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Pyridoxal-5'-phosphate (P5P) supplementation in ALT and AST assay reagents

The 2023 General Chemistry/Therapeutic Drugs (C-B) Survey included supplemental questions to assess participating laboratories' awareness and adoption of the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) reference procedure recommendations to use alanine aminotransferase (ALT) and aspartate aminotransferase (AST) reagents that are supplemented with pyridoxal-5'-phosphate (P5P), also known as vitamin B6 [1-2]. P5P is a co-factor required for the reactions that occur to measure serum or plasma ALT and AST on clinical chemistry analyzers. The use of reagents without P5P supplementation may miss ALT and AST elevations in patients with vitamin B6 deficiency [3].

Of 4304 responses included in the analysis, 1651 (38.4%) of laboratories indicted that they use ALT and/or AST reagents supplemented with P5P, while 2653 (61.6%) indicated that they do not use P5P supplemented reagents. Of 2611 respondents indicating whether they intend to switch to P5P supplemented reagents in the future, only 5.4% responded "yes," while 35.2% responded "no," and 59.4% were "unsure."

The most common barrier cited for implementing P5P supplemented reagents was that the laboratory's assay manufacturer does not provide P5P supplemented reagents (1297/2140, 60.6%). However, the Clinical Chemistry Committee noted that several of those responses came from laboratories who reported results with method codes of common clinical chemistry manufacturers who do provide such reagents. For example, of the respondents who cited "ROCHE" as their ALT reagent, 160/794 (20.2%) responded that they use P5P supplemented reagents, while 243/495 (49.1%) of laboratories not using P5P supplemented reagents indicated on the barriers to adoption question that the assay manufacturer does not provide supplemented reagents. It is possible that P5P supplemented reagents are not available for all instrument models from a given manufacturer or for all countries. Free text responses indicated that some laboratories were awaiting the installation of new chemistry instrumentation in order to adopt P5P supplemented reagents. Other cited barriers included staffing limitations (12.4%), the cost or difficulty in managing supplemented reagents (8.6%), and that the patient population would not benefit (6.4%). The anticipated patient benefits are dependent on the prevalence of vitamin B6 deficiency in the population, which may be as high as 10% in the United States, with risk factors including malabsorption, drug interactions, and alcoholic hepatitis [4]. Free text responses regarding barriers revealed that some labs were unaware of P5P supplemented reagents, had not been asked to use such reagents (e.g., by providers), or that they were part of a broader laboratory network or health system that had not aligned to this approach.

Overall, the results of the supplemental questionnaire highlight a general lack of awareness of the existence and benefits of P5P supplemented ALT and AST reagents, and further, illustrate possible variances in ways laboratories are reporting their proficiency testing methods for these tests. Participants are encouraged to: 1) review ALT and AST reagents options with their assay manufacturer; 2) ensure that they are using reference intervals aligned to their specific reagent; and 3) confirm that they are using the appropriate ALT and AST reagent codes when submitting proficiency testing results.

References

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