

Midwest Pediatric Cardiology Nurses Association

Winter Newsletter 2007

Volume 4

Welcome to the fourth issue of the

Midwest Pediatric Cardiology Nurses Association Newsletter.

Table of Contents

Board of Directors	Page 1
Mission of Statement	Page 2
Letter from the President of MPCNA	Page 3
Midwest Conference Update	Page 4
Rastelli Procedure	Page 5-6
Article	Page 7-8
Websites of Interest	Page 9
Mystery Rhythm Strip	Page 10
Member Application	Page 11
Rhythm Strip Answer	Page 12

MPCNA Board of Directors

Elections were held at the first MPCNA meeting in April 2007. The following individuals were elected to the Board of Directors:

President	Heidi Fields, MSN, RN, CPNP	St. Louis Children's Hospital
President Elect	Kym Galbraith, BSN, RN	St. Louis Children's Hospital
Secretary	Mary Grace Manoli	Cardinal Glennon Children's Hospital
Treasurer	Mary Beth Kwentis	St. Louis Children's Hospital
Editor	Carrie DeHart, BSN, RN	St. Louis Children's Hospital
Co-Editor	Angela Burks, BSN, RN	St. Louis Children's Hospital
Program Chairperson	Julie Osborne, BSN, RN	St. Louis Children's Hospital
Program Co-chairperson	Jamie Backowski, BSN, RN	St. Louis Children's Hospital

Midwest Pediatric Cardiology Nurse Association

Mission and Goal

1. To provide communication and promote educational opportunities to pediatric cardiology nurses within the mid-west and nation wide
2. To encourage ongoing professional and educational growth among pediatric cardiovascular nurses
3. To provide research opportunities and ongoing investigation among latest pediatric cardiac technology and those with acquired congenital heart disease.

Midwest Pediatric Cardiology Nurses Association Newsletter

Volume 2

President's Letter

The Midwest Pediatric Cardiology Nurses Association (MPCNA) has begun its third year as a professional organization whose goals are to improve and strengthen our vision of providing educational and networking opportunities for nurses and healthcare professionals dedicated to caring for children with congenital and acquired heart disease.

In September, the Midwest Pediatric Cardiology Society and Washington University Division of Pediatric Cardiology invited MPCNA to develop the agenda for and host the Nursing Symposium portion of the society's annual meeting in St. Louis. We created an agenda with 4 incredible nurse lecturers that featured a variety of topics that included the Berlin Heart, cardiac resynchronization therapy, issues in pediatric cardiac transplantation and hybrid procedures in the cardiac catheterization laboratory. Forty nurses registered for the conference and the overall comments about the program content and lecturers were very good.

I would like to thank the MPCNA Board members and Washington University staff for their hard work and dedication to bring this program to fruition. We are honored that we had the opportunity to collaborate to produce a fine educational program to help fulfill our organization's vision.

In 2008, I look forward to a strong agenda with two additional dinner meetings that feature topics related to nursing practice and/or technology. Also, our second newsletter will be published and distributed to all MPCNA members. Please be sure to read the articles and review the rhythm strip to see how you "rate" in your knowledge of arrhythmias. We would love to hear any feedback about the newsletter and we certainly would welcome any articles for inclusion in future issues.

A goal for 2008 is to expand our nursing and allied health membership. Growth within our organization provides opportunities for strong networking, creates the ability to share best practices and offers a unique local educational program that provides contact hours at a fraction of the cost that would be incurred to attend other regional and national conferences. In addition, MPCNA members who are participating in a clinical ladder or professional nurse development program receive credit or points for membership in a professional organization. Within the last several months, I have had multiple requests for and have happily provided confirmation to employers that our members are in good standing within our organization.

Our local membership dues are \$20/year or \$35 for two years. For those outside of the metropolitan St. Louis area, our regional membership dues are \$15/year or \$25 for two years. Student or associate membership dues are \$15 per year. The fee for non-members attending meetings is \$10.

Please be sure to visit our website at mpcna.org which features our bylaws, past newsletters, standing committees, membership applications, upcoming events and links to more sites of interest.

We are an organization who wants to hear from our members so that we can create an agenda of interest to you. Please feel free to contact me or any member of the Board if you have questions or comments. We would love to hear from you.

Heidi W. Fields, MSN, RN, CPNP

Midwest Cardiology Update 2007

Midwest Pediatric Cardiology Annual Meeting

Midwest Pediatric Cardiology Society held their annual meeting this year at the Eric P. Newman Educational Center (EPNEC) located at the Washington University Medical campus. The meeting took place on September 20 and 21, 2007 and the weather was beautiful for the Pediatric Cardiology Golf Tournament held at Forest Park on September 20.

The Nursing symposium was held on September 20 with numerous presentations offered. Welcoming the attendees was Heidi Fields, President, MPCNA as well as a brief introduction from Lee Fetter, President, St. Louis Children's Hospital. Lee Fetter highlighted the progress of SLCH cardiology and cardiothoracic units as well as the future in embryonic/fetal heart development research to be implemented within the next year.

Four oral presentations were featured at the nursing symposium. These presentations included:

- The Berlin Heart and Nursing Care
- Change of Heart: The Evolution of Heart Transplantation in Pediatrics
- Cardiac Resynchronization Therapy
- Hybrid Procedures in Cardiac Catheterization Laboratory

Once the symposium was completed, all were invited to attend a complimentary cocktail reception located in the EPNEC center atrium. The turnout was a success. Those who attended the golf outing were also invited to attend and a great time was had by all.

The second day of the annual meeting consisted of the Cardiology/Cardiothoracic Surgery Scientific Session. Dr. Alan Schwartz, MD., Ph.D., Chairman, Washington University Department of Pediatrics at SLCH welcomed those in attendance. Six presentations were featured and a tour of the hospital and the new Cardiac Intensive Care Unit and Cardiac Cath Lab followed by Dr. David Balzer and Dr. Susan Foerster. Dr. Antonella Rastelli shared an inspirational presentation during lunch about the life of her father, Giancarlo Rastelli, who immigrated from Italy to the United States, and despite a terminal illness developed the famous Rastelli procedure. Posters and Exhibitions were located in the atrium/lobby and abstract prizes were awarded at the end of the scientific session by Charles Huddleston, M.D. and Soraya Nouri, M.D.

The conference was very informative and many ideas were shared. There were approximately 40 registered nurses and 70 physicians in attendance. The MPCNA was honored to collaborate with the Midwest Pediatric Cardiology Society to provide such a high caliber program. We look forward to other collaborative efforts to further the education of nurses who care for children with congenital and acquired heart disease.

Rastelli Procedure

About the Rastelli procedure

- A Rastelli procedure is a type of [open-heart surgery](#) used to correct various [congenital heart defects](#) that cause [cyanosis](#) – a bluish tint to the skin, lips, fingernails and other parts of the body. Cyanosis occurs as a result of a lack of [oxygen-rich blood](#) in the body. The *cyanotic heart defects* that can be treated by the Rastelli procedure include the following:
- [Transposition of the great arteries](#) (TGA) with [ventricular septal defect](#) (VSD). TGA is a type of [heart defect](#) in which the two great [arteries](#) (the [pulmonary artery](#) and the [aorta](#)) are in reversed (transposed) locations. Normally, the pulmonary artery carries oxygen-poor blood from the [heart](#) to the [lungs](#), where it receives fresh oxygen. The aorta then carries oxygen-rich blood from the heart to the tissues and organs of the body.

In TGA, however, these arteries are switched in position, and oxygen-rich and oxygen-poor blood is frequently allowed to mix through the hole in the [septum](#) between the left and right [ventricles](#). In this case, the defect is actually saving the patient's life. Because some of the circulating blood does not have enough oxygen to nourish the cells and tissues, the infant is born a [blue baby](#).

- [Pulmonic stenosis](#). A condition in which there is a narrowing of the [pulmonic valve](#) between the right ventricle and the pulmonary artery. This restricts the amount of blood that can flow from the heart to the lungs.
- [Pulmonary atresia](#) (absence of the pulmonary valve), accompanied by a VSD. In patients with this defect, oxygen-rich blood is unable to travel from the right ventricle to the lungs. Instead, the blood must go through alternative routes, including a VSD if present.
- [Double outlet right ventricle](#) (DORV), accompanied by pulmonary stenosis. This is a very rare defect in which both of the heart's great vessels, the aorta and the pulmonary artery, are connected to the right ventricle and a VSD is present. In this case, the right ventricle must pump blood for the entire body, and oxygen-rich and oxygen-poor blood is allowed to mix freely.
- Depending upon the exact nature and severity of the underlying heart defect(s), the following steps are taken:
 - The [ventricular septal defect](#) (abnormal hole in the wall between the right and left [ventricle](#)) is closed with a *Dacron patch*.
 - The surgeon creates a *valved conduit* between the right ventricle and the [pulmonary artery](#). A valved conduit is a tube made of fabric, human tissue from a cadaver or part of the patient's own [pericardium](#) (the sac that surrounds the heart). Within the tube is a [pulmonic valve](#) made of other organic tissue (a biological valve) or man-made tissue (a [mechanical valve](#)). The pulmonic valve will alternately open and close in precise time with the [heartbeat](#), allowing blood to flow only in one direction and only at the right time. This allows blood to be pumped by the right ventricle through the valved conduit and the pulmonary artery to the lungs.
- If present, a damaged pulmonic valve will be surgically closed because it cannot withstand the high pressures created by the narrowed or blocked valve.
- If necessary, muscle from the right ventricle that is either enlarged or obstructing normal blood flow in the heart is removed.
- Once the procedure is completed, the heart incision is closed, the heart is allowed to restart, blood circulation and oxygen are restored to the heart, bypass circulation is suspended, and the chest incisions are closed.

- The Rastelli procedure is a long and complex surgical procedure. It involves extensive and invasive monitoring of the patient before, during and after the operation. This includes [catheters](#) in a [vein](#), an [artery](#) and the left [atrium](#). Another catheter is used to measure the level of [oxygen](#) in the [blood](#). Additionally, various medications will be used as necessary to alter the workload of the [heart](#) and blood vessels.

An uncomplicated procedure will result in a hospital stay of 10 days to two weeks. During this time, more tests will be done to assess and monitor the patient's condition. The [cardiologist](#) will discuss further medical treatment, including the use of pain medications or possibly [anticoagulants](#). He or she will also update any medications that the patient had already been taking and provide additional recommendations for periodic checkups, lifestyle consideration and other factors.

References

Bercow, Neil R. M.D., Elhendy, Abdou M.D., Dullum, Mercedes, K.C., M.D. (2007)
Heart.Health.ivillage.com

Cardiac Resynchronization Therapy

Tammy M. Bowman, MSN, RN, CPNP-AC

Cardiac Resynchronization Therapy (CRT) is a fairly new cardiac pacemaker therapy wherein biventricular pacing is employed to treat heart failure. The focus of treatment for heart failure has shifted through the years from enhancing contractility and hemodynamics, to manipulation of neuroendocrine activation, and now more recently, to ventricular mechanical remodeling and altering electrical activation sequences. (1)

The most common cause of heart failure is left ventricular (LV) systolic dysfunction characterized by LV dilation and hypertrophy which result in decreased contractility. Impaired LV function can also cause ventricular conduction abnormalities, which can lead to mechanical dyssynchrony, atrioventricular conduction abnormalities, diastolic mitral regurgitation, and decreased systolic ventricular filling time. Biventricular pacing restores the coordinated pumping of the ventricles by overcoming the delay in electrical conduction within the ventricles and improving cardiac output without increasing the myocardial oxygen demand. Biventricular pacemakers also allow for atrial pacing which restores atrioventricular coordination, resulting in increased ventricular filling time and decreased mitral regurgitation. (2)

CRT refers to the synchronization of ventricular function through electrical pacing. Many patients with heart failure have a wide QRS, or bundle branch block, and dyssynchronous ventricular squeezing evidenced by echocardiography. The goal of CRT is to achieve the narrowest QRS complex possible (demonstrating decreased conduction delay) , while optimizing ventricular squeeze time (demonstrated by echocardiography) to improve cardiac output. Pacemakers which provide biventricular pacing require one atrial lead for atrial sensing and pacing, and two ventricular leads for ventricular sensing and pacing. The ventricular leads are placed in the right ventricle, usually at the apex, and in a coronary vein to pace the lateral left ventricular wall, thereby optimizing the timing of left ventricular systole and interventricular systolic coordination. Controlling the timing of LV systole enhances filling time of the left ventricle and allows the mitral valve to close completely, thereby promoting increased cardiac output for the patient. Coordinating interventricular systole allows the heart to contract more efficiently improving overall function and decreasing cardiac oxygen consumption.

Not all patients respond favorably to CRT. The mechanism behind the variable response to biventricular pacing is not fully understood. Therefore, pediatric patients at St. Louis Children's Hospital (SLCH) are brought to our cardiac cath lab prior to implanting a CRT device to test their response to biventricular pacing. Patients who do not demonstrate an increase in their cardiac output are not candidates for this therapy. In patients who do respond favorably, the ventricles are paced at various locations during their cardiac cath to determine optimal ventricular lead placement prior to their biventricular pacemaker placement.

Potential CRT candidates must meet the following criteria:

- moderate to severe symptoms of heart failure (NYHA class III and class IV)
- conduction disturbances
- widened QRS greater than 120 ms
- receiving stable optimum medical therapy
- ejection fraction less than or equal to 35% and in sinus rhythm
- not likely to improve with additional medications.

Although most of the research data for this therapy comes from the adult community, there is a growing interest in applying CRT to the pediatric population. As a matter of fact, SLCH has one of the largest populations of pediatric CRT patients in the world, thanks in large part to the efforts of Dr. Charles Canter and Dr. Ed Rhee to provide pediatric heart failure patients with the most up to date treatment options.

Nursing care of the CRT patient is similar to care after a standard pacemaker placement. Patients undergoing epicardial lead placement may have a left thoracotomy incision if LV lead positioning necessitates. Potential complications include pneumothorax, vessel or myocardial perforation, air embolus, infection, bleeding or dysrhythmias. As the goal of CRT is synchronized ventricular pacing, you should see 100% ventricular pacing on telemetry.

Although CRT is not the treatment of choice for all pediatric heart failure patients, it has been shown to improve the quality and quantity of life for many children and adults alike. We at SLCH will continue to evaluate the evidence CRT studies generate.

References

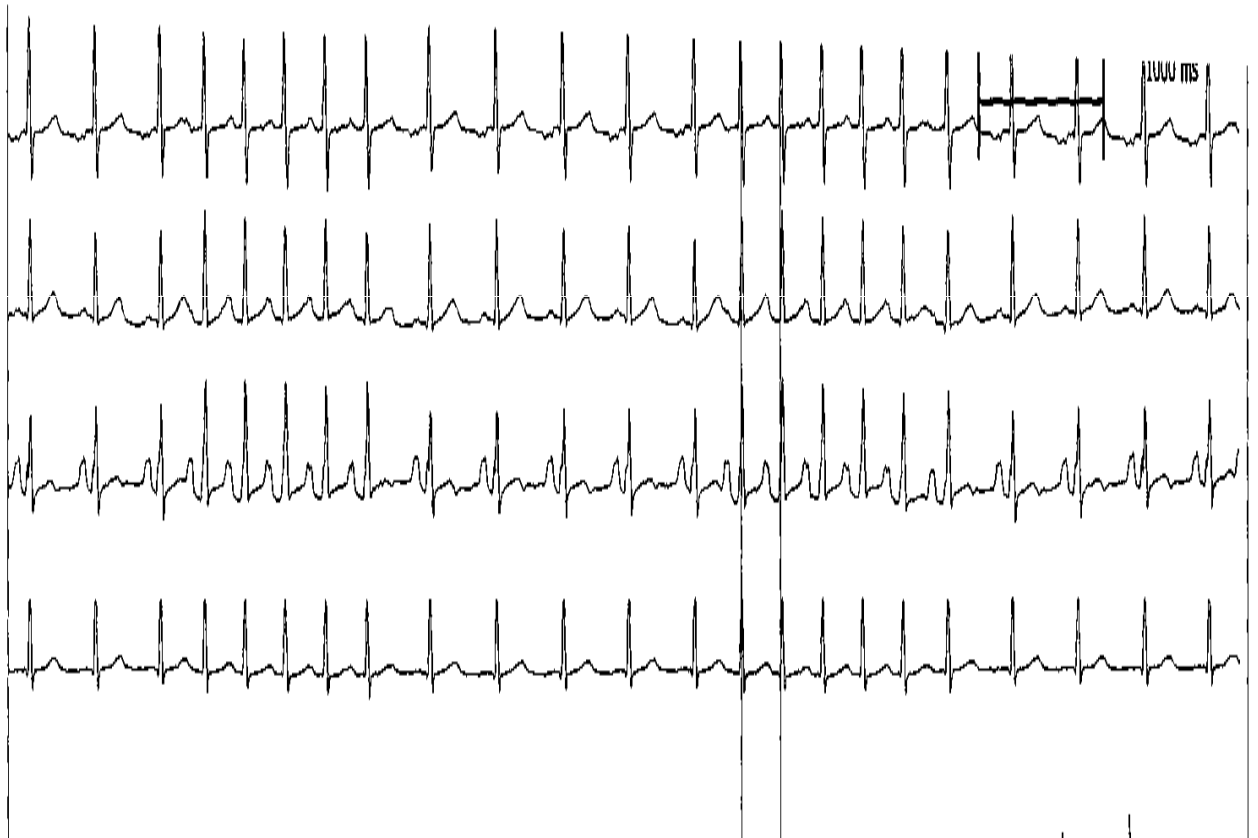
- (1) Albert, N. M. (2003). Cardiac resynchronization therapy through biventricular pacing in patient with heart failure and ventricular dyssynchrony. *Critical Care Nurse* (supplement). 23(3).
- (2) Czarnecki, R. (2007). Biventricular pacing: When one or two leads aren't enough. *Cardiac Insider*. (Spring).
- (3) Lagrotteria, J. M. (2003). Biventricular pacing for congestive heart failure. *Critical Care Nursing Quarterly*. 26(1):50-58.

Websites of Interest

1. www.Chdvideo.com-site offers several pre-recorded videos containing:
 - a. Percutaneous valve implantation
 - b. Perimembranous VSD closure
 - c. Hybrid stage 1 palliation for complex single ventricle in 1.4 kg neonate
2. www.pediatriccardiology.uchicago.edu-offers pediatric cardiology information for professionals along with 3-D illustrations in embryologic cardiac development
3. www.geocities.com/nyern/h/heart.htm-site-offers various cardiology topics as well as online resources for cardiac defects
4. pennhealth.com/health_info/animationplayer/heart_tool.html- website with numerous cardiac surgery and cardiology animation: cardiac development to atherosclerosis to CABG surgery

Mystery Rhythm Strip

Answer on Page 10



MPCNA Membership Application

Fall 2007-2008 Membership Drive

Midwest Pediatric Cardiac Nurses Association Membership Application

Name (Last / First): _____

Degree(s) / Certification(s): _____

Home Address _____

Home Phone _____

Preferred e-mail address _____

Hospital: _____

Position: _____

Work mailing address: _____

Street Address: _____

City / State / Zip: _____

Work Phone: _____

Areas of interest: _____

I would like to :

____ Attend dinner/lecture meetings

____ Attend conferences

____ Write an article for the newsletter

____ Share an oral presentation

I would like to participate on the following committee(s):

____ Membership / Annual Directory

____ Newsletter

____ Conference Planning

____ Research

Membership Fees

Local membership (member resides in St. Louis Metropolitan area)

_____ \$20.00 per year

_____ \$35.00 for 2 years

Regional membership (member lives outside St. Louis Metropolitan area)

_____ \$15.00 per year

_____ \$25.00 for 2 years

Student/Associate membership fee (non-RN)

_____ \$15.00 per year

Please make checks payable to: MPCNA

Mail Form To:

MPCNA

c/o Mary Grace Manoli

805 Paul Avenue

Florissant, MO 63031

Mystery ECG Rhythm Strip

Answer

This ECG demonstrates ectopic atrial tachycardia (EAT). EAT is characterized by a narrow complex tachycardia (in the absence of aberrancy or BBB) with visible P waves at an inappropriately rapid rate ranging from 120-300 bpm. P wave axis is usually abnormal, although a focus near the sinus node can be mistaken for ST. Similarly the P wave morphology may be abnormal.

Onset of the tachycardia occurs with a P wave identical to the subsequent p waves and may exhibit a “warming up”, which refers to a progressively shortening P-P interval for the first few beats of arrhythmia. A “cooling down” may be observed at its termination. First-degree AV block is typical and second-degree AV block is common. Tachycardia rate and degree of AV block are influenced by autonomic tone.

It is thought that a small cluster of cells with abnormal automaticity is responsible for EAT. A conduction delay from atrium to ventricle often occurs, with most patients demonstrating first-degree AV block and some showing second-degree block causing an irregular rhythm.

EAT is often incessant and may cause a tachycardia-induced cardiomyopathy which usually improves following ventricular rate control and arrhythmia treatment. It is predominantly observed in infants and children and most patients have structurally normal hearts.

EAT is an automatic rhythm which can be transiently suppressed with overdrive pacing or adenosine but does not terminate with these treatments. Treatment is immediate ventricular rate control with digitalization, or IV amiodarone. Overdrive pacing the atria to a point of consistent 2:1 AV block lowering the ventricular response rate is also effective rate control therapy. Class IC and III antiarrhythmics most effective for chronic rate control therapy. Approximately 75% of all patients require >one medication for effectiveness.

Reference

Sanatani, S. & Hamilton, R. (2008) Supraventricular tachycardia, atrial ectopic tachycardia. Retrieved Nov. 19, 2007.