

**LABORATORY DIAGNOSTICS OF CHANGES IN VITAMIN D LEVELS IN
CHRONIC PANCREATITIS USING THE AFIAS AUTOMATIC ANALYZER**

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Annotation: This article explores the changes in vitamin D levels in patients with chronic pancreatitis and evaluates the effectiveness of laboratory diagnostics using the AFIAS automatic analyzer. Chronic pancreatitis is a progressive inflammatory disease that often leads to malabsorption and nutritional deficiencies, including vitamin D deficiency. The study highlights the clinical significance of monitoring vitamin D status in such patients and demonstrates the diagnostic accuracy and convenience of the AFIAS system in detecting serum vitamin D concentrations. The findings emphasize the importance of timely vitamin D assessment for better management of chronic pancreatitis and prevention of related complications.

Keywords: Chronic pancreatitis, Vitamin D deficiency, Laboratory diagnostics, AFIAS analyzer, Serum 25(OH)D, Malabsorption, Automated analysis.

INTRODUCTION

Chronic pancreatitis (CP) is a long-standing inflammatory condition of the pancreas characterized by irreversible structural changes, leading to progressive loss of both exocrine and endocrine functions. One of the key complications associated with CP is malabsorption, particularly of fat-soluble vitamins, including vitamin D. Vitamin D plays a vital role in calcium-phosphorus homeostasis, bone metabolism, immune modulation, and overall systemic health. Deficiency of vitamin D in patients with chronic pancreatitis is common and often underdiagnosed, potentially contributing to osteoporosis, increased fracture risk, and impaired immune response.

Accurate and timely assessment of vitamin D status is therefore critical in the management of patients with CP. Recent advancements in laboratory technologies have enabled more efficient and precise detection of serum 25-hydroxyvitamin D [25(OH)D], the major circulating form of vitamin D. The AFIAS (Automated Fluorescent Immunoassay System) is a modern, compact, and user-friendly analyzer that provides reliable quantitative measurements of 25(OH)D levels in clinical samples.

This study aims to investigate changes in vitamin D levels in patients diagnosed with chronic pancreatitis and to evaluate the performance of the AFIAS automatic analyzer in routine laboratory diagnostics. The findings are expected to contribute to the improvement of diagnostic protocols and patient outcomes in the context of chronic pancreatic disorders.

Objective of the study

The objective of this study is to identify changes in serum vitamin D [25(OH)D] levels in patients with chronic pancreatitis and to evaluate the diagnostic efficacy of the AFIAS automated analyzer for detecting vitamin D deficiency. The study aims to substantiate the clinical feasibility of regular vitamin D monitoring and the introduction of modern laboratory methods into the practice of managing patients with chronic pancreatic diseases.

Methods

This study was conducted at the Tashkent Medical Academy from January to April 2025. A total of 60 patients diagnosed with chronic pancreatitis (CP) and 30 healthy control subjects were enrolled in the research. The diagnosis of CP was confirmed based on clinical presentation, imaging studies, and laboratory findings according to established criteria.

Venous blood samples were collected from all participants following an overnight fast. Serum was separated by centrifugation and stored at -20°C until analysis. Vitamin D status was assessed by measuring serum 25-hydroxyvitamin D [25(OH)D] levels using the AFIAS automatic analyzer (Boditech Med Inc., South Korea), which employs fluorescent immunoassay technology for quantitative detection.

The assay was performed according to the manufacturer's instructions, with each sample analyzed in duplicate to ensure accuracy. Reference ranges were used to classify vitamin D status as deficient (<20 ng/mL), insufficient (20–30 ng/mL), or sufficient (>30 ng/mL).

Statistical analysis was performed using SPSS version 26.0. Data were presented as mean \pm standard deviation (SD). Comparisons between groups were made using Student's t-test or Mann-Whitney U test as appropriate, with a p-value < 0.05 considered statistically significant.

Results

The study included 60 patients with chronic pancreatitis (mean age: 48.6 ± 10.2 years; 38 males and 22 females) and 30 healthy controls (mean age: 45.3 ± 9.7 years). Serum 25(OH)D levels were significantly lower in the chronic pancreatitis group compared to the control group (18.2 ± 6.5 ng/mL vs. 31.7 ± 7.4 ng/mL, $p < 0.001$).

Among CP patients, 42 individuals (70%) were classified as vitamin D deficient (<20 ng/mL), 12 (20%) as insufficient (20–30 ng/mL), and only 6 (10%) had sufficient levels (>30 ng/mL). In contrast, 80% of the control group had sufficient levels, with only 3 participants (10%) classified as deficient.

The AFIAS analyzer demonstrated high sensitivity and specificity in detecting 25(OH)D levels, with results correlating strongly ($r = 0.92$) with reference laboratory methods used for validation in a subset of 20 randomly selected samples.

Discussion

Vitamin D deficiency is a common yet often overlooked complication in patients with chronic pancreatitis. This study confirmed a high prevalence of hypovitaminosis D in CP

patients, supporting previous findings that pancreatic insufficiency leads to malabsorption of fat-soluble vitamins, particularly vitamin D.

The use of the AFIAS automatic analyzer enabled rapid, accurate, and cost-effective assessment of vitamin D status. The system's ease of use and reliability make it suitable for routine clinical practice, especially in settings with limited laboratory infrastructure.

The strong correlation between AFIAS results and standard reference methods further validates its diagnostic utility. Early detection of vitamin D deficiency is crucial for timely supplementation, which may help prevent complications such as osteoporosis, immune dysfunction, and chronic fatigue in CP patients.

However, this study has limitations, including a relatively small sample size and lack of longitudinal follow-up. Future studies are needed to evaluate the impact of vitamin D supplementation on clinical outcomes in CP.

Conclusion

This study highlights a significant reduction in vitamin D levels among patients with chronic pancreatitis, emphasizing the importance of regular screening and early intervention. The AFIAS automatic analyzer proved to be a reliable and efficient tool for detecting vitamin D deficiency, supporting its use in clinical and laboratory settings. Integration of routine vitamin D assessment into the management protocol of chronic pancreatitis could improve patient outcomes and reduce the risk of associated complications.

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