

Getting to the heart of his 'shocking' trauma

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Implant jolts cause Mr. J severe pain and embarrassment—and revive the specter of his troubled youth. He'd rather die of tachycardia than fear the next discharge. What would you do?

CASE 'Like a sledgehammer'

Mr. J, age 54, is admitted to the cardiac critical care unit after repeated tachycardia episodes over 3 years. He also has depressive symptoms including social isolation, passive suicidal thoughts, lack of interest in sex, weight loss, difficulty sleeping, sadness, and decreased appetite, energy, and ability to concentrate. The psychiatry consult team subsequently evaluates him.

Shortly after retiring as a police officer, Mr. J started having 10-second episodes of loss of consciousness and suffered 30 episodes within 1 year. After diagnosing chronic idiopathic ventricular tachycardia, a cardiologist ablated an aberrant left ventricular pathway and inserted a single-lead implantable cardioverter-defibrillator (ICD). He also prescribed the antiarrhythmic amiodarone, but Mr. J could not tolerate the medication's side effects.

Mr. J's tachycardia persisted, and repeated episodes triggered an estimated 13 electrical shocks from the ICD over 5 months. At this point, the cardiologist performed a second ablation, removed the single-lead ICD, and implanted a two-lead ICD, which he hoped would more accurately discern between lethal and nonlethal fast heart rhythms.

In addition, the cardiologist prescribed the antiarrhythmic sotalol—which did not suppress the arrhythmia—before switching

to flecainide, 100 mg bid, which did. However, Mr. J still suffered fatigue, exercise intolerance, near-syncope, and chest heaviness.

One week after receiving the first ICD, Mr. J recalls, he felt his first shock while out for a walk. He said the shock lasted 5 to 10 seconds and "felt like somebody took a sledgehammer to my chest." Another time, he suffered 6 successive shocks that threw him to the ground. Motorists pulled over to assist him, which made him feel ashamed.

Before long, Mr. J became increasingly afraid of repeat discharges. As soon as he began a task, he would feel a "thumping" in the back of his neck and start panicking, fearful that a heart rate increase would trigger another shock.

The stress forced Mr. J to abandon his favorite retirement hobbies—remodeling houses and yard work—and to spend his days lying around watching television. Fearing another discharge in public, he has stopped seeing friends and going to church. He has also stopped driving and depends on his female partner of 14 years for daily visits, grocery shopping, and rides to medical appointments. She feels frustrated by his debility.

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The authors' observations

By delivering electrical shocks when ventricles beat too quickly, an ICD shocks the heart back into a normal rhythm. Based on our observation, Mr. J probably had both anxiety-induced tachycardia and recurrent atrial fibrillation.

Although ICDs have prolonged survival for patients with potentially fatal ventricular arrhythmias,^{1,2} painful discharges can occur without warning. Patients liken the discharge to an electric shock or to being kicked or punched in the chest.³

Depending on the patient's activity level, cardiologists routinely program ICDs to discharge at approximately 10 beats per minute above expected heart rates during typical activities. Because ICD leads cannot differentiate between ventricular and supraventricular rhythm disturbances, a rapid supraventricular rhythm might precipitate a discharge intended to treat a more serious ventricular rhythm disturbance.

Frequent ICD discharges could indicate:

- the patient needs a more effective anti-arrhythmic
- the device needs to be set at a higher rate to avoid discharge during periods of anxiety/exertion
- or the device is defective.

Between 50% and 70% of patients with a ICD receive multiple shocks within 2 years of implantation, whereas about one-third never experience discharge.⁴

ICD-induced psychopathology

Depression or tachycardia could have caused Mr. J's fatigue. Either way, he showed numerous other depressive symptoms.

Fear of implant discharge or malfunction often induces psychiatric disorders, particularly in patients who have experienced discharge. As many as 87% of ICD patients suffer anxiety, depression, or other psychiatric symptoms after implantation,⁵ and 13% to 38% meet DSM-IV-TR criteria for an anxiety spectrum disorder.⁶

Multiple psychological theories explain iatrogenic anxiety disorders resulting from ICD firing. Behaviorally, ICD discharge represents an initially unconditioned stimulus that the patient associates with the activity he was engaging in when shocked. The shock discourages the patient from that activity—however benign—for fear it triggered the discharge and could cause future shocks.

ICD recipients often fear the device will malfunction or discharge while they are in public, driving, or operating machinery—leading some to become homebound and cease activities of daily living. The discharge's unpredictability shatters a patient's perception of control over his or her life and might induce a learned helplessness⁷ that can strain relationships, as it did with Mr. J and his partner. The patient also could develop anticipatory anxiety, mistaking benign body symptoms or increasing shock frequency for signs of a potentially fatal heart problem.⁸

Whether quality of life diminishes as ICD firings become more frequent is uncertain.⁹ The Canadian Implantable Defibrillator Study (N=317) found greater quality of life improvements with ICD therapy than with amiodarone—200 to 400 mg/d maintenance therapy—but the improvements were lost in patients who experienced ≥ 5 shocks over 12 months.¹⁰ Pauli et al⁷ found misinterpretation of the reason for increasing shocks to be more emotionally destructive than shock frequency, however.

Detecting ICD maladjustment

Patients with ICD maladjustment typically show anticipatory anxiety and negative cognitive attributions, and many engage

Clinical Point

Patients can become reclusive, fearing the ICD could discharge or malfunction at any time—such as while driving or in public



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Clinical Point

Cognitive-behavioral therapy and participation in a peer support group might alleviate ICD-induced behavioral symptoms

in fruitless maneuvers to prevent device firing.⁵ Nervousness, dizziness, weakness, and fear are common responses to shock by ICD.¹¹

Most patients with new-onset, post-ICD anxiety disorders have no pre-implant psychiatric history.¹² Only one trial assessing state and trait anxiety before and after ICD placement reported increased trait anxiety in some patients before implantation.¹³

HISTORY Nights in the cornfield

During psychiatric evaluation, Mr. J reveals that his parents physically and emotionally abused him as a child. He says his father frequently beat him with farm tools, and sometimes the beatings were so severe that his parents kept him home from school to prevent teachers from noticing his bruises. He never received medical treatment for his injuries.

The physical torture continued until high school when, Mr. J recalls, he became fast enough to escape his father's grasp. "Some nights, I'd sleep in the cornfield," he said.

For Mr. J, the inescapable threat of painful, unannounced ICD discharges has brought back the anticipatory terror and helplessness of his childhood. Just as he feared his father's sudden rages, the specter of repeat ICD shocks now haunts him. He says he'd rather have the ICD removed and risk death from tachycardia than live another minute in fear.

Mr. J meets DSM-IV-TR criteria for posttraumatic stress disorder (PTSD)

- yes
- no

The authors' observations

Mr. J meets DSM-IV-TR criteria for PTSD. He associates ICD discharge with childhood abuse and experiences new-onset flashbacks, hyperarousal, and avoidance behavior.

To our knowledge, ICD shock-induced flashbacks to pre-implant trauma have not been reported, although some data associate ICDs with posttraumatic stress related to heart disease and treatment.¹⁴⁻¹⁶ In one case series,¹⁴ patients showed:

- cluster B re-experiencing symptoms (cognitive preoccupation with trauma or psychophysiologic reactivity to reminders of the ICD and heart disease)
- cluster C avoidance symptoms (avoiding activities they thought might activate the ICD)
- cluster D hyperarousal symptoms (insomnia, decreased concentration, hypervigilance, and irritability).

How would you treat Mr. J's psychiatric symptoms?

- cognitive-behavioral therapy (CBT)
- group therapy
- anxiolytic regimen
- psychotropic and psychosocial therapy

The authors' observations

Treating comorbid anxiety or depression in ICD recipients is critical. A number of psychiatric interventions might alleviate behavioral and psychological effects of body-device interactions.

CBT. In a retrospective study¹⁷ of 36 ICD recipients, those who received 9 months of CBT reported decreased depression, anxiety, distress, and sexual problems compared with those who did not. Interestingly, more CBT-group patients (11 of 18) suffered ICD shocks than did controls (6 of 18).

Peer support groups. Out of 58 ICD recipients who answered a post-implant questionnaire, 23 (39%) attended a peer support group.¹⁸ Of these, 22 (96%) found the group helpful and were happier, less hostile, and more sociable after participating. Peer group participants also were more likely to return to work than non-participants.

Box

When a patient wants a life-preserving device deactivated

How would you handle a patient's request to deactivate an implantable cardioverter-defibrillator (ICD) or other life-preserving device that is causing debilitating mental anguish? Physicians dealing with such requests will find themselves in an ethical wilderness.

Pinski²² offers guidelines in line with withdrawal of other life-extending technologies in terminally ill patients. "Deactivation of an ICD is appropriate when the device is believed to be prolonging patient suffering," he writes, adding that preventing ICD shocks induced by frequent or agonal arrhythmias "will not only hasten but also permit a peaceful death." Disabling the ICD function that responds

to bradycardia will prevent agonal pacing and—as a result—shocks.

The literature, however, offers little guidance on responding to patient requests for ICD deactivation and few precedents on which to base such decisions for the terminally ill.

Even less guidance exists when mental illness resulting from ICD complications induces unbearable suffering. The underlying psychiatric condition should be optimally treated before clinicians entertain ICD removal. Mr. J, for example, decided to keep the implant once his crippling anxiety resolved and he was assured that his tachycardia finally was under control.

Psychotropics and psychotherapy. A small case series¹² attributes reduction of ICD-induced anxiety to combination individual psychotherapy and unspecified dosages of benzodiazepines. Two patients also received adjunctive fluoxetine or paroxetine, dosages unspecified.

In a double-blind, placebo-controlled crossover study, implantable atrial defibrillator recipients reported decreased pain and anxiety while taking the short-acting benzodiazepine triazolam, 0.375 mg, before patient-activated shock.¹⁹

We recommend trying a combination regimen that acts acutely and subacutely. A long-acting benzodiazepine such as clonazepam can calm acute, overwhelming anxiety, and a selective serotonin reuptake inhibitor (SSRI) such as fluoxetine or paroxetine can help manage chronic depressive and generalized anxiety symptoms.

SSRIs are relatively benign but more research on their cardiac safety is needed.^{20,21} Tricyclic antidepressants, which prolong cardiac conduction, should be avoided.

In addition to psychotropics, concomitant psychotherapy can reduce chronic symptoms.

How would you handle Mr. J's request for ICD removal?

- inform his cardiologist and encourage removal of device
- convince Mr. J to keep the device
- revisit after treating the psychopathology and counseling on ICD risks and benefits

The authors' observations

Requests for ICD removal because of intolerance pose an ethical dilemma (*Box*).²² Is increased life expectancy resulting from heart-implant technology worth the diminished quality of life stemming from iatrogenic psychopathology? Mr. J felt it was not, but we wanted to try to resolve his crippling anxiety before making a recommendation.

Preparing patients for ICD problems.

Anxiety after an ICD shock and the dread of repeat shocks are normal; the goal is to prevent that anxiety from destroying quality of life.

As with Mr. J, many ICD recipients are emotionally unprepared for device-related complications. Most cardiologists do not screen patients for pre-existing anxiety

Clinical Point

Try a psychotropic combination that offers acute and subacute treatment for severe ICD-induced anxiety or depression

Clinical Point

Increased patient education and communication with providers can help ICD recipients cope with shocks should they occur

before ICD placement, nor do many adequately address ICD-induced anxiety once the device has been placed.

Psychological screening before implantation can help detect and manage pre-existing anxiety disorders. Small-scale evaluations have used anxiety scales to continuously measure anxiety before and after ICD placement.^{13,23}

Increased patient education on how ICDs work can help patients decide whether to proceed with implantation and tolerate discharges should they occur. Psychological screening and brief, routine communication between providers and patients about psychosocial issues can help patients adjust and identify those who need extended psychological services.⁴

To cope with ICD discharges, encourage patients to:

- develop a plan for how a shock would be handled
- perform relaxation exercises immediately after the shock
- resume activities they were involved with when the shock occurred to prevent avoidance.²⁴

Large, randomized, prospective studies using validated, structured interview tools could help clarify the nature of psychopathology induced by ICD and other technological innovations and evaluate interventions.

TREATMENT Third attempt

The cardiology team discontinues flecainide and performs a third radioablation, which eradicates ectopic ventricular activity.

Bottom Line

Patients who experience shocks from electronic cardiac implants can suffer debilitating depression or anxiety as a result. Several psychotropic and psychosocial interventions can alleviate symptoms and restore quality of life. Treat the psychiatric disorder before considering the patient's request to deactivate the device.

Related Resources

• Stutts LA, Cross NJ, Conti JB, Sears SF. Examination of research trends on patient factors in patients with implantable cardioverter defibrillators. *Clin Cardiol* 2007;30:64-8.

• Sears SF, Shea JB, Conti JB. How to respond to an implantable cardioverter-defibrillator shock. *Circulation* 2005;111:380-2. <http://circ.ahajournals.org/cgi/reprint/111/23/e380>.

• Pauli P, Wiedemann G, Dengler W, et al. Anxiety in patients with an automatic implantable cardioverter defibrillator: what differentiates them from panic patients? *Psychosom Med* 1999;61:69-76. www.psychosomaticmedicine.org/cgi/reprint/61/1/69.

Drug Brand Names

Amiodarone • Cordarone	Paroxetine • Paxil
Clonazepam • Klonopin	Sotalol • Betapace
Flecainide • Tambacor	Triazolam • Halcion, others
Fluoxetine • Prozac	

Disclosure

The authors report no financial relationship with any company whose products are mentioned in this article or with manufacturers of competing products.

Acting on the psychiatry consult team's advice, Mr. J is transferred to the inpatient mood disorders unit to aggressively treat his PTSD. He undergoes 4 days of intensive CBT designed to explore the connection between his response to the discharges and his father's abuse. We prescribe clonazepam, 0.5 mg bid, to reduce Mr. J's agitation and anxiety, and recommend outpatient counseling to help manage his stress—particularly his anxious response to stimuli that remind him of the ICD discharge.

Mr. J is discharged after 12 days in the cardiac and psychiatric units. He has no suicidal thoughts, his sadness has decreased, and his energy, concentration, sleep, and outlook on his future have improved. He also is resolving relationship issues with his partner.

As Mr. J's anxiety declines and he is increasingly reassured that his arrhythmias

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are under control, he decides to keep the ICD. His function gradually improves with continued cardiac rehabilitation, although he does not continue psychotherapy.

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