

Charles D. Swerdlow, M.D.

CURRICULUM VITAE

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PERSONAL HISTORY:

Citizenship: U.S.
Birth date: June 4, 1951
Birthplace: Los Angeles, CA
Marital Status: Married

EDUCATION:

1968-1972 B.S., Physics, Stanford University, Stanford, CA
1972-1976 M.D., Harvard-M.I.T. Program in Health Sciences and Technology (Harvard Medical School), Boston, MA
1976-1977 Intern in Medicine, L.A. County-U.C.L.A., Harbor General Hospital, Torrance, CA
1977-1979 Resident in Medicine, L.A. County-U.C.L.A., Harbor General Hospital, Torrance, CA
1979-1981 Fellow in Cardiology, Stanford University Medical Center, Stanford, CA
1981-1982 Fellow in Cardiac Electrophysiology, Stanford University Medical Center, Stanford, CA

LICENSURE: California: G34913

BOARD CERTIFICATION:

1979 Diplomate, American Board of Internal Medicine
1981 Diplomate, Subspecialty of Cardiovascular Disease, American Board of Internal Medicine
1982 Diplomate, Subspecialty of Cardiac Electrophysiology, American Board of Internal Medicine
1988 Special Competency Examination in Cardiac Pacing, North American Society of Pacing and Clinical Electrophysiology
1994 Diplomate in Clinical Cardiac Electrophysiology, American Board of Internal Medicine
2003-2014 Recertification in Clinical Cardiac Electrophysiology
2013-2024 Recertification in Clinical Cardiac Electrophysiology (pending result of exam)

PROFESSIONAL EXPERIENCE:**Present Positions:**

- 2013 Clinical Professor of Medicine, Cedars Sinai Medical Center, Los Angeles, CA
- 2000 Clinical Professor of Medicine, David Geffen School of Medicine, University of California, Los Angeles
- 1990 Attending Physician Cardiac Electrophysiology Laboratory, Cedars Sinai Medical Center, Los Angeles, CA

Previous Positions:

- 1981-1982 Assistant Clinical Professor of Medicine, Stanford University Medical Center, Stanford, CA
- 1983-1984 Clinical Assistant Professor of Medicine, Clinical Faculty, University of Washington, Spokane, WA
- 1984-1988 Assistant Professor of Medicine, Stanford University Medical Center, Stanford, CA
- 1988-1992 Clinical Assistant Professor of Medicine, University of California, Los Angeles
- 1993-2000 Clinical Associate Professor of Medicine, University of California, Los Angeles

Previous Responsibilities:

- 1983-1984 Director, Cardiac Electrophysiology Laboratory, Deaconess Hospital, Spokane, WA
Director, Cardiac Arrhythmia Study Unit, Deaconess Hospital, Spokane, WA
- 1984-1988 Director, Clinical Electrophysiology Laboratory, Stanford University, Stanford, CA
Director, Cardiac Arrhythmia Study Unit, Stanford University, Stanford, CA
- 2006-2008 Co-director Fellowship Program in Clinical Cardiac Electrophysiology, Cedars Sinai Medical Center, Los Angeles, CA
- 2006-2008 Co-Section Chief: Clinical Cardiac Electrophysiology, Cedars Sinai Medical Center, Los Angeles, CA

PROFESSIONAL SOCIETIES:

- 1979 Member, American Heart Association
- 1980 Member, American College of Physicians
- 1982 Member, North American Society of Pacing and Clinical Electrophysiology
- 1982 Fellow, American Heart Association Council on Clinical Cardiology
- 1985 Fellow, American College of Cardiology
- 1986 Member, American Federation for Clinical Research
- 2006 Fellow, Heart Rhythm Society

COMMITTEES AND TASK FORCES:

- 2010-2014 Heart Rhythm Society Annual Scientific Session Program Committee
- 2014-2016 Heart Rhythm Society Research Committee: Young Investigators SubCommittee
- 2011-2012 Heart Rhythm Society Task Force on Pacemaker Mode Selection
- 2014-2015 Heart Rhythm Society Task Force on Testing and Programming of ICDs
- 2014- Association for the Advancement of Medical Instrumentation (AAMI) Cardiac Rhythm Management Device Committee

HONORS AND SPECIAL AWARDS:

- 1972 Phi Beta Kappa, Stanford Chapter
- 1976 Alpha Omega Alpha, Harvard Chapter
- 1997 Heart Saver Award, Save a Heart Foundation
- 2000 Medtronic Inc. Award, Contributions in the Area of Arrhythmia Event Detection and Dual-Chamber Algorithm Development
- 2006 Outstanding Teacher Award, Cedars-Sinai Medical Center Division of Cardiology

GRANTS**Principal Investigator – Awarded/Completed****Competitive**

- 1995 - 1997 American Heart Association: Local Grant-in-Aid Los Angeles Affiliate
Research Award No.: 1085-G11
Optimal Biphasic Waveforms for Implantable Defibrillators
- 1997 - 2000 American Heart Association: National Grant-in-Aid (\$40,000)
Research Award No.: 9750408N
Safe Value for 60 Hz Leakage Current in Humans (\$50,000)

Industry

- 1996 - 1997 SurvivaLink Corporation
Optimal Biphasic Waveforms for External Defibrillator (\$30,000)
- 1997 - 1998 St. Jude Medical Corporation
Optimal Multistep Waveform for Implantable Defibrillators (\$30,000)

Co-Investigator – Awarded/In Progress**Competitive**

- 2013 - 2014 NHLBI Small Business Innovation Research Grant No. 1R43HL120529-01
In-Situ Lead Tester for Implantable Devices (\$213,597) 10% FTE

Co-Investigator Under Review**Competitive**

- 2015 - 2016 NHLBI Small Business Innovation Research Grant No. 2R44HL120529-02
In-Situ Lead Tester for Implantable Devices Phase 2 (\$ 1,206,071, requested) 15% FTE

JOURNAL REVIEWER AND EDITORIAL BOARD**Editorial Board**

- 1996 Journal of Cardiovascular Electrophysiology
- 2004 Heart Rhythm Journal
- 2006 Pacing and Clinical Electrophysiology

Guest Editor

- Journal of American College of Cardiology
- Heart Rhythm Journal
- Circulation, including Series Co-Editor for Cardiac Implantable Electronic Devices (2013)

Journal Reviewer

Circulation
Circulation Arrhythmia
Journal of the American College of Cardiology
Journal of Cardiovascular Electrophysiology
Heart Rhythm Journal
IEEE Proceedings in Biomedical Engineering
Pacing and Clinical Electrophysiology
American Journal of Cardiology
American Heart Journal
Psychosomatic Medicine
European Heart Journal
EuroPace
Journal of Interventional Cardiac Electrophysiology

U.S. PATENTS

(Corresponding international patents provided upon request)

U.S. Patents: Issued

1. Chen PS, **Swerdlow CD**. 1996. Method and apparatus for improved prediction of transvenous defibrillation threshold. US Patent 5564422, filed on April 3, 1995, and issued on October 15, 1996.
2. Brewer JE, **Swerdlow CD**. 1999. Method and apparatus for external defibrillation using a device having a low capacitance and small time constant. US Patent 5902323, filed on April 11, 1997, and issued on May 11, 1999.
3. **Swerdlow CD**, Swerdlow NR, Brewer JE. Method and apparatus for reduction of pain from electric shock therapies. U.S. Patent 2000, 6,091,989 filed on September 14, 1998, and issued on July 18, 2000.
4. Brewer JE, **Swerdlow CD**, Olson KF. 2000. Electrode triad for external defibrillation. US Patent 6134479, filed on February 3, 1999, and issued October 17, 2000.
5. **Swerdlow CD**, Swerdlow NR, Brewer JE. 2002. Method and apparatus for reduction of pain from electric shock therapies. US Patent 6438418, filed on May 5, 2000, and issued on August 20, 2002.
6. **Swerdlow CD**, Shivkumar K. 2003. Defibrillation shock strength determination technology. US Patent 2003/0195569, filed on January 27, 2003, and issued on October 16, 2003.

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7. **Swerdlow CD**, Swerdlow NR, Brewer JE. 2004. Method and apparatus for reduction of pain from electric stimulation therapies. US Patent 6711442, filed on April 8, 1999, and issued on March 23, 2004.
8. **Swerdlow CD**, Havel WL. 2006. Method and apparatus for validating a pacing train associated with T-shock delivery. US Patent 2006/0247687, filed on April 28, 2005, and issued on November 2, 2006.
9. **Swerdlow CD**. 2008. Shock timing technology. US Patent 2008/0033494, filed on May 18, 2007, and issued on February 7, 2008.
10. **Swerdlow CD**, Shivkumar K. 2008. Defibrillation shock strength determination technology. US Patent 2008/0051841, filed on August 21, 2007, and issued on February 28, 2008.
11. Belk PA, **Swerdlow CD**. 2010. Methods for the determination of T-shock vulnerable window from far-field electrograms in implantable cardioverter defibrillators. US Patent 2010/0023072, filed on July 24, 2008, and issued on January 28, 2010.
12. Belk PA, **Swerdlow CD**, Ruetz LL. 2010. Determination of upper limit of vulnerability using a variable number of shocks. US Patent 2010/0023073, filed on July 24, 2008, and issued on January 28, 2010.
13. Belk PA, Gillberg JM, Cao J, **Swerdlow CD**. 2011. Automatic determination of T-shock vulnerable window. US Patent 8064996, filed on April 9, 2009, and issued on November 22, 2011.
14. **Swerdlow CD**. 2012. Shock timing technology. US Patent 8150510 B2, filed on May 18, 2007 and issued on April 3, 2012.
15. Gunderson BD, Wanasek KA, **Swerdlow CD**. 2012. Identifying a lead related condition based on detecting noise subsequent to signal delivery. US Patent 20110054558 A1, filed on March 8, 2010, and issued on July 4, 2012.
16. **Swerdlow CD**, Shivkumar K. 2013. Defibrillation shock strength determination technology. US Patent 8401638 B2, issued on March 19, 2013.
17. Belk PA, **Swerdlow CD**. 2013. Methods for the determination of T-shock vulnerable window from far-field electrograms in implantable cardioverter defibrillators. US Patent US8565865 B2, issued on October 22, 2013
18. Belk PA, **Swerdlow CD**, Ruetz LL. 2014. Determination of upper limit of vulnerability using a variable number of shocks. US Patent 8644923 B2, issued on February 4, 2014.
19. **Swerdlow CD**. 2014 Method and apparatus for detection of lead conductor anomalies using dynamic electrical parameters. US Patent US20110054554 A1 filed on Aug 25, 2010, allowed March 2014

U.S. Published Patent Applications Under Review

1. Kroll MW, Swerdlow CD. Method for detecting and treating insulation lead-to-housing failures. Publication No. US20130325080; Publication Date Dec 5, 2013
2. Kroll MW, Swerdlow CD. Method for detecting and localizing insulation failures of implantable device leads. Publication No. US20130325079; Publication Date Dec 5, 2013

RESEARCH PAPERS - PEER REVIEWED

1. Mason, JW, Swerdlow CD, Winkle RA, Griffin JC, Ross DL, Keefe DL, Clusin WT. Programmed ventricular stimulation in predicting vulnerability to ventricular arrhythmias and their response to antiarrhythmic therapy. *American Heart Journal* 103:633-638, 1982.
2. Ross DL, Keefe DL, **Swerdlow CD**, Echt DS, Griffin JC, Winkle RA, Mason JW. Efficacy of drug combinations in preventing induction of refractory ventricular tachycardia at electrophysiologic study. *Circulation* 66:1205-1210, 1982.
3. **Swerdlow CD**, Winkle RA, Griffin JC, Ross DL, Mason JW. Decreased incidence of antiarrhythmic drug efficacy at electrophysiologic study associated with use of a third extrastimulus. *American Heart Journal* 104:1004-1010, 1982.
4. Fogoros R, Anderson KA, Winkle RA, **Swerdlow CD**, Mason JW. Amiodarone: Clinical efficacy and toxicity in 96 patients with recurrent, drug-refractory arrhythmias. *Circulation* 68:88-94, 1983.
5. Mason JW, **Swerdlow CD**, Mitchell LB. Efficacy of verapamil in chronic, recurrent ventricular tachycardia. *American Journal of Cardiology* 51:1614-1617, 1983.
6. Shapeero LG, Guthaner DF, **Swerdlow CD**, Wexler L. CT evaluation and treatment of a coronary bypass graft aneurysm. *American Journal of Roentgenography* 141:1060-1062, 1983.
7. **Swerdlow CD**, Gong G, Echt DS, Winkle RA, Griffin JC, Ross DL, Mason JW. Clinical factors predicting antiarrhythmic drug efficacy at electrophysiologic study in patients in ventricular tachycardia. *Journal of the American College of Cardiology* 1:409-416, 1983.
8. **Swerdlow CD**, Winkle RA, Mason JW. Determinants of survival in patients with ventricular tachyarrhythmias. *New England Journal of Medicine* 308:1436-1442, 1983.
9. **Swerdlow CD**, Winkle RA, Mason JW. Prognostic significance of the number of induced ventricular complexes during assessment of antiarrhythmic therapy for ventricular tachyarrhythmias. *Circulation* 68:400-405, 1983.
10. **Swerdlow CD**, Yu EO, Jacobson E, Mann S, Winkle RA, Griffin JC, Ross DL, Mason JW. Safety and efficacy of intravenous quinidine. *American Journal of Medicine* 75:36-42, 1983.
11. Winkle RA, Bach, Jr. SM, Echt DS, **Swerdlow CD**, Imran M, Mason JW, Boyer PE, Stinson EB. The automatic implantable defibrillator: local ventricular bipolar sensing to detect ventricular tachycardia and fibrillation. *American Journal of Cardiology* 52:265-270, 1983.
12. Anderson KA, **Swerdlow CD**, Mason JW. Entrainment in a patient with ventricular tachycardia: Evidence for macro-reentry. *American Journal of Cardiology* 53:335-340, 1984.
13. Connolly ST, Mitchell LB, **Swerdlow CD**, Mason JW, Winkle RA. The clinical efficacy and electrophysiology of imipramine in patients with ventricular tachycardia. *American Journal of Cardiology* 53:516-521, 1984.

14. Freedman RA, **Swerdlow CD**, Echt DS, Winkle RA, Soderholm-Difatte V, Mason JW: Facilitation of ventricular tachyarrhythmia induction by isoproterenol. *American Journal of Cardiology* 54:765-770, 1984.
15. Abrams J, Allen J, Allin D, Anderson J, Anderson S, Blanski L, Chadda K, DiBianco R, Favrot L, Gonzalez J, Horowitz L, Laddu A, Lee R, MacCosbe P, Morganroth J, Narula O, Singh B, Singh J, Steck J, **Swerdlow CD**, Turlapaty P, Waldo A. Efficacy and safety of esmolol vs. propranolol in the treatment of supraventricular tachyarrhythmias: A multicenter double-blind clinical trial. *American Heart Journal* 110:913-922, 1985.
16. **Swerdlow CD**, Peterson JL. Prospective comparison of Holter monitoring and electrophysiologic study in patients with coronary artery disease and sustained ventricular tachyarrhythmias. *American Journal of Cardiology* 56:577-580, 1985.
17. Nguyen KPV, Thomsen G, Liem B, **Swerdlow CD**, Franz MR. N-acetyl-procainamide induced torsade de pointes treated with hemodialysis. *Annals of Internal Medicine* 104:283-284, 1986.
18. **Swerdlow CD**, Freedman RA, Peterson J, Clay D. Determinants of prognosis in ventricular tachyarrhythmia patients without induced sustained arrhythmias. *American Heart Journal* 111:433-437, 1986.
19. **Swerdlow CD**, Mason JW, Stinson EB, Oyer PE, Winkle RA, Derby GC. Results of operations for ventricular tachycardia in 105 patients. *Journal of Cardiovascular Surgery* 92:105-113, 1986.
20. **Swerdlow CD**, Oyer PE, Pitlick PT. Septal origin of sustained ventricular tachycardia in a patient with right ventricular outflow tract obstruction after correction of tetralogy of Fallot. *Pacing and Clinical Electrophysiology* 9:584-588, 1986.
21. **Swerdlow CD**, Peterson J, Turlapaty P. Clinical electrophysiology of flestolol, a potent ultrashort-acting beta blocker. *American Heart Journal* 111:49-53, 1986.
22. Adhar GC, **Swerdlow CD**, Lance BL, Clay D, Bardy GH, Greene HL. Tocainide for drug-resistant sustained ventricular tachyarrhythmias. *Journal of the American College of Cardiology* 11:124-131, 1987.
23. Fischell TA, Stinson EB, Derby GC, **Swerdlow CD**. Long-term follow-up after surgical correction of Wolff-Parkinson-White syndrome. *Journal of the American College of Cardiology* 9:283-287, 1987.
24. Lerman BB, Greenberg M, Overholt ED, **Swerdlow CD**, Fellows TD, Dimarco JT. Differential electrophysiologic properties of decremental retrograde pathways in long RP'-tachycardia. *Circulation* 76:21-23, 1987.
25. Liem LB, Clay DA, Franz MR, **Swerdlow CD**. Electrophysiology and antiarrhythmic efficacy of intravenous pirlmenol in patients with sustained ventricular tachyarrhythmias. *American Heart Journal* 113:1390-1396, 1987.

26. **Swerdlow CD**, Bardy GH, McAnulty J, Kron J, Lee JT, Graham E, Peterson J, Greene HL. Determinants of induced sustained arrhythmias in survivors of out-of-hospital ventricular fibrillation. *Circulation* 76:1053-1060, 1987.
27. **Swerdlow CD**, Liem LB, Franz MR. Summation and inhibition by ultra-rapid train pacing in the human ventricle. *Circulation* 76:1101-1109, 1987.
28. **Swerdlow CD**, Peterson J, Liem LB, Blake K, Franz MR, Laddu A. Electropharmacology of flestolol for supraventricular tachycardia without associated structural heart disease. *American Journal of Cardiology* 60:1055-1060, 1987.
29. Adhar GC, **Swerdlow CD**, Lance BL, Clay D, Bardy GH, Greene HL. Tocainide for drug-resistant sustained ventricular tachyarrhythmias. *Journal of the American College of Cardiology* 11:124-131, 1988.
30. Franz MR, **Swerdlow CD**, Liem LB, Schaefer J. Cycle-length dependence of human action potential duration in vivo: Effects of single extrastimuli, sudden sustained rate acceleration and deceleration, and different steady-state frequencies. *Journal of Clinical Investigation* 82:972-979, 1988.
31. Freedman RA, **Swerdlow CD**, Soderholm-Difatte V, Mason JW. Prognostic significance of arrhythmia inducibility or noninducibility at initial electrophysiologic study on survivors of cardiac arrest. *American Journal of Cardiology* 61:578-582, 1988.
32. Freedman RA, **Swerdlow CD**, Soderholm-Difatte V, Mason JW. Prognostic value of arrhythmias induced at electrophysiologic study in cardiac arrest survivors. *Journal of the American College of Cardiology* 12:973-978, 1988.
33. Liem LB, Mason DM Jr., **Swerdlow CD**. Strength-interval relation for ventricular function refractoriness. *American Journal of Cardiology* 61:88-92, 1988.
34. Liem LB, **Swerdlow CD**. Value of electropharmacologic testing in patients with idiopathic dilated cardiomyopathy and sustained ventricular tachyarrhythmias. *American Journal of Cardiology* 62:611-616, 1988.
35. Liem LB, **Swerdlow CD**, Franz MR. Distinctive features of ventricular fibrillation and ventricular tachycardia detected by monophasic action potential recording in human subjects. *Journal of Electrophysiology* 2:484-492, 1988.
36. Liem LB, Yee YG, **Swerdlow CD**, Kates, RE. Pharmacodynamics of procainamide in patients with ventricular tachyarrhythmias. *Journal of Clinical Pharmacology* 28:984-989, 1988.
37. Lo YA, Cutler JE, Blake K, Wright AM, Kron J, **Swerdlow CD**. Angiographic coronary morphology in survivors of cardiac arrest. *American Heart Journal* 115:781-785, 1988.

38. Lo YA, Cutler JE, Wright A, Kron J, Blake K, **Swerdlow CD**. Long-segment coronary ulcerations in survivors of sudden cardiac death. *American Heart Journal* 115:1444-1447, 1988.
39. **Swerdlow CD**, Peterson J, Liem LB. Effect of flestolol on ventricular rate during atrial fibrillation in Wolff-Parkinson-White syndrome. *American Journal of Cardiology* 62:78-82, 1988.
40. Schnittger I, Lee JT, Hargis J, Wyndham CR, Echt DS, **Swerdlow CD**, Griffin JC. Long-term results of antitachycardia pacing in patients with supraventricular tachycardia. *Pacing and Clinical Electrophysiology* 12:936-941, 1989.
41. Lo YS, **Swerdlow CD**. Multiple protruding, mobile left ventricular thrombi and risk of embolism after cardioversion. *Chest* 97:1023, 1990.
42. Poole JE, Mathisen TL, Kudenchuk PJ, McAnulty JH, **Swerdlow CD**, Bardy GH, Greene HL. Long-term outcome in patients who survive out of hospital ventricular fibrillation and undergo electrophysiologic studies: Evaluation by electrophysiologic subgroups. *Journal of the American College of Cardiology* 16:657-665, 1990.
43. Chen PS, Feld GK, Kriett JM, Mower MM, Tarazi RY, Fleck RP, **Swerdlow CD**, Gang ES, Kass RM. Relation between upper limit of vulnerability and defibrillation threshold in humans. *Circulation* 88:186-192, 1993.
44. **Swerdlow CD**, Kass RM, Hwang C, Gang E, Chen PS, Peter CT. Effects of voltage and respiration on impedance in nonthoracotomy defibrillation pathways. *American Journal of Cardiology* 73:688-692, 1994.
45. **Swerdlow CD**, Chen PS, Kass RK, Allard JA, Peter C. Discrimination of ventricular tachycardia from sinus tachycardia and atrial fibrillation in a tiered-therapy cardioverter-defibrillator. *Journal of the American College of Cardiology* 23:1342-1355, 1994.
46. **Swerdlow CD**, Olson W, Chen PS, Ahern T, Gang E, Kass R, Mandel W, Peter T. Incidence and significance of underdetection of ventricular tachycardia by algorithms to enhance specificity in an advanced antiarrhythmic device. *Journal of the American College of Cardiology* 24:416-424, 1994.
47. **Swerdlow CD**, Kass RM, Hwang C, Chen PS, Raissi S. Effect of capacitor size and pathway resistance on defibrillation threshold for implantable defibrillators. *Circulation* 90:1840-1846, 1994.
48. Hwang C, **Swerdlow CD**, Kass R, Gang E, Mandel W, Peter T, Chen PS. Upper limit of vulnerability predicts transvenous defibrillation threshold. *Circulation* 90:2308-2315, 1994.
49. Ong JJC, Hsu PC, Lin L, Yu A, Kass RM, Peter CT, **Swerdlow CD**. Arrhythmias following cardioverter-defibrillator implantation: Comparison of epicardial and transvenous systems. *American Journal of Cardiology* 75:137-140, 1995.

50. **Swerdlow CD**, Davie S, Kass RM, Chen PS, Hwang C, Mandel WJ, Gang ES, Raissi S, Peter CT. Optimal electrode configuration for pectoral transvenous implantable defibrillator without an active can. *American Journal of Cardiology* 76:370-374, 1995.
51. Jones, GK, **Swerdlow CD**, Reichenbach D, Lones M, Dolack G, Poole J, Kudenchuk P, Bardy G. Anatomical findings in patients having had a chronically indwelling coronary sinus defibrillation lead. *Pacing and Clinical Electrophysiology* 18:2062-2067, 1995.
52. **Swerdlow CD**, Ahern T, Kass RM, Davie S, Mandel WJ, Chen PS. Upper limit of vulnerability is a good estimator of shock strength associated with 90% probability of successful defibrillation in humans with transvenous implantable cardio-defibrillators. *Journal of the American College of Cardiology* 27:1112-1118, 1996.
53. **Swerdlow CD**, Kass RK, Davie S, Raissi S, Chen PS, Hwang C. Short biphasic pulses from 90 microfarad capacitors lower defibrillation threshold. *Pacing and Clinical Electrophysiology* 19: 1053-1060, 1996.
54. **Swerdlow CD**, Fan W, Brewer JE. Charge-burping theory predicts optimal ratios of phase duration for small-capacitor biphasic defibrillation waveforms. *Circulation* 94:2278-2284, 1996.
55. **Swerdlow CD**, Davie S, Ahern T, Chen PS. Comparative reproducibility of defibrillation threshold and upper limit of vulnerability. *Pacing and Clinical Electrophysiology* 19:2103-2111, 1996.
56. **Swerdlow CD**, Martin DJ, Kass RM, Davie S, Mandel WJ, Gang ES, Chen PS. Zone of vulnerability to T-Wave shocks in humans. *Journal of Cardiovascular Electrophysiology* 8:145-154, 1997.
57. **Swerdlow CD**, Peter CT, Martin, DJ, Hwang C, Kass RM, Mandel WJ, Gang E, Chen PS. Programming of implantable defibrillators based on the upper limit of vulnerability. *Circulation* 95:1497-1504, 1997.
58. Martin DJ, Chen PS, Hwang C, Gang ES, Mandel WJ, Peter CT, **Swerdlow CD**. Upper limit of vulnerability predicts chronic defibrillation threshold for transvenous implantable defibrillators. *Journal of Cardiovascular Electrophysiology* 8:241-248, 1997.
59. Hwang C, Martin DJ, Goodman JS, Gang ES, Mandel WJ, **Swerdlow CD**, Peter CT, Chen PS. Atypical atrioventricular nodal reciprocating tachycardia masquerading as tachycardia using a left sided accessory pathway. *Journal of the American College of Cardiology* 30:218-225, 1997.
60. **Swerdlow CD**, Brewer JE, Kass RM, Kroll MW. Application of models of defibrillation to human defibrillation data. *Circulation* 96:2813-2822, 1997.
61. **Swerdlow CD**, Kass RM, O'Connor ME, Chen, PS. Effect of shock waveform on relationship between upper limit of vulnerability and defibrillation threshold. *Journal of Cardiovascular Electrophysiology* 9:339-349, 1998.

62. Chen PS, **Swerdlow CD**, Hwang C, Karaguezian HS. Current concepts of ventricular defibrillation. *Journal of Cardiovascular Electrophysiology* 96:553-562, 1998.
63. **Swerdlow CD**, Olson WH, O'Connor ME, Gallik DM, Malkin RA, Laks M. Cardiovascular collapse caused by electrocardiographically silent 60-Hz intracardiac leakage current: implications for electrical safety. *Circulation* 99:2559-2564, 1999.
64. **Swerdlow CD**, Schoels W, Dijkman B, Jung W, Sheth NV, Olson WH, Gunderson BD. Detection of atrial fibrillation and flutter by a dual-chamber implantable cardioverter-defibrillator. *Circulation* 101:878-885, 2000.
65. Gollob MH, Bharati S, **Swerdlow CD**. Accessory AV node with properties of a typical accessory pathway. Anatomic –electrophysiologic correlation. *Journal of Cardiovascular Electrophysiology*, 11:922-926, 2000.
66. Voroshilovsky O, Qu Z, Moon HL, O'Hara T, Fishbein GA, Huang HL, **Swerdlow CD**, Garfinkel A, Weis JN, Karaguezian HS, Chen PS. Mechanisms of ventricular fibrillation induction by 60Hz alternating current in isolated swine right ventricle. *Circulation*. 102:1569-1574, 2000.
67. Bain AC, **Swerdlow CD**, Love CJ, Ellenbogen KA, Deering TF, Brewer JE, Augostini RS, Tchou PJ. Multicenter study of a principles-based waveforms for external defibrillation. *Annals of Emergency Medicine*. 37:5-12, 2001.
68. Blumenthal TD, Burnett TT, **Swerdlow CD**. Prepulses reduce the pain of cutaneous electrical shocks. *Psychosomatic Medicine*. 63:275-281, 2001.
69. Sweeney MO, Natale A, Volosin KL, **Swerdlow CD**, Baker JH, DeGroot P. Prospective randomized comparison of 50/50% versus 65/65% tilt biphasic waveform on internal defibrillation in humans. *Pacing and Clinical Electrophysiology* 24:60-65, 2001.
70. **Swerdlow CD**. Implantation of cardioverter defibrillators without induction of ventricular fibrillation. *Circulation*, 103:2159-2164, 2001.
71. Schoels W, **Swerdlow CD**, Jung W, Lerman B, Seidl K, Haffajee C. Worldwide clinical experience with a new dual-chamber implantable cardioverter-defibrillator system. *Journal of Cardiovascular Electrophysiology* 12:521-528, 2001.
72. **Swerdlow CD**, Schwartzman D, Hoyt R, Bailin SJ, Koehler JL, Warman EN. Determinants of first-shock success for atrial implantable cardioverter defibrillators. *Journal of Cardiovascular Electrophysiology* 13:347-354, 2002.
73. **Swerdlow CD**, Brown ML, Koyrakh LA, Lurie K, Zhang J, Wood NM, Olson WH, Gillberg JM. Discrimination of ventricular tachycardia from supraventricular tachycardia by a downloaded wavelet-transform morphology algorithm. A paradigm for development of ICD detection algorithms. *Journal of Cardiovascular Electrophysiology* 13:432-441, 2002.

74. Blumenthal TD, **Swerdlow CD**. Electrical shocks to the arm elicit and inhibit startle eyeblink. *Psychophysiology*, 39:218-221, 2002.
75. Schwartzman D, Musley SK, **Swerdlow CD**, Hoyt R, Warman EN. Early recurrence of atrial fibrillation following ambulatory shock conversion. *Journal of the American College of Cardiology* 40:93-99, 2002.
76. **Swerdlow CD**, Shivkumar K, Zhang, J. Determination of the upper limit of vulnerability using implantable cardioverter-defibrillator electrograms. *Circulation* 107:3028-3033, 2003.
77. Gurevitz OT, Friedman PA, Glikson M, Trusty JM, Ballman KV, Rosales AG, Hayes DL, Hammill SC, **Swerdlow CD**. Discrepancies between the upper limit of vulnerability and defibrillation threshold: Prevalence and clinical predictors. *Journal of Cardiovascular Electrophysiology* 14:1382-1384, 2003.
78. Offir P, Birgersdotter-Green U, **Swerdlow CD**. Acceleration of ventricular rate following atrial antitachycardia pacing: What is the mechanism? *Journal of Cardiovascular Electrophysiology* 14:1382, 2003.
79. Ji S, Cesario DA, **Swerdlow CD** and Shivkumar K. Left ventricular endocardial lead placement using a modified transeptal approach. *Journal of Cardiovascular Electrophysiology* 15:234-236, 2004.
80. Valderrabano M, Cesario DA, Ji S, Shannon KM, Wiener I, **Swerdlow CD**, Oral H, Morady F, Shivkumar K. Percutaneous epicardial mapping during ablation of difficult accessory pathways as an alternative to cardiac surgery. *Heart Rhythm* 1:311-316, 2004.
81. Shorofsky SR, Rashba E, Havel W, Belk P, DeGroot P, **Swerdlow C**, Gold MR. Improved defibrillation efficacy in humans with an ascending ramp waveform. *Heart Rhythm* 2:388-394, 2005.
82. Glikson M, **Swerdlow CD**, Gurevitz O, Daoud E, Shivkumar K, Wilkoff B, Shipman T, Friedman P. Optimal combination of discriminators for differentiating ventricular from supraventricular tachycardia by dual chamber defibrillators. *Journal of Cardiovascular Electrophysiology* 16: 732-739, 2005.
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INVITED LECTURES, SYMPOSIA AND COURSES 2008 - 2014

[Chairperson and Moderator roles furnished on request]

Invited Lectures and Symposia: Cedars-Sinai Medical Center

Debate: ICDs are effective and underutilized. Cedars Sinai Heart Institute and ACC California Chapter Symposium on Controversies and Advances in the Treatment of Cardiovascular Disease, the Ninth in the Series, September 4, 2008.

Debate: The conventional ICD is a useful therapy that is here to stay. Cedars Sinai Heart Institute and ACC California Chapter Symposium on Controversies and Advances in the Treatment of Cardiovascular Disease, the Ninth in the Series, October 2, 2009.

The ICD patient with shocks – What to do until the electrophysiologist arrives? Arrhythmia Symposium at Cedars-Sinai Heart Institute. Los Angeles, December 11, 2009.

ICDs and CIEDs: What the Cardiologist Should Know. Cardiology Grand Rounds. August 24, 2010.

Catheter ablation should be considered first-line therapy for rhythm control of atrial fibrillation. Cardiology Grand Rounds. March 1, 2011.

ICDs What every care provider needs to know. Arrhythmia Symposium at Cedars-Sinai Heart Institute. Los Angeles, December 7, 2012.

Debate: The subcutaneous defibrillator will replace the transvenous defibrillator ICD. Cedars Sinai Heart Institute and ACC California Chapter Symposium on Controversies and Advances in the Treatment of Cardiovascular Disease, the Fourteenth in the Series, November 21, 2014

Invited Lectures and Symposia: UCLA

ICD Leads: Design and diagnostics for lead failure. University of California at Los Angeles Electrophysiology Grand Rounds. Los Angeles, August 15, 2013

Invited Lectures and Symposia: Other Academic Institutions, National/International Meetings

Ethics & economical ICD therapy. 1st Annual National Sudden Cardiac Arrest Foundation Symposium: From Awareness to Prevention. San Diego, April 26, 2008.

ICD device troubleshooting. Stanford Cardiology Ventricular Arrhythmia and Sudden Death Symposium. San Francisco, March 14, 2008.

How and when to assess defibrillation efficacy? Heart Rhythm Society's 29th Annual Scientific Sessions, San Francisco CA, May 14, 2008.

Early identification of lead fracture and the potential to reduce inappropriate shocks. Heart Rhythm Society's 29th Annual Scientific Sessions, San Francisco, CA, May 15, 2008.

How to avoid EP lab disasters with ICD shock testing. Heart Rhythm Society's 29th Annual Scientific Sessions, San Francisco, CA, May 15, 2008.

Diagnosing the reason for ICD Shocks: What to do until the electrophysiologist comes? University of California Irvine Medical Center, Cardiology Lecture Series, October 2008.

Comparison of upper limit of vulnerability (ULV) and defibrillation testing to assess defibrillation efficacy. Heart Rhythm Society's 30th Annual Scientific Sessions, Boston, May 15, 2009.

Is there an optimal method for early diagnosis of ICD lead fractures or should we be more aggressive in extracting ICD leads under recall? Heart Rhythm Society's 30th Annual Scientific Sessions, Boston, MA, May 15, 2009.

Defibrillation threshold testing: ULV vs. DFT. University of California at San Diego Medical Center, Cardiac Electrophysiology Conference, May 28, 2009.

Should we induce VT at ICD implant? Cardiac Electrophysiology Lecture Series, Stanford University Medical Center August 21, 2009.

ICD shock reduction. Cardiology Grand Rounds. Stanford University Medical Center August 22, 2009.

Rhythm discrimination in ICDs. American Heart Association National Meeting. Orlando, FL, November 15, 2009.

Defibrillation basics: Sensing, testing, waveforms, efficacy. University of California at San Diego and Heart Rhythm Society 1st Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting, and Extraction. San Francisco, December 5, 2009.

Nitty gritty of SVT-VT discrimination algorithms. University of California at San Diego and Heart Rhythm Society 1st Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting, and Extraction. San Francisco, December 5, 2009.

How to diagnose lead failure. 1st Annual ICD, University of California at San Diego and Heart Rhythm Society West Coast Symposium: CRT Implantation, Programming, Troubleshooting, and Extraction. San Francisco, December 5, 2009.

Atrial fibrillation ablation in patients with heart failure: Patient selection and expected results. USC Heart Failure Symposium 2010: An Update on Therapy: Heart Failure, Arrhythmias and Hypertension. Los Angeles, January 30, 2010.

ICD technology for the clinician: Sensing, batteries, capacitors, waveforms, problems of miniaturization, MRI compatibility. University of California at San Diego and Heart Rhythm Society 2nd Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, March 5, 2011.

Systematic approach to ICD sensing problems. University of California at San Diego and Heart Rhythm Society 2nd Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, March 5, 2011.

Diagnosis and management of lead failures. University of California at San Diego and Heart Rhythm Society 2nd Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, March 6, 2011.

Defibrillation tests are required in all patients receiving an implantable cardioverter defibrillator. Heart Rhythm Society's 31st Annual Scientific Sessions. Denver, May 13, 2010.

The Role of upper limit of vulnerability ICD shock testing: How to perform this technique properly. Heart Rhythm Society's 31st Annual Scientific Sessions. Denver, May 13, 2010.

EP fellow boot camp: Challenging device-based cases for your practice and EP boards. Heart Rhythm Society's 31st Annual Scientific Sessions. Denver, May 15, 2010.

Early diagnosis of ICD lead failure. Kaiser Permanente Cardiac Electrophysiology Conference, October 2010

Catheter ablation of atrial fibrillation. Fifth Annual Cardiovascular Symposium, Los Robles Hospital. Thousand Oaks, April 30, 2011.

Defibrillation testing: Who, when and how. Heart Rhythm Society's 32nd Annual Scientific Sessions. San Francisco, May 5, 2011.

Methods of defibrillation assessment. Heart Rhythm Society's 32nd Annual Scientific Sessions. San Francisco, May 5, 2011.

Differential diagnosis of lead failure. Heart Rhythm Society's 32nd Annual Scientific Sessions. San Francisco, May 5, 2011.

ICD technology: Where are we now and where are we going? Heart Rhythm Society's 32nd Annual Scientific Sessions. San Francisco, May 5, 2011.

EP fellows in training boot camp: Optimizing and troubleshooting cardiac implantable electrical devices for the beginning EP fellow. Heart Rhythm Society's 32nd Annual Scientific Sessions. San Francisco, May 5, 2011.

Keynote Address: How and why devices [usually] work in treating arrhythmia—A perspective for engineers. American Society for Mechanical Engineering (ASME) 6th Frontiers in Biomedical Devices Conference, Irvine, CA, September 26, 2011

Troubleshooting implantable cardiac defibrillators. 2011 Kaiser Permanente National Cardiovascular COAST Conference. Huntington Beach, December 3, 2011.

Remote Follow-up: What are the Options? Riata ICD Lead Summit. January 20, 2012

ICD technology for the clinician: Sensing, batteries, capacitors, waveforms, problems of miniaturization, MRI compatibility. University of California at San Diego and Heart Rhythm Society 3rd Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 23, 2012.

Systematic approach to ICD sensing problems. University of California at San Diego and Heart Rhythm Society 3rd Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 23, 2012.

Diagnosis and management of lead failures. University of California at San Diego and Heart Rhythm Society 3rd Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 24, 2012.

The Science behind DFT and ULV testing. Heart Rhythm Society 33rd Annual Scientific Sessions. Boston, May 11, 2012.

Clinical presentations that may be confused with lead failure. Heart Rhythm Society 33rd Annual Scientific Sessions. Boston, May 11, 2012.

Electrogram morphology algorithms: Has progress stopped? Heart Rhythm Society 33rd Annual Scientific Sessions. Boston, May 12, 2012.

Intracardiac T-wave alternans. Cardiostim 2012: 18th World Congress Cardiac Electrophysiology & Cardiac Techniques. Nice, France. June 14, 2012.

Application of the basics of ICD technology in the clinical setting. University of California at San Diego and Heart Rhythm Society 4th Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 23, 2013.

Lead failure, lead technology. University of California at San Diego and Heart Rhythm Society 4th Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 24, 2013.

How to interpret ICD diagnostics and electrograms. Heart Rhythm Society 34th Annual Scientific Sessions. Denver, May 9, 2013.

CRT based questions In board format for Mini Board Review. Heart Rhythm Society 34th Annual Scientific Sessions. Denver, May 10, 2013.

ICD leads: Design, diagnostics and management. Northwest Electrophysiology Society Annual Meeting, Portland OR, June 14, 2013

Indications for ICD and CRT. Mayo Clinic Electrophysiology Board Review Course, Rochester MN, August 24, 2013

ICD Troubleshooting Cases. Mayo Clinic Electrophysiology Board Review Course, Rochester MN, August 24, 2013

Troubleshooting devices I: Detection algorithms, electrogram interpretation. University of California at San Diego and Heart Rhythm Society 5th Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 21, 2014.

Troubleshooting devices III: Leads management. University of California at San Diego and Heart Rhythm Society 5th Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 22, 2014.

Engineering aspects of ICD systems. Heart Rhythm Society's 35th Annual Scientific Sessions. San Francisco, May 7, 2014.

CIED performance. Heart Rhythm Society's 35th Annual Scientific Sessions. San Francisco, May 7, 2014.

Lead failure: Clinical presentations and differential diagnosis Heart Rhythm Society's 35th Annual Scientific Sessions. San Francisco, May 9 2014

Analysis of ICD tracings: Mini Board Review Boot Camp for EP Fellows. Heart Rhythm Society's 35th Annual Scientific Sessions. San Francisco, May 10, 2014.

Diagnostics for ICD lead failure. Mayo Clinic Rhythm Device Summit: Implantation, Management, and Follow Up. Chicago, June 13, 2014.

Troubleshooting cardiac resynchronization devices. Mayo Clinic Rhythm Device Summit: Implantation, Management, and Follow Up. Chicago, June 13, 2014.

ICD troubleshooting. Mayo Clinic Electrophysiology Board Review Course, Rochester MN, September 6, 2014

Troubleshooting the problematic lead. University of California at San Diego Lead Management Update. La Jolla, CA. September 20, 2014

Contemporary ICD Discrimination Algorithms. University of California at San Diego and Heart Rhythm Society 6th Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 13, 2015.

Case Studies: Challenging ICD Troubleshooting I. University of California at San Diego and Heart Rhythm Society 6th Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 13, 2015.

Troubleshooting Devices: Lead Management/Diagnosis of Lead Fracture. University of California at San Diego and Heart Rhythm Society 6th Annual West Coast Symposium: ICD, CRT Implantation, Programming, Troubleshooting and Extraction. La Jolla, February 13, 2015.

Course Faculty and Other Invited Lectures

ICD Troubleshooting: Parts 1 & 2. Josephson-Wellens: How to Approach Complex Arrhythmias for EP Fellows. Boston, July 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014.

ICD troubleshooting: Parts 1 & 2. Josephson-Wellens Course: How to Approach Complex Arrhythmias for EP Fellows. San Francisco, January 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015.

SVT-VT discrimination: Humans vs. ICDs. St Jude Medical Lyceum. Sylmar, CA March 2009

Minimizing shocks to improve survival in ICD patients. Cardiology Lecture Series. French Hospital, San Luis Obispo, October 28, 2010.

The science behind defibrillation threshold testing. Device Management: Beyond the Basics. Scottsdale, Az, March 11, 2011.

ICD troubleshooting. Device Management: Beyond the Basics. Scottsdale, Az, March 11, 2011.

Complex electrogram analysis. St Jude Medical's 8th Annual EP Fellows Conference. San Francisco, May 2, 2011.

Complex device management: The other intracardiac electrogram. St Jude Medical's 8th Annual EP Fellows Conference. San Francisco, May 3, 2011.

How to avoid ICD shocks: Algorithms and appropriate programming. Electrophysiology Innovations (EPI) Congress 2011. Washington DC, September 11, 2011.

How to fix a high DFT — And should we even bother to check? Electrophysiology Innovations (EPI) Congress 2011. Washington DC, September 11, 2011.

Ablation should be first-line therapy for paroxysmal atrial fibrillation. Medtronic CRDM Collaborative Medicine Program, Las Vegas, NV, March 3, 2011

ICD troubleshooting. Device Management, Beyond the Basics. Coral Gables, Fl. March 10, 2012.

Strategies to reduce ICD shocks. Medtronic CRDM Collaborative Medicine Program, Carlsbad, CA, October 20, 2012

Primary prevention of sudden cardiac death in patients with heart disease: patient selection and long-term outcomes. Mayo School of Medicine Symposium: Arrhythmias & the Heart: A Cardiovascular Update. Maui, Hawaii, January 29, 2013

Keys to selecting and managing patients receiving CRT systems. Mayo School of Medicine Symposium: Arrhythmias & the Heart: A Cardiovascular Update. Maui, Hawaii, January 30, 2013

Innovations in cardio devices. MedTech Innovate Seminars 2013, Anaheim, CA, February 14, 2013

ICD troubleshooting. Device Management: Beyond the Basics. Scottsdale, Az, March 2, 2013.

Engineering of devices and leads. Device Management: Beyond the Basics. Scottsdale, Az, March 2, 2013.

How does it work? Understanding the hardware of CIEDs. Device Management: Beyond the Basics. Scottsdale, Az, February 28, 2014.

ICD sensing and detection abnormalities. Device Management: Beyond the Basics. Scottsdale, Az, March 1, 2014.

Leads management. West Coast EP Fellows Cardiovascular Summit. Los Angeles, CA. November 15, 2014.

ICD Troubleshooting. Device Management: Beyond the Basics. Austin, Tx, February 27, 2015.

Understanding the hardware of CIEDs. Device Management: Beyond the Basics. Austin, Tx, February 28, 2015.