLENE GLYCOL PRECIPITATION TO CONFIRM MACROAMYLASEMIA

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To the Editor,

In the 2017 winter issue of Acta Medica Croatica, we published a case report with review of literature entitled Diagnosing Macroamylasemia in Unexplained Hyperamylasemia. The paper discussed a case of a young female patient with elevated levels of amylase only in serum without related symptoms (1). After excluding other causes, taking into consideration medical history, physical examination, and routine laboratory testing, we suspected and subsequently confirmed macroamylasemia with a formula, the only method available to us at the time working in general practice (1). As mentioned in our article, macroamylasemia is a benign condition where macroamylase complexes form with immunoglobulins, which cannot be normally secreted by the kidneys, leading to falsely elevated serum levels, possibly creating confusion among unaware clinicians (1). Although the formula we used is an acceptable method to confirm macroamylasemia, electrophoresis is considered a definite confirmation, resulting in a smeared band instead of defined bands of amylase subtypes (salivary and pancreatic) (1). This test is not routinely used in Croatia, and unfortunately, we could not confirm macroamylasemia in our patient with this test at the time (1).

Upon moving from general practice to hospital, we have become more aware of a routine test done for a similar but much more common condition, hyperprolactinemia. As prolactin commonly forms macrohormone complexes, macroprolactin presence in hyperprolactinemia is routinely tested using polyet-

hylene glycol (PEG) precipitation. This test can also be used to confirm macroamylasemia, stipulated in our original paper as well, alongside the formula and electrophoresis (1). With this test in mind having the opportunity to invite our original patient presenting herself, the patient voluntarily came in for the PEG precipitation test to further confirm, or we could say, more definitely confirm her condition of macroamylasemia. The test was performed using the method by Levitt and Ellis (2). PEG precipitable activity (PPA) was subsequently calculated with the formula  $\%PPA = ((\text{activity blank} \times \text{activity PEG}) / \text{activity blank}) \times 100$ , and a cut-off value of 60% was used, according to Davidson and Watson (2,3). The test result was positive for macroamylasemia, confirming our previous suspicion and calculation.

Considering our previous experience with macroenzymes, in particular our patient with macroamylasemia, and our further work with macroenzymes, a small study determining macroenzyme, that is, macro-aspartate (AST) and alanine transferase (ALT) prevalence in rheumatoid arthritis patients, and its effect on further diagnostics and treatment, of which preliminary results were presented at the 23<sup>rd</sup> IFCC/EFLM European Congress of Clinical Chemistry and Laboratory Medicine in May 2019 (4), the concept of macroenzymes and their detection using the PEG precipitation test was presented to internists, that is, gastroenterologists, in our centre, which was positively received as some of the doctors noted following up patients with elevated serum amylase without an underlying cause. Since then, the test has been in-

roduced into the repertoire of the laboratory, as it is simple and inexpensive, and already routinely done for the detection of macroprolactin, and gastroenterologists have been requesting the test for patients with unclear elevated serum amylase as a differential diagnosis. Although it is unclear how the availability of the test will influence the management of patients with hyperamylasemia, if it will save resources and time by avoiding other diagnostics, it is hoped that, if nothing else, it will diagnose some patients with previously unexplained hyperamylasemia.

## REFERENCES

1. Šimac DV, Špelić M, Devčić B, Rački S. Diagnosing macroamylasemia in unexplained hyperamylasemia. *Acta Med*

*Croatica* [Internet]. 2017 [cited 2020 Sept 9];71(1):63-6. Available at: <https://hrcak.srce.hr/184908>

2. Levitt MD, Ellis C. A rapid and simple assay to determine if macroamylase is the cause of hyperamylasemia. *Gastroenterology* [Internet]. 1982 Aug [cited 2020 Sept 9];83(2):378-82. Available at: [https://www.gastrojournal.org/article/S0016-5085\(82\)80331-4/pdf](https://www.gastrojournal.org/article/S0016-5085(82)80331-4/pdf)

3. Davidson DF, Watson DJM. Macroenzyme detection by polyethylene glycol precipitation. *Ann Clin Biochem* [Internet]. 2003[cited 2020 Sept 9];40:514-20. Available at: <https://journals.sagepub.com/doi/10.1258/000456303322326425>

4. Špelić M, Šimac DV, Bilić-Zulle L. Prevalence of aminotransferase macroenzyme in rheumatoid arthritis patients and its impact on treatment. Poster presented at 23<sup>rd</sup> IFCC-EFLM European Congress of Clinical Chemistry and Laboratory Medicine, 2019 May 19-23, Barcelona, Spain.