



POSTER PRESENTATION

4. FORENSIC PATHOLOGY

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DNA analysis of biological traces in identification of persons: Technology and application in crimes investigation

KEYWORDS: Identification; Crimes Investigation; DNA

With introduction of DNA molecules for the purpose of human identification, the probability is increased for the identified person to be the unique bearer of the given genotype, while linking trails with certain persons is enabled through application of this technology, not only through analysis of the trails of blood and sperm, but also of other secreted and fibers, even in old cases, in which the question of the identity of the victim and/or perpetrator remained unsolved. The difference between two persons on the level of the genetic material (DNA) is reflected in the sequence of nucleotides. Genes, as parts of the genome responsible for morphological and physiological characteristics of the organism, are during evolution exposed to the action of a selective pressure. Stability of the primary structure, which during evolution was maintained in functional regions of the genome, is the cause of a smaller allelic diversity. That is why a high rate of genetic variability is linked to selectively neutral non coding genomes. A gene which, despite the rule, with a large number of alleles (8), exists as a stable component within the genome, together with five more genes (LDLR, GYPA, HBGG, D7S8, GC) presents the first system of markers (PM + DQA system) used in analysis of DNA typification based on the PCR method. The basic principle of the method of PCR amplification of certain and desired segment of DNA molecule is very simple and in fact presents an imitation of the replication (doubling) of DNA, i.e., the process which normally evolves in all living organisms. Since each of the DNA chains contains a sequence of nucleotides which is absolutely complementary to the opposite DNA chain, during replication each chain serves as a matrix for the synthesis of a new, complementary chain. One of the ways for application of the PCR method in human identification is realized through the technique of a reverse dot blot. The examination included a trail similar to blood, of a smear type, located on the object which after perpetration of a theft was found in the possession of the suspect (the disputed trail). The disputed trail, as well as samples of undisputed blood (in the form of a stain), of the suspect and the victim, were sent to the laboratory with a request for a DNA typing. After the review and description of the delivered samples, the benzidine probe was applied on the trace similar to blood, to check if the same derives from the blood. In order to perform the analysis of the SNA molecule, it is necessary to free the DNA, in a way, from the nucleus. The method of isolation with the chelating resin Chelex-100 is quick, simple, does not require the use of organic solvents as possible inhibitors of amplification and does not include a large number of steps whose application carries the risk from a significant loss of the material and contamination. Simultaneous amplification and typification (applied in this case through technique of a reverse dot-blot) in the aim of

human identification were speeded up through use of commercially available kits. In the kit used in this case, a segment of the DNA sample analyzed was amplified with the use of primers marked with biotin. AmpliType PM+DQA Amplification and Typing Kit contain reagents which enable simultaneous amplification and typification of six genic loci as follows: HLADQA, LDLR, GYPA, HBGG, D7S8 and GC. In the case of the given disputed trail, a positive result was obtained through application of benzidine probe, which indicated that the material sent for examination probably contained blood (of human or animal origin). Determination of the origin of blood and the blood type in the ABO system, in case of the disputed trail, was not done because the said analyses would cause losing of a large part of the trail present in minimal quantity anyway. The undisputed samples were not subjected to the said analyses since the type and their origin were known. Genomic DNA from all three samples (the disputed trail, the undisputed blood of the victim and the undisputed blood of the suspect) was isolated through the method of quick isolation of DNA with a chelating resin (Chelex-100), the target fragments (of the said six loci) were amplified, and then typed through use of AmpliType PM + DQA Amplification and Typing Kit. The obtained results were then compared. Comparison was made of the DNA profiles of the disputed trail (in this case the blood stain located on the object found in possession of the suspect) and the DNA profile of undisputed samples (in this case the delivered blood stains of the suspect and the victim). As a result of the comparison in this case it is possible to derive one of the three following conclusions: 1. There is a matching of the DNA profiles - if matching is determined between the undisputed sample of the suspect and the disputed trail the suspect is included in the group of persons that could be perpetrators; 2. There is no matching of DNA profiles - the suspect is excluded from the group of persons that could be perpetrators; 3. DNA profile was not obtained - the causes of this phenomenon could be numerous factors (insufficient quantity of materials, contamination of samples). Based on the presented results of the DNA typing it was confirmed that DNA profiles of the disputed trail and the undisputed blood of the victim are matching.



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Tracheotomy risks

KEYWORDS: Tracheotomy; Forensic medicine

A sudden death induced by bleeding, as a result of tracheotomy complications, was described. An experienced nursing staff and doctors were upset by a sudden death, induced by an abundant bleeding, although it happened in hospital circumstances. The death occurred in the hospital of Pristina, during the morning doctors' visit. The affected patient had his canule hole and mouth bleeding. The doctors searched for the reason of death, but many forensic medicine questions were asked as well. One should have explained if the death was caused by a former wound or the sudden death resulted from an inadequate treatment. The doctors' fault was doubted. The death cause established at autopsy was bleeding from the fissure on the brachio-cephalic trunk, the cause of which was the long-term pressure on the blood vessel wall. The canule made a contact with the artery, due to a permanent pressure, necrosis of the trachea front wall developed and a communication of the trachea area and the middle pectoral one was achieved. Leaning of the canule against the brachiocephalic trunk induced a very rapid wearing of all layers of the blood vessel wall because of the artery pulsation and successive increasing of pressure at the place of contact. During the critical pulsation, the fissure developed, followed by an unrestrainable bleeding. The pathoanatomical findings have cleared up the cause of death and contained the facts on the basis of which one could find out for sure all concerning the dynamics and way of the trachea and artery fissure development. It is certain that a permanent pressure induced a damage to the trachea and brachiocephalic trunk. However, that does not mean the static and continuous pressure was the only reason of the damage appearance. It is about a dynamic process of a delicate mechanism which was induced by moving of the heart and big blood vessels cor-nae cordis during systola cordis and simultaneous moving of the respiratory organs. Although tracheotomy saves many patients' lives and helps their recovery, because of complications, it can induce mortality in a small number of patients. Since these complications are not so numerous and they rarely develop, they are seldom suspected. Because of that, they are more dangerous and our case report provides important evidence on the need for a permanent cooperation of clinical doctors and autopsists.

Validity of diatoms in the forensic medicine expertise of drowning

KEYWORDS: Drowning; Diatoms; Forensic expertise

The controversial opinions about the validity of the method for determining of drowning instead of possible drowning, have driven us on the idea to check the validity of the method for determining of diatoms present on the body of the drowned person. The method has been accepted diversely by different authors in regard to making the diagnosis of drowning, although its validity is higher when examinations are made on the material taken from the body of the corpse, i.e. the body taken out from the water as well as from the field, on the material taken out from the water in which the body was found. In that way, on the basis of the knowledge about the eco-system, it is possible to obtain additional data about the location the drowning took place, which have exceptional criminological and forensic importance. During the course of work 22 cases of bodies found in water were analyzed, one check case and several tests made on laboratory rats, for obtaining the data about the presence of diatoms micro flora in the air, water and food. The quantitative determination of diatoms in a gram analyzed tissue, enables establishing a final diagnosis. The finding of diatoms in certain organs is of exceptional interest. The validity of the results depends not only of the quantitative determination of diatoms in the organs, but also on the type of diatoms and their comparison to the findings from the field.



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Medical expert opinion on the physical injuries in the maxillofacial region

KEYWORDS: Maxillofacial region; Injuries; Forensic evidence

Injuries in the maxillofacial region are a frequent object of forensic expertise and evidence during criminal/legal proceedings. Task of the expert physician in giving forensic evidence on the traumas is to establish the type of the injury in relation to exogenous harmful nox (classification) evaluation of the degree of injury (qualification) and manner of infliction. If given initial forensic evidence do not meet the set task, judicial bodies are under no obligation to accept the evidence; furthermore they have the right to require additional or repeated evidence. Therefore the aim of this paper is to indicate the disadvantages of forensic evidence given by certain forensic medicine physicians, as well to suggest parameters and criteria for correct classification and qualification of injuries of the maxillofacial region. There have been analyzed those files of the expert opinion relating to the injuries of the maxillofacial region that were submitted to the Faculty of Stomatology in Belgrade with a request for a repeated provision of an expert opinion. It was found out that some of these procedures were unusable for the court proceedings because of insufficient or unclear finding for the lawyers or because of an inadequate estimation of the seriousness of injuries. In order to enable the medical expert (doctor of stomatology) during the process of the high quality expertise of injuries in the maxillofacial region to adequately classify injuries of the maxillofacial region, it is necessary to do this in relation to the structure of this body part, quality and quantity levels of the injury and the type of the acting harmful injurious agent. Classification of injuries of the maxillofacial region should be done on the basis of the stated nature of the injury, respecting forensic medical criteria for the classification of physical injuries in general in accordance with Criminal legislation. Estimation of injuries of structures of the maxillofacial region should be entrusted to the forensic medical experts and to the experts of maxillofacial surgery who are well familiar with the forensic medical issues concerning classification of physical injuries in general and have practical experiences.

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Identification of burt corpse the use DNA typing

KEYWORDS: Identification; Burt corpse; DNA

Forensic applications often necessitate the identification of the dead persons. This is made more difficult when the tissues have been exposed to high temperatures. To the purpose of human identification, genetic markers have been newly introduced in the forensic medical practice (the places in the genome where the sequence variability of the deoxyribonucleic acid - DNA exists). After invention of the polymerization chain reaction (PCR) which enables amplification of an exactly specified and desired chain segment of DNA, biological materials have become the commonly used material for the human identification, material for obtaining an individually specific print of a molecule of the DNA. Teeth are able to withstand high temperatures, they are tough, due to their high inorganic content. Out of all the above mentioned, there emerges the aim of this study by which we intended to find out the possibility of isolating the DNA from dentine of extracted human teeth that had been exposed to different temperatures for 30 minutes by applying chelex from such isolated samples to amplify six gene loci: LDLR, GYPA, HBGG, D7S8, GC and HLA-DQA1. The obtained results of gene profiles from the teeth were compared to the results of gene profiles from the blood of the same person. The results might be useful for human postmortem identification that is important for forensic medicine.



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Fatal intoxication with ethanol - A case report

Case report of fatal MDMA intoxication

KEYWORDS: Intoxication; Etanol; Autopsy finding

KEYWORDS: Intoxication; Ecstasy

In this paper we want to present the fatal case of intoxication with ethanol. A Male, 37 years old, consumed brandy in the morning hours which was bought from an individual producer. The dead body was found in the afternoon hours. There was a smell of alcohol spreading from the body. Around the body the vomiting mass was found. Quantitative analysis of ethanol using head-space gas chromatography showed the concentration of 5.83 gr%_o (126.56 mmol/l) in the blood and of 5.81 gr%_o (126.30 mmol/l) in the urine. According to the autopsy finding, histopathological finding, toxicology analysis and the previously collected data for this case, we concluded that the cause of death was due to ethanol poisoning.

3,4-methylenedioxyamphetamine (MDMA, Ecstasy) is an amphetamine derivative, the use of which is especially widespread at rave parties. The belief that this is a relatively safe drug is a false one - its ingestion can lead to unexpected and severe intoxication, with hypothermia, multiorgan failure and death in some individuals. When establishing the cause of death in MDMA poisoning cases, the autopsy results, which are not very specific, must be combined with toxicological examinations. In this case a 21-year-old man ingested several Ecstasy pills during the course of a long party at a discotheque. The progress of intoxication was rapid. Disseminated intravascular coagulation with profuse bleeding and rapid multiorgan failure occurred a few hours after loss of consciousness, hyperthermia and shock. Despite aggressive symptomatic therapy, the patient died 11 hours after being admitted to hospital.



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PAS identification of renal lesions in postmortal autolysis

KEYWORDS: Post-mortal analysis; Renal lesions

On the sample of 112 experimental rats, a PAS histochemical analysis of a piece cortex renis has been done. The animals were kept, after the sacrifice on temperatures of 10°C, 20°C and 30°C. The rats have been dissected from 1 to 72 h. after the sacrifice. The samples, after the standard procedure of tissue processing, were stained with PAS, and then the following structures were analyzed: mesangium of glomeruli, basement membrane of glomeruli, parietal layer of Bowman s capsule, basement membrane of tubuli and apical parts of tubular epithelia cells. The results of this investigation confirm that the dynamics of the appearance of morphological postmortal autolytic changes depends on the time since death and on the temperature at which the autolysis evolves and also, that there is a certain autolytical order depending of the environmental conditions.