Biochemistry is basic medical science subjects which is introduced in the second year curriculum in medical university. Biochemistry is the study of chemical processes of living organisms and the reactions occurring in living cells on the molecular level [1]. The importance of the knowledge of biochemistry is necessary for a medical student to understand main functions of the human body. Teaching basic science courses is challenging because of the ubiquitous use of monotonous lectures, tutorials, practical and end semester exams. Clinical case based learning is one of the innovative teaching and learning method, which promotes a student’s critical thinking skills [2].

The purpose of this study is to introduce clinical cases based learning to improve learning of biochemistry course content.

Biochemical abnormalities produce many different clinical manifestations of disease. Clinical case studies should detail a particular medical case, describing the background of the patient, discuss laboratory research in order to define a diagnosis, and should indicate on the treatment choice. In general, case studies should be an informative and useful part of every student’s medical education. [3]. The following example is a diagnose for the clinical case, based on a patient’s symptoms and tests.

An 18-year-old girl consulted her family doctor because of tiredness and weight loss. On questioning, she admitted to feeling thirsty and had noticed she had been passing more urine than normal. Analysis of urine revealed glucosuria and ketonuria. Analysis of blood plasma: glucose – 32 mmol/L, ketone bodies – 12 mmol/L, hyperlipidemia and hypercholesterolemia, urea – 18 mmol/L, pH – 7.05.

a) Explain all these changes of blood and urine analysis. What is a possible diagnosis? Why are they developed in patients with type 1 diabetes mellitus (DM)?

b) Explain the causes of excessive production and decreased catabolism of ketone bodies in type 1 DM patients. Indicate the consequences of ketosis.

c) Extreme thirst (polydipsia) and excessive hunger (polypagia) are characteristic symptoms of DM. Explain why?
d) What other laboratory tests are used for diagnosis of DM and long-term control (monitoring) of the diabetic patients?

e) One day she was brought to the emergency room of the hospital in a coma. Her respirations were deep and rapid (Kussmaul’s breathing [4]), and her pulse rate was rapid. The partial pressure of CO₂ (PaCO₂) in arterial blood was 28 mmHg (reference range = 37-43), and her serum bicarbonate level was 8 meq/L (reference range = 24-28). Why does this occur? Explain the mechanism of Kussmaul’s breathing development and changes of PaCO₂ and bicarbonates levels.

Presented clinical case arouses interest in the subject and can help the students to understand the molecular basis of diabetes mellitus development, which test to use to assess a specific patient for diabetes and its treatment. Case based learning promotes active involvement of students in studying of biochemistry in the context of clinical case and it also improves diagnostic skills rather than memorization [2, 3].

In conclusion, case technology is an interactive technology for learning based on real or fictional situations, aimed not only at the acquisition of knowledge, but also better application of biochemistry in medicine and at the formation of students’ new qualities and skills.

**References:**


