■ *Case Report*

Short QT interval

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Abstract

Introduction: Short QT Interval (Short QT Syndrome) is a very rare clinical condition. An individual with short QT interval frequently presents with chest pain, palpitation, fainting attack and sometimes cardiac death. Objective: To report a case of Short QT Syndrome. Case: A 27 year old man presented with the complaint of frequent attack of chest pain, palpitation and fainting attack for last one and half years. The ECG revealed short QT interval of 300ms without any cardiac abnormalities. Conclusion: The short QT interval (Short QT Syndrome) is one of the causes of palpitation, chest pain, dizziness and syncope in a young person. Early detection is possible by doing ECG. So ECG is advised to all adults complaining of frequent chest pain, unexplained fainting attack.

Keywords: Short QT Interval, Cardiac death, Implantation of cardiac defibrillator

Introduction

Sudden death occurs predominantly in individuals with structural heart disease. However, in approximately 10–20% of all sudden deaths, no structural cardiac abnormalities can be identified.[1] The short QT syndrome would be a possible diagnosis for unclear sudden cardiac deaths in patients without structural heart disease.

The short QT syndrome (SQTS) is an inheritable primary electrical disease of the heart, discovered in 1999. It is characterized by an abnormally short QT interval (<300 ms) and a propensity to atrial fibrillation and sudden cardiac death.[2].The QT interval generally represents electrical depolarization and repolarization of the left and right ventricles. The QT interval is measured from the beginning of the Q wave (or R wave, if Q wave is absent) to the end of the T wave. The QT interval varies with age, sex, and heart rates. Ordinarily, the QT interval is 400 ms (2 large squares) but it should not exceed 0.42 secs in men and 0.43 secs in women. An abnormal shortened QT interval could be due to Short QT interval so called Short QT syndrome. Patients with SQTS have a near constant QT interval with slow rates and fast heart rates and have proven to be predisposed with SQTS to arrhythmia. The characteristic findings in ECGs are short QT interval typically <300 ms, this may or may not be significantly changed with heart rates. Tall, peaked T waves may also be noted. The arrhythmias of concern in patients with Short QT Syndrome are atrial fibrillation and ventricular fibrillation[2,3]. Atrial fibrillation is the arrhythmia that originates in the atria and is characterized by a fast and very irregular pulse. The patient will often be able to feel the irregular heart beats and may develop other symptoms in term of dizziness, shortness of breath, chest pain, and anxiety. The arrhythmia may terminate spontaneously within minutes or hours, but can be become a chronic condition. Many people learn to live with it and it rarely becomes a major problems. These types of arrhythmia are rarely fatal, and are generally not considered dangerous if the proper medications are taken.

Ventricular fibrillation is a life-threatening event. The diagnosis of ventricular fibrillation is difficult to make because the unmonitored patient typically dies before

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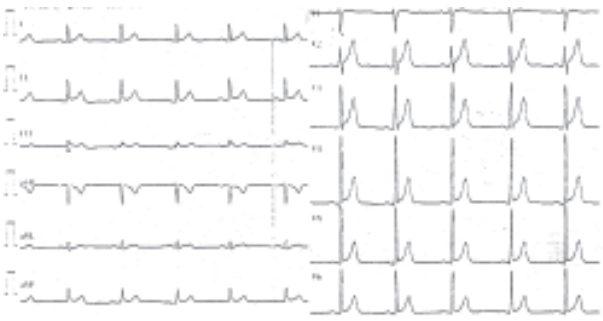
the diagnosis can be made. To date, no individual with SQTS has been monitored during sudden collapse or sudden cardiac death. Electrophysiology studies performed in controlled environments have shown that patients with SQTS develop ventricular fibrillation much more easily than normal subjects. These observations suggest that ventricular fibrillation is the cause of death in patients with SQTS. A shortened QT interval can be associated with hypercalcemia. The individual with short QT interval usually have manifestation like palpitations, chest pain, dizziness, headache, cough, fainting attacks (syncope), cardiac arrest and even sudden death without any cardiac abnormalities.[3,4]

Case

Here, I report a case of short QT Syndrome to highlight the mode of presentation of this condition. The first case on 07/03/2010: A 27 years old man presented in emergency ward B. P Koirala Institute of Health Sciences with complaint of frequent attack of chest pain for last one and half years. Chest pain which was gradual onset, mainly in central part of chest, intermittent, mild to moderate in intensity. Sometimes associated with palpitations and headache. There was also history of remission and re attack of cough with haemoptysis. By occupation, he was working in local FM radio station. Non smoker and no habit of alcohol consumption. No significant chronic illness in family. On clinical examination patient was afebrile, Pr 80/m reg, Rr16/m, BP120/70 mm of Hg. jaundice, anaemia, clubbing, cynosis and lymphadenopathy could not be detected. Lungs and heart absolutely normal. Rest of the systemic examinations also found normal. The chest x-ray normal, T5700, N70 L26, M04, Platelate 223000, ESR 39 mm in 1st hr, Hb15.2gm/dl, Rbg104mg/dl, Na144 mmol/L, K3.7 mmol/L, Urea15 mg/dl, Cre0.9 mg/dl, se ca+ 8 mg/dl.

The 12 leads ECG showing the 'short QT Interval"



Chest X-ray- normal, ECG showed tall and peaked T waves and short QT interval. According to Bazett's formula the corrected QT interval was calculated i.e. QTc = measured QT/"RR where QTc is the QT interval corrected for heart rate, measured QT is the measured QT interval in seconds and the RR is the interval between two R waves measured in seconds. The corrected QT interval (QTc) should be less than 0.44 seconds. In this case the corrected QT interval was found 300 ms. Echocardiography was normal. CT chest was normal. Patient was referred to cardiac centre for further management. Second case: on 2009/09/13: A 25 year old young man presented with chief complaint of chest pain and fainting attack for last 1 month. All investigations revealed normal except ECG that showed short QT interval. The corrected QT interval was found 300ms. He was also referred for further management

Discussions

The short QT interval or short QT syndrome (SQTS) is a very rare clinical condition. Fewer than 53 cases of short QT syndrome have been identified till October, 2008 since this condition was discovered in 1999[5]. There has been very little written about short Q-T intervals in the scientific and medical journals. However it is believed that there is Mutations in the KCNH2, KCNJ2 and KCNQ1 genes cause short QT syndrome.[5,6,7] These genes provide instructions for making proteins that act as channels across the cell membrane. These channels transport positively charged ions of potassium into and out of cells. In cardiac muscle, these ion channels play critical roles in maintaining the heart's normal rhythm. Mutations in the KCNH2, KCNJ2, or KCNQ1 gene increase the activity of the channels, which changes the flow of potassium ions between cells[6]. This disruption in ion transport alters the way the heart beats, leading to the abnormal heart rhythm characteristic of short QT syndrome.[7,8] Short QT syndrome appears to have an autosomal dominant pattern of inheritance. Due to autosomal dominant inhertance pattern, most individual will have family members with a history of unexplained or sudden deaths at a young age.The clinical syndrome is manifested by chest pain, palpitations, cough, haemoptysis, headache, dizziness and fainting attack, cardiac arrest and sudden death. The characteristic findings of short QT syndrome in EKG are a short QT interval, typically d" 300 ms,

tall, peaked T waves similar to encountered with hyperkalemia[9]. The heart rates may or may not be changed. The most commonly used QT correction formula in clinical practice is the one introduced by Bazett's QTc = QTinterval divided by the square root of the R-R interval measured in seconds 10. However there is no evidence of structural heart disease. The only effective treatment option is implantation of an implantable cardioverter-defibrillator.

Conclusion

The short QT interval (Short QT Syndrome) is one of the causes of palpitation, chest pain, and syncope in a young person. Early detection is possible by doing ECG. So ECG is advised to all adults complaining of frequent chest pain, palpitation and unexplained fainting attack.

References

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