14. Summary

The main goal of pathomorphologists after a patient's death is to determine the cause of death. To this end, they perform autopsies, during which they perform a detailed visual inspection of the various organs and take sections and fluids for histopathological and biochemical studies. Biochemical examinations sometimes include determinations of markers of alcoholic disease, including gamma-glutamyltransferase (GGT), aspartate aminotransferase (AST) and alanine aminotransferase (ALT), mean red blood cell volume - MCV, and the Carbohydrate Deficient Transferin (CDT) test, or so-called desialylated transferrin - not much available in Poland. When routine ethanol determinations are made in cadaveric material, it is not uncommon for the result to include information about the detection of acetone and isopropanol in the test sample. However, the search is still on for new, more sensitive and specific markers for more accurate and rapid assessment of the cause of death.

One of the most commonly performed determinations is the concentration of ethanol in blood, urine and cerebrospinal fluid - due to the ease of obtaining material and high diagnostic value.

Currently, there is a lack of sensitive markers that could help in the diagnostic detection of alcoholic disease in living people and have diagnostic value in determining the cause of death in denizens. Such markers could be lysosomal exoglycosidases, such as N-acetyl-β-D-hexosaminidase, β-galactosidase, α-mannosidase, α-fucosidase, β-glucuronidase.

The results of the determination of the activity of lysosomal exoglycosidases (HEX, GAL, MAN, GLU, FUC) occurring in the bodies of living persons consuming ethyl alcohol are known. However, the literature lacks results of studies on the activity of lysosomal exoglycosidases in biological material collected from patients after death under the influence of alcohol. These studies could prove diagnostically useful for determining the cause of death of the deceased, as well as comparing changes in exoglycosidase activity during life and after the death of patients, which could help determine the exact time of death and determine to what extent alcohol influenced the patient's death.

Lysosomal exoglycosidases, which include: N-acetyl-β-hexosaminidase (HEX), α-fucosidase (FUC), β-galactosidase (GAL), α-mannosidase (MAN) and β-glucuronidase (GLU), are specific for one anomeric form of the glycosidic bond and cleave single monosaccharides from the non-reducing end of the oligosaccharide [8]. Together with endoglycosidases, they

form sequences of reactions in which the product of the previous one becomes the substrate for the next one. They are responsible for the catabolism of glycoproteins - proteins containing covalently bound oligosaccharides with a straight chain, sometimes branched, usually composed of 2-10 residues of a monosaccharide. Saccharide attachment occurs after full synthesis of the polypeptide chain as part of the so-called post-translational modification. Glycoproteins are widely distributed in nature: they are components of mucilaginous secretions of animal organisms (mucins), occur in blood plasma (immunoglobulins), erythrocytes (blood group substances), connective tissues (mucopolysaccharides), virus antigens and pituitary hormones.

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The study was approved by the Bioethics Committee of the Medical University of Bialystok no: R-I-002/82/2013. The study material consisted of blood, urine, cerebrospinal fluid and vitreous body of the eye collected at autopsy in the Department of Forensic Medicine at the Medical University of Bialystok from 52 deceased. The study group consisted of 10 women aged 26 to 65 years and 42 men aged 15 to 82 years. The study was conducted on 2 groups of the deceased. The first group (K) consisted of 30 people (22 males and 8 females aged 15 to 83 years (mean age 54). No alcohol was found in the bodies of these deceased. The second group (A) consisted of 22 people (20 men and 2 women, aged 26 to 82 (mean age 46), who died of ethanol poisoning. Persons under the influence of ethanol died as a result of a traffic accident, suicide, or other unfortunate events. Family history ruled out ethanol consumption by these individuals earlier, before the last one resulting in death. The presence of cancer, kidney disease, liver disease and chronic inflammatory diseases, including rheumatoid arthritis, was excluded in all subjects. The activity of lysosomal exoglycosidases: N-acetyl-b-D-hexosaminidase (HEX), its isoenzymes A (HEX A) and B (HEX B), α-mannosidase

(MAN), α-fucosidase (FUC) and β-galactosidase (GAL) were performed in duplicate assays using the method of Chatterjee et al. as modified by Zwierz et al, adapted by Marciniak et al. The study shows that, one of the most likely mechanisms of death may be kidney damage during ethanol intoxication. Oversized kidney damage may occur due to inflammation. In addition, damage to the brain, vitreous body and kidney, may result from ethanol byproducts. In ethanol-poisoned individuals, there is a significant reduction in the urinary concentration of MAN, FUC, GAL and GLU activity. MAN activity is significantly lower in the vitreous body. However, larger-scale studies are needed to assess the usefulness of lysosomal exoglycosidases in explaining the mechanisms of mortality in acute fatal ethanol poisoning. The study shows that the determination of the activity levels of HEX and its isoenzymes (HEX B and HEX A) in the urine of people who died of ethanol poisoning can be a potential marker of harmful alcohol consumption. There is a need for further research on the diagnostic utility of lysosomal exoglycosidases to determine the mechanisms of death in ethanol intoxicated individuals.