

## Conflict of interest

None of the authors has any conflicts of interest to declare.

## Acknowledgments

The authors thank Professors Nobuhisa Hagiwara, Morio Shoda, and Hiroshi Kasanuki for helpful suggestions and support, and thank Drs. Kazue Kuwahara, Naoki Matsuda, and Kohei Tanizaki for their support and assistance.

## References

- [1] Goldberger Z, Lampert R. Implantable cardioverter-defibrillators. Expanding indications and technologies. *JAMA* 2006;295:809–18.
- [2] Sears SF, Conti JB. Quality of life and psychological functioning of ICD patients. *Heart* 2002;87:488–93.
- [3] Spurrell P, Mitchell A, Kamalvand K, et al. Quality of life after use of the patient activated atrial defibrillator. *Int J Clin Pract* 2003;57:30–4.
- [4] Thomas SA, Friedmann E, Kao CW, et al. Quality of life and psychological status of patients with implantable cardioverter defibrillators. *Am J Crit Care* 2006;15:389–98.
- [5] Jacq F, Fouldrin G, Savouré A, et al. A comparison of anxiety, depression, and quality of life between device shock and nonshock groups in implantable cardioverter defibrillator recipients. *Gen Hosp Psychiatry* 2009;31:266–73.
- [6] Sears SF, Hauf JD, Kirian K, et al. Posttraumatic stress and the implantable cardioverter-defibrillator patient: what the electrophysiologist needs to know. *Circ Arrhythmia Electrophysiol* 2011;4:242–50.
- [7] Whang W, Albert CM, Sears Jr. SF, et al. Depression as a predictor for appropriate shocks among patients with implantable cardioverter-defibrillators: results from the Triggers of Ventricular Arrhythmias (TOVA) study. *J Am Coll Cardiol* 2005;45:1090–5.
- [8] Heller SS, Ormont MA, Lidagoster L, et al. Psychosocial outcome after ICD implantation: a current perspective. *Pacing Clin Electrophysiol* 1998;21:1207–15.
- [9] Pedersen SS, Van den Broek KC, Sears SF. Psychological intervention following implantation of an implantable defibrillator: a review and future recommendations. *Pacing Clin Electrophysiol* 2007;30:1546–54.
- [10] Hamner M, Hunt N, Gee J, et al. PTSD and automatic implantable cardioverter defibrillators. *Psychosomatics* 1999;40:82–5.
- [11] Neel M. Posttraumatic stress symptomatology in patients with automatic implantable cardioverter defibrillators: nature and intervention. *Int J Emergency Ment Health* 2000;2:259–63.
- [12] Prudente LA, Reigle J, Bourguignon C, et al. Psychological indices and phantom shocks in patients with ICD. *J Interventional Card Electrophysiol* 2006;5:185–90.
- [13] Ladwig KH, Baumert J, Marten-Mittag B, et al. Posttraumatic stress symptoms and predicted mortality in patients with implantable cardioverter-defibrillators: results from the prospective living with an implanted cardioverter-defibrillator study. *Arch Gen Psychiatry* 2008;65:1324–30.
- [14] Kapa S, Rotondi-Trevisan D, Mariano Z, et al. Psychopathology in patients with ICDs over time: results of a prospective study. *Pacing Clin Electrophysiol* 2010;33:198–208.
- [15] von Kanel R, Baumert J, Kolb C, et al. Chronic posttraumatic stress and its predictors in patients living with an implantable cardioverter defibrillator. *J Affect Disord* 2010;31:344–52.
- [16] Versteeg H, D.A.M.J. Theuns, Erdman RAM, et al. Posttraumatic stress in implantable cardioverter defibrillator patients: the role of preimplantation distress and shocks. *Int J Cardiol* 2011;3:438–9.
- [17] Habibović M, van den Broek KC, Alings M, et al. Posttraumatic stress 18 months following cardioverter defibrillator implantation: shocks, anxiety, and personality. *Health Psychol* 2012;31:186–93.
- [18] Bilanovic A, Irvine J, Kovacs AH, et al. Uncovering phantom shocks in cardiac patients with an implantable cardioverter defibrillator. *Pacing Clin Electrophysiol* 2013;36:673–83.
- [19] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Washington: American Psychiatric Association; 1994 ([Revised]).
- [20] Weathers F.W., Litz B.T., Herman D.S., et al., The PTSD checklist: reliability, validity, & diagnostic utility. Paper presented at the Annual Meeting of the International Society for Traumatic Stress Studies, San Antonio, Texas; 1993.
- [21] W.W.K. Zung. A self-rating depression scale. *Arch Gen Psychiatry* 1965;12:63–70.
- [22] Shiotani I, Sato H, Kinjo K, et al. The Osaka Acute Coronary Insufficiency Study (OACIS) group. Depressive symptoms predict 12-month prognosis in elderly patients with acute myocardial infarction. *J Cardiovasc Risk* 2002;9:153–60.
- [23] Pihl E, Jacobsson A, Fridlund B, et al. Depression and health-related quality of life in elderly patients suffering from heart failure and their spouses: a comparative study. *Eur J Heart Fail* 2005;7:583–9.
- [24] Spielberger CD, Gorsuch RL, Lushene PR, et al. Manual for the State-Trait Anxiety Inventory. Palo Alto: Consulting Psychologists Press; 1983.
- [25] Kamphuis HC, de Leeuw JR, Derksen R, et al. Implantable cardioverter defibrillator recipients: quality of life in recipients with and without ICD shock delivery: a prospective study. *Europace* 2003;5:381–9.
- [26] van den Broek KC, Nyklicek I, van der Voort PH, et al. Risk of ventricular arrhythmia after implantable defibrillator treatment in anxious type D patients. *J Am Coll Cardiol* 2009;54:531–7.
- [27] Fukuhara S, Bito S, Green J, et al. Translation, adaptation, and validation of the SF-36 Health Survey for use in Japan. *J Clin Epidemiol* 1998;51:1037–44.
- [28] Fukuhara S, Ware JE, Kosinski M, et al. Psychometric and clinical tests of validity of the Japanese SF-36 Health Survey. *J Clin Epidemiol* 1998;51:1045–53.
- [29] The Japanese Circulation Society, The Japanese Association for Thoracic Surgery, The Japanese Society for Artificial Organs, The Japanese Society for Cardiovascular Surgery, The Japanese College of Cardiology, The Japanese Society of Electrocardiology, The Japanese Heart Failure Society, The Japanese Heart Rhythm Society. Guidelines for the Diagnosis and Treatment of Cardiovascular Diseases; 2005.
- [30] Nightingale VR, Sher TG, Mattson M, et al. The effects of traumatic stressors and HIV-related trauma symptoms on health and health related quality of life. *AIDS Behav* 2011;15:1870–8.
- [31] Blake DD, Weathers FW, Nagy LM, et al. The development of a Clinician-Administered PTSD Scale. *J Traumatic Stress* 1995;8:75–90.
- [32] Weiss DS, Marmar CR. The impact of event scale-revised. In: Wilson J, Keane T, editors. *Assessing Psychological Trauma and PTSD*. New York: Guilford; 1997 pp. 344–62.
- [33] Foa E, Cashman L, Jaycox L, et al. The validation of a self-report measure of posttraumatic stress disorder: the posttraumatic diagnostic scale. *Psychol Assess* 1997;9:445–51.
- [34] Whang W, Albert CM, Sears Jr. SF, et al. Depression as a predictor for appropriate shocks among patients with implantable cardioverter-defibrillators: results from the Triggers of Ventricular Arrhythmias (TOVA) study. *J Am Coll Cardiol* 2005;45:1090–5.
- [35] Stein DJ, Ipser J, McAnda N. Pharmacotherapy of posttraumatic stress disorder: a review of meta-analyses and treatment guidelines. *CNS Spectrums* 2009;14 (1 Suppl 1):25–31.
- [36] Mendes DD, Mello MF, Ventura P, et al. A systematic review on the effectiveness of cognitive behavioral therapy for posttraumatic stress disorder. *Int J Psychiatry Med* 2008;38:241–59.
- [37] Frizelle DJ, Lewin RJP, Kaye G, et al. Cognitive-behavioral rehabilitation programme for patients with an implanted cardioverter defibrillator: a pilot study. *Brit J Health Psychol* 2004;9:381–92.
- [38] Sears SF, Sowell LDV, Kuhl EA, et al. The ICD shock and stress management program: a randomized trial of psychosocial treatment to optimize quality of life in ICD patients. *Pacing Clin Electrophysiol* 2007;30:858–64.
- [39] Leftheriotis D, Flevari P, Ikonomidis I, et al. The role of the selective serotonin re-uptake inhibitor sertraline in nondepressive patients with chronic ischemic heart failure: a preliminary study. *Pacing Clin Electrophysiol* 2010;33:1217–23.
- [40] Kuijpers PM, Honig A, Wellens HJ. Effect of treatment of panic disorder in patients with frequent ICD discharges: a pilot study. *Gen Hosp Psychiatry* 2002;24:181–4.



