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Letter to the Editor

YOUng Football Italian amateur players Remote electrocardiogram Screening with Telemedicine (YOU FIRST) study: Preliminary results

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Sudden death in young athletes is largely related to cardiovascular disease [1]. According to recent studies, cardiovascular causes of sudden death in young athletes were hypertrophic cardiomyopathy (36%) and congenital coronary artery anomalies (17%) [2]. Hypertrophic cardiomyopathy [3] and arrhythmogenic right ventricular dysplasia [4], however, are reported as the leading cause of cardiac sudden death in different populations.

A pre-participation screening based on an electrocardiogram has been proposed as the ideal way to minimize the incidence of sudden cardiac death in young athletes [5]. Group 2 electrocardiogram changes, appearing at rest electrocardiogram, may indicate further cardiovascular examinations, as recommended by European Society of Cardiology [6].

The implementation of pre-participation screening with an electrocardiogram may be facilitated by tele-medicine support, which might allow even remote patients to be screened by a cardiologist. Several telemedicine experiences have been reported so far, remarking the possibility to deliver an accurate electrocardiogram analysis in acute coronary syndrome [7–9], arrhythmias [10], syncope [11], and chronic heart failure [12]. Preliminary reports are available also from detainees in penitentiaries [13] and adolescents attending primary and secondary schools [14].

We therefore report preliminary data coming from a pilot experience of pre-participation screening with an electrocardiogram performed by tele-medicine support in a population of young amateur football players (FPs) attending local football schools, the YOUng Football Italian amateur players Remote electrocardiogram Screening with Telemedicine (YOU FIRST) study.

Thanks to a grant by the 'serie A' football club "Hellas Verona", a mentoring project (the "Football Manager Young" project) for 20 football schools located in Apulia (Southern Italy, 4 millions of inhabitants) was started in October 2013. The project included the possibility to perform an electrocardiogram by remote telemedicine support for each young FP attending local football schools.

The first 515 young FPs in the 2000 underwent from January 1 to June 31, 2014 remote electrocardiogram screening by tele-medicine support. The electrocardiograms were recorded by Cardiovox P12 device, sent by (mobile-)telephone support to a telemedicine 'hub' where a cardiologist, 24/7 available, reported and sent back the electrocardiogram, as described elsewhere [15,16].

The electrocardiograms were recorded by local football schools' personnel, adequately skilled after a short (30-minute) training.

The electrocardiogram findings and further examination required by the remote cardiologist were recorded and analyzed.

All adolescents were preliminary screened by general practitioner and found as normal at medical examination without symptoms possibly related to cardiovascular disease (chest pain, dyspnea, palpitations, syncope).

All enrolled subjects gave a written informed consent; the consent was signed by parents in the case of minor FPs.

Electrocardiograms were correctly recorded, sent and reported in 99.8% of cases. Mean age of the patients enrolled in the study was 13 ± 10 years, 98.5% of FPs were male.

Electrocardiogram findings were sinus rhythm in 95.5% of cases, 6 subjects showed supra-ventricular premature beats, 7 ventricular premature beats, 6 negative T-waves, 1 high QRS-voltage, 4 incomplete right bundle branch block, and 3 complete right bundle branch block.

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In 7 subjects a cardiologist referral was required, in 2 cases an ambulatory electrocardiogram was required, and in 3 cases an echocardiogram: initial diagnostic suspect was ruled-out at following work-up in all cases.

We report one of the first experiences of large pre-participation screening of young FP with tele-medicine support. Electrocardiogram based pre-participation screening was shown as effective in reducing the incidence of sudden cardiac death in athletes [17,18].

Some studies, however, questioned the sustainability of such approach [19], even though any economic consideration is conditioned by local cost of specific cardiologic examinations [20]. According to some authors, the efficacy of pre-participation screening is debatable [2,21]. The incidence of sudden cardiac death was deemed relatively rare, thus not justifying large pre-participation screening campaigns [1,2], and higher additional costs [19].

Probably, the limited efficacy of pre-participation screening found in some studies is actually due to limited reliability of symptoms and clinical examination in identifying subject at higher risk [21], while a pre-participation screening including an electrocardiogram might be much more sensitive.

Tele-medicine support, however, could probably facilitate the implementation of pre-participating screening with an electrocardiogram. Several fields of medicine have benefited from tele-medicine support; cardiology is one of those where tele-medicine support was more effective [22]. Less data are available in the field of sport medicine. Initiatives aimed at the reduction of cardiovascular disease thanks to tele-medicine support have been already undertaken in our region [23].

A tele-medicine based approach to pre-participation screening for young amateur athletes may represent a feasible strategy to join clinical efficacy and cost reduction [24].

In conclusion, pre-participating screening with remote tele-medicine support in young FPs attending football schools is easy and feasible. In a very small preliminary population, the prevalence of electrocardiogram anomalies is quite rare. Further data from larger populations are warranted for more definitive conclusions.

Conflict of interest

Authors have no potential conflict of interest to disclose.

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