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Electronic gaming can trigger potentially lethal heart rhythm problems in susceptible children

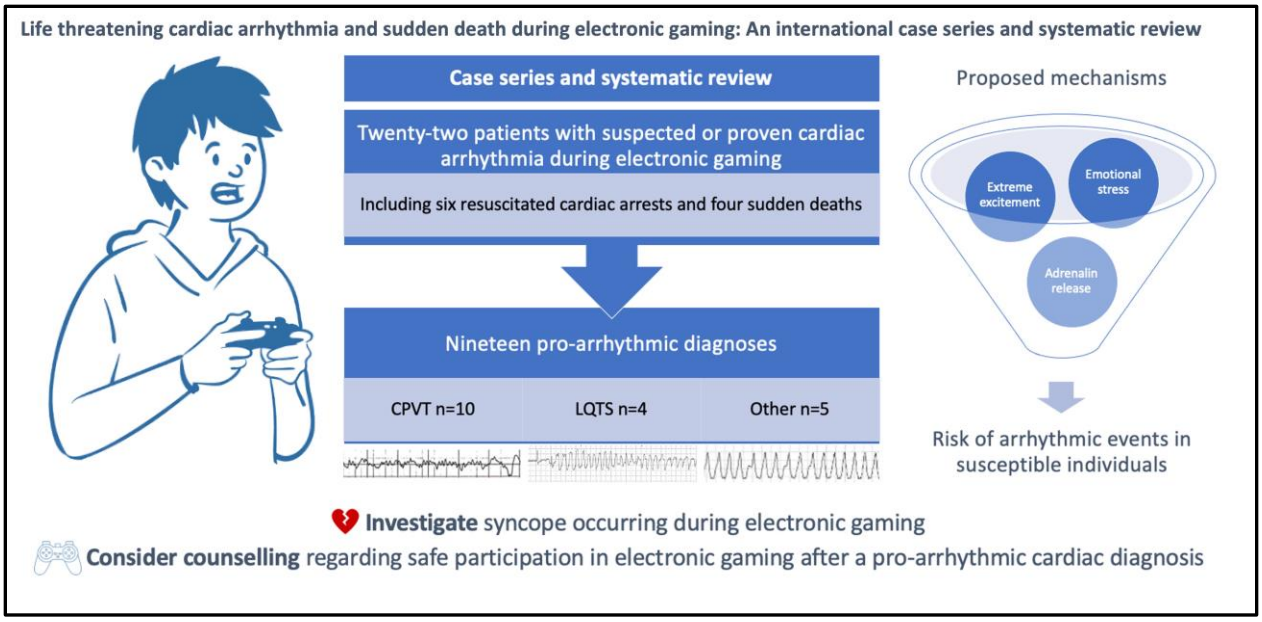
Video games may not always be a safe alternative to competitive sports, according to a new study in Heart Rhythm

Philadelphia, October 11, 2022 – Electronic gaming can precipitate life-threatening cardiac arrhythmias in susceptible children whose predisposition may have been previously unrecognized, according to a new report in *Heart Rhythm*, the official journal of the Heart Rhythm Society, the Cardiac Electrophysiology Society, and the Pediatric & Congenital Electrophysiology Society, published by Elsevier. The investigators documented an uncommon, but distinct pattern among children who lose consciousness while playing electronic (video) games.

“Video games may represent a serious risk to some children with arrhythmic conditions; they might be lethal in patients with predisposing, but often previously unrecognized arrhythmic conditions,” explained lead investigator Claire M. Lawley, MBBS, PhD, The Heart Centre for Children, Sydney Children’s Hospitals Network, Sydney, Australia. “Children who suddenly lose consciousness while electronic gaming should be assessed by a heart specialist as this could be the first sign of a serious heart problem.”

The investigators performed a systematic review of literature and initiated a multisite international outreach effort to identify cases of children with sudden loss of consciousness while playing video games. Across the 22 cases they found, multiplayer war gaming was the most frequent trigger. Some children died following a cardiac arrest. Subsequent diagnoses of several heart rhythm conditions put the children at continuing risk. Catecholaminergic polymorphic ventricular tachycardia (CPVT) and congenital long QT syndrome (LQTS) types 1 and 2 were the most common underlying causes.

There was a high incidence of potentially relevant genetic variants (63%) among the patients, which has significant implications for their families. In some cases, the investigation of a child who lost consciousness during video gaming led to many family members being diagnosed with an important familial heart rhythm problem. “Families and healthcare teams should think about safety precautions around electronic gaming in children who have a condition where dangerous fast heart rhythms are a risk,” noted Dr. Lawley.



Caption: Electronic video games may not always be a safe alternative to sports for children who have a condition in which dangerous fast heart rhythms are a risk (Credit: *Heart Rhythm*).

The investigators attributed adrenergic stimulation related to the emotionally charged electronic gaming environment as the pathophysiological basis for this phenomenon. Electronic gaming is not always the "safe alternative" to competitive sports it is often considered. At the time of the cardiac incidents, many of the patients were in excited states, having just won or lost games, or were engaging in conflict with companions.

"We already know that some children have heart conditions that can put them at risk when playing competitive sports, but we were shocked to discover that some patients were having life-threatening blackouts during video gaming," added co-investigator Christian Turner, MBBS, The Heart Centre for Children, Sydney Children's Hospitals Network, Sydney, Australia. "Video gaming was something I previously thought would be an alternative 'safe activity.' This is a really important discovery. We need to ensure everyone knows how important it is to get checked out when someone has had a blacking out episode in these circumstances."

The study notes that while this phenomenon is not a common occurrence, it is becoming more prevalent. "Having looked after children with heart rhythm problems for more than 25 years, I was staggered to see how widespread this emerging presentation is, and to find that a number of children had even died from it. All of the collaborators are keen to publicize this phenomenon so our colleagues across the globe can recognize it and protect these children and their families," noted co-investigator of the study, Jonathan Skinner, MBChB, MD, also from Sydney.

As an accompanying editorial Daniel Sohinki, MD, MSc, Department of Cardiology, Augusta University, Augusta, GA, USA, and coauthors pointed out that, "exertion should be understood to encompass activities outside of traditional competitive athletics. Appropriate counseling regarding the risks of intense video gameplay should be targeted in children with a pro-arrhythmic cardiac diagnosis, and in any child with a history of exertional syncope of undetermined etiology. Further, any future screening programs aimed at identifying athletes at risk for malignant arrhythmias should encompass athletes being considered for participation in eSports."

Notes for editors

The article is "Life-threatening cardiac arrhythmia and sudden death during electronic gaming: An international case series and systematic review," by Claire M. Lawley, MBBS, PhD, FRACP, Matthew

Tester, BSc, Shubhayan Sanatani, MD, FHRS, Terence Prendiville, MD, Cheyenne M. Beach, MD, Jeffrey M. Vinocur, MD, Minoru Horie, MD, PhD, Jae-Sun Uhm, MD, Apichai Khongphatthanayothin, MD, Mark D. Ayers, MD, Luke Starling, MBBS, FRCPCH, Yoko Yoshida, MD, Maully J. Shah, MBBS, FHRS, Jonathan R. Skinner, MBChB, FHRS, MD, and Christian Turner, MBBS, FRACP (https://doi.org/10.1016/j.hrthm.2022.08.003). The article is openly available at https://www.heartrhythmjournal.com/article/S1547-5271(22)02284-6/fulltext.

The editorial is "Ventricular arrhythmias during electronic gaming: Sudden victory and sudden death," by Johnathan Rast, BS, William White, MD, and Daniel Sohinki, MD, MSc, FACC, FHRS (https://doi.org/10.1016/j.hrthm.2022.08.028). The editorial is openly available at https://www.heartrhythmjournal.com/article/S1547-5271(22)02376-1/fulltext.

The articles appear online in advance of *Heart Rhythm*, volume 19, issue 11 (November 2022) published by Elsevier.

Full text of the articles is also available to credentialed journalists upon request; contact Jane Grochowski at +1 406 542 8397 or hmsmedia@elsevier.com. Journalists who wish to interview the study authors should contact SCHN-PublicRelations@health.nsw.gov.au, or Sarah Palmer, at +61 2 9845 3364 or sarah.palmer@health.nsw.gov.au. To reach the editorial's authors for comment, contact Daniel Sohinki, at dsohinki@augusta.edu.

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Heart Rhythm, the official Journal of the Heart Rhythm Society, the Cardiac Electrophysiology Society, and the Pediatric & Congenital Electrophysiology Society, is a unique journal for fundamental discovery and clinical applicability. It integrates the entire cardiac electrophysiology (EP) community from basic and clinical academic researchers, private practitioners, engineers, allied professionals, industry, and trainees, all of whom are vital and interdependent members of our EP community.
www.heartrhythmjournal.com

About the Heart Rhythm Society
The Heart Rhythm Society is the international leader in science, education, and advocacy for cardiac arrhythmia professionals and patients, and the primary information resource on heart rhythm disorders. Its mission is to improve the care of patients by promoting research, education, and optimal healthcare policies and standards. The Heart Rhythm Society is the preeminent professional group representing more than 7,300 specialists in cardiac pacing and electrophysiology from more than 70 countries.
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