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1 **Letter to the Editor**

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4 **An updated approach to sudden cardiac death, the AECVP perspective**

5
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21
22 According to the recommendations of the Council of Europe from 1999, a medico-legal
23 autopsy should be practiced for any sudden unexpected death [1]. Sudden cardiac
24 deaths (SCD), especially among young people, fall into this category. In most
25 European countries, forensic pathologists perform autopsies on SCD victims.
26 Nowadays, the role of forensic pathology even has enhanced substantially due to
27 dramatic decrease of the rate of medical autopsies over the last decades while the rate
28 of forensic autopsies remains stable [2].

29
30 The International Journal of Legal Medicine (IJLM) is a leading European journal in the
31 field of forensic pathology and we recognize the importance to update the knowledge
32 of forensic pathologists in the field of cardiovascular pathology and SCD. This is also
33 one of the major missions of the Association for European Cardiovascular Pathology
34 (AECVP). Therefore, we are grateful for the opportunity to address this issue in the
35 IJLM after reading with interest the recent publication on updating the pathology SCD
36 by Markwerth et al. in this journal [3].

37
38 As mentioned by the authors, the AECVP updated in 2017 their guidelines on autopsy
39 investigation of SCD, as previously published in 2008, considering an increased
40 understanding of the genetics of cardiovascular diseases, the availability of new
41 diagnostic methods as postmortem imaging and also the experience gained from
42 validation and routine use of the original guidelines [4,5]. We would like to underline
43 again the genetic background in many cardiovascular diseases and the role of forensic
44 pathologist in the multidisciplinary management of SCD. We agree that given the
45 amount of information generated by new analytical techniques, such as next-
46 generation sequencing, a rigorous variant interpretation strategy combined with
47 multidisciplinary collaboration is crucial to determine the potential pathogenic role of
48 identified variants in the cause of death. For example, the genetics of ion channel
49 disease, HCM and several other types of cardiomyopathies that potentially may
50 underlie fatal ventricular arrhythmias, are very complex, and a proper risk stratification

51 in the family members of SCD victims requires concerted action of pathologist, GP,
52 cardiologist and clinical geneticist. However, it should be noted that post-mortem
53 genetic analyses raise several ethical and/or legal issues and, in most European
54 countries, postmortem genetic testing is only carried out if genetic counselling of family
55 members is available, as recommended by international associations of human
56 genetics, cardiology, the AECVP and the European Council of Legal Medicine [6-
57 8].The role of forensic pathologist in this multidisciplinary team is to diagnose correctly
58 the underlying pathology of SCD following the guidelines, to collect samples for
59 potential genetic testing and to identify families at risk based upon the autopsy findings
60 and not to overinterpret findings of uncertain significance [9]. In this context, the final
61 interpretation of morphological substrate as the cause of SCD is very important. We
62 noticed that in the paper of Markwerth *et al.*, the Table 7 was erroneously referred to
63 a paper by Basso *et al.* from 2001. In fact, the certainty of diagnosis of cardiovascular
64 substrate of SCD at postmortem, which differ from the table cited above, was published
65 in our updated guidelines in 2017.

66
67 Forensic pathologists should follow and integrate new clinical knowledge into their
68 routine practice. Myocardial infarction is very often encountered in forensic autopsies,
69 and diagnosis can be challenging, especially in the absence of an acute coronary
70 occlusion or when the death results from arrhythmia. Recently, our association
71 published an update on diagnosis of myocardial infarction at autopsy [10]. It is
72 important for forensic pathologist to be updated in different clinically defined types of
73 myocardial infarction and to discriminate myocardial infarction from other forms of
74 myocardial injury. One of the major difficulty in forensic practice is to identify the cause
75 of the myocardial injury. We noticed that our approach differs from the opinion
76 presented by the authors concerning the criteria for postmortem diagnosis of sudden
77 coronary death and myocardial infarction. Potential pitfalls related to different
78 postmortem diagnostic methods, including imaging, immunohistochemistry, should be
79 considered by the forensic pathologist while interpreting a case of SCD with suspected
80 myocardial injury.

81
82 The remaining problem is the failure to perform an autopsy for cases of SCD, despite
83 the recommendations of the Council of Europe, and the impossibility to carry out
84 certain analyses, which results at least partly from the dependence of forensic
85 medicine on the police or the juridical system. The autopsy is often not performed after
86 the sudden death of a previously healthy adult of less than 50 years of age and the
87 data concerning the real numbers of SCD especially in the young and the autopsy rate
88 for SCD are missing in many European countries [11,2]. This situation must change
89 especially knowing that most of the cardiac causes of SCD in young people is genetic.

90
91 Finally, we would like to remind the importance to establish a second opinion system
92 and to create reference centers at regional or national levels, considering that in many
93 countries the training in cardiovascular pathology for forensic practitioners is limited
94 [4,12-14]. Our association offers a platform to update the knowledge and training in the
95 field of cardiovascular pathology, also addressed for daily practice of forensic
96 pathologists <https://aecvp.org/>.

101 **Compliance with Ethical Standards**

102

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107

108

109 **References**

110

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