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Research Article

**DETECTION AND CONTROL OF BRUGADA SYNDROME
DEPENDING ON OCCUPATIONAL RISKS**¹Dr Numan Ali, ²Dr Asifa Zaib, ³Dr Ambreen Shahzadi¹Medical Officer, THQ Daska²Faisalabad Medical University, Faisalabad³Women Medical Officer, THQ Hospital Khushab

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Abstract:

The ECG showed an electrocardiographic pattern in which Brugada type 2 syndrome was reported and the patient was sent to a cardiac arrhythmia treatment center, where flecainide confirmed the diagnosis. Electrophysiological examination showed a low arrhythmia profile, and the patient was advised to avoid the consumption of certain drugs and drug abuse in patients with Brugada syndrome. Brugada syndrome is distinguished by fainting or sudden death based on the electro-cardio graphic outline of ST segment advancement in the normal heart, but on the precordial paths from V1 to V3 and the right bundle division block. Polymorphic ventricular tachycardia is caused by syncope and sudden death. These electrocardiographic symbols may appear during a routine professional examination of an asymptomatic patient.

Keywords: Detection, Control, Brugada Syndrome, Occupational Risks.**Corresponding author:****Dr. Numan Ali,**

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CASE REPORT:

A 37-year-old man with a history of syncope or syncope has joined a professional medical service for routine monitoring. The ECG showed an electrocardiographic pattern in which Brugada type 2 syndrome was reported and the patient was sent to a cardiac arrhythmia treatment center, where flecainide confirmed the diagnosis. Electrophysiological examination showed a low arrhythmia profile, and the patient was advised to avoid the consumption of certain drugs and drug abuse in patients with Brugada syndrome. The patient remains asymptomatic 6 months after diagnosis. Conclusions. Experts conducting scheduled tests can detect Brugada syndrome and prevent sudden death. It is important to understand the occupational risk of an employee who is diagnosed with Brugada syndrome to prevent or reduce the occurrence of ventricular arrhythmias.

INTRODUCTION:

The band Brugada (BS) was first described in 1992. It is distinguished by a typical

electrocardiographic pattern and susceptibility to ventricular arrhythmias and sudden death in normal precordial leads^{1,2,3,4}.

1. BS is caused by a large abnormality of the myocardium ion channels and is determined by genetic mutations without being associated with any structural heart disease.

2. In recent years, many contributing genetic mutations have been identified, some mechanisms associated with the appearance of the characteristic phenotype have been clarified, and progress has been made in identifying clinical prognostic markers. Three BS associated electrocardiographic patterns have been identified⁵. Type 1 pattern (Fig. 1) is distinguished by a convex ST height of 2 mm ST segment, followed by negative T waves in many exact precordial cables (V1-V3)⁶. The type 2 pattern is explained by an elevated concave elevation of the ST segment by about 2 mm in the right precordial lead, followed by positive T waves or isophase's showing an assisting ECG pattern.



Fig 1. – 12-lead ECG showing a pattern of spontaneous type 1 Brugada syndrome in leads V1 and V2 (diagnostic).

Type 3 model (Figure 2) is defined as any of the above, with the segment height ST <1 mm. Type 1 formula is the only model accepted as a diagnosis. Type 2 and 3 patterns are significant, but BS are not analytical and require a positive result for the presence of ajmaline or flecainide, i.e. BS diagnostic confirmation requires the development of type 1 pattern.



Fig 2. – 12-lead ECG showing a type 3 pattern Brugada syndrome in the exact precordial leads (suggestive, not diagnostic).

Patients with BS remain largely asymptomatic, but fainting or sudden death occurs at any time due to up to 25% of ventricular arrhythmias (torsade de pointes and / or ventricular fibrillation). This requires that all patients with a characteristic ECG pattern are isolated at risk even when they are isolated. We present the case of BS detected during the vocational exam.

A CASE REPORT:

The patient was a 37-year-old man who smoked nine cigarettes a day and 70 cigarettes for 22 years ago, but is currently undergoing smoking cessation therapy and there is no history of alcohol or other substance abuse. bodybuilding and diving. There were no fainting or sudden death in the family. For eight years he worked at a company manufacturing wood cutting machines, the main risk of industrial hygiene was exposed to noise, cutting oils and chlorinated solvents (methylene chloride and

trichloroethylene) used for cleaning. He also worked as a security guard, where from time to time he was exposed to very stressful situations. In a routine professional examination, the physical examination was satisfactory, blood pressure was 120/70 mmHg, and total cholesterol 318 mg / dl (LDL: 150 mg / dl) and triglycerides 254 mg / dl in blood counts. The ECG detected a high increase in the segment of the saddle ST 2 in the left pre-moon hemisphere and the right precordial lead (Fig. 3) (type 3).

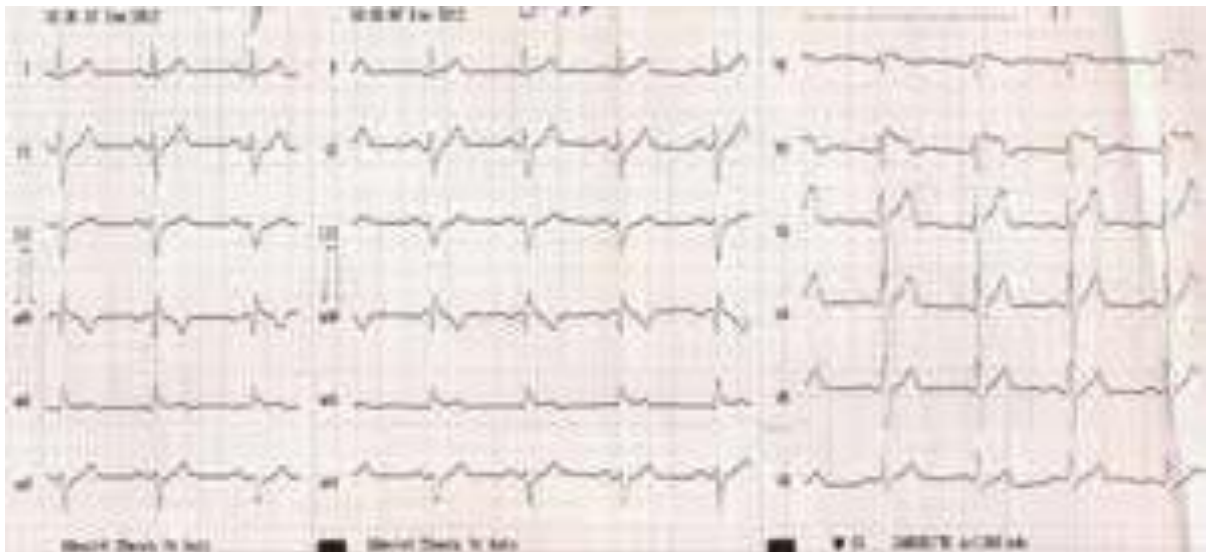


Fig 3. – ECG of the patient reported here, showing a type 2 pattern Brugada syndrome (in V2: concave ST segment elevation > 2 mm followed by isodiphasic saddle back pattern T wave).

The employee was sent to a referral center for cardiac arrhythmias and underwent a flecainide test to detect high-quality clinical tolerance confirming the diagnosis of BS and the transition from model 2 to type 1.

To complete the risk classification, electrophysiological studies were first performed showing normal conduction intervals, and secondly, continuous ventricular arrhythmias were not induced during the ventricular pacing protocol. Therefore, the patient was assessed to have a low arrhythmia risk profile (asymptomatic, non-diagnostic ECG without induction in an electrophysiological study). Since reports show that fever can cause ventricular arrhythmias in patients with BS, it is recommended to avoid energy treatment with drugs and addictive substances and any feverish diseases and drugs listed in the table with the necessary necessary consultation in case of syncope. An appointment was made for genetic tests and check-ups at a cardiology outpatient clinic. Six months later the patient remained asymptomatic.

DISCUSSION:

BS is in a set of heart diseases called channelopathies, diseases caused by abnormalities associated with the formation of cellular action potential in transmembrane ion channels, the most

serious consequence is a predisposition to malignant ventricular arrhythmias^{7,8}. Channelopathy is simply an electrical disorder and is usually not associated with any underlying structural heart disease⁴. BS is expected to increase from 4 to 12% of all sudden expiries and 20% of sudden expiries⁹. They happen in a seemingly normal heart. The estimated incidence of BS is 5/10,000 people, but this number probably underestimates the true incidence because many patients may have silent forms of the disease¹⁰. Implantable cardioverter-defibrillator (ICD) is the only treatment that prevents sudden death in BS. Current indications for ICD implantation are recommended by the Second International Consensus BS¹³. Patients with symptomatic BS (sudden fainting, sudden death stopped) and asymptomatic patients in whom electrophysiological examination causes continuous ventricular arrhythmias, especially spontaneous^{11,12}. ECG patterns are considered candidates for ICD implantation. Regardless of the level of risk of arrhythmia, it is recommended for all patients diagnosed with BS to avoid certain drugs and various drugs (Table I; full list is available at www.brugadadrugs.org). We also recommend aggressive fever management, emergency consultations in the event of sudden loss of consciousness, and regular monitoring by a cardiologist^{14,15}.

Main medicaments and substances of abuse that should be evaded in people with Brugada disease*		
Medicament	Antiarrhythmics	Ajmaline Pilsicainide Flecainide Propafenone Procainamide
	Psychotropic agents	Amitriptyline Desipramine Clomipramine Loxapine Lithium Nortriptyline Trifluoperazine
	Anaesthetics	Bupivacaine Oxcarbazepine Propofol Procaine
	Others	Acetylcholine Ergonovine
Substances of abuse	Cocaine Alcohol	

* Changed by: Wolpert C, Postema PG, Amin AS et al. patients and Drugs with Brugada syndrome: literature review, approvals and updated website (www.brugadadrugs.org). Heart rate in 2009; 6: 1335–41.

Biological, physical and chemical hazards in the workplace can lead to cardiac conduction disorders. Table II first describes the main chemicals that can cause arrhythmias, as well as those that can cause toxic hyperthermia. This means that workers exposed to these substances may have an increased risk of unexpected expiry if they have BS. In addition, physical factors such as electricity or extremely stressful professions, such as elite athletics or football, may support the occurrence of arrhythmias and or conduction disorders and may be discouraging in this patient group.

Table II. Main occupational risk associated with the development of cardiac arrhythmias

Main occupational risk associated with the development of cardiac arrhythmias		
Toxic agents	Chlorinated solvents	Trichloroethylene Tetrachloroethylene Methyl chloroform Methylene chloride
	Freons	Chlorodifluoromethane
	Organophosphate insecticides	Chlorpyrifos
	Heavy metals	Antimony
Physical agents	Electricity	Exposure above 30 mA
	High temperatures	Metal fume fever (Zn, Cu, Cd, Mg). Polymer fume fever. Heat stress.
Others	Highly-stressful situations.	

ECG is useful in detecting electrocardiographic abnormalities associated with sudden death, as in the case of BS. In occupations with risk profiles, as described in Table II, the inclusion of ECGs in medical controls may help in the early detection of BS, but additional sensitivity, specificity and predictive value testing will be required.

CONCLUSION:

Brugada syndrome is distinguished by fainting or sudden death based on the electro-cardio graphic outline of ST segment advancement in the normal heart, but on the precordial paths from V1 to V3 and the right bundle division block. Polymorphic ventricular tachycardia is caused by syncope and sudden death. These electrocardiographic symbols may appear during a routine professional examination of an asymptomatic patient.

REFERENCES:

- Al-Khatib, Sana M., and William G. Stevenson. "Management of ventricular arrhythmias and sudden cardiac death risk associated with cardiac channelopathies." *JAMA cardiology* 3, no. 8 (2018): 775-776. Al-Khatib SM, Stevenson WG. Management of ventricular arrhythmias and sudden cardiac death risk associated with cardiac channelopathies. *JAMA cardiology*. 2018 Aug 1;3(8):775-6.
- Tadros, Rafik, Hanno L. Tan, ESCAPE-NET Investigators, Sulayman el Mathari, Jan A. Kors, Pieter G. Postema, Najim Lahrouchi et al. "Predicting cardiac electrical response to sodium-channel blockade and Brugada syndrome using polygenic risk scores." *European heart journal* 40, no. 37 (2019): 3097-3107. Tadros, R., Tan, H.L., ESCAPE-NET Investigators, el Mathari, S., Kors, J.A., Postema, P.G., Lahrouchi, N., Beekman, L., Radivojkov-Blagojevic, M., Amin, A.S. and Meitinger, T., 2019. Predicting cardiac electrical response to sodium-channel blockade and Brugada syndrome using polygenic risk scores. *European heart journal*, 40(37), pp.3097-3107.
- Guettler, Norbert, Kim Rajappan, Joanna L. D'Arcy, and Edward D. Nicol. "Electrophysiologic assessment of aircrew and other high-hazard employees: This third article in the occupational cardiology series focusses on the assessment of arrhythmias in high-hazard employees and how, not all arrhythmias prevent employment." (2019): 2560-2563. Guettler, N., Rajappan, K., D'Arcy, J.L. and Nicol, E.D., 2019. Electrophysiologic assessment of aircrew and other high-hazard employees: This third article in the occupational cardiology series focusses on the assessment of arrhythmias in high-hazard employees and how, not all arrhythmias prevent employment.
- Dhamapurkar, Samira Kashinath, Barbara A. Wilson, Anita Rose, and Gerhard Florschütz. "Brugada syndrome and the story of

- Dave." Neuropsychological rehabilitation 28, no. 2 (2018): 259-267.
5. Chen, C.Y.J., Lu, T.P., Lin, L.Y., Liu, Y.B., Ho, L.T., Huang, H.C., Lai, L.P., Hwang, J.J., Yeh, S.F.S., Wu, C.K. and Juang, J.M.J., 2019. Impact of Ancestral Differences and Reassessment of the Classification of Previously Reported Pathogenic Variants in Patients With Brugada Syndrome in the Genomic Era: A SADS-TW BrS Registry. *Frontiers in genetics*, 9, p.680.
 6. Shlyakhto, E.V., Arutyunov, G.P., Belenkov, Y.N., Boytsov, S.A. and Ardashev, A.V., 2019. RUSSIAN GUIDELINES FOR SUDDEN CARDIAC DEATH RISK ASSESSMENT AND PREVENTION -2018. POCKET VERSION. Журнал Гродненского государственного медицинского университета, 17(3).
 7. Demir Gündoğmuş, P., Gündoğmuş, İ., Karagöz, A., Kıyanççek, M., Yaşar, A.B. and Algül, A., 2018. Treatment of ADHD in a patient with Brugada syndrome: a case report and a brief review. *Psychiatry and Clinical Psychopharmacology*, 28(3), pp.339-342.
 8. Chen, Ching-Yu Julius, Jyh-Ming Jimmy Juang, Ying-Hsiang Chen, I-Chien Wu, Chih-Cheng Hsu, Ray-Chin Wu, Kwo-Ching Chen et al. "Comparisons of clinical impacts on individuals with Brugada electrocardiographic patterns defined by ISHNE criteria or EHRA/HRS/APHRS criteria: a nationwide community-based study." *Annals of medicine* 50, no. 1 (2018): 7-15.
 9. Chen, Ching-Yu Julius, Jyh-Ming Jimmy Juang, Ying-Hsiang Chen, I-Chien Wu, Chih-Cheng Hsu, Ray-Chin Wu, Kwo-Ching Chen et al. "Comparisons of clinical impacts on individuals with Brugada electrocardiographic patterns defined by ISHNE criteria or EHRA/HRS/APHRS criteria: a nationwide community-based study." *Annals of medicine* 50, no. 1 (2018): 7-15.
 10. Yodteerug, Songkeat, P. Vathesatogkit, T. Ngamukos, S. Apiyasawat, and P. Chandanamattha. "Prevalence of early repolarization in Thailand and long term risk of cardiac mortality." In *EUROPEAN HEART JOURNAL*, vol. 40, pp. 4178-4178. GREAT CLARENDON ST, OXFORD OX2 6DP, ENGLAND: OXFORD UNIV PRESS, 2019.
 11. Brignole, M., Moya, A., de Lange, F.J., Deharo, J.C., Elliott, P.M., Fanciulli, A., Fedorowski, A., Furlan, R., Kenny, R.A., Martín, A. and Probst, V., 2018. Practical Instructions for the 2018 ESC Guidelines for the diagnosis and management of syncope. *European heart journal*, 39(21), pp.e43-e80.
 12. Chan, Xin Hui S., Yan Naung Win, Laura J. Mawer, Jireh Y. Tan, Josep Brugada, and Nicholas J. White. "Risk of sudden unexplained death after use of dihydroartemisinin-piperazine for malaria: a systematic review and Bayesian meta-analysis." *The Lancet Infectious Diseases* 18, no. 8 (2018): 913-923.
 13. Matusik, Paweł Tomasz, Anna Rydlewska, Joanna Pudło, Jakub Podolec, Jacek Lelakowski, and Piotr Podolec. "Brugada syndrome: new concepts and algorithms in management (RCD code: V-1A. 1)." *Journal of Rare Cardiovascular Diseases* 3, no. 5 (2018): 151.
 14. Claeys, Marc J., Yves Vandekerckhove, Bernard Cosyns, Philippe Van de Borne, and Patrizio Lancellotti. "Summary of 2019 ESC Guidelines on chronic coronary syndromes, acute pulmonary embolism, supraventricular tachycardia and dislipidaemias." *Acta Cardiologica* (2020): 1-8.
 15. Guettler, Norbert, Dennis Bron, Olivier Manen, Gary Gray, Thomas Syburra, Rienk Rienks, Joanna d'Arcy, Eddie D. Davenport, and Edward D. Nicol. "Management of cardiac conduction abnormalities and arrhythmia in aircrew." *Heart* 105, no. Suppl 1 (2019): s38-s49.