RESEARCH ARTICLE

ECG Changes of Patients with and without Conversion Disorder

Dhrubajyoti Bhuyan[1], Sriparno Patra[2], Soumitra Ghosh[3], Hemchandra Kalita[4]

Received on: 24 June 2024; *Accepted on*: 04 August 2024; *Published on*: 19 December 2025

Abstract

Background: Conversion disorder (CD), typically linked to diverse psychological conflicts, often manifests as autonomic imbalance. The current study further examines changes in ECG parameters of conversion patients attending emergency departments after stabilization and compares it with healthy individuals.

Methods: Eighty conversion patients and 80 healthy individuals participated in this cross-sectional investigation. A "12-lead ECG" has been performed on each subject. For CD patients, it is only done after the stabilization of their symptoms. For controls, ECG was collected from individuals who had done ECG as a routine health checkup. Frontal QRS-T angle and the *P*-wave dispersion (PWD), QT wave dispersion (QTWd), QT corrected (QTc), and QTc dispersion (QTcd) were computed.

Results: The ECG between CD patients and controls were compared. The group with CD had noticeably greater anxiety levels than the control group. (Beck anxiety inventory-12 $\pm$ 5 vs 6 $\pm$ 5, $p < 0.001$), high heart rate (90 $\pm$ 29 vs 83 $\pm$ 20.5, $p = 0.04$), PWD (53.2 $\pm$ 26.8 vs 40 $\pm$ 12, $p < 0.001$), QTWd (80 $\pm$ 40 vs 40 $\pm$ 20, $p < 0.001$), QTc (421.6 $\pm$ 86 vs 416 $\pm$ 45, $p = 0.03$), QTcd (92.4 $\pm$ 57.2 vs 45.2 $\pm$ 9.75, $p < 0.01$), frontal QRS-T angle (23.73 $\pm$ 11.22 vs 19.9 $\pm$ 12.85, $p = 0.001$). Level of anxiety is strongly associated with PWD ($r = 0.89$ in Spearman correlation), QTwd ($r = 0.45$) and QTcd ($r = 0.49$). Depression substantially corresponds with QTc ($r = 0.24$) and PWD ($r = 0.46$).

Conclusion: Our study has uncovered a significant association between CD and changes in ECG readings.

Keywords: Conversion disorder, ECG, Liaison psychiatry.

Indian Journal of Private Psychiatry (2025): 10.5005/jp-journals-10067-0185

Introduction

An inexplicable physical symptom that impairs mobility or sensation develops in people with conversion disease, also known as functional neurological symptom disorder. Contributing psychological elements include stress. This theory, which Sigmund Freud first proposed, contends that unresolved conflicts cause physical symptoms of emotional anguish.[1–4] In various geographic regions, the yearly incidence of conversion disorder (CD) varied from around 4–12 cases per 1,00,000 individuals.[4,5] Evidence suggests that this disorder results in autonomic dysfunction, which can lead to changes in motor responses and disruptions in circadian rhythm.[3,6–8] As autonomic dysfunction occurs, CD may negatively impact cardiac function.[9,10] Electrocardiography (ECG) is the foremost noninvasive method for evaluating cardiac function in this situation.[11,12] There is a lack of research[13,14] on ECG alterations in CD, prompting our sincere effort to compare ECG changes in this condition with healthy individuals.

Materials and Methods

The study included people who attended the psychiatry emergency room of Assam Medical College between March 2023 and February 2024, aged 18–50 years, and who met DSM-5 criteria for CD diagnosis. The participants gave their informed consent. The study group excluded participants with past diagnoses of major cardiac diseases, other psychiatric illnesses except CD, or other comorbidities, such as hypertension, diabetes mellitus, thyroid disorders, cognitive dysfunction causing neurological disorders like multiple sclerosis, and Parkinson's disease from previous history. They were also excluded if they had a regular history of substance abuse. Within the CD group, the number of CDs was recorded. Electrocardiogram was performed within 48 hours of the hospital arrival but after the stabilization of the patient, as physical symptoms or exertion of CD do not interfere with ECG findings. If ECG was done in the acute state, this was repeated after the stabilization of the patient. The authors bear the cost of the ECG. The sample size for the current study is calculated and rounded off to be 80 in each group with 95% confidence and 80% power, taking into account the standard deviation of *P*-wave dispersion in patients with CD and normal healthy people to be 5.7 and 5.5, respectively.[14] Additionally, changes of at least 2.5 in patients with conversive disorder compared with healthy individuals are estimated. Therefore, 80 conversion patients and 80 healthy volunteers participated in this cross-sectional

[1–3]Department of Psychiatry, Assam Medical College, Dibrugarh, Assam, India

[4]Department of Cardiology, Assam Medical College, Dibrugarh, Assam, India

Corresponding Author: Sriparno Patra, Department of Psychiatry, Assam Medical College, Dibrugarh, Assam, India, Phone: +91 8617435814, e-mail: sriparnopatra333@gmail.com

How to cite this article: Bhuyan D, Patra S, Ghosh S, *et al*. ECG Changes of Patients with and without Conversion Disorder. Ind J Priv Psychiatry 2025;19(2):58–63.

Source of support: Nil

Conflict of interest: None

© The Author(s). 2025 Open Access. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (https://creativecommons.org/licenses/by-nc/4.0/), which permits unrestricted use, distribution, and non-commercial reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.

investigation. Healthy volunteers who went to private hospitals for yearly physicals made the control group. We visited the private hospitals monthly on the fourth week and checked their register. We contacted the individuals who came for routine health checkups during this study period. After their informed consent, they were included in the study. Then the control groups were matched with the cases according to sociodemographic profile. The Assam Medical College in Dibrugarh's Institutional Ethics Committee (H) granted ethical approval.

ECG Measurements

For every patient, a "12-lead ECG" was jotted down on paper at a speed of 25 mm/s and an amplitude of 10 mm/mV. All ECGs were digitalized, and estimations were taken under a magnifying glass to minimize computation errors. Two experienced cardiologists independently examined the ECG recordings. In a 12-lead ECG, the *P*-wave dispersion (PWD) is the gap between the maximum P-wave duration (P_{max}) and the lowest *P*-wave duration (P_{min}).[15] Similarly, the gap between the maximum QT interval and minimum QT interval[16] is used to calculate QT wave dispersion (QTWd). Usually, V2, V3, V5, or II, the lead with the greatest QT readings was used to evaluate the QT interval. This measurement was made using the previous RR interval, which was used to calculate heart rate. With the help of Bazett's formula, the QT interval (QTc) was corrected.[16] The term corrected QT dispersion (QTcd) refers to the variation between the highest and lowest QTc measurements for a certain heart rate.[17] An automated QRS-T angle generator was employed by the "12-lead ECG" equipment.

Statistical Analysis

"SPSS version 25 has been used for the statistical analysis. The Kolmogorov–Smirnov (*K–S*) test evaluated the normal distribution of the data. Continuous variables were compared using the Mann–Whitney *U* test or the student's *t*-test, depending on the data normality. Mean ± standard deviation or median (interquartile range) has been used for data representation. The Chi-square test was utilized to compare the categorical variables' numerical and percentage expressions. ECG variables and other factors were correlated using multivariate linear regression analysis. Statistical significance has been defined as a *p*-value less than 0.05."

Results

Results and observations are made as follows:

Changes of ECG Parameters in Conversion Patients and Healthy Controls

Demographics are listed in Table 1. This study included 80 patients with CD, whose mean age was 21.01 ± 7.92 years, and 80 healthy controls, whose mean age was 28.91 ± 6.02 years. The various blood parameters, ECG parameters, Beck depression questionnaire scores, and Beck anxiety inventory (BAI) scores are given in Table 2, which shows significantly increased heart rate, PWD, QTWd, QTc, QTcd, QRS-T angle, and BAI scores in patients with CD. Table 3 displays ECG parameters categorized by gender. Table 4 compares predominant symptom-wise ECG parameters in CD patients.

Relation between BAI and BDI Scores with ECG Parameters

Figures 1 to 3 demonstrate that there is a significant increase in PWD, QTWd, and QTcd as anxiety levels rise. Conversely, Figures 4 and 5 illustrate a significant increase in PWD and QTc as depression levels escalate.

Figures 1 to 3 show comparison of BAI scores with ECG parameters.

Figures 4 and 5 show comparison of BDI scores with ECG parameters.

ECG Parameters Based on the Number of Conversion Disorders

Figure 6 shows how the ECG varies with the number of CDs. A noteworthy association ($r = 0.8$) has been seen between the rise in conversion assaults and the QRS-T angle value.

Discussion

This study is the first of its kind in India which looks at the changes in electrocardiograms between individuals with CD and a group of healthy controls. Our findings highlight several key outcomes. Firstly, individuals with CD exhibit notably elevated parameters including PWD, QTWd, QTc, QTcd, and QRS-T angle in their ECG readings, as well as increased anxiety levels compared with healthy control. Secondly, females exhibit a higher prevalence of conversion symptoms (86.25%) compared with males, with their PWD showing a statistically significant increase in comparison to males ($p = 0.023$). Moreover, a relationship exists between increased anxiety and elevated levels of PWD, QTwd, and QTdc ($p < 0.001$), while PWD ($p < 0.001$) and QTc ($p = 0.028$) are notably heightened in cases of depression. Finally, the QRS-T angle ($r = 0.8$) is significantly higher in the patients with more CD episodes.

Increased *P*-wave dispersion predicts supraventricular arrhythmias like atrial fibrillation, while increased QTWd predicts conditions, such as ventricular hypertrophy, ventricular tachycardia, and coronary artery disease. And QTc and QTdc are indicators of cardiac mortality and coronary artery disease,[18–25] Likewise, the frontal QRS-T angle is prognostic of ventricular arrhythmia, left ventricular systole dysfunction, and coronary heart disease.[25–29] So, conversion patients may be at increased risk of cardiac morbidity.

Most of our participants were female, unmarried, students by occupation, within 18–28 years of age group, literate, and belonged to upper-lower socioeconomic status and rural background. This result follows the research of Deka et al.[30] Previous findings also reinforce the prevalence of conversion syndrome among women.[31–34]

Previous studies also found that CD tends to occur more frequently among individuals aged 18–30, residing in rural regions, with lower socioeconomic status, particularly among married women.[35–39] However, most of the unmarried females participated in our study. Our study primarily focused on a government hospital setting, which likely accounts for the predominance of participants from lower socioeconomic backgrounds, as individuals in this demographic often turn to government hospitals for treatment. Additionally, the physically demanding nature of rural occupations could contribute to the higher occurrence of motor-dominant conversion symptoms in this demographic,[32,39,40] which supports our findings that the most common conversion symptoms are motor symptoms (26.25%) including pseudoseizure and unresponsiveness followed by breathlessness. Most participants had mixed features but we have documented the most prominent symptom.

Increased PWD, QTc, and QRS-T angle in conversive patients support findings by Ocak et al. and Izci et al.[13,14] But Ocak et al. had not found any increased QTwd in conversion patients and no

Table 1: Study subject distribution based on sociodemographic factors

	Persons with conversion disorder		*Persons without conversion disorder*		*χ2*	*p-value*
	Number	*Percentage*	*Number*	*Percentage*		
Age						
18–28	53	66.25%	42	52.5%	3.172	0.075
29–39	23	28.75%	33	41.25%		
40–50	4	5%	5	6.25%		
Gender						
Male	11	13.75%	16	20%	1.11	0.29
Female	69	86.25%	64	80%		
Occupation						
Government employee	7	8.75%	10	12.5%	7.32	0.12
Private job	3	3.75%	6	7.5%		
Homemaker	9	11.25%	13	16.25%		
Shop owner	3	3.75%	9	11.25%		
Student	54	67.5%	40	50%		
Daily wedge worker	4	5%	2	2.5%		
Socio economic status						
Upper	0	0	0	0	2.96	0.23
Upper middle	13	16.25%	22	27.5%		
Lower middle	31	38.75%	27	33.75%		
Upper-lower	36	45%	31	38.75%		
Lower	0	0	0	0		
Marital status						
Married	30	37.5%	35	43.75%	0.65	0.42
Unmarried	50	62.5%	45	56.25%		
Separated	0	0	0	0		
Literacy						
Literate	66	82.5%	71	88.75%	1.27	0.26
Illiterate	14	17.5%	9	11.25%		
Inhabitat						
Rural	55	68.75%	45	56.25%	2.67	0.10
Urban	25	31.25%	35	43.75%		
Suburban	0	0	0	0		

Socio-demographic variables are described in numbers and percentages. Utilizing the Chi-square test. *$p < 0.05$ signifies significance

Table 2: Different variables in persons with and without conversion disorder

Variables	*Persons with conversion disorder* Median (IQR)	*Persons without conversion disorder* Median (IQR)	*U-value*	*p-value*
Urea	24 (10)	25 (21.75)	1300	0.406
Glucose	90 (29)	88 (33)	1258	0.280
Hb	7 (2)	8 (2)	1292	0.379
WBC	6.9 (3.68)	5 (3.83)	1112	0.512
SBP	120 (20)	120 (30)	1416	0.889
DBP	74 (10)	78 (10)	1288	0.368
BAI	12 (5)	6 (5)	540	<0.001
BDI	8 (5)	7 (2)	1366	0.660
HR	90 (29)	83 (20.5)	1092	0.038
PWd	53.2 (26.8)	40 (12)	848	<0.001
QTWd	80 (40)	40 (20)	200	<0.001
QTc	421.6 (86)	416 (45)	1072	0.029
QTcd	92.4 (57.2)	45.2 (9.75)	160	<0.01
QRS-T angle	23.733 (11.22)	19.9 (12.85)	888	0.001

Variables expressed in the median (Interquartile range) (IQR) in both groups, the differentiation between the two groups was done by applying the Mann–Whitney *U* test. (Statistical significance is shown by *$p < 0.05$, high significance by **$p < 0.01$, and very high significance by ***$p < 0.001$)

Table 3: ECG changes in different genders of conversion patients

Gender	*PWD*	*p-value*	*QTWd*	*p-value*	*QTc*	*p-value*	*QTcd*	*p-value*	*QRS-T angle*	*p-value*
Male	40 (13.36)	0.023*	80 (26.52)	0.365	375.3 (208.57)	0.116	98 (27.9)	0.432	15.206 (18.21)	0.148
Female	53.2 (33.33)		80 (66.67)		430.2 (83.9)		80 (74.2)		16.26 (21.24)	

In both groups, variables are given as the median (interquartile range; IQR). The Mann–Whitney U test has been used to compare the two groups. *p less than 0.05 denotes statistical significance

Table 4: Symptom-wise variation of ECG in conversion patients

Predominant conversion symptom	*Number of patients*	*PWD*	*p-value*	*QTWd*	*p-value*	*QTc*	*p-value*	*QTcd*	*p-value*	*HR*	*p-value*
Breathlessness	19	53.2 ± 26.8	0.003**	80 ± 33.2	0.158	435 ± 61.4	<0.001***	98 ± 35.6	0.281	90 ± 9	0.198
Dizziness, headache	4	66.8		120		363.3		136.8		78 ± 31.5	
Mutism	10	90 ± 50		93.33 ± 80		450 ± 8.6		111.2 ± 97.57		103.5 ± 30	
Pseudoseizure	10	40 ± 40		60 ± 40		350 ± 60		77.5 ± 39.5		100 ± 25	
Unresponsiveness	11	48 ± 13.2		100 ± 80		405 ± 69		127.8 ± 86.4		70 ± 28	
Chest pain	4	40		40		335		43.5		71	
Partial loss of consciousness	8	43.2 ± 26.4		133.4 ± 100		500 ± 108		167.7 ± 150.2		84 ± 32	

Variables are expressed in the median (interquartile range) (IQR) in all the groups, the comparison between these groups was done by applying the ANOVA test. (*$p < 0.05$ signifies statistically significant, ** $p < 0.01$ signifies highly significant, ***$p < 0.001$ signifies very highly significant)

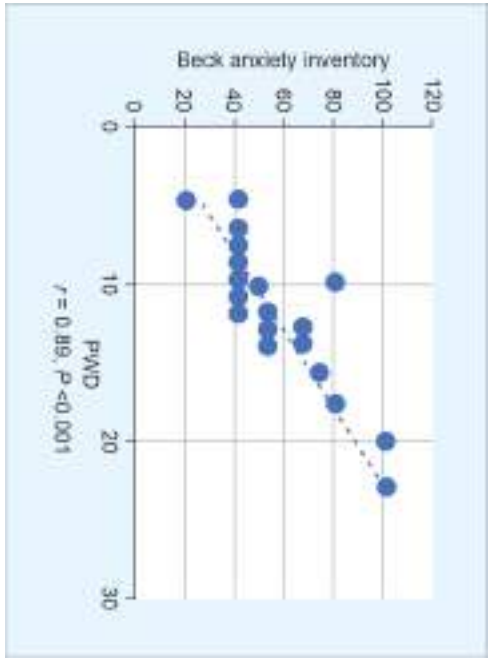


Fig. 1: BAI vs PWD

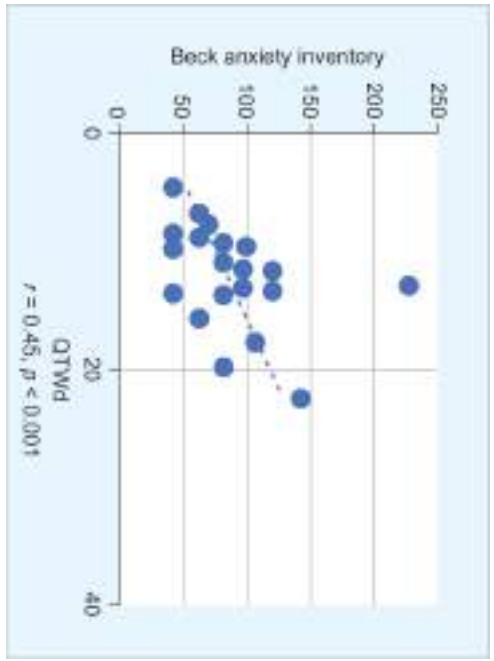


Fig. 2: BAI vs QTWd

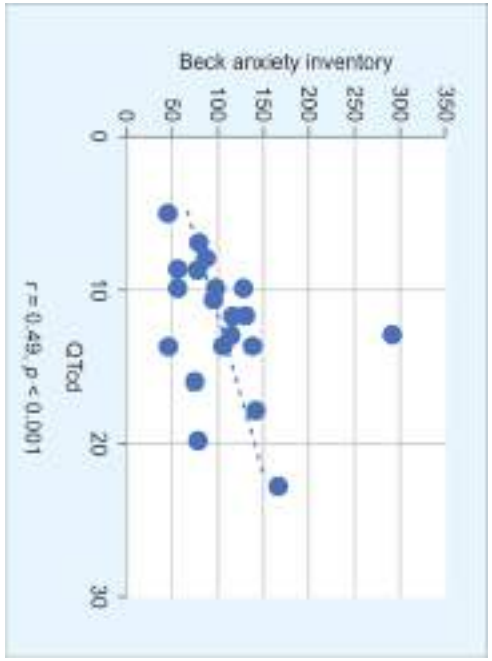


Fig. 3: BAI vs QTcd

By Spearman correlational coefficient BDI score and ECG parameters are correlated. Statistical significance is indicated by a result "$p < 0.05$, high significance by $p < 0.01$, and very high significance by $p < 0.001$"

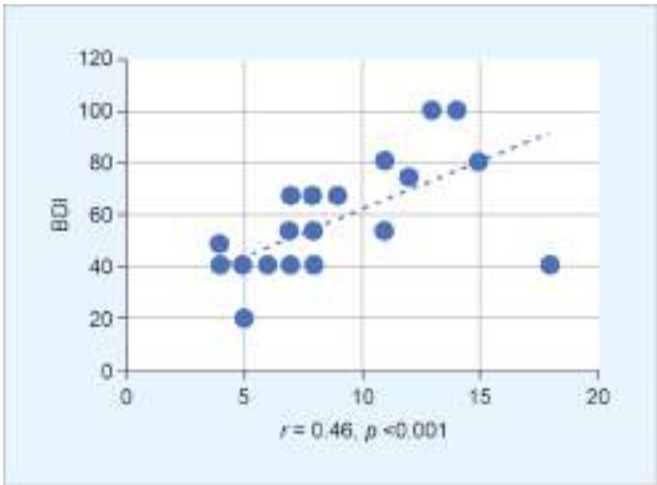


Fig. 4: BDI vs PWD

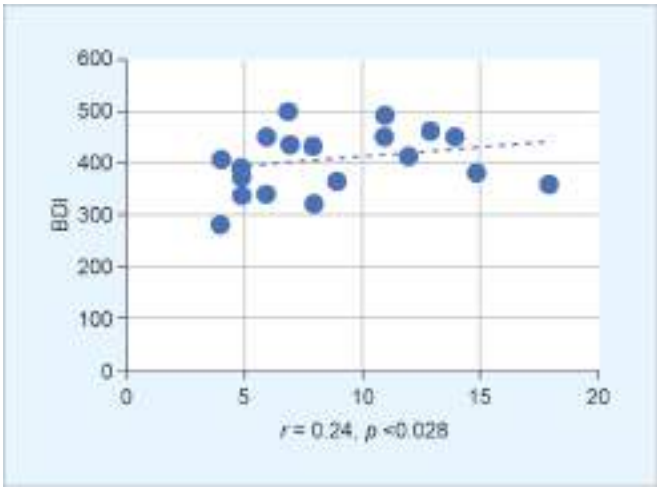


Fig. 5: BDI vs QTc

By Spearman correlational coefficient BDI score and ECG parameters are correlated. "$p < 0.05$ denotes a statistically significant result, $p < 0.01$ states a highly significant result, and $p < 0.001$ states a very highly significant result"

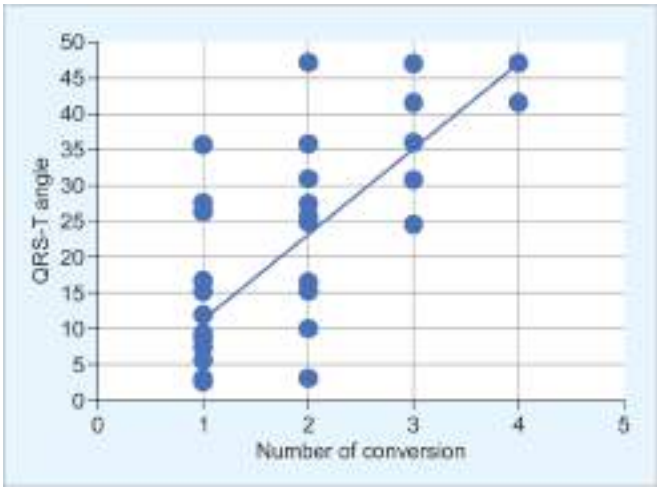


Fig. 6: QRS-T angle vs number of conversion disorder

Correlation is seen between the conversion disorders' number and the QRS-T angle

previous study had observed QTcd in conversion patients. Similarly, Izci et al. did not find PWD changes in conversion patients. Our observation of a rise in heart rate correlating with higher BAI scores supports the results reported by Kozlowska et al.[8] Furthermore, the significant rise in PWD and frontal QRS-T angle seen in patients who had multiple episodes of CD is in harmony with the findings of Ocak et al. and Izci et al.[13,14]

Several arrhythmias can be initiated, maintained, or resolved by the sympathetic and parasympathetic branches of the "autonomic nervous system" (ANS). Dysfunctions in the ANS, often seen in conditions like CD, can disrupt the control of ventricular repolarization, potentially leading to the development of cardiac arrhythmias.[14,15,18,41]

Although previous researches show more PWD in males, we have found in CD that females have more PWD. This could be attributed to the fact that females are more susceptible to developing anxiety.[42] Consequently, when CD manifests, heightened anxiety in females leads to more pronounced ECG alterations.

Our findings of increased PWD, QTWd, QTcd with increased anxiety, and increased PWD and QTc with increased depression support previous studies.[14,43–47] Our results are at odds with previous research, as those found a correlation between elevated QTd and depression.[47,48]

Higher levels of QRS-T angle and a higher frequency of CDs are correlated. This is consistent with the findings published by Ocak et al.[13]

Limitations

- This study included a small number of participants and was done from a single center.
- 24-hour halter monitoring could not be done, with which detailed ECG assessment could be possible.
- Patients were not followed up in this study.

Conclusion

This study has brought to our attention that changes in ECG are associated with CD, which consult earlier studies on the same topic. Therefore, this may be an indication to consider a cardiac origin in investigating patients who present CD, not merely diagnosing them as functional origin. To fully comprehend the relationship between cardiac diseases and CD, more study is required.

Orcid

Dhrubajyoti Bhuyan https://orcid.org/0000-0001-7623-3781
Sriparno Patra https://orcid.org/0009-0000-8797-1202

References

1. Conversion disorder revisited - PubMed [Internet]. [cited 2024 Apr 11]. Available from: https://pubmed.ncbi.nlm.nih.gov/16324233/.
2. DSM [Internet]. [cited 2024 Apr 11]. Available from: https://www.psychiatry.org:443/psychiatrists/practice/dsm.
3. Blitzstein SM. Recognizing and treating conversion disorder. Virtual Mentor 2008;10(3):158–160. DOI: 10.1001/virtualmentor.2008.10.3.cprl1-0803.
4. Ali S, Jabeen S, Pate RJ, et al. Conversion disorder—mind versus body: A review. Innov Clin Neurosci 2015;12(5–6):27–33. PMID: 26155375.
5. Peeling JL, Muzio MR. Conversion Disorder. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024.
6. Nagata R, Matsuura E, Nozuma S, et al. Anti-ganglionic acetylcholine receptor antibodies in functional neurological symptom disorder/

conversion disorder. Front Neurol 2023;14:1137958. DOI: 10.3389/fneur.2023.1137958.
7. Fukuta M, Inami R, Arai H. Points of intersection between mental disorder and the autonomic nervous system, and their characteristics. Juntendo Med J 2016;62(5):386–391. DOI: 10.14789/jmj.62.386.
8. Kozlowska K, Palmer DM, Brown KJ, et al. Reduction of autonomic regulation in children and adolescents with conversion disorders. Psychosomatic Med 2015;77(4):356–370. DOI: 10.1097/PSY.0000000000000184.
9. Cardiovascular Disorders Mediated by Autonomic Nervous Syste: Cardiology in Review [Internet]. Available from: https://journals.lww.com/cardiologyinreview/fulltext/2020/03000/Cardiovascular_Disorders_Mediated_by_Autonomic.2.aspx.
10. Goldberger JJ, Arora R, Buckley U, et al. Autonomic nervous system dysfunction. J Amer College Cardiol 2019;73(10):1189–206. DOI: 10.1016/j.jacc.2018.12.064.
11. Kamaruddin NH, Murugappan M, Omar MI. Early prediction of cardiovascular diseases using ECG signal: Review. In: 2012 IEEE Student Conference on Research and Development (SCOReD) [Internet]. 2012. pp. 48–53. DOI: 10.1109/SCOReD.2012.6518609.
12. Terho HK, Tikkanen JT, Kenttä TV, et al. Electrocardiogram as a predictor of sudden cardiac death in middle-aged subjects without a known cardiac disease. Int J Cardiol Heart Vasc 2018;20:50–55. DOI: 10.1016/j.ijcha.2018.08.002.
13. Ocak M, Tascanov MB, Kemer Z, et al. Examination of ECG characteristics of patients admitted to emergency department with conversive attack. Am J Emerg Med 2021;48:110–113. DOI: 10.1016/j.ajem.2021.04.027.
14. Izci F, Hocagil H, Izci S, et al. P-wave and QT dispersion in patients with conversion disorder. Ther Clin Risk Manag 2015;11:475–480. DOI: 10.2147/TCRM.S81852.
15. Perez MV, Dewey FE, Marcus R, et al. Electrocardiographic predictors of atrial fibrillation. Am Heart J 2009;158(4):622–628. DOI: 10.1016/j.ahj.2009.08.002.
16. De Oliveira Neto NR, De Oliveira WS, Campos Pinto GD, et al. A practical method for QTc interval measurement. Cureus 12(12):e12122. DOI: 10.7759/cureus.12122.
17. Helmy H, Abdel-Galeel A, Taha Kishk Y, et al. Correlation of corrected QT dispersion with the severity of coronary artery disease detected by SYNTAX score in non-diabetic patients with STEMI. Egypt Heart J 2017;69(2):111–117. DOI: 10.1016/j.ehj.2016.12.001.
18. Pérez-Riera AR, De Abreu LC, Barbosa-Barros R, et al. P-wave dispersion: An update. Indian Pacing Electrophysiol J 2016;16(4):126–133. DOI: 10.1016/j.ipej.2016.10.002.
19. Hnatkova K, Malik M. Sources of QTc variability: implications for effective ECG monitoring in clinical practice. Ann Noninvasive Electrocardiol 2020;25(2):e12730. DOI: 10.1111/anec.12730.
20. Sanad AM, Ghazal KH, Eltahlawi MA, et al. An overview of QT dispersion finding in cardiac patients. Review article. Egyptian J Hosp Med 2021;85(2):3805–3809. DOI: 10.21608/ejhm.2021.204579.
21. Afsin A, Asoğlu R, Orum MH, et al. Evaluation of TP-E interval and TP-E/QT ratio in panic disorder. Medicina (Kaunas) 2020;56(5):215. DOI: 10.3390/medicina56050215.
22. Atmaca M, Korkmaz H, Korkmaz S. P wave dispersion in patients with hypochondriasis. Neurosci Lett 2010;485(3):148–150. DOI: 10.1016/j.neulet.2010.08.071.
23. Yavuzkir M, Atmaca M, Dagli N, et al. P-wave dispersion in panic disorder. Psychosom Med 2007;69(4):344–347. DOI: 10.1097/PSY.0b013e3180616900.
24. Tascanov MB, Tanriverdi Z, Gungoren F, et al. The effect of propofol on frontal QRS-T angle in patients undergoing elective colonoscopy procedure. J Clin Pharm Ther 2020;45(1):185–190. DOI: 10.1111/jcpt.13055.
25. Gökçen E, Savrun A. The impact of fever on myocardial repolarization parameters. J Electrocardiol 2021;64:45–49. DOI: 10.1016/j.jelectrocard.2020.11.016.
26. Oehler A, Feldman T, Henrikson CA, et al. QRS-T angle: A review. Ann Noninvasive Electrocardiol 2014;19(6):534–542. DOI: 10.1111/anec.12206.
27. Chua KCM, Teodorescu C, Reinier K, et al. Wide QRS-T angle on the 12-Lead ECG as a predictor of sudden death beyond the LV ejection fraction. Cardiovasc Electrophysiol 2016;27(7):833–839. DOI: 10.1111/jce.12989.
28. Tanriverdi Z, Unal B, Eyuboglu M, et al. The importance of frontal QRS-T angle for predicting non-dipper status in hypertensive patients without left ventricular hypertrophy. Clin Exp Hypertens 2018;40(4):318–323. DOI: 10.1080/10641963.2017.1377214.
29. Gotsman I, Keren A, Hellman Y, et al. Usefulness of electrocardiographic frontal QRS-T angle to predict increased morbidity and mortality in patients with chronic heart failure. Am J Cardiol 2013;111(10):1452–1459. DOI: 10.1016/j.amjcard.2013.01.294.
30. Deka K, Chaudhury PK, Bora K, et al. A study of clinical correlates and socio-demographic profile in conversion disorder. Indian J Psychiatry 2007;49(3):205. DOI: 10.4103/0019-5545.37323.
31. Grattan-Smith P, Fairley M, Procopis P. Clinical features of conversion disorder. Arch Dis Child 1988;63(4):408–414. DOI: 10.1136/adc.63.4.408.
32. Roy R. A descriptive study on the clinical correlates of conversion disorder. Int J Res Rev 2021;8:513–529. DOI: 10.52403/ijrr.20211263.
33. Chandrasekaran R, Goswami U, Sivakumar V, et al. Hysterical neurosis--a follow-up study. Acta Psychiatr Scand. 1994;89(1):78–80. DOI: 10.1111/j.1600-0447.1994.tb01490.x.
34. Kuloglu M, Atmaca M, Tezcan E, et al. Sociodemographic and clinical characteristics of patients with conversion disorder in Eastern Turkey. Soc Psychiatry Psychiatr Epidemiol 2003;38(2):88–93. DOI: 10.1007/s00127-003-0608-5.
35. Chand SP. The role of cognitive psychotherapy in dissociative disorders. In: Scrimali T, Grimaldi L (eds.) Cognitive Psychotherapy Toward a New Millennium [Internet]. Boston, MA: Springer US; 2002. pp. 343–346.
36. Silva W, Giagante B, Saizar R, et al. Clinical features and prognosis of nonepileptic seizures in a developing country. Epilepsia 2001;42(3):398–401. DOI: 10.1046/j.1528-1157.2001.45299.x.
37. Bhatia MS, Vaid L. Hysterical aphonia – an analysis of 25 cases. Indian J Med Sci 2000;54(8):335–338. PMID: 11143747.
38. Fukuda K, Matsue Y. The changing style of symptomatology of hysteria. Folia Psychiatr Neurol Jpn. 1980;34(4):407–412. DOI: 10.1111/j.1440-1819.1980.tb02446.x.
39. Gaur V. Anxiety and depression in females with (conversion) dissociative disorder. Delhi Psychiatry Journal 2023;25(2):9–15. Available from: https://www.researchgate.net/publication/367332276.
40. Guz H, Doganay Z, Ozkan A, et al. Conversion disorder and its subtypes: a need for a reclassification. Nordic J Psychiat 2003;57(5):377–381. DOI: 10.1080/08039480310002723.
41. TKDA_27_10_701_707.pdf [Internet]. [cited 2024 Apr 13]. Available from: https://jag.journalagent.com/tkd/pdfs/TKDA_27_10_701_707.pdf.
42. Faulkner A, Garrett A. Effect of gender on P-wave dispersion in asymptomatic populations: Original research article. Int SportMed J 2013;14(4):236–244. Available from: https://www.researchgate.net/publication/259973967.
43. Piccirillo G, Elvira S, Viola E, et al. Autonomic modulation of heart rate and blood pressure in hypertensive subjects with symptoms of anxiety. Clin Sci (Lond) 1998;95(1):43–52. PMID: 9662484.
44. Uyarel H, Okmen E, Cobanoğlu N, et al. Effects of anxiety on QT dispersion in healthy young men. Acta Cardiol 2006;61(1):83–87. DOI: 10.2143/AC.61.1.2005144.
45. Takimoto Y, Yoshiuchi K, Akabayashi A. Effect of mood states on QT interval and QT dispersion in eating disorder patients. Psychiatry Clin Neurosci 2008;62(2):185–189. DOI: 10.1111/j.1440-1819.2008.01753.x.
46. Kelmanson IA. High anxiety in clinically healthy patients and increased QT dispersion: A meta-analysis. Eur J Prev Cardiol 2014;21(12):1568–1574. DOI: 10.1177/2047487313501613.
47. Tosu AR, Demir S, Kaya Y, et al. Increased QT dispersion and P wave dispersion in major depressive disorder. Exp Clin Cardiol 2013;18(2):110–112. PMID: 23940433.
48. Nahshoni E, Aizenberg D, Strasberg B, et al. QT dispersion in the surface electrocardiogram in elderly patients with major depression. J Affect Disord 2000;60(3):197–200. DOI: 10.1016/s0165-0327(99)00142-1.