

THE IMPORTANCE OF TOXICOLOGICAL-CHEMICAL ANALYSIS IN RESOLVING DEATHS OF UNKNOWN CAUSE – CASE REPORT

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Reliable forensic determination of the cause of death is performed by comparative analysis of data on the case circumstances, clinical picture, autopsy findings, and toxicologic-chemical analysis results. This case describes a previously healthy three-and-a-half-year-old girl hospitalized after a short period of fever, agitation, and convulsions. Despite adequate and prompt symptomatic therapy, the death occurred soon after the admission to hospital, without a conclusion on the possible reasons for the etiology of a presented pathological condition. External autopsy findings showed no apparent signs of violence. The internal examination showed diffuse cerebral hemorrhage, brain and lung swelling, confirmed by pathohistological exam. Toxicologic-chemical analysis of cadaveric liquids and tissues samplings, using the technique of gas-mass chromatography and liquid chromatography with the flame ionizing detector, determined the presence of theophylline, the active metabolite of aminophylline, in a concentration of 83.64 mg/L (toxic concentration: above 20 mg/L) (1,2), as well as phenobarbitone and thiopental in therapeutic concentrations. The conclusion was that the death is violence caused by aminophylline poisoning. Investigative authorities established that the child, without the supervision of the elderly, consumed a large amount of aminophylline tablets orally. Prosecution was filed against the parents for neglecting a minor. This specific case emphasizes the significant role of the toxicologic-chemical results in complete autopsy findings (macroscopic and microscopic) which must be a fundamental part of medico-legal closure of the determination of the cause of death.

References

1. Jiao F, Gao N, Zhang S, Yang Y. A Clinical Analysis and Study of 110 Pediatric Cases with Aminophylline Poisoning. *Journal of Pharmacology & Clinical Research*. 2018; 5(5):555673 DOI: 10.19080/JPCR.2018.05.555673
2. Yaman A, Kendirli T. et al. Severe theophylline poisoning treated with continuous venovenous hemodialysis in a child. *The Turkish journal of pediatrics*. 2016; 58(3):297-300 DOI:10.24953/turkjped.2016.03.011

ZNAČAJ TOKSIKOLOŠKO-HEMIJSKE ANALIZE U RAZREŠAVANJU SMRTI NEPOZNATOG UZROKA – PRIKAZ SLUČAJA

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Pouzdanu utvrđivanje uzroka smrti u forenzičkoj medicini vrši se uporednom analizom podataka o okolnostima slučaja, kliničkoj slici, obdukcijom nalazu i rezultata toksikološko-hemijske analize. Prezentovan je slučaj tro i po godišnje devojčice koja je iz punog zdravlja hospitalizovana nakon kraćeg perioda febrilnosti, agitacije i konvulzija. Uprkos adekvatnoj simptomatskoj terapiji (tiopental i fenobarbiton), smrt je nastupila ubrzo po prijemu u bolnicu, bez zaključka o mogućim razlozima za nastanak ovakvog patološkog stanja. Spoljašnjim obdukcijom nalazom nisu utvrđeni očigledni znaci nasilja, a unutrašnji nalaz je pokazao difuzna cerebralna tačkasta krvarenja, edem mozga i pluća, kao i prisustvo beličasto kašasto-praškastog sadržaja po zidovima želudačne sluznice. Patohistološkim nalazom su potvrđena cerebralna perivaskularna i tkivna krvarenja, uz evidentan otok mozga i pluća. Toksikološko-hemijskom analizom uzoraka lešnih tečnosti i tkiva, primenom tehnike gasno-masene hromatografije i tečne hromatografije sa plameno jonizujućim detektorom utvrđeno je prisustvo teofilina, aktivnog metabolita aminofilina, u koncentraciji od 83,64 mg/L (toksična koncentracija > 20 mg/L) (1,2), kao i fenobarbitona i tiopentala u terapijskim koncentracijama. Zaključeno je da se radilo o nasilnoj smrti nastaloj usled trovanja aminofilinom. Istražnim radnjama utvrđeno je da je dete, u periodu bez nadzora starijih lica, zadesno konzumiralo peroralnim putem veći broj tableta aminofilina, a protiv roditelja je podignuta optužnica za zanemarivanje maloletnog lica. Značaj konkretnog slučaja se ogleda u činjenici da kompletan autopsijski nalaz može biti baziran isključivo na makroskopskom, mikroskopskom i toksikološko-hemijskom nalazu, kao neizostavnom segmentu u forenzičkom zaključivanju o uzroku smrti.

Literatura

1. Jiao F, Gao N, Zhang S, Yang Y. A Clinical Analysis and Study of 110 Pediatric Cases with Aminophylline Poisoning. *Journal of Pharmacology & Clinical Research*. 2018; 5(5):555673 DOI: 10.19080/JPCR.2018.05.555673
2. Yaman A, Kendirli T. et al. Severe theophylline poisoning treated with continuous venovenous hemodialysis in a child. *The Turkish journal of pediatrics*. 2016; 58(3):297-300 DOI:10.24953/turkjped.2016.03.011