

Echocardiography

One of the most important developments in the practice of cardiology in the past century has been the use of ultrasound to examine the heart or echocardiography. The first practical and wide spread use of this technique was developed in 1963 by investigators at the Krannert Institute headed by [Dr. Harvey Feigenbaum](#). With the numerous worldwide contributions to the field including papers, trainees, courses, lectures, books, and organizations by Dr. Feigenbaum and his coworkers, echocardiography has become by far the most frequently used cardiac imaging tool in the world. This group is still at the forefront in advances in this field. An example is the use of echocardiography with stress testing which again was developed at the Krannert Institute and continues to be advanced under the leadership of [Dr. Stephen Sawada](#).

This fellowship offers a rare opportunity to train at one of the world's leading echocardiography centers, work with the "Father of Echocardiography" and gain from the knowledge and perspective accumulated from 50 years of developing and advancing this essential cardiology imaging modality. One unique feature of this Israeli fellowship is that it offers the option of helping the IU echocardiographic program promote strain echocardiography, which is largely an Israeli development. This investigational effort is aimed at making strain echocardiography become an indispensable component of the routine, everyday echocardiographic examination. Strain studies are now being performed in three of the IU campus institutions. Orders have been placed for more instruments with strain capabilities. A modified, more practical approach to speckle strain has been developed. So far nearly 3,000 strain studies have been done. Convincing the world of the importance of strain echocardiography will require numerous investigations assessing the essential clinical information that strain data provides. Studies to gain this information will be ongoing for years to come. An Israeli fellow has the opportunity to be a vital part of this effort.

**Indiana University School of Medicine
Krannert Institute of Cardiology
Clinical Cardiac Electrophysiology Fellowship Curriculum**

Goals and Objectives:

The goal of the clinical cardiac electrophysiology fellowship is to provide education and experience in the broad range of activities undertaken by a clinical cardiac electrophysiologist, leading to proficiency in the consultative and primary care of patients with cardiac rhythm disturbances. It involves ambulatory, medical ward, telemetry, and intensive care unit settings, including invasive laboratory procedures used in the evaluation and treatment of arrhythmia patients (electrophysiology studies, cardiac ablation procedures, implantation and expert follow-up management of permanent pacemakers and defibrillators). It is recognized that achievement of this goal also requires experience in research and other scholarly activities, both to encourage continued participation in an academic environment and also to contribute to a pattern of lifetime self-education. The components of the program are designed to be in accordance with the Accreditation Council for Graduate Medical Education (ACGME) requirements.

These goals are accomplished by dedicated application of sound educational principles by a highly qualified faculty. In an era during which more time is occupied with doing procedures, our program strives to focus on the cognitive aspects of being an expert electrophysiologist, by didactic lectures, case conferences and hands on experience. Trainees are exposed to a rich variety of electrophysiologic experience very early in their training program. Expertise is gained in selection of appropriate implantable devices, implantation techniques, follow-up and troubleshooting as well as diagnostic electrophysiologic testing and catheter ablation of all types of complex and simple rhythm disturbances. Realizing that the fellowship program is only one phase of a continuous training process, the desire for lifelong learning is fostered during the fellowship training program as well.

The environment for training consists of three major teaching hospitals (Methodist Hospital, Roudebush Veterans Administration Medical Center and Wishard Memorial Hospital) at which invasive Intracardiac procedures and implantable device procedures are performed (or, in the case of Wishard, device implants only). These venues give a rich blend of different types of patient populations and illnesses for the trainee's experience. Fellows are exposed to and gain proficiency in the full panoply of heart rhythm disorders and procedures. Training and mentoring by a world-renowned faculty (included among whom are Drs. Chen, Zipes and Miller, each of whom has been or is currently serving on the American Board of Internal Medicine [ABIM] examination committee for Clinical Cardiac Electrophysiology) forms an essential part of the educational process. Fellows spend about 85% of their time in clinical pursuits, including inpatient and outpatient consultations and follow-up of patients who have had procedures, device interrogation and troubleshooting, as well as (the bulk of their time) with procedures. Approximately 15% of the fellows' schedule is dedicated to research, either in an animal laboratory or in clinical research. It is anticipated that at the end of their training, fellows will be poised to not only to excel in the ABIM Subspecialty Examination in Clinical Cardiac Electrophysiology, but be able to assume a position on an academic faculty if that is their desire (strongly encouraged).

**Advanced Heart Failure and Heart Transplant Fellowship
Indiana University School of Medicine
Department of Medicine
Division of Cardiology**

Overview

The Advanced Heart Failure and Heart Transplant Fellowship at Indiana University provides inpatient and outpatient training in the management of patients with advanced heart failure from initial diagnosis to consideration of high-risk cardiac surgery, cardiac transplantation, mechanical circulatory support, and end-of-life care. This is a one-year fellowship, intended to follow 3 years of general cardiology training. A physician completing this fellowship at Indiana University would be eligible to pursue the Advanced Heart Failure Board Examination, as well as the UNOS designation of Heart Transplant Cardiologist, if desired.

Heart Failure and Transplant Fellowship Director

Irmina Gradus-Pizlo M.D.

Heart Failure and Transplant Cardiology Faculty

Jacqueline O' Donnell M.D.

Adnan Malik M.D.

M. Azam Hadi M.D.

Heart transplant and Mechanical Assist Device Surgeons:

Thomas Wozniak M.D., Surgical Director of Heart Transplant Program

I-wen Wang, M.D., PhD

Fellowship Objectives:

Upon completion of the Advanced Heart Failure and Transplant Fellowship, the Fellow will be well-versed in:

- Heart failure etiology and prevention
- Heart failure evaluation (including all diagnostic tests and modalities, serologic tests, etc.)
- Heart failure management (including novel drug therapies and the evaluation of patients for cardiac transplant or mechanical circulatory support)
- Heart failure procedures (including heart biopsies, right heart catheterization, management of diagnostic and therapeutic devices used for evaluation and management of heart failure in acute and chronic settings, and evaluation of device function)
- Heart failure disease management (including issues related to participation in multidisciplinary teams delivering clinical care in settings dedicated to heart failure)
- The care of the heart transplant patient (including immediate post-operative care and long-term maintenance and surveillance)
- The continuity care of the patient living with mechanical circulatory support (including anti-coagulation, device infection diagnosis and management, and timing of relisting for transplantation)
- End-of-life care in heart failure and appropriate time for referral and patient guidance
- Basic mechanisms of heart failure (including cellular mechanisms, ventricular remodeling, hypertrophy, and inflammation)
- Clinical research issues (including ethical standards, design, and application and interpretation of trial results)

The fellow will complete Level 3 Training requirements for Advanced Heart Failure and Heart Transplant as proposed by COCATS Task Force 8: Training in Heart Failure, published in JACC 2008;51;383-389, including:

- Evaluation of at least 30 patients for cardiac transplant of mechanical assist devices
- The care of at least 30 patients who have undergone a heart transplant, of whom at least 5 are seen during the initial hospitalization
- The care of at least 5 patients supported on a mechanical device, of whom at least 2 are followed during initial hospitalization
- The evaluation of at least 50 patients for ICD and 50 patients for CRT
- Device interrogation and interpretation in patients with ICD or ICD-CRT in at least 100 patients
- Performance of at least 30 endomyocardial biopsies

The fellow will also fulfill UNOS requirements for certification that are as follows:

- Heart transplant physician must maintain board certification in Internal Medicine or Pediatrics, as well as complete a Cardiology Fellowship
- Must be involved in the care of 20 or more heart or heart/lung transplant recipients from the time of their transplant.
- Participate in the observation of 3 organ procurements and 3 heart transplants.
- Current working knowledge (within the last 2 years) of the care of heart transplant patients, including heart transplantation, donor selection, acute and chronic heart failure, mechanical assist devices, recipient selection, pre and post-operative care hemodynamic care, immunosuppressive therapy, interpretation and grading of myocardial biopsies, and long-term patient follow-up.
- A letter from the fellowship director sent directly to UNOS stating the above requirements have been met.

Curriculum

Faculty will clearly outline the specific expectations and learning objectives of the activities/rotations prior to each month and review them at the end of the activity/rotation. The fellow is expected to maintain a log of procedures, transplants and mechanical circulatory devices.

Inpatient Activities:

A minimum of 7 months will be spent on the Heart Failure/Transplant Inpatient service

Other inpatient electives:

1 month Adults with Congenital Heart Disease Service (Riley Hospital inpatient and outpatient)

Expectations and goals of each

Outpatient Activities/Clinics:

The fellow will participate in the equivalent of one half-day per week Advanced Heart Failure clinic alternating weekly with a one half-day per week Heart Transplant clinic. This one-half day clinic per week is mandatory and active throughout the academic year precepted by Drs. Gradus-Pizlo and O'Donnell.

Fellow will also participate in one-half day LVAD clinic during the non-Inpatient months working in concert with the LVAD clinic RN and NP. Preceptors; Drs. Malik and Hadi.

Electives:

The fellow will have 2 weeks rotation in the HLA lab and 2 weeks performing Cardiopulmonary testing.

In addition, another month (can be split into 2 week blocks) of elective will be reserved for the fellow to choose from the following:

- Abdominal (Liver and/or Kidney Transplant) or Lung Transplant a.
- Histopathology b.
- Cardiac Critical care c.
- HF/Mechanical Device/ Transplant Echocardiography with Dr Feigenbaum d.

Procedures:

Fellow will participate in performing endomyocardial biopsies, right heart catheterizations, and diagnostic left heart catheterizations two half days per week during the non-Inpatient months under the preceptorship of Drs. Malik and Hadi.

Research Activities:

2 months research, including possibility of clinical epidemiology

- Research can be interspersed with clinical activities throughout the year or in dedicated blocks
- Research focus should be planned and designed at the start of the academic year, and the planning stages should be complete prior to the dedicated months
- At least one abstract resulting in a manuscript submission by the end of the academic year will be expected
- Presenting at a national meeting will be highly encouraged
- Help with patient recruitment and consenting for ongoing clinical research projects
- Input data into the Heart Failure/Transplant clinical database

CME:

The fellow will be provided funds (for boarding, airfare and registration) to participate in one national meeting.

The fellow is expected to attend the Cardiology Grand Rounds and the Case conference.

In addition, the fellow will be expected to present a bimonthly M&M conference and attend bimonthly Heart Failure and Transplant Journal club

Vacation:

Four weeks of total vacation time (excluding CME) are allotted but not more than 2 continuous weeks can be taken except for extraordinary circumstances and after approval by the program director.

Appendix 1: Core competencies

Clinical Experience (Inpatient and Outpatient) and Proficiencies to Be Required for Eligibility for Secondary Subspecialty Certification in Advanced Heart Failure and Transplant Cardiology (from Konstam et al, J Am Coll Cardiol, 2009; 53:834-836)

Heart failure with dilated or nondilated LV
New-onset heart failure
Acute decompensation of chronic heart failure
Heart failure in a geriatric population
Heart failure associated with cancer chemotherapy
Heart failure patients who are pregnant or recently postpartum

Heart failure and congenital heart disease
Heart failure in patient from diverse ethnic groups, with attention to specific diagnostic and therapeutic issues within these groups
Heart failure in men and women
Pulmonary hypertension
Heart failure pre- and post-cardiac and noncardiac surgery
Inherited forms of cardiomyopathy
Hypertrophic cardiomyopathies
Infiltrative and inflammatory cardiomyopathies
Heart failure and arrhythmias
Heart failure in patients with other organs transplanted
Evaluation of patients for cardiac transplant or mechanical assist devices
Care of patients who have undergone cardiac transplant
Care of patients with mechanical assist devices
Evaluation of patients for ICDs and for CRT
Device interrogation and interpretation in patients with implanted ICD or ICD-CRT devices
Endomyocardial biopsies

Appendix 2: Suggested Reading List

Guidelines and Policy Statements

American College of Cardiology/American Heart Association

- 2009 Focused Update: ACCF/AHA Guidelines for the Diagnosis and Management of Heart Failure in Adults. Circ 2009;119:1977-2016
<http://circ.ahajournals.org/cgi/reprint/CIRCULATIONAHA.109.192064.pdf>
- Focused Update Incorporated into the 2005 ACC/AHA Guidelines for the Diagnosis and Management of Heart Failure in Adults. Circ 2009;119:e391-3479
<http://circ.ahajournals.org/cgi/reprint/CIRCULATIONAHA.109.192065.pdf>
- Prevention of Heart Failure: A Scientific Statement from the American Heart Association Councils on Epidemiology and Prevention, Clinical Cardiology, Cardiovascular Nursing, and High Blood Pressure Research; Quality of Care and Outcomes Research Interdisciplinary Working Group; and Functional Genomics and Translational Biology Interdisciplinary Working Group. Circ 2008;117:2544-2565
<http://circ.ahajournals.org/cgi/reprint/CIRCULATIONAHA.107.188965>
- The Role of Endomyocardial Biopsy in the Management of Cardiovascular Disease: A Scientific Statement from the American Heart Association, the American College of Cardiology, and the European Society of Cardiology. Circ 2007;116:2216-2233
<http://circ.ahajournals.org/cgi/reprint/CIRCULATIONAHA.107.186093.pdf>

ACC/AHA and ESC

- ACC/AHA/ESC Guidelines for the Management of Patients with Atrial Fibrillation Executive Summary (2006) *Circ* 2006;114:700-752 <http://circ.ahajournals.org/cgi/reprint/114/7/700>

ACC/AHA and Heart Rhythm Society

- ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities
http://www.hrsonline.org/Policy/ClinicalGuidelines/upload/DBT08_guidelines_full.pdf
http://www.hrsonline.org/Policy/ClinicalGuidelines/upload/devicebased_therapy.pdf
(Executive Summary)
- A Practical Guide for Clinicians Who Treat Patients with Amiodarone (2007) See under heading for "Arrhythmias, CRM Devices, and Leads" *Heart Rhythm* 2007;4:1250-1259
<http://www.hrsonline.org/Policy/ClinicalGuidelines/upload/Amiodarone-Guide-2007.pdf>
- Resynchronization Therapy for Heart Failure (2005)
http://www.hrsonline.org/Policy/ClinicalGuidelines/upload/resynch_therapy_HF.pdf

Heart Failure Society of America

- Heart Failure Society of America (HFSA) 2006 Comprehensive Heart Failure Practice Guideline *J Cardiac Fail* 2006;12:e1-e122 <http://www.heartfailureguideline.org/>
- HFSA 2006 Comprehensive Heart Failure Practice Guideline Executive Summary *J Card Fail* 2006;12:1-29 <http://download.journals.elsevierhealth.com/pdfs/journals/1071-9164/PIIS1071916405013783.pdf>

International Society for Heart and Lung Transplantation

- 2009 ESC/ERS Guidelines on the Diagnosis and Treatment of Pulmonary Hypertension *European Heart J* 2009;30:2493-2537 <http://www.escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/guidelines-PH-FT.pdf>
- Listing Criteria for Heart Transplantation: International Society for Heart and Lung Transplantation Guidelines for the Care of Cardiac Transplant Candidates 2006 *J Heart Lung Transplant* 2006;25:1024-42
<http://download.journals.elsevierhealth.com/pdfs/journals/1053-2498/PIIS1053249806004608.pdf>
- Heart Rhythm Considerations in Heart Transplant Candidates and Considerations for Ventricular Assist Devices: International Society for Heart and Lung Transplantation Guidelines for the Care of Cardiac Transplant Candidates 2006 *J Heart Lung Transplant* 2006;25:1043-1056 <http://download.journals.elsevierhealth.com/pdfs/journals/1053-2498/PIIS1053249806004578.pdf>
- Optimal Pharmacologic and Non-pharmacologic Management of Cardiac Transplant Candidates: International Society for Heart and Lung Transplantation Guidelines for the Care of Cardiac Transplant Candidates 2006 *J Heart Lung Transplant* 2006;25:1003-1023
<http://download.journals.elsevierhealth.com/pdfs/journals/1053-2498/PIIS1053249806004591.pdf>

Key Articles

Acute Heart Failure

1. Emerging therapies for the management of decompensated heart failure: from bench to bedside.

deGoma EM, Vagelos RH, Fowler MB, Ashley EA. J Am Coll Cardiol. 2006 Dec 19;48(12):2397-409. Epub 2006 Nov 28. Review.

2. Acute heart failure syndromes. *Gheorghiade M, Pang PS. J Am Coll Cardiol. 2009 Feb 17;53(7):557-73. Review.*

Arrhythmias and Implantable Devices

1. Atrial fibrillation and acute decompensated heart failure. *DiMarco JP. Circ Heart Fail. 2009 Jan;2(1):72-3. Review.* <http://circheartfailure.ahajournals.org/cgi/reprint/2/1/72.pdf>
2. The efficacy of implantable cardioverter-defibrillators in heart transplant recipients: results from a multicenter registry. *Tsai VW, Cooper J, Garan H, Natale A, Ptaszek LM, Ellinor PT, Hickey K, Downey R, Zei P, Hsia H, Wang P, Hunt S, Haddad F, Al-Ahmad A. Circ Heart Fail. 2009 May;2(3):197-201. Epub 2009 Apr 30.* <http://circheartfailure.ahajournals.org/cgi/reprint/2/3/197.pdf>
3. Resynchronization therapy for the treatment of heart failure. *Saxon LA, Ellenbogen KA. Circulation. 2003 Sep 2;108(9):1044-8. Review.* <http://circ.ahajournals.org/cgi/reprint/108/9/1044.pdf>
4. Heart failure and sudden death in patients with tachycardia-induced cardiomyopathy and recurrent tachycardia. *Nerheim P, Birger-Botkin S, Piracha L, Olshansky B. Circulation. 2004 Jul 20;110(3):247-52. Epub 2004 Jun 28.* <http://circ.ahajournals.org/cgi/reprint/110/3/247.pdf>
5. Management of atrial fibrillation in patients with heart failure. *Neuberger HR, Mewis C, van Veldhuisen DJ, Schotten U, van Gelder IC, Allessie MA, Böhm M. Eur Heart J. 2007 Nov;28(21):2568-77. Epub 2007 Sep 13. Review.* <http://eurheartj.oxfordjournals.org/content/28/21/2568.full.pdf>
6. Rhythm control versus rate control for atrial fibrillation and heart failure. *Roy D, Talajic M, Nattel S, Wyse DG, Dorian P, Lee KL, Bourassa MG, Arnold JM, Buxton AE, Camm AJ, Connolly SJ, Dubuc M, Ducharme A, Guerra PG, Hohnloser SH, Lambert J, Le Heuzey JY, O'Hara G, Pedersen OD, Rouleau JL, Singh BN, Stevenson LW, Stevenson WG, Thibault B, Waldo AL; Atrial Fibrillation and Congestive Heart Failure Investigators. N Engl J Med. 2008 Jun 19;358(25):2667-77.* <http://content.nejm.org/cgi/reprint/358/25/2667.pdf>
7. Use of traditional and biventricular implantable cardiac devices for primary and secondary prevention of sudden death. *Klein MH, Gold MR. Cardiol Clin. 2008 Aug;26(3):419-31, vi-vii. Review.* <http://www.ncbi.nlm.nih.gov/pubmed/18538188>
8. Problems with implantable cardiac device therapy. *Kowalski M, Huizar JF, Kaszala K, Wood MA. Cardiol Clin. 2008 Aug;26(3):441-58, vii. Review.* <http://www.ncbi.nlm.nih.gov/pubmed/18538190>
9. Troubleshooting pacemakers and implantable cardioverter-defibrillators. *Scher DL. Curr Opin Cardiol. 2004 Jan;19(1):36-46. Review.* <http://www.ncbi.nlm.nih.gov/pubmed/14688633>
10. Pathobiology of cardiac dyssynchrony and resynchronization. *Kass DA. Heart Rhythm. 2009 Nov;6(11):1660-5. Epub 2009 Aug 14. Review.* <http://www.ncbi.nlm.nih.gov/pubmed/19879547>
11. Supraventricular tachycardia after orthotopic cardiac transplantation. *Vaseghi M, Boyle NG, Kedia R, Patel JK, Cesario DA, Wiener I, Kobashigawa JA, Shivkumar K. J Am Coll Cardiol. 2008 Jun 10;51(23):2241-9.* <http://tinyurl.com/3xwcn6k>
12. Catheter ablation of supraventricular tachycardia in the transplanted heart: a case series and literature review. *Magnano AR, Garan H. Pacing Clin Electrophysiol. 2003 Sep;26(9):1878-86. Review.* <http://www.ncbi.nlm.nih.gov/pubmed/12930504>

Biomarkers

1. Biomarkers in heart failure. *Braunwald E. N Engl J Med. 2008 May 15;358(20):2148-59. Review. No abstract available.* <http://www.ncbi.nlm.nih.gov/pubmed/18480207>

2. Rapid measurement of B-type natriuretic peptide in the emergency diagnosis of heart failure. *Maisel AS, Krishnaswamy P, Nowak RM, McCord J, Hollander JE, Duc P, Omland T, Storrow AB, Abraham WT, Wu AH, Clopton P, Steg PG, Westheim A, Knudsen CW, Perez A, Kazanegra R, Herrmann HC, McCullough PA; Breathing Not Properly Multinational Study Investigators. N Engl J Med. 2002 Jul 18;347(3):161-7.*
<http://content.nejm.org/cgi/reprint/347/3/161.pdf>

Cardiac Surgery in Heart Failure Patients

1. Coronary artery bypass grafting in patients with low ejection fraction. *Topkara VK, Cheema FH, Kesavaramanujam S, Mercado ML, Cheema AF, Namerow PB, Argenziano M, Naka Y, Oz MC, Esrig BC. Circulation. 2005 Aug 30;112:1344-50.*

http://circ.ahajournals.org/cgi/reprint/112/9_suppl/I-344.pdf

2. The use of contrast-enhanced magnetic resonance imaging to identify reversible myocardial dysfunction. *Kim RJ, Wu E, Rafael A, Chen EL, Parker MA, Simonetti O, Klocke FJ, Bonow RO, Judd RM. N Engl J Med. 2000 Nov 16;343(20):1445-53.*

<http://content.nejm.org/cgi/reprint/343/20/1445.pdf>

3. Comparison of coronary artery bypass grafting versus medical therapy on long-term outcome in patients with ischemic cardiomyopathy (a 25-year experience from the Duke Cardiovascular Disease Databank). *O'Connor CM, Velazquez EJ, Gardner LH, Smith PK, Newman MF, Landolfo KP, Lee KL, Califf RM, Jones RH. Am J Cardiol. 2002 Jul 15;90(2):101-7.*

<http://www.ncbi.nlm.nih.gov/pubmed/12106836>

4. Revascularization for heart failure. *Phillips HR, O'Connor CM, Rogers J. Am Heart J. 2007 Apr;153(4 Suppl):65-73. Review.*

<http://www.ncbi.nlm.nih.gov/pubmed/17394905>

5. Mitral valve surgery in heart failure: insights from the Acorn Clinical Trial. *Acker MA, Bolling S, Shemin R, Kirklin J, Oh JK, Mann DL, Jessup M, Sabbah HN, Starling RC, Kubo SH; Acorn Trial Principal Investigators and Study Coordinators. J Thorac Cardiovasc Surg. 2006 Sep;132(3):568-77, 577.e1-4. Epub 2006 Jul 31.*

<http://content.nejm.org/cgi/reprint/343/20/1445.pdf>

Cardiac Transplantation (Also see ISHLT guidelines and articles under "Immunosuppression")

1. Transplant coronary artery disease. *Zimmer RJ, Lee MS. JACC Cardiovasc Interv. 2010 Apr;3(4):367-77.*

<http://www.ncbi.nlm.nih.gov/pubmed/20398862>

2. Use of rapamycin slows progression of cardiac transplantation vasculopathy. *Mancini D, Pinney S, Burkhoff D, LaManca J, Itescu S, Burke E, Edwards N, Oz M, Marks AR. Circulation. 2003 Jul 8;108(1):48-53. Epub 2003 May 12.*

<http://circ.ahajournals.org/cgi/reprint/108/1/48.pdf>

3. Tacrolimus versus cyclosporine microemulsion for heart transplant recipients: a meta-analysis. *Ye F, Ying-Bin X, Yu-Guo W, Hetzer R. J Heart Lung Transplant. 2009 Jan;28(1):58-66. Epub 2008 Dec 4.*

<http://www.ncbi.nlm.nih.gov/pubmed/19134532>

Disease Management and End-of-Life Care

1. The heart failure clinic: a consensus statement of the Heart Failure Society of America. *Hauptman PJ, Rich MW, Heidenreich PA, Chin J, Cummings N, Dunlap ME, Edwards ML, Gregory D, O'Connor CM, Pezzella SM, Philbin E; Heart Failure Society of America. J Card Fail. 2008 Dec;14(10):801-15. Review.*

<http://download.journals.elsevierhealth.com/pdfs/journals/1071-9164/PIIS1071916408010129.pdf>

2. Effectiveness of comprehensive disease management programmes in improving clinical outcomes in heart failure patients. A meta-analysis. *Roccaforte R, Demers C, Baldassarre F, Teo KK, Yusuf S. Eur J Heart Fail. 2005 Dec;7(7):1133-44. Epub 2005 Sep 29.*

<http://eurjh.oxfordjournals.org/content/7/7/1133.full.pdf>

3. Efficacy and safety of exercise training in patients with chronic heart failure: HF-ACTION randomized controlled trial. O'Connor CM, Whellan DJ, Lee KL, Keteyian SJ, Cooper LS, Ellis SJ, Leifer ES, Kraus WE, Kitzman DW, Blumenthal JA, Rendall DS, Miller NH, Fleg JL, Schulman KA, McKelvie RS, Zannad F, Piña IL; HF-ACTION Investigators. *JAMA*. 2009 Apr 8;301(14):1439-50.

<http://jama.ama-assn.org/cgi/content/full/301/14/1439>

4. Palliative care in congestive heart failure. Goodlin SJ. *J Am Coll Cardiol*. 2009 Jul 28;54(5):386-96. Review.

<http://www.ncbi.nlm.nih.gov/pubmed/19628112>

5. Palliative care in the treatment of advanced heart failure. Adler ED, Goldfinger JZ, Kalman J, Park ME, Meier DE. *Circulation*. 2009 Dec 22;120(25):2597-606.

<http://circ.ahajournals.org/cgi/content/extract/120/25/2597>

Epidemiology and Risk Factors

1. Prevention of heart failure: a scientific statement from the American Heart Association Councils on Epidemiology and Prevention, Clinical Cardiology, Cardiovascular Nursing, and High Blood Pressure Research; Quality of Care and Outcomes Research Interdisciplinary Working Group; and Functional Genomics and Translational Biology Interdisciplinary Working Group.

Schocken DD, Benjamin EJ, Fonarow GC, Krumholz HM, Levy D, Mensah GA, Narula J, Shor ES, Young JB, Hong Y; American Heart Association Council on Epidemiology and Prevention; American Heart Association Council on Clinical Cardiology; American Heart Association Council on Cardiovascular Nursing; American Heart Association Council on High Blood Pressure Research; Quality of Care and Outcomes Research Interdisciplinary Working Group; Functional Genomics and Translational Biology Interdisciplinary Working Group. *Circulation*. 2008 May 13;117(19):2544-65. Epub 2008 Apr 7.

<http://circ.ahajournals.org/cgi/reprint/117/19/2544.pdf>

2. Disease-specific health-related quality of life questionnaires for heart failure: a systematic review with meta-analyses. Garin O, Ferrer M, Pont A, Rué M, Kotzeva A, Wiklund I, Van Ganse E, Alonso J. *Qual Life Res*. 2009 Feb;18(1):71-85. Epub 2008 Dec 4. Review.

<http://www.ncbi.nlm.nih.gov/pubmed/19052916>

Hypertrophic Cardiomyopathy

1. American College of Cardiology/European Society of Cardiology clinical expert consensus document on hypertrophic cardiomyopathy. A report of the American College of Cardiology Foundation Task Force on Clinical Expert Consensus Documents and the European Society of Cardiology Committee for Practice Guidelines.

Maron BJ, McKenna WJ, Danielson GK, Kappenberger LJ, Kuhn HJ, Seidman CE, Shah PM, Spencer WH 3rd, Spirito P, Tan Cate FJ, Wigle ED; Task Force on Clinical Expert Consensus Documents. American College of Cardiology; Committee for Practice Guidelines. *European Society of Cardiology. J Am Coll Cardiol*. 2003 Nov 5;42(9):1687-713. Review.

<http://tinyurl.com/34koj6k>

2. Sudden death in hypertrophic cardiomyopathy: identification of high risk patients. Elliott PM, Poloniecki J, Dickie S, Sharma S, Monserrat L, Varnava A, Mahon NG, McKenna WJ. *J Am Coll Cardiol*. 2000 Dec;36(7):2212-8.

<http://tinyurl.com/2vw45d9>

3. Left ventricular outflow tract obstruction in hypertrophic cardiomyopathy: past, present and future. Ommen SR, Shah PM, Tajik AJ.

Heart. 2008 Oct;94(10):1276-81. Epub 2008 Jul 24. Review.

<http://www.ncbi.nlm.nih.gov/pubmed/18653577>

Immunosuppression

1. Drug therapy in the heart transplant recipient: part I: cardiac rejection and immunosuppressive drugs. *Lindenfeld J, Miller GG, Shakar SF, Zolty R, Lowes BD, Wolfel EE, Mestroni L, Page RL 2nd, Kobashigawa J. Circulation. 2004 Dec 14;110(24):3734-40. Review.*
<http://circ.ahajournals.org/cgi/reprint/110/24/3734.pdf>
2. Drug therapy in the heart transplant recipient: part II: immunosuppressive drugs. *Lindenfeld J, Miller GG, Shakar SF, Zolty R, Lowes BD, Wolfel EE, Mestroni L, Page RL 2nd, Kobashigawa J. Circulation. 2004 Dec 21;110(25):3858-65.Review.*
<http://circ.ahajournals.org/cgi/reprint/110/25/3858.pdf>
3. Drug therapy in the heart transplant recipient: Part III: common medical problems. *Lindenfeld J, Page RL 2nd, Zolty R, Shakar SF, Levi M, Lowes B, Wolfel EE, Miller GG. Circulation. 2005 Jan 4;111(1):113-7. Review.*
<http://circ.ahajournals.org/cgi/reprint/111/1/113.pdf>
4. Drug therapy in the heart transplant recipient: part IV: drug-drug interactions. *Page RL 2nd, Miller GG, Lindenfeld J. Circulation. 2005 Jan 18;111(2):230-9. Review.*
<http://circ.ahajournals.org/cgi/reprint/111/2/230.pdf>

Mechanical Circulatory Support

1. Evaluation for a ventricular assist device: selecting the appropriate candidate. *Wilson SR, Mudge GH Jr, Stewart GC, Givertz MM. Circulation. 2009 Apr 28;119(16):2225-32. Review.*
<http://circ.ahajournals.org/cgi/reprint/119/16/2225.pdf>

Mechanical Circulatory Support: Post-operative Management

1. Clinical management of continuous-flow left ventricular assist devices in advanced heart failure. *Slaughter MS, Pagani FD, Rogers JG, Miller LW, Sun B, Russell SD, Starling RC, Chen L, Boyle AJ, Chillcott S, Adamson RM, Blood MS, Camacho MT, Idrissi KA, Petty M, Sobieski M, Wright S, Myers TJ, Farrar DJ; HeartMate II Clinical Investigators. J Heart Lung Transplant. 2010 Apr;29(4 Suppl):S1-39. Epub 2010 Feb 24.*
<http://www.ncbi.nlm.nih.gov/pubmed/20181499>

Other Causes of Cardiomyopathy

1. Myocarditis. *Cooper LT Jr. N Engl J Med. 2009 Apr 9;360(15):1526-38. Review.*