Heart Disease Community of Practice Series 2

Demystifying ICDs – do you always need to deactivate?

Project ECHO
Palliative Care - Canada
BY Pallium Canada

Host: Holly Finn, PMP

Presenter: Michael Slawnych, MD FRCPC

Date: January 18, 2023

Territorial Honouring

The Palliative Care ECHO Project

The Palliative Care ECHO Project is a 5-year national initiative to cultivate communities of practice and establish continuous professional development among health care providers across Canada who care for patients with life-limiting illness.

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The Palliative Care ECHO Project is supported by a financial contribution from Health Canada. The views expressed herein do not necessarily represent the views of Health Canada.

Health Canada Santé Canada

Project ECHO Palliative Care - Canada BY Pallium Canada

Introductions

Host

Holly Finn, PMP
Senior Manager, Program Delivery, Pallium Canada

Presenter

Dr. Michael Slawnych, MD FRCPC
Clinical Assistant Professor
Department of Cardiology, St Paul's Hospital
University of British Columbia

Introductions

Panelists

Dr. Lynn Straatman, MD FRCPC
Clinical Assistant Professor, UBC
Department of Medicine (Cardiology and Palliative Care)
Department of Pediatrics (Adolescent Health)
Medical Director, Cardiac Function Clinic
Co-chair Physician Diversity, Equity and Inclusion Committee, VCH

Dr. Leah Steinberg, MD, CFPC, FCFP, MA
Palliative Care Clinician, Sinai Health System
Assistant Professor, Division of Palliative Care, University of Toronto

Morgan Krauter, NP, CCN(C)
Nurse Practitioner, Heart Function

Dr. Caroline McGuinty, MD FRCPC
Cardiologist, Advanced Heart Failure and Transplantation, Cardiac Palliative Care
University of Ottawa Heart Institute
Assistant Professor, University of Ottawa

Shannon Poyntz, NP-PHC, MN
Nurse Practitioner, Supportive Care

Drew Stumborg, RN
Saskatchewan Health Authority

Disclosure

Relationship with Financial Sponsors:

Pallium Canada

- Not-for-profit
- Funded by Health Canada

Disclosure

This program has received financial support from:

- Health Canada in the form of a contribution program.
- Pallium Canada generates funds to support operations and R&D from Pallium Pocketbook sales and course registration fees.

Host/ Presenter/Panelists:

- Holly Finn: Senior Manager, Program Delivery, Pallium Canada
- Dr. Michael Slawnych:
  - Speakers Bureau/Honoraria: Novartis
  - Patents: GE Healthcare (Rowlandson GI, Kaiser W, Slawnych M, Xue JQ, and Exner D: Method and system for detecting T-wave alternans. General Electric, November 2011: US 8060192)
  - Other: Pallium Canada –Master Facilitator
- Dr. Leah Steinberg: Pallium Canada (education material), HPCO (clinical advisory committee, educator)
- Dr. Caroline McGuinty: Servier (consulting fees), Novartis (speaker fees)
- Dr. Lynn Straatman- Servier, Novartis, Astra Zeneca, BI, Medtronic, Pfizer, Eli Lilly, Bayer, Merck (clinical trials)
- Drew Stumborg: None to disclose.
- Morgan Krauter: None to disclose.
- Shannon Poyntz: None to disclose.

Disclosure

Mitigating Potential Biases:

- The scientific planning committee had complete independent control over the development of program content.

Welcome and Reminders

- Please introduce yourself in the chat!
- Your microphones are muted. There will be time during this session for questions and discussion.
- You are also welcome to use chat function to ask questions, add comments or to let us know if you are having technical difficulties, but also feel free to raise your hand!
- This session is being recorded and will be emailed to registrants within the next week.
- Remember not to disclose any Personal Health Information (PHI) during the session.
- This 1-credit-per hour Group Learning program has been certified by the College of Family Physicians of Canada for up to **6 Mainpro+** credits.

Objectives of this Series

After participating in this program, participants will be able to:

- Describe what others have done to integrate palliative care services into their practice.
- Share knowledge and experience with their peers.
- Increase their knowledge and comfort around integrating a palliative care approach for their patients with advanced heart failure.

Overview of Topics

Session #	Session title	Date/ Time
Session 1	Update to medical management of HF decompensations in the community, including Cardiorenal dysfunction: how to manage with a palliative approach to care	November 16, 2022 from 12-1pm ET
Session 2	Demystifying ICDs – do you always need to deactivate?	January 18, 2023 from 12-1pm ET
Session 3	Complex case management/ Patients with complex goals of care	March 15, 2023 from 12-1pm ET
Session 4	Diuretic management in the community: Lasix, Metolazone and Bumetanide	May 17, 2023 from 12-1pm ET
Session 5	Multi-morbidity and Heart Failure- Managing Patients with Multiple Illnesses	September 20, 2023 from 12-1pm ET
Session 6	De-prescribing cardiac and other medications: palliative care in people with advanced heart failure	November 15, 2023 from 12-1pm ET

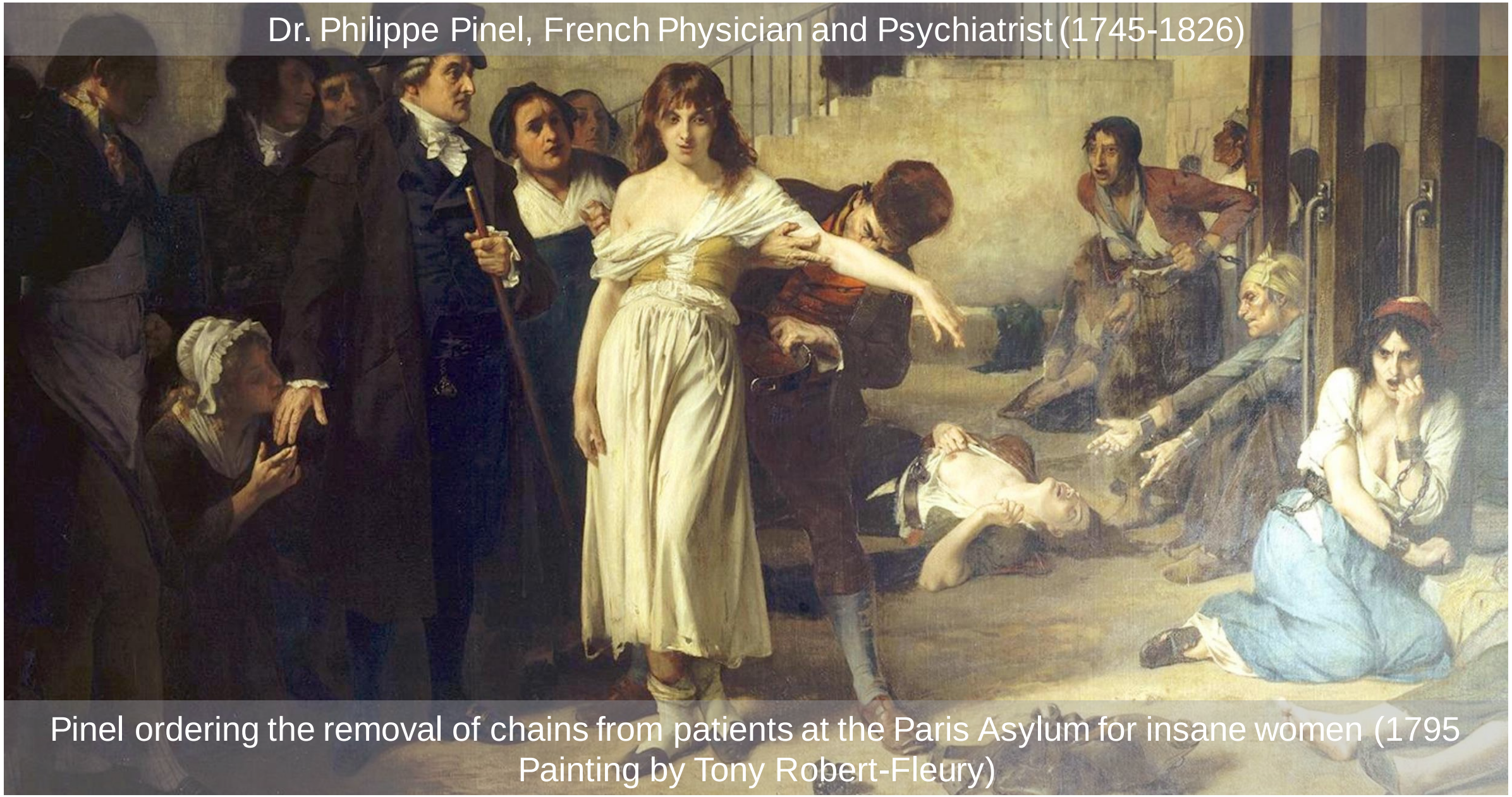
Objectives of this Session

After participating in this session, participants will be able to:

- Learn about the indications for ICDs.
- Expand their understanding about when to consider deactivation.

Demystifying ICDs
Do you always need to deactivate?

Dr. Philippe Pinel, French Physician and Psychiatrist (1745-1826)



Pinel ordering the removal of chains from patients at the Paris Asylum for insane women (1795 Painting by Tony Robert-Fleury)

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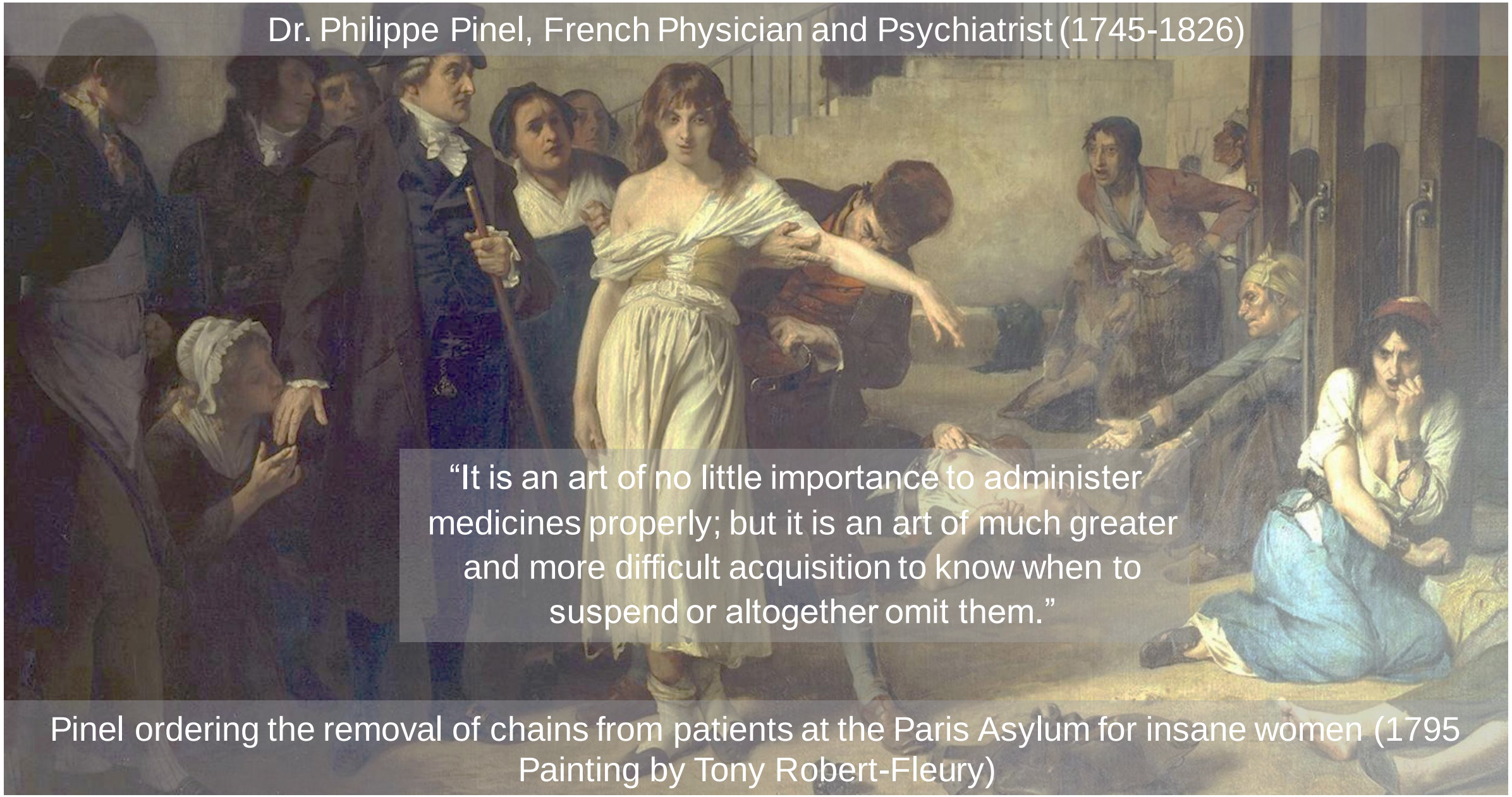
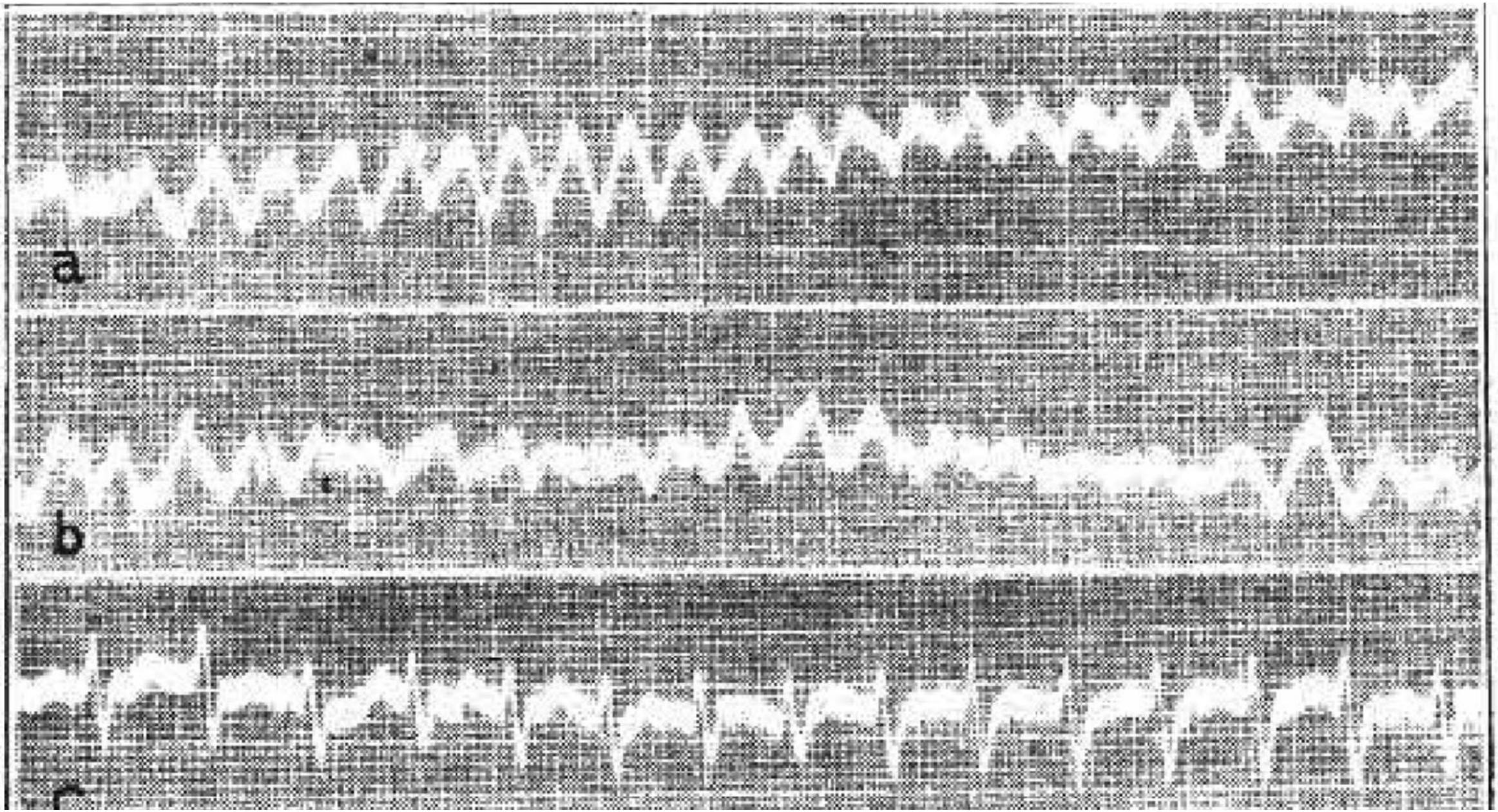


"It is an art of no little importance to administer medicines properly; but it is an art of much greater and more difficult acquisition to know when to suspend or altogether omit them."

Pinel ordering the removal of chains from patients at the Paris Asylum for insane women (1795 Painting by Tony Robert-Fleury)

History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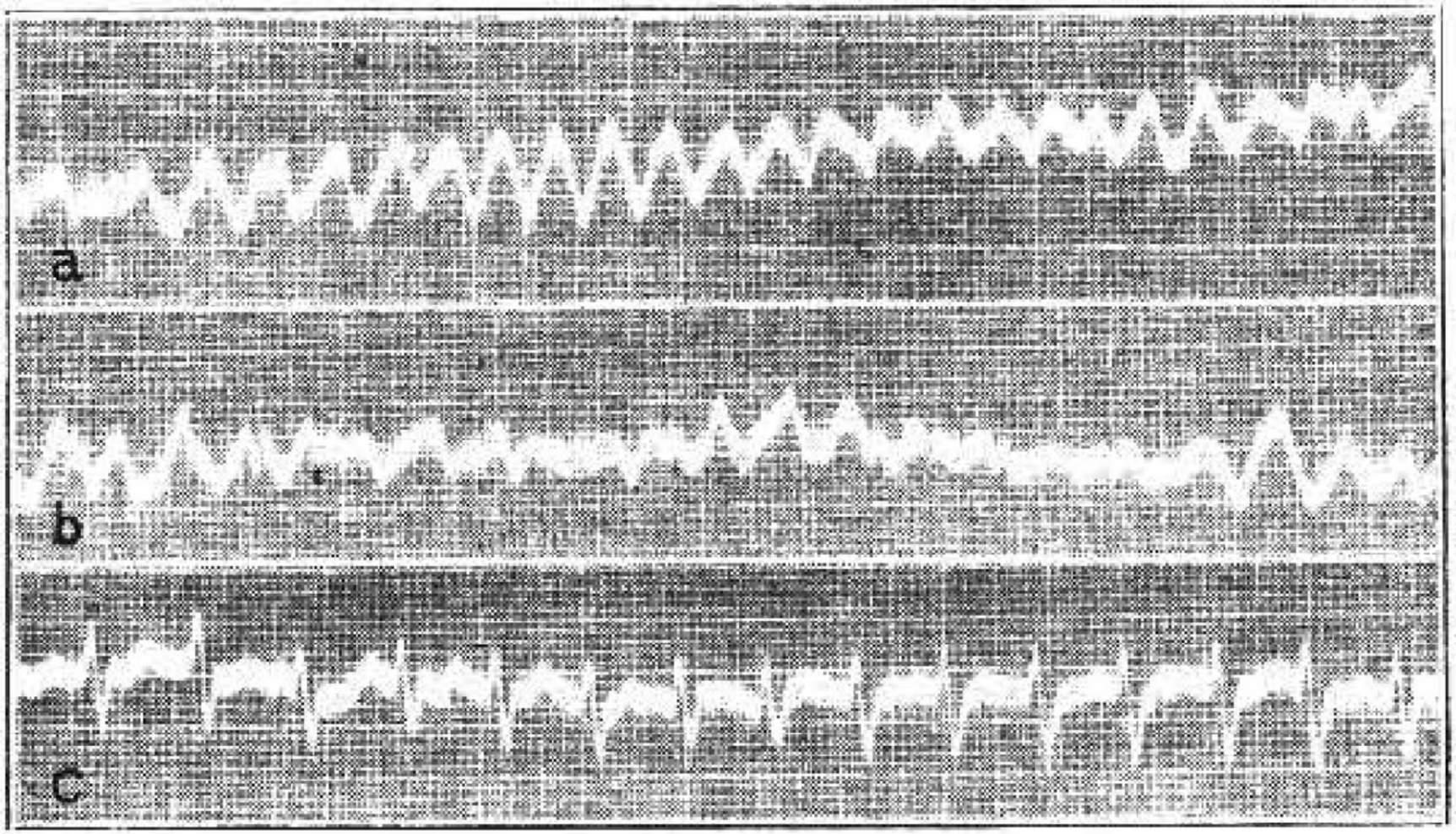
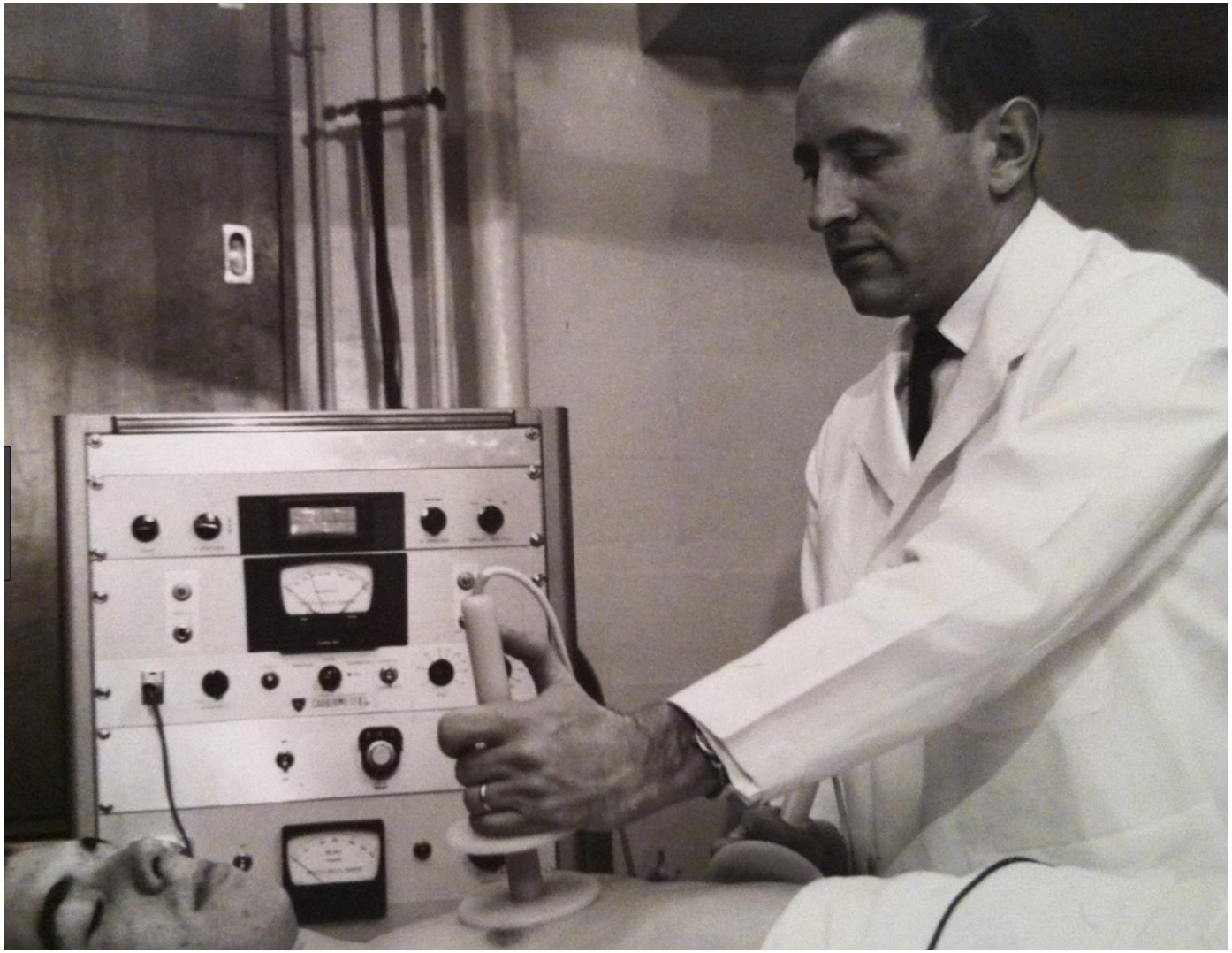
First Documented Successful Defibrillation of a Human recorded by **Dr. Claude Beck (1947)**



Bernard Lown, MD, Nobel Laureate



Circulation
OCTOBER 1972
VOL. XLVI NO. 4
AN OFFICIAL JOURNAL of the AMERICAN HEART ASSOCIATION

EDITORIAL

Implanted Standby Defibrillators

WHEN A PROBLEM gains wide social consciousness a diversity of practical and impractical solutions is engendered. This is now the case with the formidable problem of sudden death in patients with coronary heart disease.

Sudden death largely afflicts the ambulatory subject, prodromes are not distinctive, lead time is short, and death probably results from ventricular fibrillation (VF). Tragedy is magnified by the realization that the heart may have been only minimally impaired, that the arrhythmia could have been reversed, and, if reversed, a long and productive life would have been possible. Hospital experiences during this past decade have amply demonstrated that survival depends upon promptness in defibrillation. The time for effective action is limited to a few minutes. It seems unlikely, therefore, that medical intervention after the event will yield a substantial harvest of survivors. The inexorable logic of the problem coerces a new direction, namely, identification and protection of the patient at high risk from sudden death.[1] One intriguing approach is to prevent sudden death by the implantation in the body of a standby automatic defibrillator system.[2, 3]

A completely implanted defibrillator can reverse VF in dogs.[2] A special transducer-tipped catheter, sensing pulsatile pressure, is introduced through a peripheral vein into the right ventricle. Six seconds of asystole initiates automatic charging of a 16-μfarad capacitor to a preset limit of 2500 volts, which is completed 50 sec after cessation of the heart beat. If phasic right ventricular pressure returns, the discharge is inhibited; otherwise the charge is delivered through the right ventricular electrode. The circuit is completed by a second electrode positioned in the superior vena cava. As compared to delivery of the shock transthoracically,[4] only a fraction of the energy is necessary for intracardiac defibrillation.

Though fraught with a multitude of technical difficulties, on first examination, this method bears the stamp of logic. The underdamped exponential waveform currently employed for external defibrillation and cardioversion[5] is unsuitable for an internal system because of the weight required by the series inductor. A change in waveform is necessary

From the Cardiovascular Research Laboratories, Department of Nutrition, Harvard School of Public Health, and Cardiovascular Service, Department of Medicine, Peter Bent Brigham Hospital, Boston, Massachusetts.

Supported in part by Grants HE-14602-01 and HE-07776-08 from the National Institutes of Health, U. S. Public Health Service.

Address for reprints: Dr. Bernard Lown, Department of Nutrition, Harvard School of Public Health, 665 Huntington Avenue, Boston, Massachusetts 02115.

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"… the implanted defibrillator system represents an imperfect solution in search of a plausible and practical application … "

The 11th World Survey of Cardiac Pacing and Implantable Cardioverter-Defibrillators: Calendar Year 2009–A World Society of Arrhythmia's Project

HARRY G. MOND, O.A.M., M.D.* and
ALESSANDRO PROCLEMER, M.D.†

From the *Department of Epidemiology and Preventive Medicine, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Victoria, Australia; and †Director of Cardiology Unit, Cardiothoracic Department, Azienda Ospedaliero-Universitaria, Udine, Italy

A worldwide cardiac pacing and implantable cardioverter-defibrillator (ICD) survey was undertaken for calendar year 2009 and compared to a similar survey conducted in 2005. There were contributions from 61 countries: 25 from Europe, 20 from the Asia Pacific region, seven from the Middle East and Africa, and nine from the Americas. The 2009 survey involved 1,002,664 pacemakers, with 737,840 new implants and 264,824 replacements. The United States of America (USA) had the largest number of cardiac pacemaker implants (225,567) and Germany the highest new implants per million population (927). Virtually all countries showed increases in implant numbers over the 4 years between surveys. High-degree atrioventricular block and sick sinus syndrome remain the major indications for implantation of a cardiac pacemaker. There remains a high percentage of VVI(R) pacing in the developing countries, although compared to the 2005 survey, virtually all countries had increased the percentage of DDDR implants. Pacing leads were predominantly transvenous, bipolar, and active fixation. The survey also involved 328,027 ICDs, with 222,407 new implants and 105,620 replacements. Virtually all countries surveyed showed a significant rise in the use of ICDs with the largest implanter being the USA (133,262) with 434 new implants per million population. This was the largest pacing and ICD survey ever performed, because of mainly a group of loyal enthusiastic survey coordinators. It encompasses more than 80% of all the pacemakers and ICDs implanted worldwide during 2009. (PACE 2011; 34:1013–1027)

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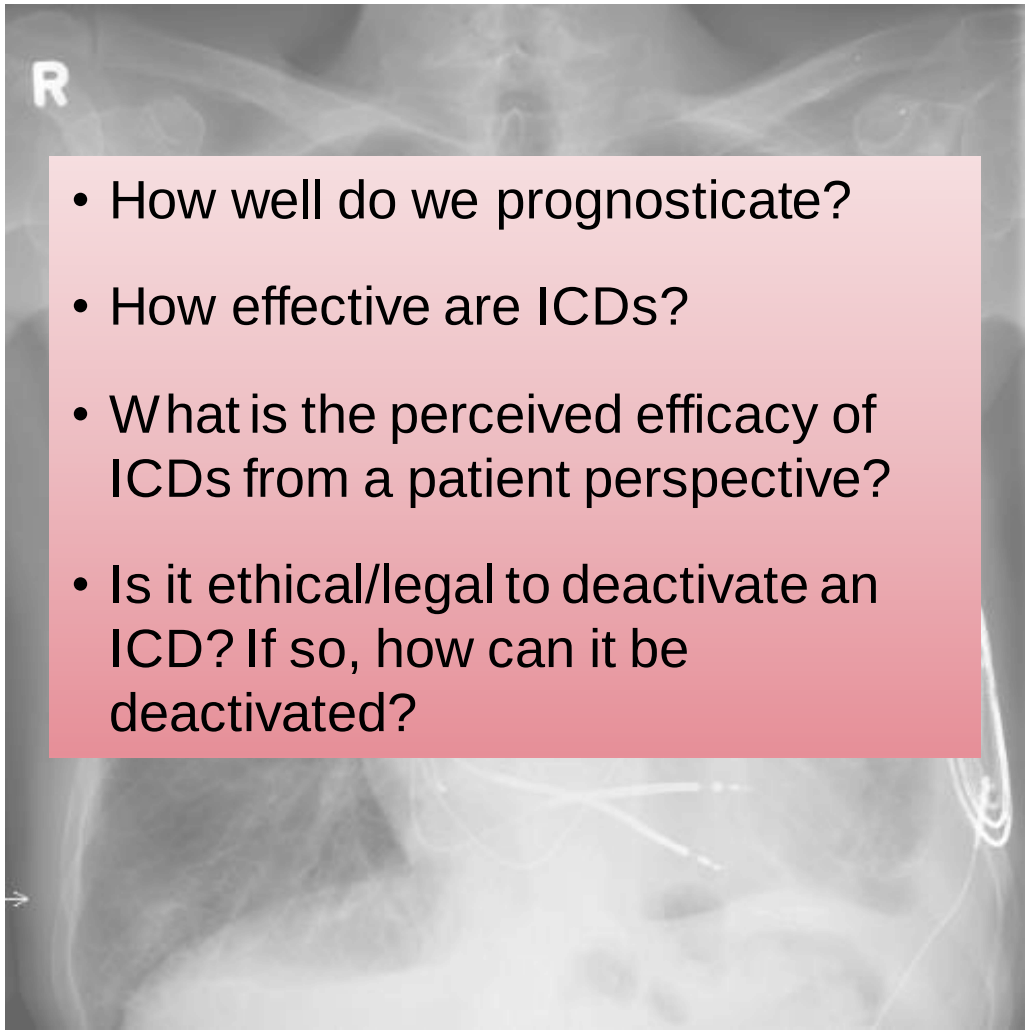
- 328,027 ICDs were implanted in 2009
- 222,407 new implants
- 105,620 generator upgrades

Case 1: 82-Year-Old Male With Ischemic Cardiomyopathy

- Previous CABG, residual ischemic cardiomyopathy with an ejection fraction estimated at 20%, LBBB.
- Primary prevention CRT-ICD implanted in 2001.
- Multiple admissions for heart failure.
- Challenges with maximizing medical therapy secondary to hypotension - initiated on IV milrinone therapy (3 times/week, 6 hrs/session).
- Does well for several years, then admitted for a subdural hematoma - reviewed by cardiology, prognosis felt to be poor.
- ***What should we do with the ICD?***

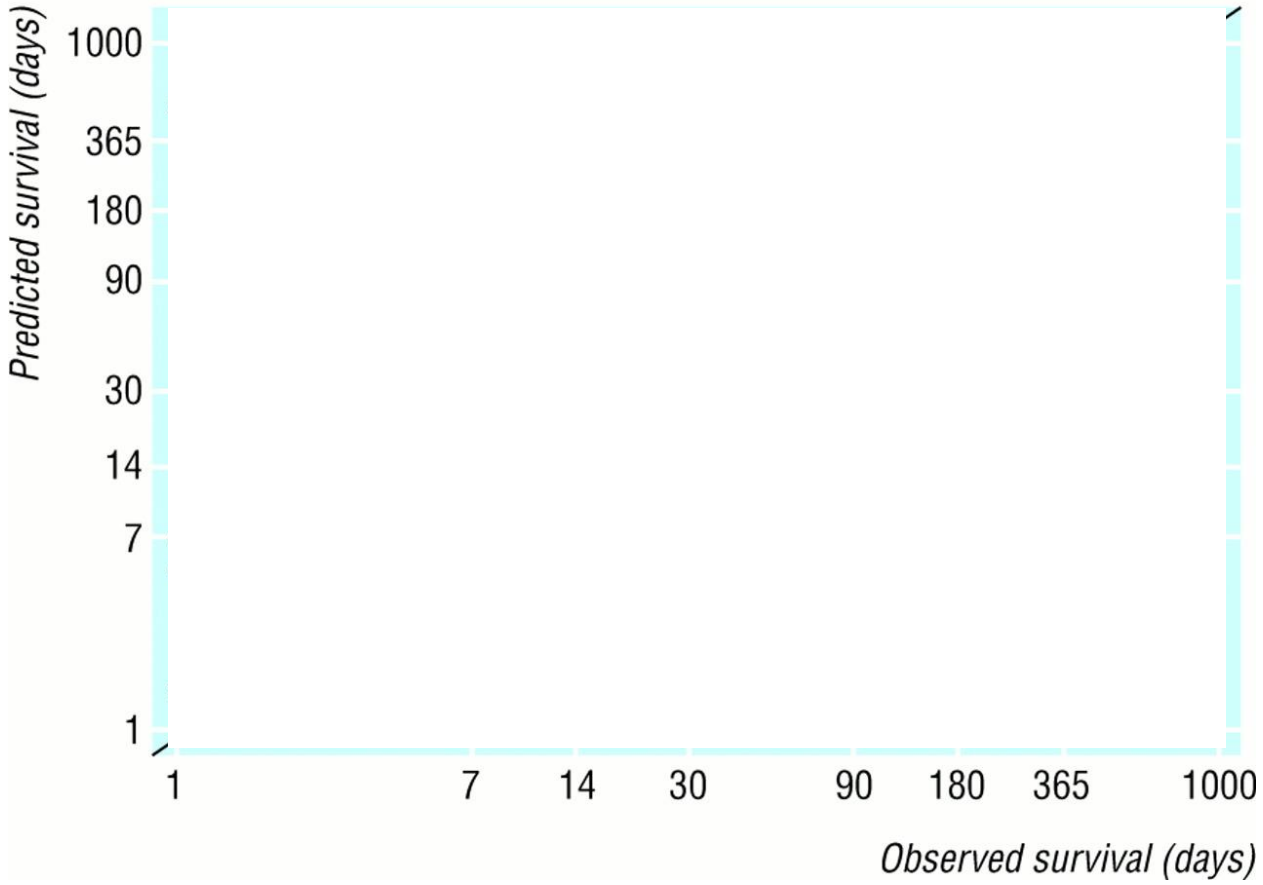


- How well do we prognosticate?
- How effective are ICDs?
- What is the perceived efficacy of ICDs from a patient perspective?
- Is it ethical/legal to deactivate an ICD? If so, how can it be deactivated?

How Well Do We Prognosticate?

How Well Do We Prognosticate?

Predicted versus observed survival in 468 terminally ill hospice



Christakis et al. *BMJ* 2000

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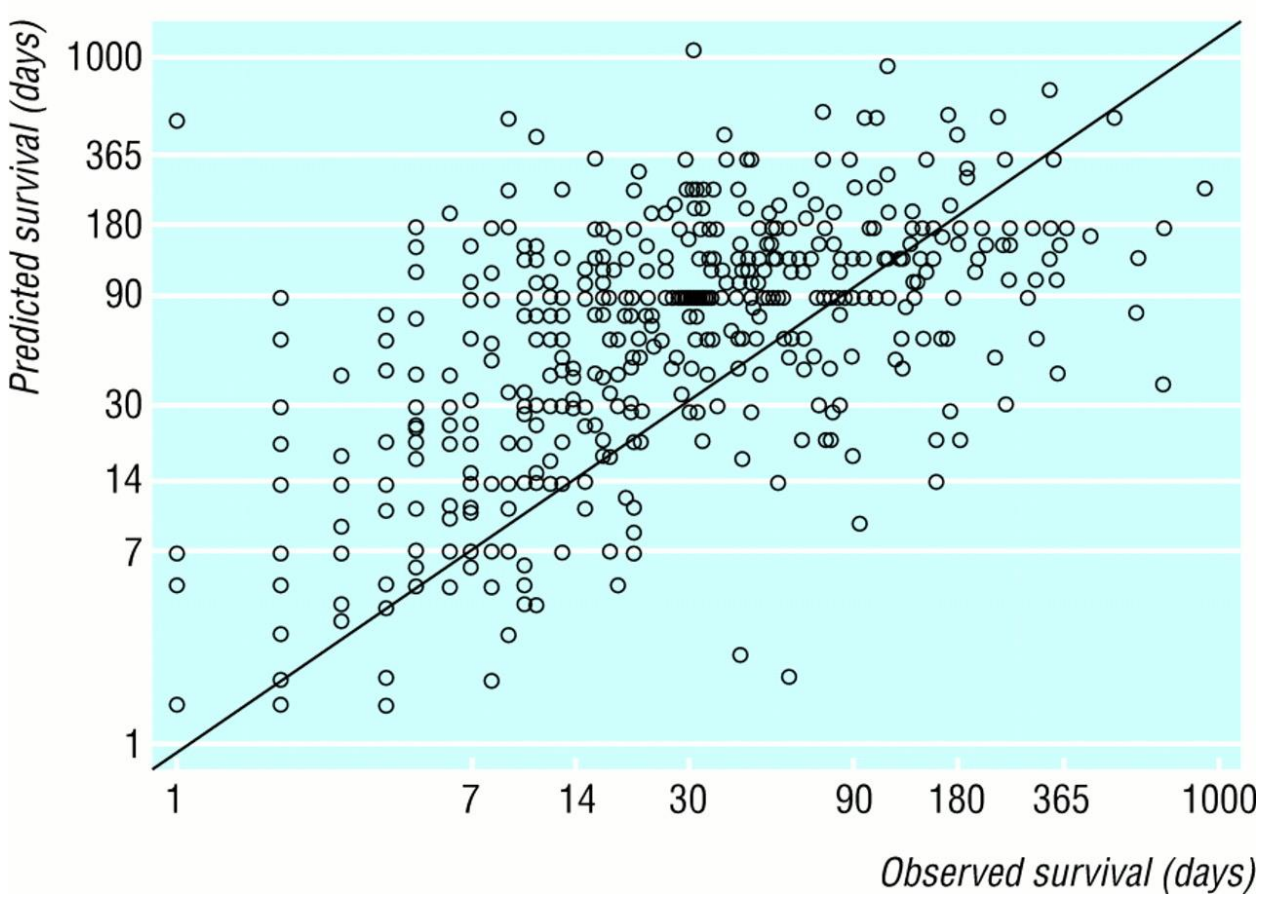
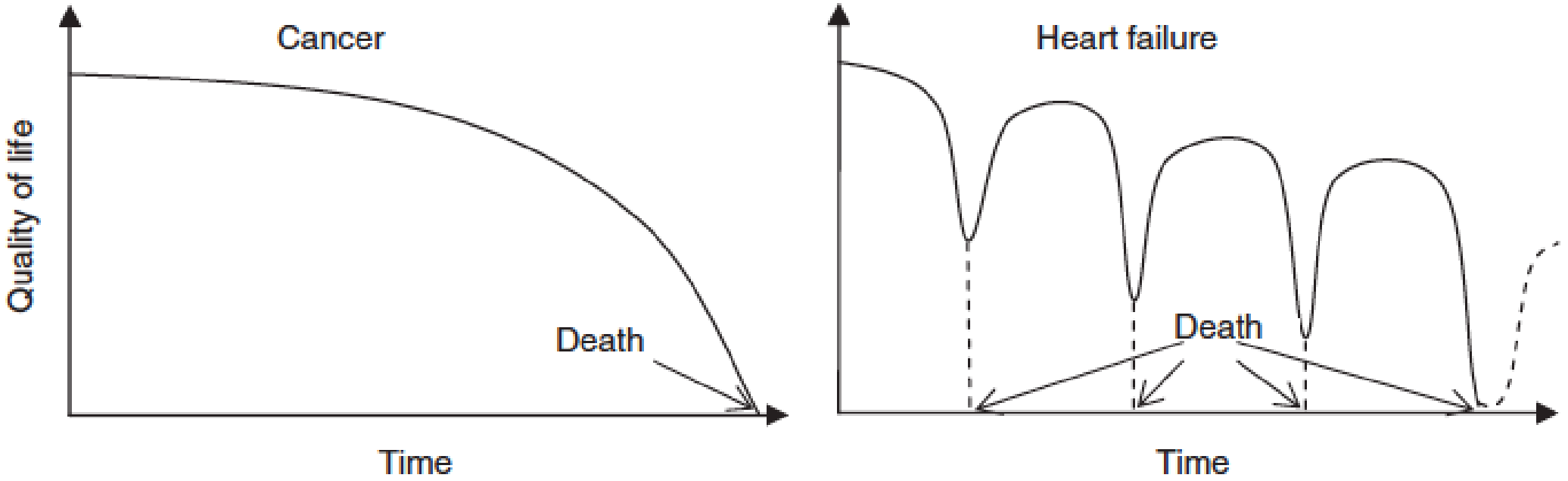


Christakis et al. *BMJ* 2000

How Well Do We Prognosticate?

Comparison of the Disease Courses for Severe Chronic Heart Failure and Cancer During the Last 6-12 Months of Life



Hochgerner et al. Wien Med Wochenschr 2009

How Well Do We Prognosticate?

Prognostication Models

- **Heart Failure Survival Score**
  (Aaronson et al., Circulation, 1997)
- **EFFECT Heart Failure Mortality Prediction**
  (Lee et al., JAMA, 2003)
- **Acute Decompensated Heart Failure National Registry regression tree discrimination**
  (Fonarow et al., JAMA, 2005)
- **Seattle Heart Failure Model**
  (Levy et al., Circulation, 2006)
- **HF-ACTION Predictive Risk Score Model**
  (O'Connor et al., Circ Heart Fail, 2012)
- **Four-Variable Risk Model**
  (Chyu et al., Circ Heart Fail, 2014)

How Well Do We Prognosticate?

138 patients with NYHA class III and IV Heart Failure

- Physicians were asked to prognosticate using two tools:
  1) Qualitative NHS Tool
  2) SHFM

At the <u>12-month</u> follow-up:

43 patients had died (31%)

	Sensitivity	Specificity
Qualitative NHS Tool		
Seattle Heart Failure Model		

Haga et al. *Heart* 2012

How Well Do We Prognosticate?

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At the <u>12-month</u> follow-up:

43 patients had died (31%)

		Sensitivity	Specificity
Qualitative NHS Tool	119 deaths	83%	22%
Seattle Heart Failure Model	4 deaths	12%	99%

Haga et al. *Heart* 2012

Patient Expectations from ICDs to Prevent Death

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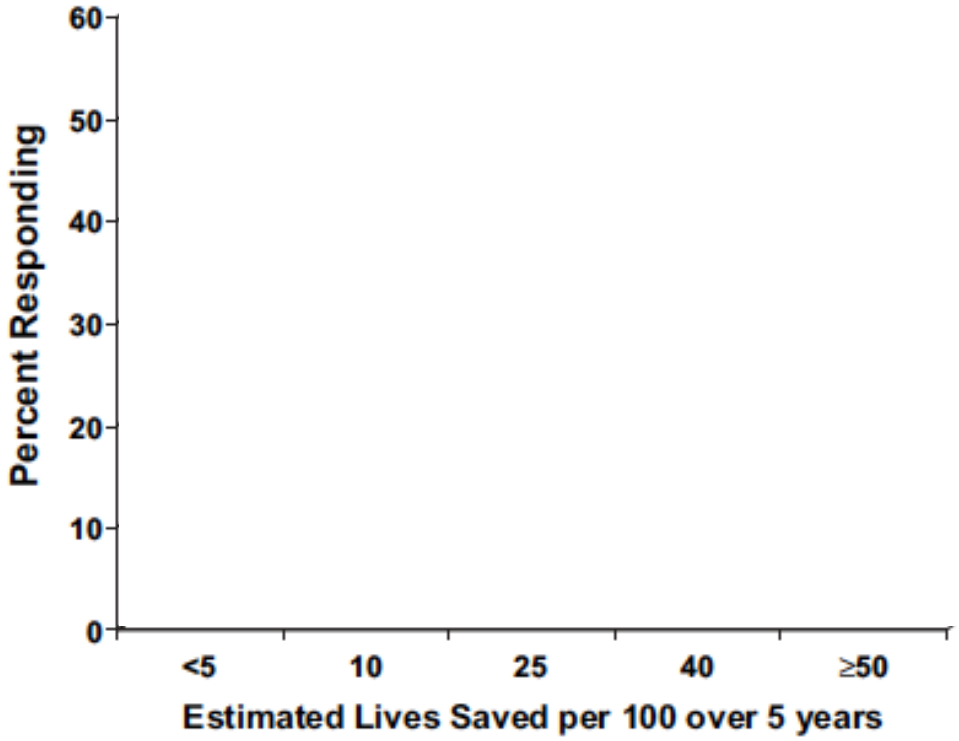

Subjects were asked how many lives per 100 they would expect an ICD to save during the first 5 years after implantation

Stewart et al. 2010

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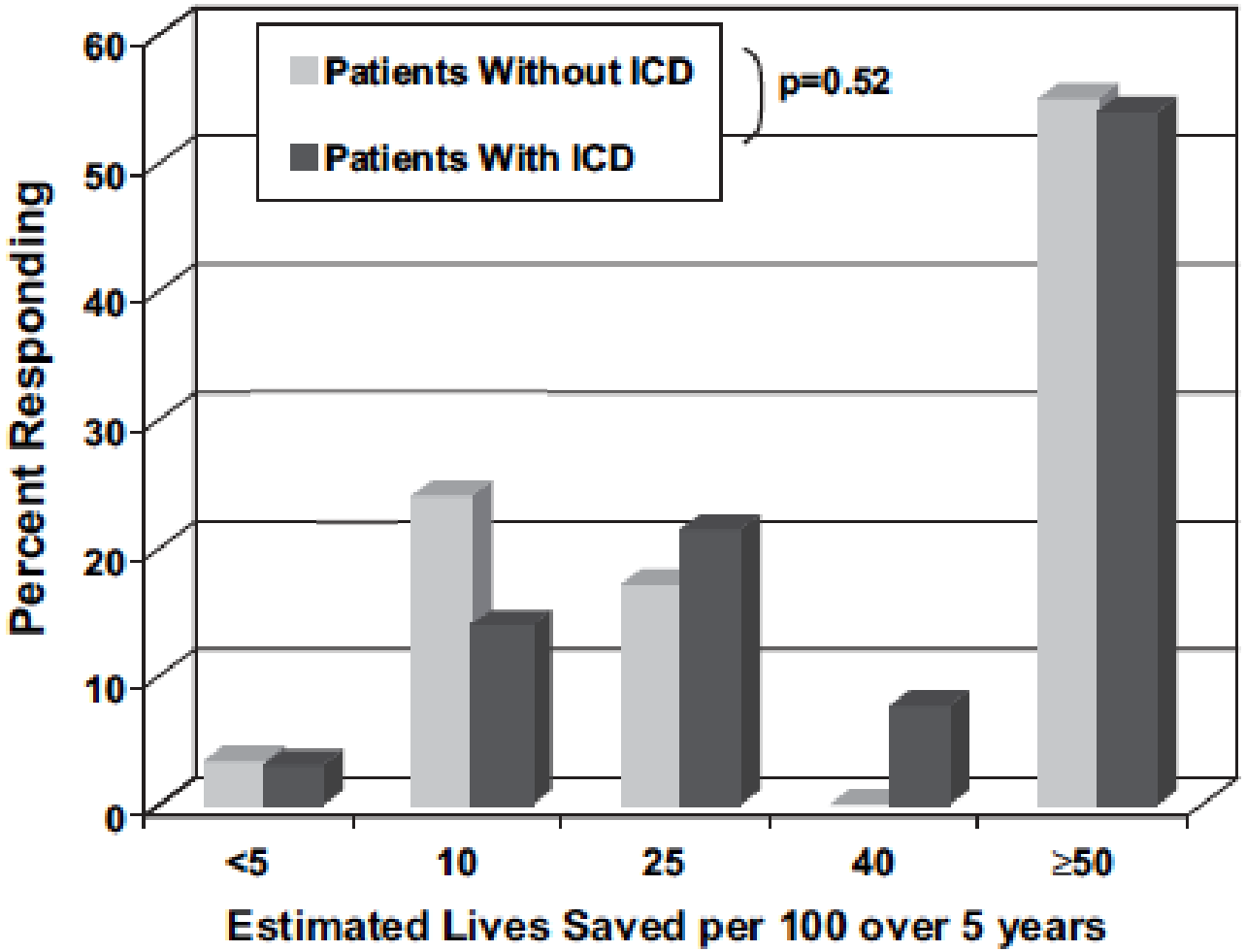

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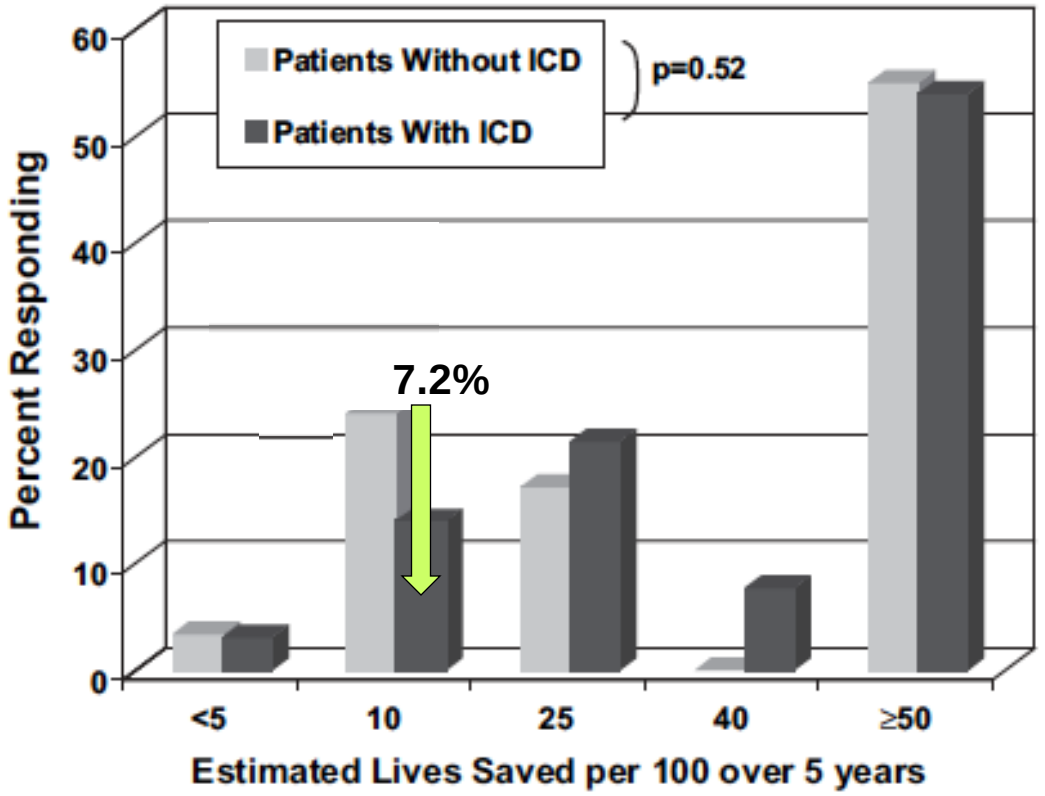

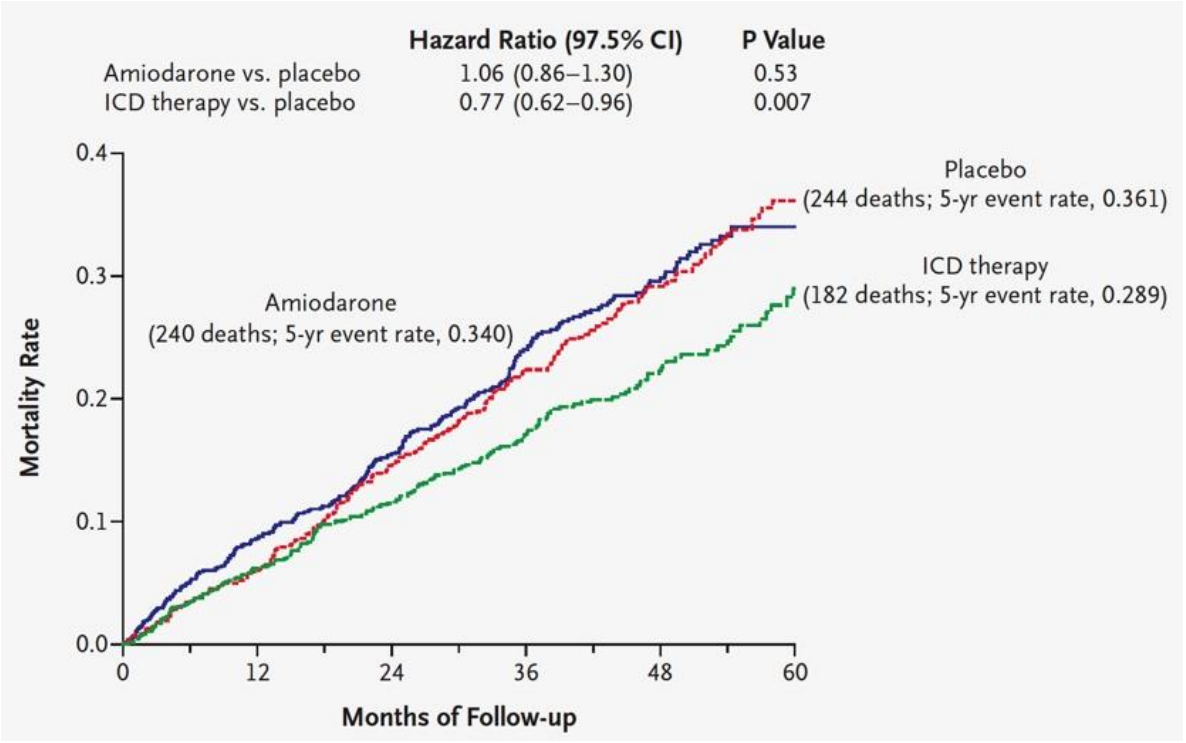

Bardy et al. *NEJM* 2005

Subjects were asked how many lives per 100 they would expect an ICD to save during the first 5 years after implantation.

Stewart et al. 2010

Is it Ethical/Legal to Deactivate an ICD?

HRS Expert Consensus Statement on the Management of Cardiovascular Implantable Electronic Devices (CIEDs) in patients nearing end of life or requesting withdrawal of therapy

This document was developed in collaboration and endorsed by the American College of Cardiology (ACC), the American Geriatrics Society (AGS), the American Academy of Hospice and Palliative Medicine (AAHPM); the American Heart Association (AHA), the European Heart Rhythm Association (EHRA), and the Hospice and Palliative Nurses Association (HPNA).

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It is well-documented that implantable cardioverter-defibrillators (ICDs) save lives in multiple populations at risk for sudden death.[2] Pacemakers (PMs) have saved lives for individuals with bradyarrhythmias for five decades,[3] and cardiac resynchronization therapy (CRT) devices more recently have also been shown to improve symptoms and survival.[4] As indications for device therapy continue to expand,[2] the population of patients with these devices continues to grow.[5]

Despite the introduction of new technologies, all patients ultimately will reach the end of their lives, whether due to their underlying heart condition, or development of another terminal illness. In the last weeks of their lives,[1] twenty percent of ICD patients receive shocks which are painful[6]

Lampert et al. *Heart Rhythm* 2010

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"Ethically, CIED deactivation is neither physician-assisted suicide nor euthanasia."

"… the clinician's intent is to discontinue the unwanted treatment and allow the patient to die naturally of the underlying disease - not to terminate the patient's life."

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It is well documented that implantable cardioverter-defibrillators (ICDs) and pacemakers (PMs) have saved lives for patients at risk for sudden death.[2] Pacemakers (PMs) have saved lives for [illegible] and cardiac resynchronization therapy (CRT) devices more recently have also been shown to improve symptoms and survival.[4] As indications for device therapy continue to expand,[2] the population of patients with these devices continues to grow.[5]

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Lampert et al. *Heart Rhythm* 2010

How is an ICD Deactivated?

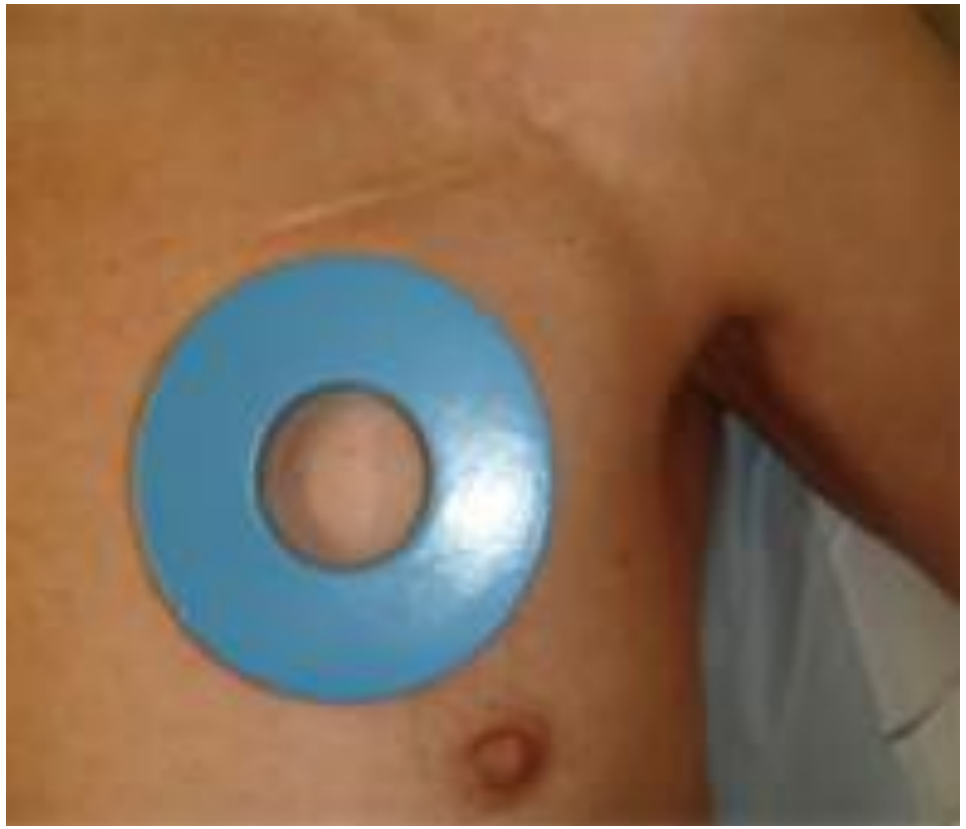
How is an ICD Deactivated?

Deactivation does **not** require an operation.

- It can be carried out by reprogramming the ICD.
- This is typically done by a cardiologist/electrophysiologist or a cardiac device nurse.

When formal deactivation by reprogramming cannot be performed in a timely manner, a strong magnet placed over the ICD generator will usually result in the ICD therapies being disabled.

- Pacing therapies are not deactivated by magnet application.
- **The magnet must remain in place for ICD therapies to be deactivated.**



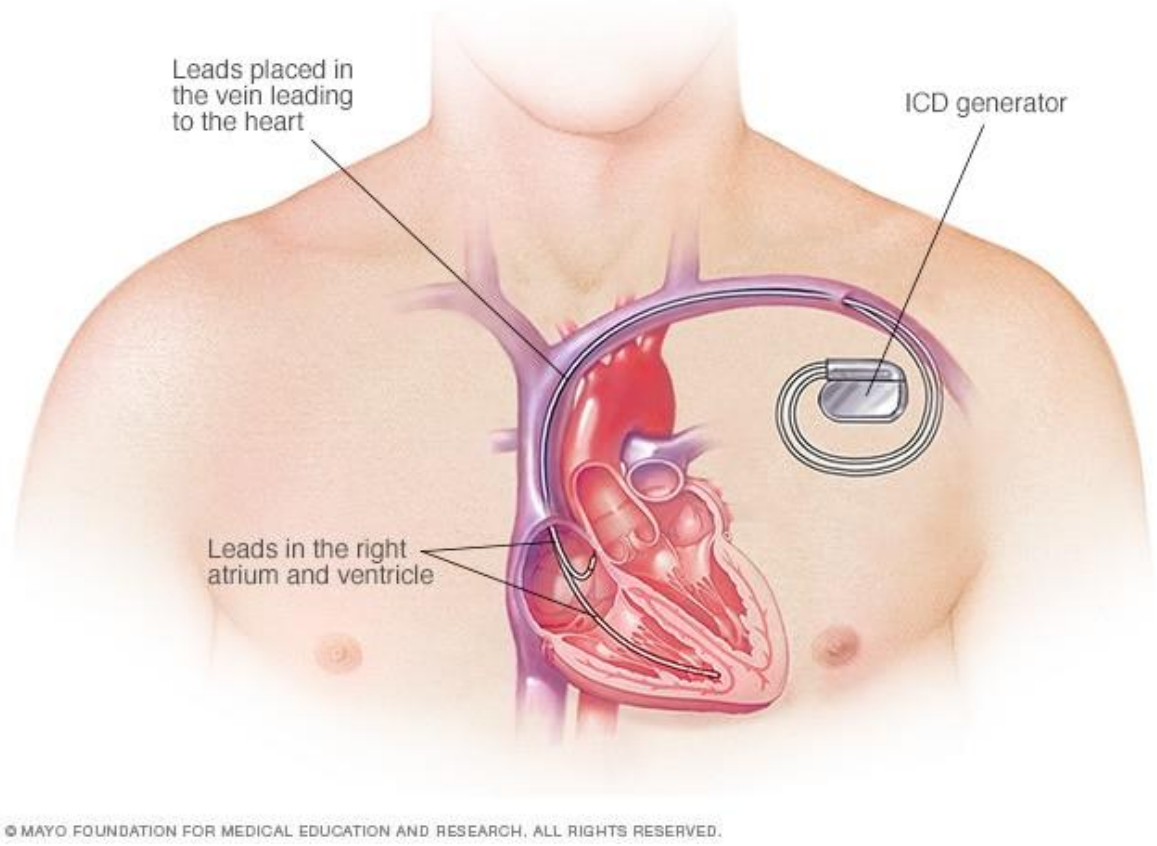
Case-Based Discussion

Case 1: 82-Year-Old Male With Ischemic Cardiomyopathy

What should we do with the ICD?

Case 1: 82-Year-Old Male With Ischemic Cardiomyopathy

- The role of the ICD therapies was reviewed with the patient & family.
    - The patient elected to maintain all therapies.
- The patient's clinical status improves and he is discharged from hospital.
- He continues with milrinone for another 2 ½ years (at a reduced dose).

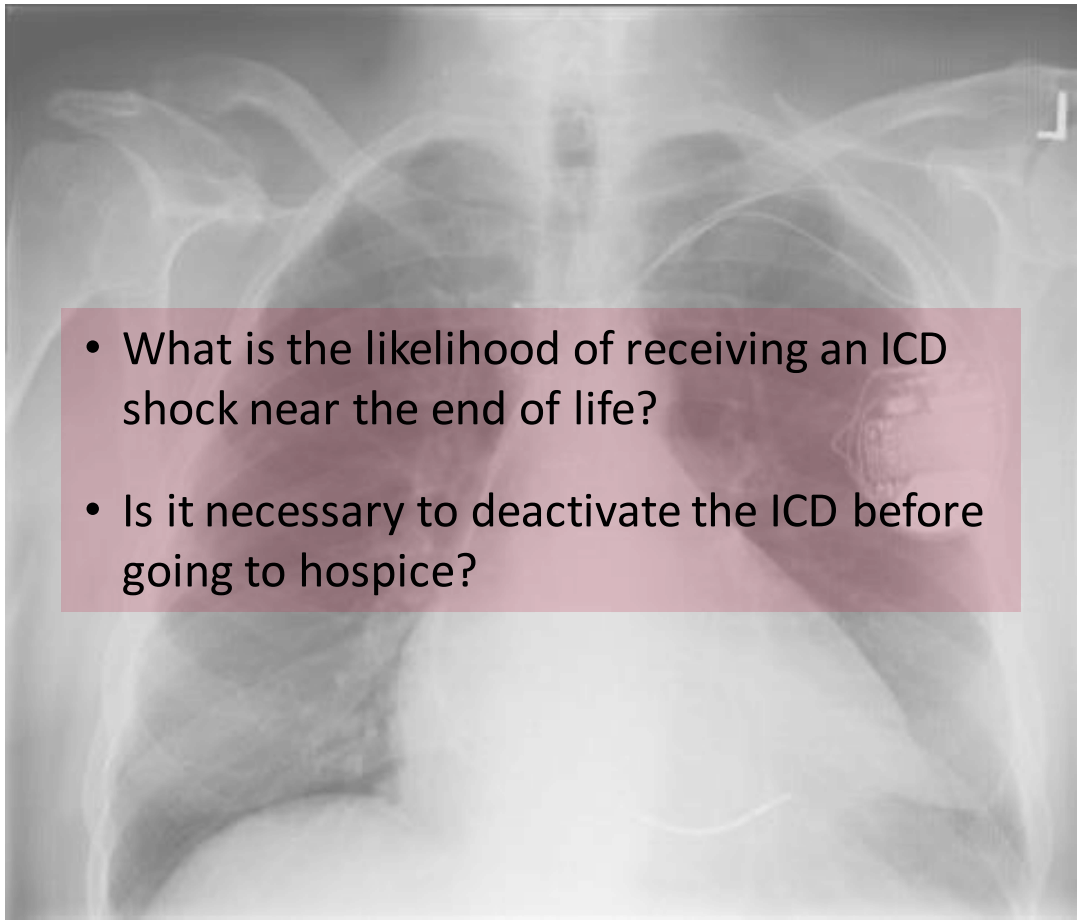


Case 1: 82-Year-Old Male With Ischemic Cardiomyopathy

- The patient's clinical status then deteriorates and his hemodynamics no longer support the use of milrinone.
  - Milrinone is discontinued.
  - The role of the ICD therapies was again reviewed, and the patient again elected to maintain all ICD therapies.
- The patient died at home 6 months later (10 years after first being hospitalized for CHF).
  - It is not known if the patient's ICD discharged on his last day(s) of life.

Case 2: 78-Year-Old Male Awaiting Hospice

- Diagnosed with advanced pancreatic cancer 4 months earlier, for which he was initiated on palliative chemotherapy
- Admitted to hospital for the management of worsening abdominal pain – a decision is made to transition to comfort care and the patient is listed for hospice
- The patient also has coronary artery disease, and received an ICD 5 years ago after an episode of Ventricular Tachycardia (VT)
- Interrogation of the ICD shows that the patient had another episode of VT one week ago, which was terminated by an ICD shock
- ***What should we do with the ICD?***



What is the Likelihood of Receiving an ICD Shock Near the End of Life?

Implantable Cardioverter-Defibrillator Therapy Before Death

High Risk for Painful Shocks at End of Life

Annika Kinch Westerdahl, RN; Johanna Sjöblom, MD; Anne-Cathrine Mattiasson, PhD; Mårten Rosenqvist, MD, PhD; Viveka Frykman, MD, PhD

Background—Several trials have demonstrated improved survival with implantable cardioverter-defibrillator (ICD) therapy. The cause and nature of death in the ICD population have been insufficiently investigated. The objective of this study was to analyze ICDs from deceased patients to assess the incidence of ventricular tachyarrhythmias, the occurrence of shocks, and possible device malfunction.

Methods and Results—We prospectively analyzed intracardiac electrograms in 125 explanted ICDs. The incidence of ventricular tachyarrhythmia, including ventricular fibrillation, and shock treatment was assessed. Ventricular tachyarrhythmia occurred in 35% of the patients in the last hour of their lives; 24% had an arrhythmic storm, and 31% received shock treatment during the last 24 hours. Arrhythmic death was the primary cause of death in 13% of the patients, and the most common cause of death was congestive heart failure (37%). More than half of the patients (52%) had a do-not-resuscitate order, and 65% of them still had the ICD shock therapies activated 24 hours before death. Possible malfunctions of the ICD were found in 3% of all patients.

Conclusions—More than one third of the patients had a ventricular tachyarrhythmia within the last hour of life. Cardiac death was the primary cause and heart failure the specific cause of death in the majority of the cases. Devices remained active in more than half of the patients with a do-not-resuscitate order; almost one fourth of these patients received at least 1 shock in the last 24 hours of life. **(*Circulation*. 2014;129:422-429.)**

Key Words: death ■ electric countershock ■ implantable cardioverter-defibrillators ■ tachyarrhythmia ■ terminal care

Implantable Cardioverter-Defibrillator Therapy Before Death

High Risk for Painful Shocks at End of Life

31% of patients received at least one shock from their ICDs during their last day of life

- 14 patients (45%) received 1 to 2 shocks
- 17 patients (55%) received ≥3 shocks
  - 10 patients (32%) experienced >10 shocks

More than half of the patients (52%) had a do-not-resuscitate order

- 65% of these patients still had the ICD shock therapies activated 24 hours before death

Backgro) therapy.
The c tudy was
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Implantab… …e Death

Annika … PhD;

Background—Seve… …or (ICD) therapy. The cause and m… …of this study was to analyze ICDs … …rence of shocks, and possible dev…

Methods and Resu… …The incidence of ventricular t… …ssed. Ventricular tachyarrhythmia … …storm, and 31% received shock t… …h in 13% of the patients, and the … …e patients (52%) had a do-not-res… …rs before death. Possible malfunc…

Conclusions—Mor… …r of life. Cardiac death was the pri… …Devices remained active in more tha… …received at least 1 shock in the las…

Key Words: death ■ electric countershock ■ implantable cardioverter-defibrillators ■ tachyarrhythmia ■ terminal care

Table 2. Distribution of Shocks in Patients With DNR Order*

	Adequate Shock	Number of Shocks
Patient 1	Yes	2
Patient 2	Yes	1
Patient 3	Yes	6
Patient 4	Yes	1
Patient 5	No†	2
Patient 6	Yes	6
Patient 7	Yes	1
Patient 8	No‡	42
Patient 9	Yes	18
Patient 10	Yes	1

DNR indicates do not resuscitate.
*All DNR orders were written before shock treatment.
†Inadequate shock treatment because of oversensing.
‡Inadequate shock treatment because of atrial fibrillation.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Prognostic Importance of Defibrillator Shocks in Patients with Heart Failure

Jeanne E. Poole, M.D., George W. Johnson, B.S.E.E., Anne S. Hellkamp, M.S., Jill Anderson, R.N., David J. Callans, M.D., Merritt H. Raitt, M.D., Ramakota K. Reddy, M.D., Francis E. Marchlinski, M.D., Raymond Yee, M.D., Thomas Guarnieri, M.D., Mario Talajic, M.D., David J. Wilber, M.D., Daniel P. Fishbein, M.D., Douglas L. Packer, M.D., Daniel B. Mark, M.D., M.P.H., Kerry L. Lee, Ph.D., and Gust H. Bardy, M.D.

ABSTRACT

BACKGROUND

Patients with heart failure who receive an implantable cardioverter–defibrillator (ICD) for primary prevention (i.e., prevention of a first life-threatening arrhythmic event) may later receive therapeutic shocks from the ICD. Information about long-term prognosis after ICD therapy in such patients is limited.

METHODS

Of 829 patients with heart failure who were randomly assigned to ICD therapy, we implanted the ICD in 811. ICD shocks that followed the onset of ventricular tachycardia or ventricular fibrillation were considered to be appropriate. All other ICD shocks were considered to be inappropriate.

RESULTS

Over a median follow-up period of 45.5 months, 269 patients (33.2%) received at least one ICD shock, with 128 patients receiving only appropriate shocks, 87 receiving only inappropriate shocks, and 54 receiving both types of shock. In a Cox proportional-hazards model adjusted for baseline prognostic factors, an appropriate ICD shock, as compared with no appropriate shock, was associated with a significant increase in the subsequent risk of death from all causes (hazard ratio, 5.68; 95% confidence interval [CI], 3.97 to 8.12; P<0.001). An inappropriate ICD shock, as compared with no inappropriate shock, was also associated with a significant increase in the risk of death (hazard ratio, 1.98; 95% CI, 1.29 to 3.05; P=0.002). For patients who survived longer than 24 hours after an appropriate ICD shock, the risk of death remained elevated (hazard ratio, 2.99; 95% CI, 2.04 to 4.37; P<0.001). The most common cause of death among patients who received any ICD shock was progressive heart failure.

From the University of Washington (J.E.P., D.P.F., G.H.B.); and the Seattle Institute for Cardiac Research (G.W.J., J.A., G.H.B.) — both in Seattle; Duke Clinical Research Institute, Durham, NC (A.S.H., D.B.M., K.L.L.); University of Pennsylvania, Philadelphia (D.J.C., F.E.M.); Portland Veterans Affairs Medical Center and Oregon Health Sciences University, Portland (M.H.R.); Oregon Cardiology Associates, Eugene (R.K.R.); University Hospital, London, ON, Canada (R.Y.); Johns Hopkins University, Baltimore (T.G.); Institut de Cardiologie de Montréal, Université de Montréal, Montreal (M.T.); Loyola University Medical Center, Maywood, IL (D.J.W.); and the Mayo Clinic, Rochester, MN (D.L.P.). Address reprint requests to Dr. Poole at the Division of Cardiology, University of Washington School of Medicine, 1959 NE Pacific St., Box 356422, Seattle, WA 98195-6422, or at jpoole@u.washington.edu.

N Engl J Med 2008;359:1009-17.

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ABSTRACT

In a primary prevention patient population, 31% of patients experienced a shock in the last 24 hours of life.

METHODS

Of 829 patients with heart failure who were randomly assigned to ICD therapy, we implanted the ICD in 811. ICD shocks that followed the onset of ventricular tachycardia or ventricular fibrillation were considered to be appropriate. All other ICD shocks were considered to be inappropriate.

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K.L.L.); University of Pennsylvania, Philadelphia (D.J.C., F.E.M.); Portland Veterans Affairs Medical Center and Oregon Health Sciences University, Portland (M.H.R.); Oregon Cardiology Associates, Eugene (R.K.R.); University Hospital, London, ON, Canada (R.Y.); Johns Hopkins University, Baltimore (T.G.); Institut de Cardiologie de Montréal, Université de Montréal, Montreal (M.T.); Loyola University Medical Center, Maywood, IL (D.J.W.); and the Mayo Clinic, Rochester, MN (D.L.P.). Address reprint requests to Dr. Poole at the Division of Cardiology, University of Washington School of Medicine, 1959 NE Pacific St., Box 356422, Seattle, WA 98195-6422, or at jpoole@u.washington.edu.

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Is it necessary to deactivate the ICD before going to hospice?

ARTICLE | Annals of Internal Medicine

Brief Communication: Management of Implantable Cardioverter-Defibrillators in Hospice: A Nationwide Survey

Nathan Goldstein, MD; Melissa Carlson, MBA, PhD; Elayne Livote, MPH, MS, MA; and Jean S. Kutner, MD, MSPH

Background: Communication about the deactivation of implantable cardioverter-defibrillators (ICDs) in patients near the end of life is rare.

Objective: To determine whether hospices are admitting patients with ICDs, whether such patients are receiving shocks, and how hospices manage ICDs.

Design: Cross-sectional survey.

Setting: Randomly selected hospice facilities.

Participants: 900 hospices, 414 of which responded fully.

Measurements: Frequency of admission of patients with ICDs, frequency with which patients received shocks, existence of ICD deactivation policies, and frequency of deactivation.

Results: 97% of hospices admitted patients with ICDs, and 58% reported that in the past year, a patient had been shocked. Only 10% of hospices had a policy that addressed deactivation. On average, 42% (95% CI, 37% to 48%) of patients with ICDs had the shocking function deactivated.

Limitation: The study relied on the knowledge of hospice administrators.

Conclusion: Hospices are admitting patients with ICDs, and patients are being shocked at the end of life. Ensuring that hospices have policies in place to address deactivation may improve the care for patients with these devices. The authors provide a sample deactivation policy (available at www.annals.org).

Primary Funding Source: National Institute of Aging and National Institute of Nursing Research.

Ann Intern Med. 2010;152:296-299. www.annals.org
For author affiliations, see end of text.

ARTICLE | Annals of Internal Medicine

Brief Communication: Management of Implantable Cardioverter-Defibrillators in Hospice: A Nationwide Survey

- Almost all hospices (97%) admitted patients with active ICDs.
- 58% of hospices reported that at least 1 person was shocked in the last year.
- 20% of hospices had a question on their intake forms to identify patients with ICDs.
- 10% of hospices had a deactivation policy.
- 25% of hospices had a strong magnet available to deactivate an ICD
    - of these, 64% provided training in its use.

deactivation policies, and frequency of deactivation.

Results: 97% of hospices admitted patients with ICDs, and 58% reported that in the past year, a patient had been shocked. Only

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www.annals.org

Alberta Health Services

GUIDELINE

TITLE
ICD DEACTIVATION AT PATIENT END OF LIFE

SCOPE
Cardiac Sciences Calgary Zone

DOCUMENT #
CSCZ-I-3

APPROVAL AUTHORITY
Department Head, Cardiac Sciences- Dr. Todd Anderson
Executive Director, Cardiac Sciences FMC- Caroline Hatcher

INITIAL EFFECTIVE DATE
July 31, 2015

SPONSOR
Department of Cardiac Sciences

REVISION EFFECTIVE DATE
March 28, 2017

PARENT DOCUMENT TITLE, TYPE AND NUMBER
Not applicable

SCHEDULED REVIEW DATE
March 28, 2020

NOTE: The first appearance of terms in bold in the body of this document (except titles) are defined terms – please refer to the Definitions section.

If you have any questions or comments regarding the information in this document, please contact the Policy & Forms Department at policy@ahs.ca. The Policy & Forms website is the official source of current approved policies, procedures, directives, standards, protocols and guidelines.

OBJECTIVES

To provide guidance to decision making around turning off the defibrillator function (tachycardia therapies) in patients who are at the end of their life.

APPLICABILITY

Compliance with this document is required by all Alberta Health Services employees, members of the medical and midwifery staffs, Students, Volunteers, and other persons acting on behalf of Alberta Health Services (including contracted service providers as necessary) working in Cardiac Sciences in the Calgary Zone.

PERSONNEL PERMITTED TO PERFORM PROCEDURE

The care of patients requiring deactivation of ICD tachycardia functions via a programmer is restricted to **Health Care Professionals** who demonstrate competency in clinical practice and have received the appropriate didactic and clinical education and training in dysrhythmia interpretation and CIED programming.

Where these professionals aren't available and in emergency situations, a **Health Care Professional** may apply a magnet over the ICD following confirmation of a physician order (a verbal order may be given in an emergency, but must be followed by a written order).

Alberta Health Services

GUIDELINE

TITLE
ICD DEACTIVATION AT PATIENT END OF LIFE

SCOPE
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DOCUMENT #
CSCZ-I-3

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NOTE: The first appearance of terms in bold in the body of this document (except titles) are defined terms – please refer to the Definitions section.

Hospice policy requires deactivation of an ICD once the patient is admitted.

- The on call ICD RN should be paged and will arrive at the hospice within 24hrs (after review with an Electrophysiologist).

Alberta Health Services (including contracted service providers as necessary) working in Cardiac Sciences in the Calgary Zone.

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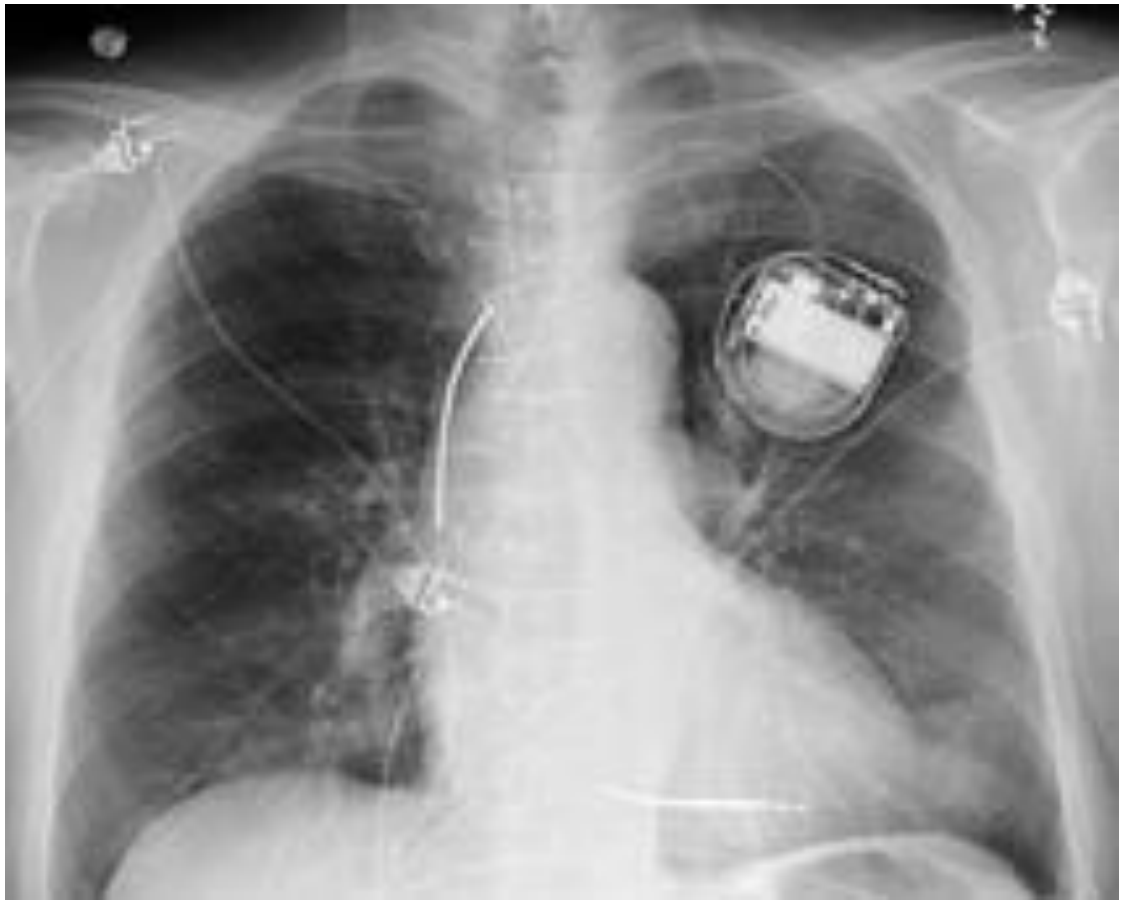
Case 2: 78-Year-Old Male Awaiting Hospice

What should we do with the ICD?

Case 2: 78-Year-Old Male Awaiting Hospice

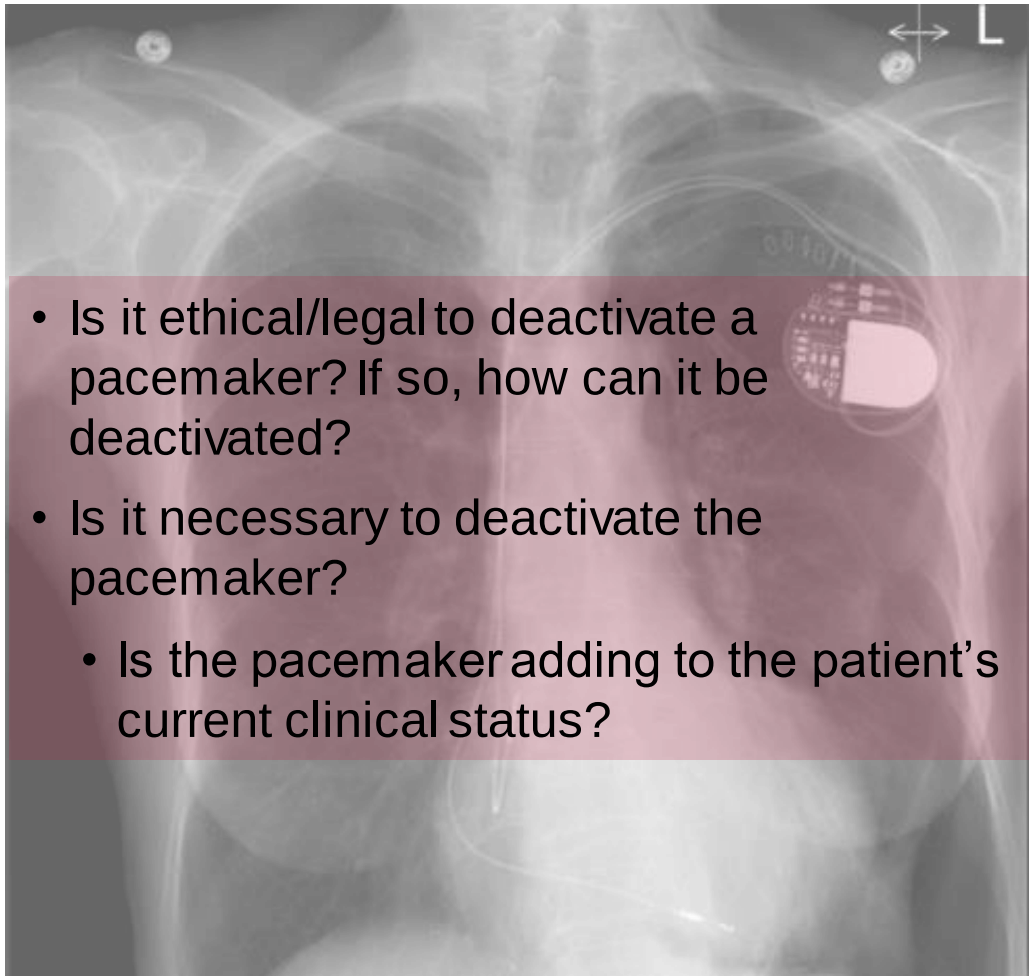


- After informing the patient that he recently received an ICD shock, he requested some time to consider what he wanted to do with his ICD shock therapies.
- After consulting with family, the patient made a decision to discontinue his ICD shock therapies.
- He was then transferred to hospice and died peacefully 4 days later.

Case 3: 88-Year-Old Female With Reduced L.O.C.

- Lives in an assisted living facility, was found in her room with a reduced level of consciousness after not showing up for dinner.
- The patient transported to ER by EMS.
  - Vitals: HR 105 BPM, BP 156/94 mm Hg.
  - A CT head shows a massive left MCA territory stroke.
  - ECG – sinus tachycardia.
- After discussion with family, a decision is made for comfort care.
- The patient had a pacemaker implanted 5 years ago for sick sinus syndrome.
  - The patient is **not** pacemaker dependant.
- The family request that all life-sustaining measures discontinued including the pacemaker.

The attending MD asks if the pacemaker should be deactivated.



Is it Ethical/Legal to Deactivate a Pacemaker?

HRS Expert Consensus Statement on the Management of Cardiovascular Implantable Electronic Devices (CIEDs) in patients nearing end of life or requesting withdrawal of therapy

This document was developed in collaboration and endorsed by the American College of Cardiology (ACC), the American Geriatrics Society (AGS), the American Academy of Hospice and Palliative Medicine (AAHPM); the American Heart Association (AHA), the European Heart Rhythm Association (EHRA), and the Hospice and Palliative Nurses Association (HPNA).

Rachel Lampert, MD, FHRS,* David L. Hayes, MD, FHRS,† George J. Annas, JD, MPH,‡ Margaret A. Farley, PhD,¶ Nathan E. Goldstein, MD,§ Robert M. Hamilton, MD,** G. Neal Kay, MD, FHRS,†† Daniel B. Kramer, MD,‡‡ Paul S. Mueller, MD, MPH,† Luigi Padeletti, MD,¶¶ Leo Pozuelo, MD,§§ Mark H. Schoenfeld, MD, FHRS,* Panos E. Vardas, MD, PhD,*** Debra L. Wiegand, PhD, RN,††† Richard Zellner, JD, MA‡‡‡

**Yale University, School of Medicine, New Haven, CT, †Mayo Clinic, Rochester, MN ‡Boston University, School of Public Health, Boston, MA, ¶Yale University Divinity School, New Haven, CT, §Mount Sinai School of Medicine New York, NY and the James J Peters VA Medical Center, Bronx, NY, **The Hospital for Sick Children, Toronto, Canada ††The University of Alabama at Birmingham, Birmingham, AL, ‡‡Beth Israel Deaconess Medical Center, Boston, MA, ¶¶University of Florence, Institute of Cardiology, Florence, Italy, §§Cleveland Clinic, Cleveland, OH, ***Heraklion University Hospital, Crete, Greece, †††University of Maryland, School of Nursing, Baltimore, MD, ‡‡‡Patient representative; Adjunct lecturer at Case Western Reserve University, Bioethics Department, Cleveland, OH.*

TABLE OF CONTENTS

It is well-documented that implantable cardioverter-defibrillators (ICDs) save lives in multiple populations at risk for sudden death.[2] Pacemakers (PMs) have saved lives for individuals with bradyarrhythmias for five decades,[3] and cardiac resynchronization therapy (CRT) devices more recently have also been shown to improve symptoms and survival.[4] As indications for device therapy continue to expand,[2] the population of patients with these devices continues to grow.[5]

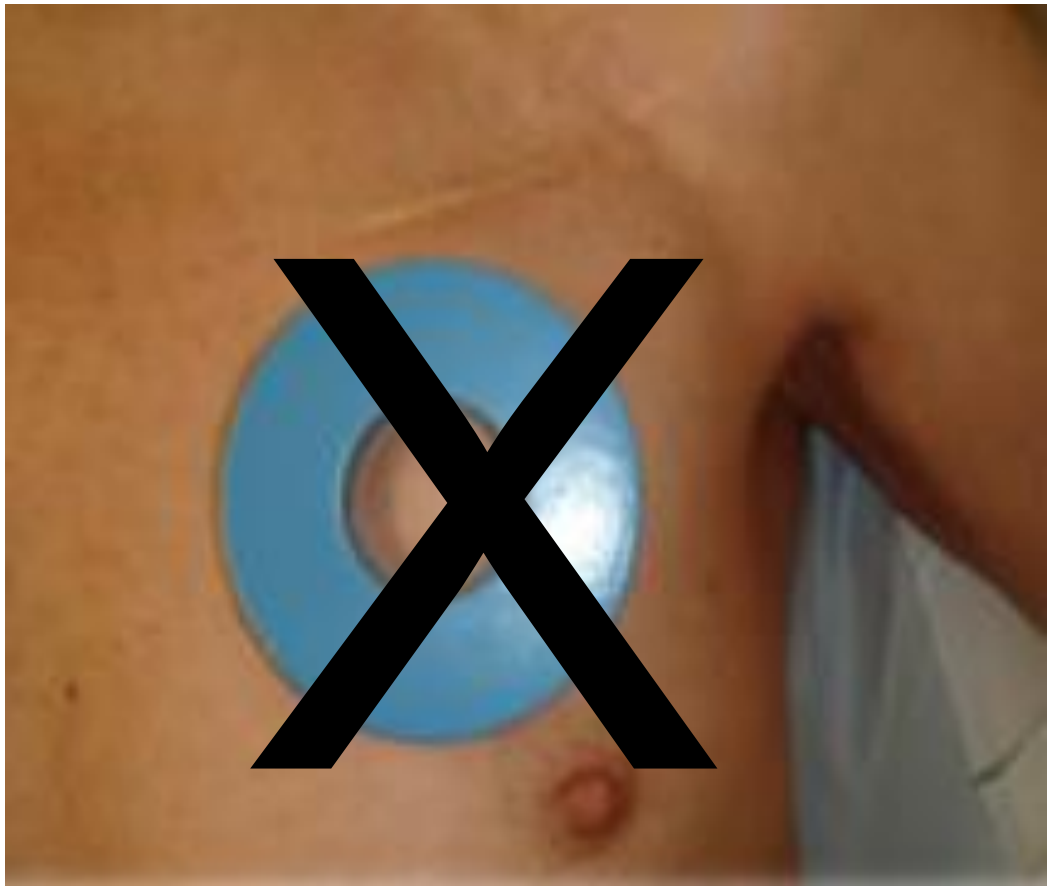
Despite the introduction of new technologies, all patients ultimately will reach the end of their lives, whether due to their underlying heart condition, or development of another terminal illness. In the last weeks of their lives,[1] twenty percent of ICD patients receive shocks which are painful[6]

Lampert et al. *Heart Rhythm* 2010

How is a Pacemaker Deactivated?

How is a Pacemaker Deactivated?

- Deactivation does **not** require an operation.
  - It can be carried out by reprogramming the pacemaker.
  - This is typically done by a cardiologist/electrophysiologist or a cardiac device nurse.
- A magnet will **not** deactivate a pacemaker.



Is it necessary to deactivate the pacemaker?

Is the Pacemaker Adding to the Patient's Current Clinical Status?

Is it necessary to deactivate the pacemaker? Is the Pacemaker Adding to the Patient's Current Clinical Status?

- Vitals: HR 105 BPM, BP 156/94 mmHg
- ECG: sinus tachycardia
- The patient is not pacemaker dependant

Is it necessary to deactivate the pacemaker? Is the Pacemaker Adding to the Patient's Current Clinical Status?

- Vitals: HR 105 BPM, BP 156/94 mmHg
- ECG: sinus tachycardia
- The patient is not pacemaker dependant

The pacemaker is NOT influencing the patient's care

Case 3: 88-Year-Old Female With Reduced L.O.C.

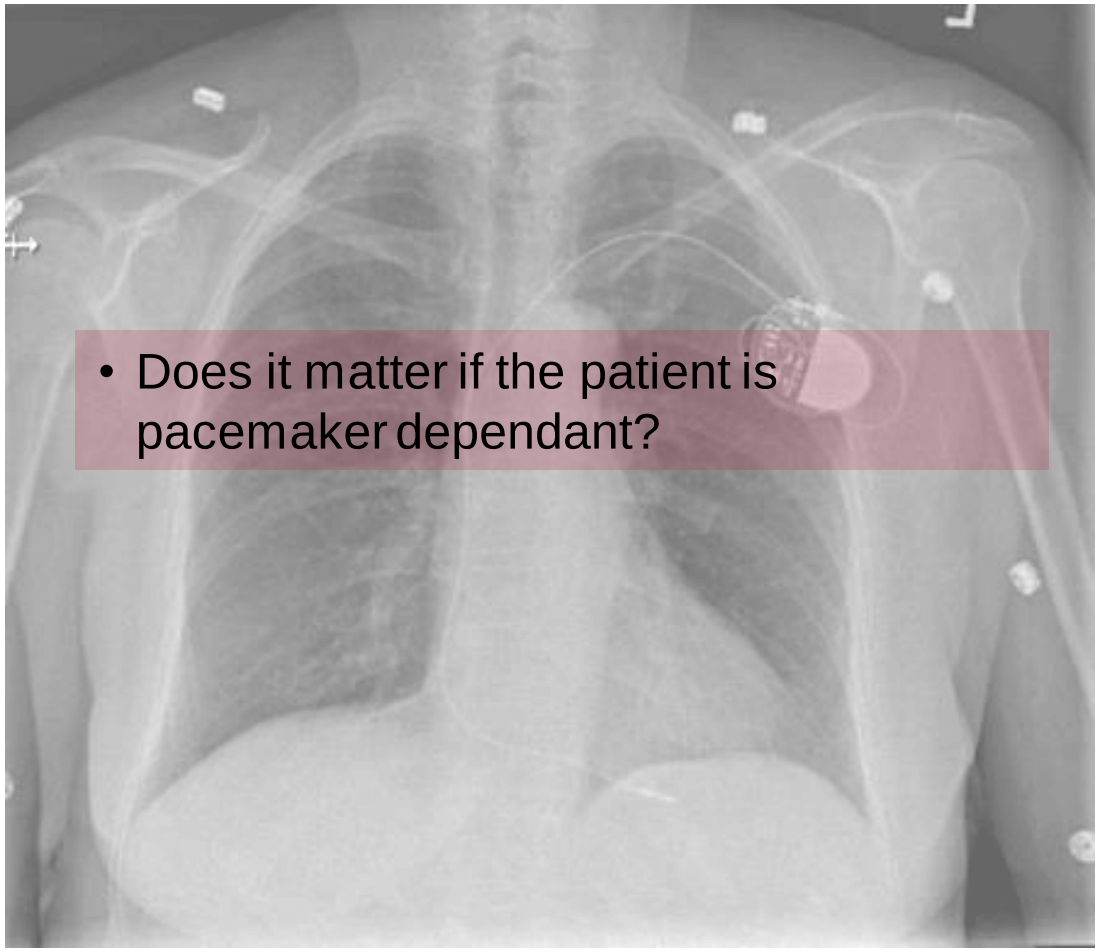
Should the pacemaker be deactivated?

Case 3: 88-Year-Old Female With Reduced L.O.C.

- Family members were informed that the pacemaker was adding very little to the patient's current clinical status.
- They still requested deactivation, which was carried out at the patient's bedside.
- The patient passed away 3 days later.
- Diagnosed with pancreatic cancer 8 months ago.
- Admitted to hospital for worsening abdominal pain.
    - CT abdomen is carried out - significant disease progression is present.

Case 4: 72-Year-Old Female With Abdominal Pain

- The patient also has a pacemaker for bradycardia support (implanted 3 years ago).
  - **The patient is pacemaker dependant.**
- The patient is reviewed by her oncologist who recommends no further chemotherapy.
- The patient request that her pacemaker be deactivated.
- ***Should the pacemaker be deactivated?***



Does it matter if the patient is pacemaker dependant?

Does it matter if the patient is pacemaker dependant?

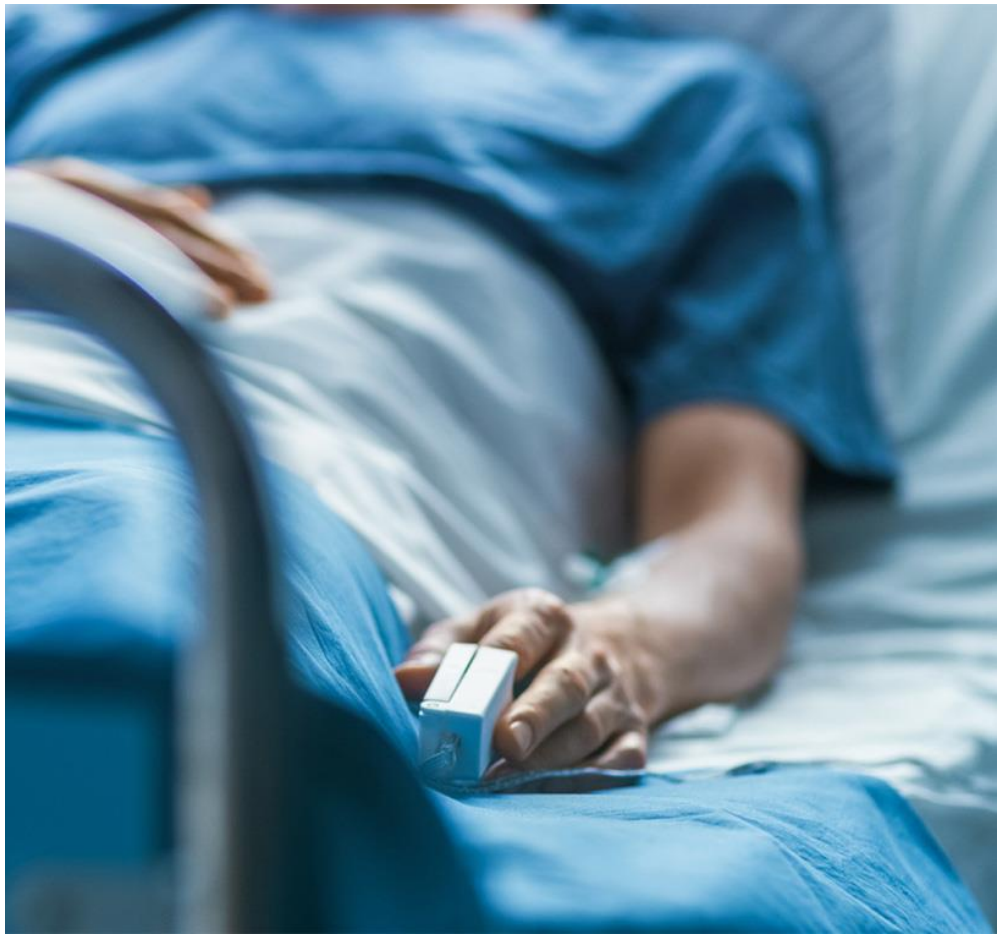
There is widespread agreement that withdrawing life-sustaining treatments such as mechanical ventilation, dialysis, and pacemakers is ethically and legally permissible.

Case 4: 72-Year-Old Female With Abdominal Pain

Should the pacemaker be deactivated?

Case 4: 72-Year-Old Female With Abdominal Pain

- The patient was informed that she could potentially die shortly after pacemaker deactivation.
    - She could also experience profound presyncope / syncope.
- She still requested deactivation, which was carried out in the device clinic.
- The patient passed away in her sleep 2 days later.



Wrap Up

- Please fill out the feedback survey following the session! Link has been added into the chat.
- A recording of this session will be e-mailed to registrants within the next week.
- Please join us for the next session in this series:
  - **Complex case management/ Patients with complex goals of care on March 15, 2023 from 12-1pm ET.**

Thank You

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