

Letters to the Editor

Electrocardiographic abnormalities in young athletes and scuba divers

Dear Editor,

I found the case report by Dr Acott of the sad death of a 17-year-old diver with a long QT interval most interesting.¹ I would like to offer some thoughts on this case. The electrocardiogram (ECG) in this normothermic diver shows a clearly prolonged QTc with notching on the R wave. This notching may well represent an intraventricular conduction defect; however, it may also represent early after-depolarisation occurring in the repolarisation phase of the action potential. This may trigger a spontaneous discharge and has been shown in dog Purkinje fibre models to initiate *torsades de pointes* ventricular tachycardia.²

In the context of diving-induced hypothermia, however, a similar ECG pattern may be seen with pronounced notching of the R wave, and the second wave may be as tall as the preceding R wave, with prolongation of QT interval and sinus bradycardia. This was described in 1953 by Osborn as an injury current, called a J wave, and may initiate ventricular fibrillation during experimental hypothermia. As the body rewarms, the Osborn waves diminish in amplitude and finally fade away.³

In both the normothermic and hypothermic rescued diving victim, confusion may further occur in those suffering with the autosomal dominant disorder due to mutations in the sodium channel (often SCN5A), described in 1991, and known as the Brugada Syndrome. The typically young South-East Asian or Japanese, with a structurally normal heart, develops nocturnal syncope due to non-sustained polymorphic ventricular tachycardia. The resting ECG shows a combination of an RBBB pattern in VI-3 with variable ST-segment elevation and a coved or saddle-type appearance.⁴ Therefore, a similar ECG abnormality to your case may be seen in a young, rescued Oriental diver.

My second point is the rising incidence internationally of sudden death in young athletes (aged less than 35 years) with, as you are aware, hypertrophic cardiomyopathy (HCM) being the most common cause. This young age group encompasses a great number of scuba divers throughout the world. For more than 30 years the Italian government, as a result of the Medical Protection of Athletic Activities Act, has mandated national pre-participation screening and medical clearance of all young athletes who participate in organised sports. This screening involves a 12-lead ECG. Since the ECG is abnormal in up to 95% of patients with HCM, this programme permits identification of many athletes with previously undiagnosed disease.⁵ The ECG also identifies other rhythm disturbances and, in particular, the long QT syndrome, as in this case study.

I am both a designated aviation medical examiner and an approved examiner for scuba trainees. I am sure that the value of an ECG taken at the initial medical screen would have been discussed in open forum at SPUMS meetings. However, I am not aware of the specific reasons advanced to exclude the ECG from the examination. This 17-year-old would have been denied a medical clearance for scuba diving had his ECG revealed the prolonged QT interval.

References

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Survey of skin and scuba divers in the December 2004 Indonesian tsunami

Dear Editor,

We are conducting a world-wide Internet survey of skin and scuba divers who were in or on the water in the Indonesian Tsunami of 26 December 2004. There has been little or no published information regarding the effects of natural disasters on divers. Drs Tom Skalko and Carmen Russoniello of East Carolina University in Greenville, NC, USA and I are studying what that experience was like for divers and how it has affected their lives since then. We need divers to help us by completing the survey.

Some of the survey questions may be upsetting, even months after the Tsunami. It will take about 10 to 15 minutes to complete. The survey will automatically skip past questions that do not apply based upon answers to earlier questions. Results will be compiled and completed as a group only.