

A Stricter Approach for Comotio Cordis in Lethal Cases



Dear Dr. William C. Roberts,

Cooper and colleagues recently proposed an interesting article that depicted the most important characteristics of the commotio cordis (CC) phenomenon as cause of sudden death in United Kingdom (UK) sports.¹ Nevertheless, as it happened for other articles that dealt with CC lethal cases,² in the aforementioned article the authors risk nullifying their precious work. Indeed, one of the most important things that they should have clearly reported in the article is the specific definition of CC that they used to identify CC lethal cases in their database. This method may allow to avoid uncorrected reports and to make stricter the approach to the CC topic.² In order to clarify the latter statement, it is useful to focalize the analysis on the case of the aforementioned article in which the authors described the presence of a broken rib. The inclusion of this case in the article is not obvious. Indeed, in the literature there are 2 different definition of CC. The first was proposed by Maron and colleagues in 1999: CC is characterized by an “instantaneous cardiac arrest that is produced by non-penetrating chest blows in the absence of heart disease or identifiable morphologic injury to the chest wall or heart”.^{3,4} The second definition was proposed by Nesbit and colleagues in 2001; they defined CC “as a mechanical stimulation of the heart by non-penetrating, impulse-like impact to the precordium that, through intrinsic cardiac mechanisms, gives rise to disturbances of cardiac rhythm of varying type, duration, and severity, including sudden cardiac death, in the absence of structural damage that would explain any observed effects”.⁵ According to Maron and colleagues the presence of rib fractures should exclude the CC diagnosis; on the contrary Nesbit and colleagues did not necessarily exclude CC in such cases.^{3,5} That said, even if Cooper and colleagues did not report the CC definition that they used, a careful analysis of their article allows to hypnotize that they founded their evaluations on Maron’s studies.¹ Therefore, they should have excluded from their study the case in which the rib fracture

was described or they should have proposed the CC diagnosis only as possible, not as definitive.

It is important to note that the differences between the 2 definitions mentioned above and the critical issues that may come from a different approach to the diagnosis of CC lethal cases had been discussed in a recent review of all CC lethal cases available in the literature.² The analysis of this review could have explained one of the reasons why Cooper and colleagues stated that the incidence of CC seems to be 21.6 times greater in the United States (US National Registry of Sudden Death in Athletes) than in the UK.¹ Among all CC cases of the US National Registry of Sudden Death in Athletes, 107 cases were lethal. However, it is important to note that in 25/107 cases the autopsy had not been performed.⁶ According to the literature, in these cases the definitive CC diagnosis is questionable because the autopsy is a mandatory tool to achieve a definitive diagnosis in case of sudden death.⁷ In the light of the above, in their article Cooper and colleagues should have explained the limitations of the comparisons between the US CC cases and the UK ones. In particular, they compared the incidence of a series of CC definitive diagnoses (the autopsy had been performed in all UK cases) with a sample (US National Registry of Sudden Death in Athletes) that also included cases in which CC was identified without the execution of an autopsy. In the light of the above, it can be stated that this approach negatively influenced the statements of the authors.

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Defining Comotio Cordis



We appreciate the interest in commotio cordis expressed by Drs. Lupariello and Di Vella from Turin, Italy. As this entity emerged as a new cause of unexpected sudden death in young people (athletes and nonathletes alike), the criteria and definition for such events has been paramount to victims, families, researchers, and the legal community.

Although perhaps expressed somewhat differently by various authors, there is general agreement that commotio cordis is a witnessed and potentially reversible collapse (including sudden death) triggered virtually instantaneously by a blunt nonpenetrating blow of various force to the anterior precordium, and which most importantly does not inflict structural damage to the heart itself (usually documented by postmortem examination). Therefore, commotio cordis is a diagnosis of exclusion in which any other cause of arrhythmic collapse is not involved.

This is essentially the stated definition of commotio cordis that appears in our report, Cooper et al., from the United Kingdom in the *American Journal of Cardiology* (2019; June 7). Therefore, we do not believe there should be any major confusion in this regard for the readership with respect to any of the 17 cases in that report, all of which had autopsy confirmation that structural cardiac abnormalities or injury (“cardiac contusion”) were absent.

In regard to the specific case at question, where broken ribs were found at postmortem examination, Drs. Lupariello and Di Vella highlight an important