NEONATOLOGY TODAY

News and Information for BC/BE Neonatologists and Perinatologists

Volume 10 / Issue 7
July 2015

IN THIS ISSUE

Scimitar Syndrome in a 3-Month Old Infant

By Howard Weber, MD, FSCAI; Khushboo Parikh, MD

Introduction

Scimitar Syndrome is a rare congenital cardiac anomaly characterized by partial or complete anomalous pulmonary venous drainage of the right lung to the Inferior Vena Cava (IVC), either above or below the diaphragm.[1, 2] It accounts for 3%–6% of all the partial anomalous pulmonary venous returns.[3] Scimitar Syndrome is frequently associated with hypoplasia of the right lung, dextroposition of the heart, hypoplasia or malformations of the right pulmonary artery, anomalous systemic supply of the lower lobe of the right lung from the abdominal aorta or its branches and pulmonary hypertension.[5]

Patients diagnosed before the first year of life were reported to have major associated cardiac defects and worse prognosis.[2] Management of the scimitar vein with respect to timing and type of intervention remains controversial.[1]

We describe a case of 3-month-old infant with Scimitar Syndrome and pulmonary hypertension, diagnosed during the evaluation of a cardiac murmur in the setting of respiratory distress.

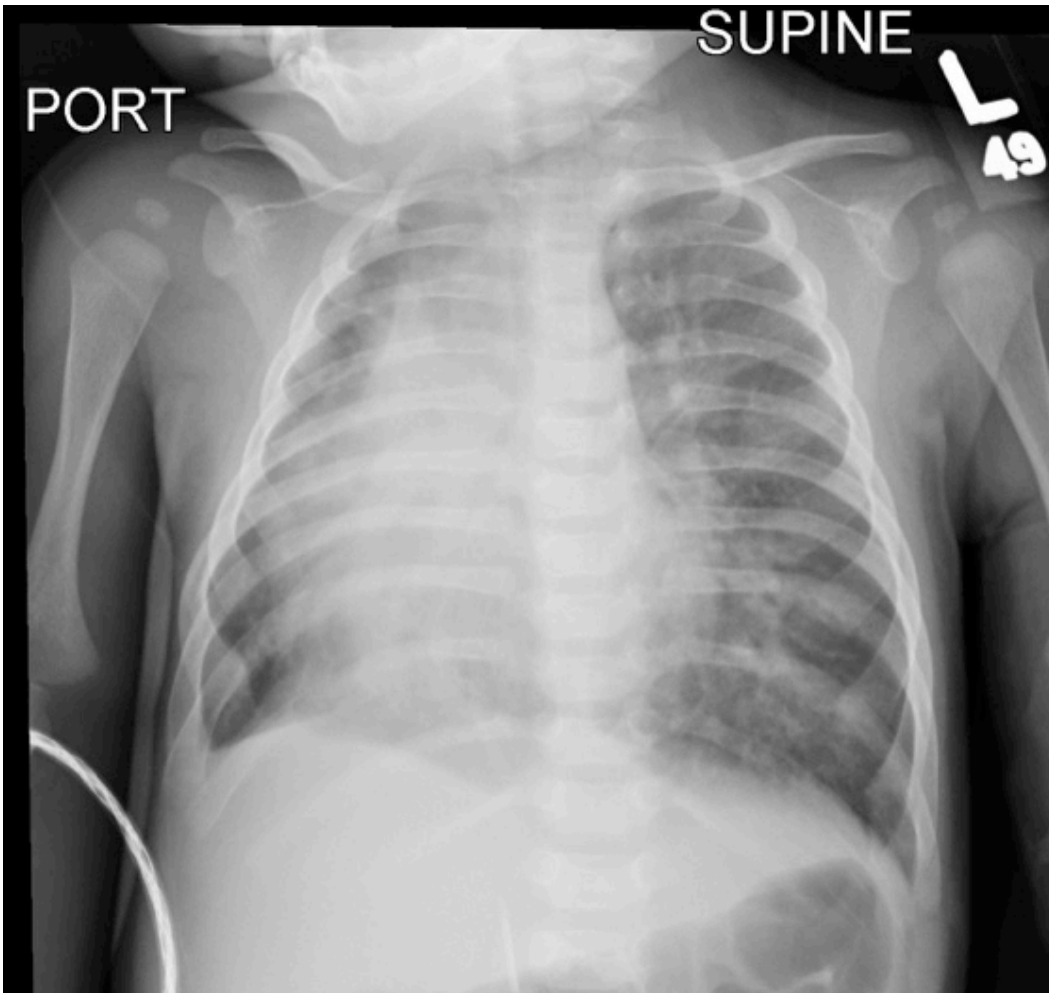

Figure 1. Enlarged cardiomediastinal silhouette. Increased interstitial edema and subsegmental airspace opacification throughout the right lung.

PLEASE READ THIS LETTER ON AN IMPORTANT BILL (*ADVANCING HOPE ACT 2015*) THAT IS NOW BEFORE CONGRESS

Extending this act, is a win-win for pediatric patients, physicians and the companies that provide the products and services. After reading this letter, if you agree, download the form letter and send to your Senator.

For additional information, please contact:

Saira Sultan, JD, President of Connect 4 Strategies, LLC at: saira.sultan@connect4strategies.com

SUGGESTED LETTER (See Links Below to Find your Senator and Download this letter)

On your institutional letterhead, if available

[Date]

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RE: The Advancing Hope Act of 2015

Dear [Your Senator],

As a physician who treats and serves hundreds of premature babies suffering from respiratory distress syndrome, I write to you today with great interest and concern regarding proposed legislation which will affect about 65,000 premature infants each year in the U.S. The Advancing Hope Act is a bill intended to reauthorize and make permanent a priority review program at the Food and Drug Administration (FDA), which will encourage development of new treatments for rare pediatric diseases such as RSD.

As a neonatologist at [insert name of your institution] treating these infants, I wanted to write to let you know how much institutions like ours in [insert your state] stand to benefit from additional research in rare pediatric diseases. Historically, our youngest and most vulnerable patients have been underserved and ignored in the drug development arena due to the high risk nature and small size of pediatric patient populations. This is why many drugs used in infants and children have never been tested in these age groups and, therefore, must be used off-label.

As you are surely aware, drug development is expensive and requires many years of effort. The positive impact of an incentive program such as the Pediatric Review Voucher Program is significantly diminished if it is too short-lived or requires frequent reauthorizations. This is because the value of the incentive is not actually realized until many years after the development process has begun. Small companies like mine, our clinical researcher partners, and our investors, need confidence that approval-related incentives like the voucher will still exist when the early-stage discoveries we are developing in the clinic finally make it through the approval process and to the patients' bedsides.

I hope you will consider supporting efforts to make permanent this voucher program described in the Advancing Hope Act of 2015. This bill will significantly benefit the large, under-served population of infants and children who need new innovative therapies to ensure their best healthcare outcomes. There is a tremendous need for new therapies for these patients, many of which bear a terrible lifelong burden not only for these young patients and their families, but also costs the US healthcare system billions per year to support the infants and children who may continue to require medical support throughout their lives. It is incumbent upon us to work together on behalf of those suffering these enormous challenges to create and promote programs that can benefit their health and potentially reduce overall healthcare costs.

Thank you your sincere consideration. Please contact me at [Your phone number or email] if I can be of any assistance on this important issue of making the rare pediatric priority review voucher program permanent.

Sincere regards,

[Your Name]
[Your Title]

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Download this letter, fill in the appropriate information in the [brackets] and mail - www.neonatologytoday.net/newsletters/ltr.doc

Case Presentation

A 3-month old previously healthy infant presented to an outside hospital with cough, congestion and fussiness. She was noted to have saturations in the 80s in the emergency department. O_2 supplementation was offered and she was admitted to the hospital. Chest Xray demonstrated an enlarged cardiothoracic silhouette and increased interstitial edema (Figure 1). During the hospitalization the patient was noted to have a murmur warranting an echocardiogram. The study revealed moderately enlarged right atrium and right ventricle with suprasystemic right ventricular pressures. There was a moderate high secundum ASD with left to right shunting noted. Only the left pulmonary veins were seen draining into the left atrium and the right pulmonary veins were not well defined. The decision was made to transfer the patient to a tertiary care center.

The following morning a cardiac CT scan was obtained to better delineate the underlying cardiac anatomy with special attention to the pulmonary veins. The CT scan showed complex right partial anomalous pulmonary venous return with two separate right pulmonary veins draining into the IVC. Associated right aortopulmonary collateral arising from the celiac artery and a mildly hypoplastic right pulmonary artery was noted. It also confirmed the echocardiographic finding of marked right atrial and ventricular enlargement. This confirmed the diagnosis of Scimitar Syndrome.

The patient was weaned off the oxygen and she remained stable on room air. Three days later the patient was taken to the catheterization lab. Angiograms performed in the catheterization lab revealed a 3.3 mm tortuous collateral arising from the abdominal aorta, which drained into the posterior aspect of the right lower lobe via two separate branches (Figures 2 and 3). The aortopulmonary collateral was coil embolized using a total of 3 Gianturco coils (one 4 mm diameter x 5 cm long, one 3 mm diameter x 4 cm long and one 2 mm diameter x 2.5 cm long). Repeat angiograms demonstrated complete occlusion of the aortopulmonary collateral.

Following a discussion with pediatric cardiothoracic surgery and 3 days post cardiac catherization, the patient underwent suture closures of the atrial septal defect and tricuspid valve annuloplasty. Postoperatively, the measured right ventricular pressures off cardiopulmonary bypass was 1/2 systemic.

Postoperative follow-up echocardiograms revealed moderately depressed RV function, moderate tricuspid regurgitation and systemic right ventricular pressures. The patient was placed on IV milrinone and supplemental oxygen with improvement of RV systolic function although the pulmonary artery pressures remained at a systemic level. The patient was started on sildenafil and increased to 1 mg/kg q8hr and ultimately the pulmonary artery pressures decreased to 1/2 systemic prior to hospital discharge.

The patient was discharged home on 1 L O_2 supplementation and sildenafil with plans to repair the scimitar vein at a

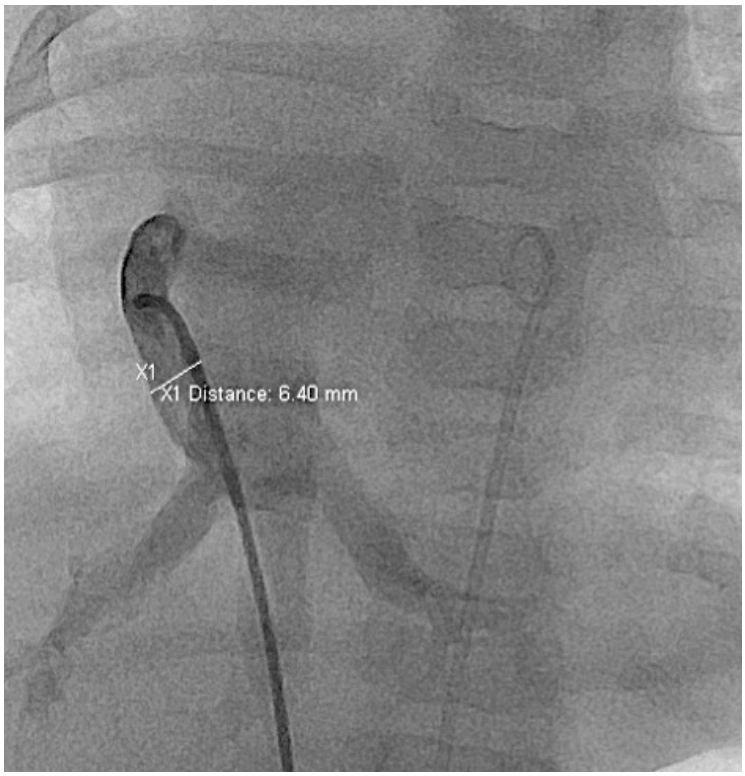

Figure 2. Right pulmonary veins entering the IVC above the diaphragm.

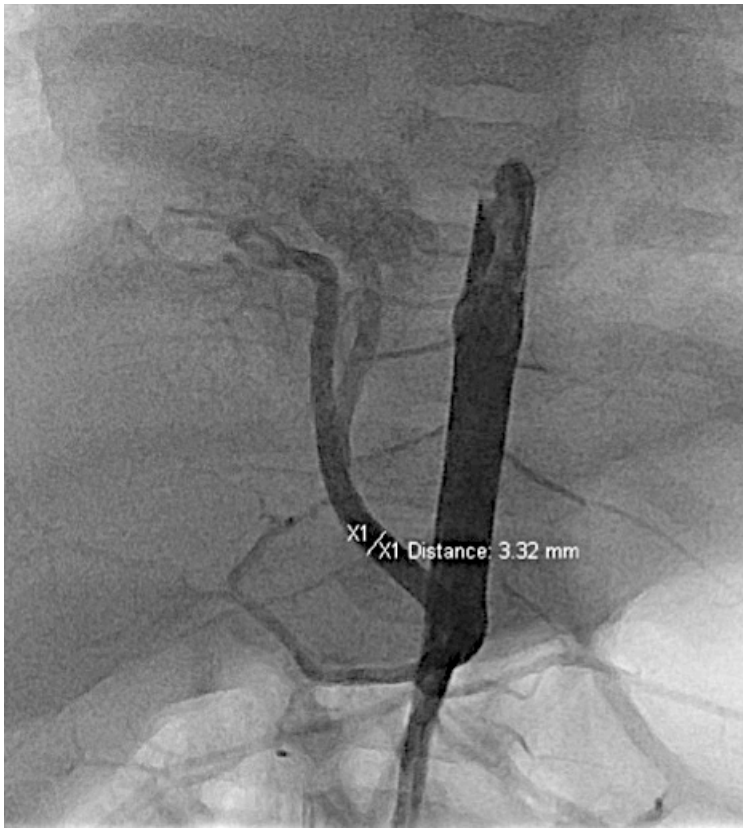

Figure 3. Aortopulmonary collateral measuring 3.3 mm seen arising from the abdominal aorta and terminating in the lower lobe of the right lung.

later date.

Discussion

In 1836 Chassinat and Cooper independently described anatomic features of a developmental complex in pathological specimens, which was later described as Scimitar Syndrome by Neill et al.[5] Dubuis and colleagues identified two forms of scimitar syndrome: the infantile form and adult form based on the age of presentation. The infantile form is associated with frequent symptoms, coexisting congenital heart defects and pulmonary artery hypertension and have a worse prognosis.[1] On the contrary, the adult form may present with recurrent pulmonary infections, dyspnea, or could be totally asymptomatic.[4]

Pulmonary artery hypertension, as noted in our patient, is identified as a risk factor for death in Scimitar Syndrome.[1, 3] It is attributed to multiple causes including stenosis of the scimitar vein, with pulmonary venous congestion, large aorta to right lung collaterals, right lung hypoplasia and pulmonary overcirculation.[1, 7]

In isolation, the anomalous venous drainage to the systemic venous atrium is unlikely to produce symptoms and may even result in less RV volume overload when compared to other cases of partial anomalous pulmonary venous return. The hypoplastic right lung and right pulmonary artery may in fact limit the magnitude of the left to right shunt.[6]

Haworth and colleagues proposed that the pulmonary hypertension was likely secondary to the failure of the pulmonary vasculature to adapt to the extra-uterine life in the presence of large pulmonary blood flow.[5] Dickinson et al and Levine at al demonstrated significant improvement in heart failure symptoms after ligation or coil embolization of the aortopulmonary collaterals.[6]

Definitive repair of the scimitar vein primarily involves redirecting the anomalous pulmonary venous drainage to the left atrium either by baffling the anomalous drainage to the left atrium via a tunnel or by transecting the scimitar vein at its entrance to the IVC and reimplanting it to the left atrium.[3] Dusenbery and colleagues from Boston, however, reported high frequency of pulmonary vein stenosis in infants who underwent either the baffle or reimplanatation procedure.[1] This was supported by the European Congenital Heart Surgeons Association multicentric study that reported relatively high operative mortality and complication rate in patients who underwent repair before the age of 1 year when compared to patients who underwent repair at an older age.[3] Hence, they recommend conservative management in patients with no pulmonary hypertension, aortopulmonary collaterals, other intracardiac defects and only mild RV dilation. In patients with pulmonary arterial hypertension, aortopulmonary collaterals and intracardiac defects, a staged assessment plan was proposed. Initially, the aortopulmonary collaterals should be embolized, followed by repair of

coexisting congenital heart defects and, reevaluation for any significant pulmonary artery hypertension or clinical symptoms.[1] This was the approach adopted in our case as well. We also instituted supplemental oxygen and Sildenafil for its potential pulmonary vasodilator effects, which appears to have improved based on serial echocardiograms.

Conclusion

Scimitar Syndrome is a complex lesion, which comprises anomalies of the lung and the heart. The infantile form is particularly complex and repair of the anomalous vein in infancy has not been reported to be successful.[1, 2] Hence, our patient with anomalous right pulmonary venous return, pulmonary arterial hypertension, aortopulmonary collateral and ASD only underwent coil embolization of the aortopulmonary collateral and surgical repair of the atrial septal defect. She remains on sildenafil and O_2 supplementation for her pulmonary arterial hypertension with plans to definitely repair the scimitar vein at a later date.

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Brief Introduction of Principal Author

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Cardiac Tumor with Rhythm Disturbances in a Neonate

By Sanjay Kumar Tanti, MD; Asit Kumar Mishra, MD

Introduction

Primary cardiac tumors are uncommon in the pediatric age group[1] with a reported incidence of 0.2% in children referred for cardiac disease;[2] whereas only 14.2% of all cardiac tumors occur in patients aged less than 16 years.[3] Cardiac tumours reported in neonates include: rhabdomyoma, fibromas and myxomas. Symptoms of cardiac myxomas are typically variable, presenting with non-specific symptoms of fever, sweating and weight loss, obstruction of a valve, embolism resulting in acute myocardial infarction and pulmonary embolism. In this neonate with left atrial myxoma which presented with paroxysmal supraventricular tachycardia (SVT), a relationship between cardiac myxoma and SVT seemed unlikely, and hence, is reported.

Primary cardiac tumors are uncommon in the pediatric age group.[1] with a reported incidence of 0.2% in children referred for cardiac disease;[2] whereas, only 14.2% of all cardiac tumors occur in patients aged less than 16 years.[3]

Case Report

A 14-days-old baby came from home with refusal of feeds and respiratory distress for 2-days. Birth history revealed that this was a late preterm baby (35-36 weeks) delivered vaginally, cried immediately after birth, and had a birth weight of 2.2 kg. Mother had a history of gestational diabetes, on diet control. There was no immediate post-natal problem.

On admission, baby was lethargic, had heart rate of 178/min, capillary refill time <3 seconds with respiratory distress and its lung fields were clear bilaterally. On cardiovascular examination first and second heart sounds were heard normally with no obvious murmur. Abdomen was soft and the liver was palpable 3 cm below right sub costal margin. CNS examination revealed normal tone and level anterior fontanelle.

Management was started for probable sepsis with IV antibiotics, IV fluids and oxygen. Blood parameters and coagulation study were normal. Subsequently, baby developed extreme tachycardia (HR of 320-330/min) with signs of congestive heart failure in the form of increasing respiratory distress, desaturation and increasing liver size. Diagnosis of supraventricular tachycardia was made on the basis of ECG showing tachycardia with absent p wave and no R – R variability. Adenosine was needed to be given twice. SVT aborted after the second dose, but because it recurred after 6 hours, amiodarone IV infusion was started to which the baby responded well. EKG after termination of tachycardia showed Sinus Rhythm with delta wave with short PR (Figure 1) suggestive of Wolff-Parkinson-White (WPW) Syndrome. The baby also received medication for congestive heart failure. Subsequently propranolol maintenance therapy was started.

Echocardiography done after 12 hours showed a 10X8 mm pedunculated hyperechoic mass in left atrium attached with LA appendages, but freely mobile, suggestive of left atrial myxoma, mild MR, mild TR, PFO of 2 mm with left-to-right shunt, normal size cardiac chambers, and good biventricular function.

The baby was referred to a cardiac centre in stable condition with oral propranolol for subsequent management where surgical resection of the mass was deferred due to the small size of baby and high risk of mortality. Baby was managed medically on propranolol maintenance dose with plan for surgery if symptoms of SVT and CHF recur.

Discussion

Cardiac tumors are very rare in the pediatric population and more so in infants.[1,6] Rhabdomyomas are the commonest cardiac tumors in neonates, accounting for 50% of primary cardiac tumors.[1,2,6] In children, myxoma is the most common tumor after rhabdomyoma. The incidence of myxoma increases with age.

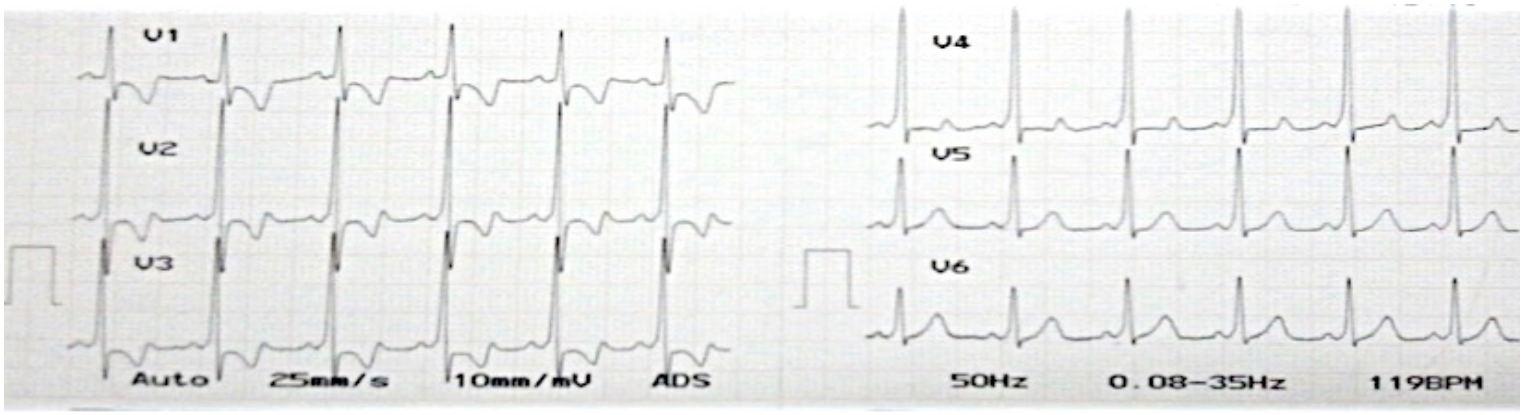

Figure 1. Short PR interval and delta wave.

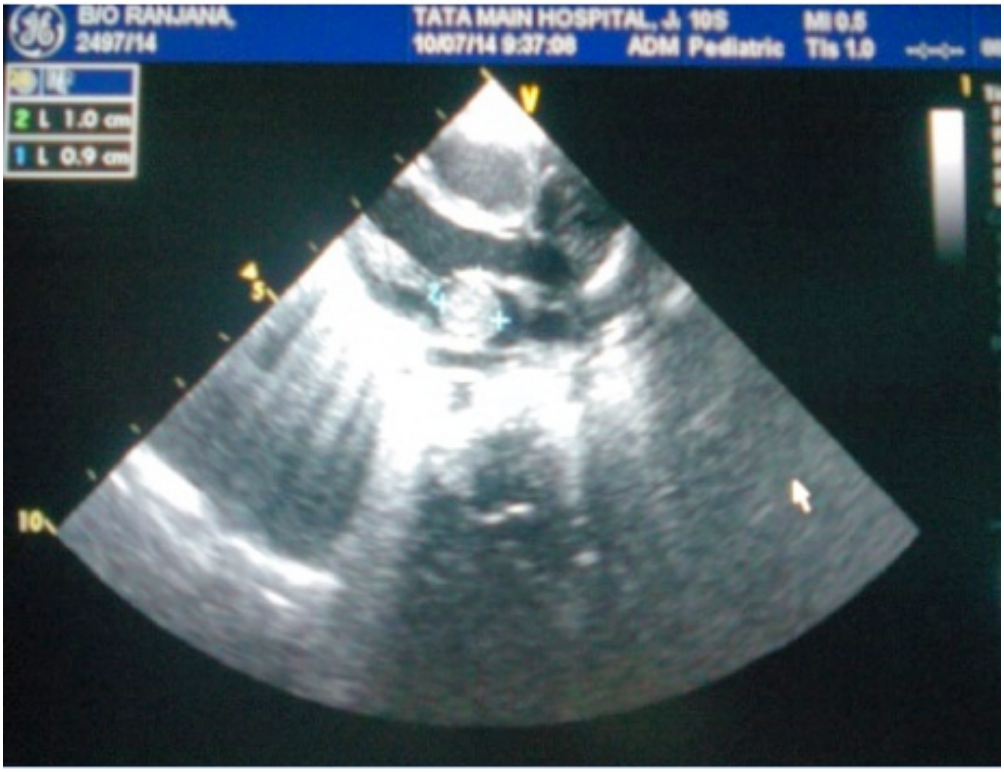

Figure 2. Para-sternal long axis view showing LA mass impinging on mitral valve.

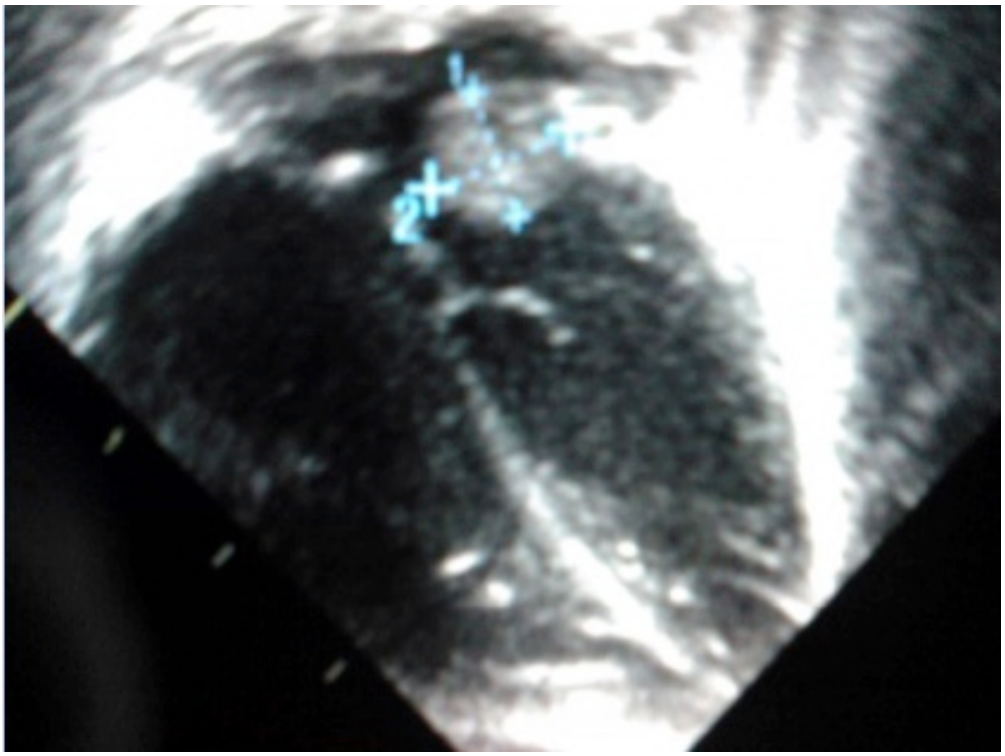

Figure 3. Apical 4-chamber view.

Differential diagnoses of a left atrial mass include cardiac tumours and thrombus. In thrombus there is hyperechoic mass with hypo-echoic areas inside indicating spontaneous lysis; in neonates, thrombosis of the left atrium is very uncommon and rare in left atrial appendages.

However, the mass in the case reported here, was pedunculated, hyperechoic and homogeneous arising from left atrial appendages and projecting into the left atrium, and is hence, is likely to be a myxoma due to its pedunculated nature and homogeneity. Whereas in adults, approximately 80% of the myxomas are localized in the left atrium, in children there is more variation in the localization of the tumor. Pathi and colleagues[5] recently reported a left atrial myxoma in a young child and reviewed the literature regarding myxoma in children.

SVT is not an uncommon event in infants with an incidence of 1:2500.[10] An increased incidence of WPW Syndrome in children with Congenital Heart Disease (CHD) is well-known. In Ebstein´s Anomaly, the associated presence of WPW Syndrome is as high as 14%.[7] Cardiac neoplasms in children may induce ventricular arrhythmias.[8,9] Rhabdomyomas are especially known to be associated with SVT and ventricular tachycardia. Thus far a relationship between WPW Syndrome and myxomas has not been reported. Presence of a symptomatic cardiac tumor is an indication for its surgical removal based on its potential risk of embolization, myocardial infarction, and sudden death. Therapy of WPW Syndrome follows clinical examination and analysis of ECG and electrophysiological studies. Emergency treatment of paroxysmal SVT is by vagal manoeuvres, intravenous adenosine and cardioversion. Intravenous procainamide, esmolol and

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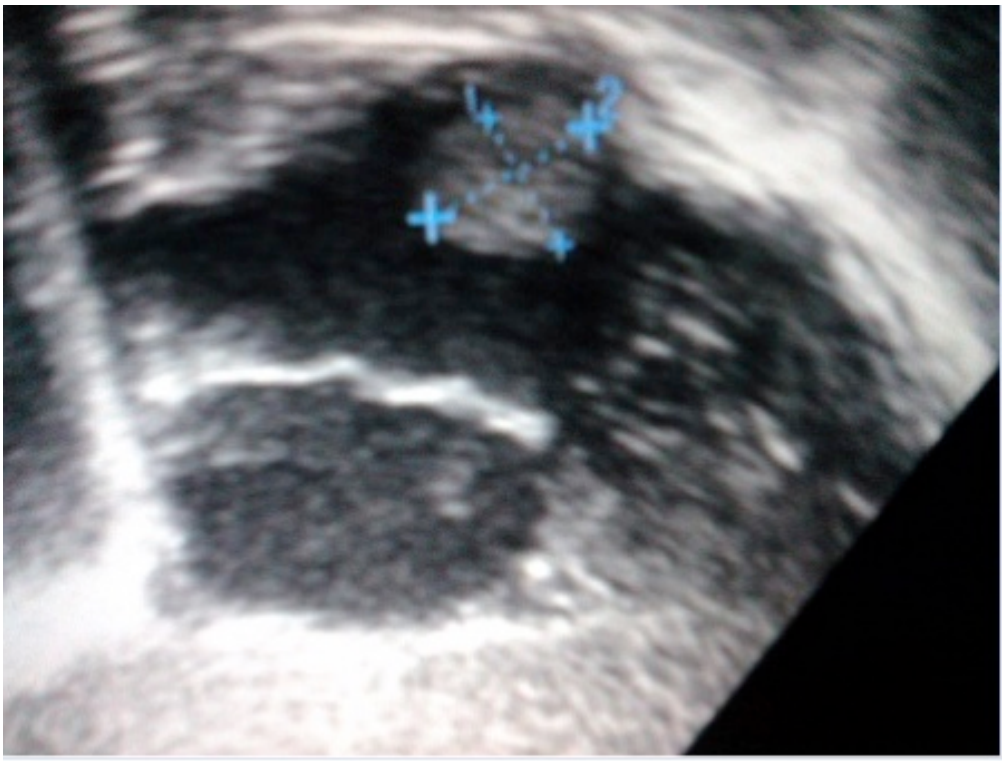

Figure 4. Sub-costal view.

amioderone have also been used in resistant cases.

Most of the SVTs in neonates resolve by the end of 1 year.[12] In long-term therapy, beta-receptor antagonists and propafenon may be used as prophylaxis. On follow-up, our patient had been without SVT for 6 months with propranolol; the necessity for doing an EPS was not felt.

Our patient again visited same cardiac centre for re-evaluation, where repeat echocardiography showed complete resolution of the left atrial mass. Hence, conservative management was planned to continue propranolol for a minimum of one year, and then re-evaluate again for SVT.

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Is the Emphasis on Immunization Uniform?

By Mitchell Goldstein, MD; T. Allen Merritt, MD

Members of the NPA write a regular column in *Neonatology Today*.

National Perinatal Association

Respiratory Syncytial Virus (RSV) has long been recognized as one of the viruses responsible for the common cold. In most, RSV is little cause for concern, and consequently, scant attention is given to RSV in the media. However, Measles, a virus closely related to RSV, is in the news again. Although a highly immunogenic vaccine has been available for years, naysayers have changed the public perception of whether this vaccine and others are truly necessary. As a country, we have become accustomed to good outcomes and believe that such horrible illnesses that plagued our forebears are now firmly in the past. Small pox was eradicated decades ago, and we no longer vaccinate routinely. Why then is it necessary to vaccinate against other disease processes such as polio when no pediatrician can recall the last case reported in the United States? What about the risk of immunization and autism? Yes, the link has been disproven in fairly rigorous analysis, but why upset the parents?[1] What about the celebrity perspective? If someone we know from television or other public venue gets up and says that vaccination is no good, surely this must be so.

Yes, Americans do not regulate where they get their health information. Since serious preventable disease rarely occurs in the United States since the advent of effective immunization programs, there is no perceived need. This again brings us back to measles. Disneyland, the happiest place on earth, was identified as the focus for the latest outbreak.[2-4] No one has died, although several people have become very sick. Our epidemiologists caution that this outbreak may just be the beginning and that historically for every 1000 cases there will be one fatality.[5] In immunocompromised individuals, measles can rapidly lead to mortality. We depend on herd immunity, which is attainable when greater than 95% of the population has been vaccinated; but granting numerous exemptions to school-aged children on the basis of a real or perceived threat was the norm until recently. Now, with the threat of a previously well-controlled public menace on the horizon, legislators nationwide have taken up the cause. Anti-immunization groups have joined the fray and have decried the latest push for universal immunization as a gross violation of the fundamental freedoms. Immunization may ultimately be required as requisite item for attendance at public school. Truly, there are those who should not be immunized. Patients who are immunocompromised, who have known or previously documented reasons for not being immunized, should be exempted from these mandates.[6] Certain individuals such as those with Burton's (x-linked) Agammaglobulinemia can be harmed by live vaccines and will not mount an appreciable response to an inactivated vaccine.[7-10] It is important that the proposed legislation not forget about these individuals. It is as important to recognize the need for those who require the benefit of herd immunity as those others who are required to be immunized to protect those who need the protection.

Measles, which is also known as rubeola or red measles, occurs as a result of an infection with the measles virus. The measles virus is a single-stranded, minus strand, enveloped RNA virus of the genus Morbillivirus of the family Paramyxoviridae. Initial presentation includes fever, cough, runny nose, and red eyes.[11] A collection of white spots often occurs inside the mouth. These are the pathognomonic Koplik's spots.[12] Classically, the measles rash begins on the face as soon as 72 hours after the initial symptoms and spreads to the rest of the body. Presentation of the initial symptoms begins approximately 10-12 days after exposure and the symptoms may last as long as 10 days. Complications occur in a third of the patients and may include: diarrhea, pneumonia, blindness, and encephalitis as well as subacute sclerosing panencephalitis (SSPE).[13] In 2011, the World Health Organization (WHO) suggested that 158,000 deaths were caused by measles. This number was approximately a third of the 630,000 deaths reported worldwide in 1990.[14] Globally, Measles continues as the principle cause of vaccine-preventable death.[15] Case rate fatality has been described as high as 20-30% in locations with a high proportion of malnourished and immunosuppressed individuals.[16,17] Measles in pregnancy may be associated with increased rates of spontaneous abortion, premature labor and delivery, and low birthweight in completed pregnancies.[18] The mainstay of measles prevention occurs at 12 months of age with the administration of the FDA indicated Measles, Mumps, and Rubella vaccine (MMR).[19] Infants below this age do not adequately respond to the immune challenge; however, passive immunization occurs during pregnancy, and does provide protection until the infant is roughly 6 months of age. A second vaccine is recommended before the child starts elementary school (age four to five). Ninety percent of those exposed to the Measles will contract the disease unless they have been vaccinated, or have had Measles before.[20-22] A previous history of measles generally confers lifelong immunity. Roughly a million children each year worldwide were estimated to have died from measles or its complications before the vaccine was introduced.[23] Since the initiation of effective immunization, the complications from measles infection have been greatly reduced. And in fact, there were no measles deaths reported from the recent outbreak in the United States, and none going back to 2003.[23-25]

In contrast, Respiratory Syncytial Virus (RSV) is a common cold virus that causes a large number of respiratory tract infections. It is a major cause of lower respiratory tract infections in infants and small children and results in a large number of hospitalizations annually.[26-30]

RSV is also a single-stranded, minus strand, enveloped RNA virus of the family Paramyxoviridae, which includes other common respiratory viruses such as those causing mumps as well as parainfluenza (in addition to measles). RSV is a member of the genus Pneumovirinae. The incubation period is generally 4–5 days. In older children and well adults, RSV produces mild symptoms, often indistinguishable from other common colds. The Centers for Disease Control (CDC), however, calls RSV the "most common cause of bronchiolitis (inflammation of the small airways in the lung) and pneumonia in children under 1 year of age in the United States".[31] RSV more severely impacts those at risk by socioeconomic and racial disparity.[32]

In RSV, F proteins on the surface of the virus cause the cell membranes on nearby cells to merge, forming syncytia. The presence of a large number of these syncytia produce thick tenacious secretions that are the basis of significant morbidity from the disease.[33-36] An infant can become infected more than once within a single RSV season, and may require multiple hospitalizations as a result of these infections. There are severe RSV infections among elderly patients as well. Worldwide, RSV disease results in an estimated 200,000 deaths.[37] Recurrent wheezing and asthma are more common among those who suffered RSV infection than those who were not found to have had an RSV infection, although there is some suggestion that those who ultimately developed wheeze may have had a predisposition.[38] Attempts to produce an effective vaccine (capable of inducing an effective immune response) have been largely unsuccessful to date.[39,40] An FDA-indicated immunization against the F-protein exists for preterm infants (under 36 weeks of gestation), infants with certain Congenital Heart Defects (CHD) or bronchopulmonary dysplasia (BPD), and infants with congenital malformations of the airway.[41] This immunization with Palivizumab (a monoclonal antibody directed against the F protein) does not protect against RSV infection, but does prevent significant symptomatology associated with the disease.[38,42-44] As infants at risk may become infected multiple times during an RSV season (usually October through May), it is important that they receive the complete monthly course of Palivizumab during the appropriate time of year to provide adequate prophylaxis.

This discussion boils down to the difference between two viruses, and how our society responds to them. Both are members of the same family of viruses. Both have been or are currently responsible for significant morbidity and mortality before there was an effective immunization strategy to either reduce the risk of infection; or, in the case of RSV, significantly decrease the risk of RSV related airway disease. Both have good effective FDA-indicated products that, when administered according to their guidelines, improve the lives of many. Granted, there is a difference. In measles, effective vaccination provides a safe haven for those who cannot be immunized or who would not respond adequately to a vaccination challenge; in RSV, the "herd" is not immunized and, as such, we have no way of preventing infection in the vast majority of people who contract RSV. But there is another important distinction, in the news media.[45]

With the first index cases of measles reported in early 2015, the news media whipped into a frenzy.[13] The coverage has been both positive and negative towards mandatory immunization. The potential of Measles to cause significant health-related problems was on every talk show, on every headline, and the subject of every conversation. Appropriately, the American Academy of Pediatrics (AAP) weighed in on the importance of vaccination according to the indicated schedule. During that same period of time, there was barely any information about how the new AAP policy on RSV prophylaxis administration had reduced eligibility by 75% those covered by the original FDA indication.[46,47] There was effectively no media coverage about a child being hospitalized with RSV that could have been prevented or at least mitigated using monthly Palivizumab administration. The effect of the "anti-vaccine" movement on the rate of Measles vaccination was discussed extensively, legislators vowed to correct this problem and numerous local, state, and national initiatives are even now winding their ways through the legislative process to insure that adequate vaccination occurs.[45,48-50] But with Palivizumab? State organizations, insurers, and others involved in deciding to cover this therapy are turning their backs to the FDA-indication, and instead, only covering those patients that fall into the more restrictive AAP policy despite active resistance from the National Medical Association, the National Association of Neonatal Nurses, the National Perinatal Association, and others.[46]

Information from the 2014-2015 season is not yet available, but each year there are deaths that are attributable to RSV infection. Will there be an increase in deaths and re-hospitalizations in the at risk group that would have otherwise been eligible for immunization before the most recent update to the AAP guidance?[51] To the credit of the news media, as well as the AAP, during the same period of time, there were no deaths from Measles. On July 2, 2015 the Washington State Department of Health reported the first death from measles virus in the last 12 years in the United States when an "immunocompromised adult who died without a characteristic rash and on autopsy revealed the the measles virus as the cause of death."[52] Despite deficiencies in coverage, significant effort was placed on identification of "at risk" individuals and preventing them from further spreading the infection. Because of its prevalence and in the absence of an engaged media, such scrutiny is not possible with RSV. Palivizumab costs more than other type of immunizations, but the FDA indications as described in the package insert have been finely tuned to those groups at most risk.[41] The MMR vaccine is less expensive, but the cumulative cost of vaccinating almost every infant in the country exceeds that of those previously eligible for Palivizumab.[53, 54] After investing large amounts of time and money in the care of our most fragile infants, is it reasonable to think that we save money by restricting access to an indicated immunization? The answer is clearly no.[54] And if saving money is not the objective, what is? Our preemies deserve better.

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Compiled and Reviewed by Tony Carlson, Senior Editor

Preemies at High Risk of Autism Don't Show Typical Signs of Disorder in Early Infancy

Newswise — Premature babies are at an increased risk for developing autism spectrum disorder. But a small study indicates that preemies who avoid eye contact in early infancy are less likely to demonstrate symptoms of autism at age 2 than preemies who maintain eye contact during early interactions, according to new research at Washington University School of Medicine in St. Louis.

"Children with autism typically have challenges with social interaction and may avoid eye contact, but it turned out that children in this study who had characteristics of autism at age 2 were more likely to maintain eye contact and not avert their gazes in early infancy," said first author Bobbi Pineda, PhD, Assistant Professor in Occupational Therapy and in Pediatrics.

The research is available in the July/August issue of The *American Journal of Occupational Therapy.*

Early intervention can benefit children with autism spectrum disorder. However, while signs of autism have been observed in infants as early as two to six months of age, the disorder is difficult to diagnose before age 2.

In the new study, the researchers observed behavioral symptoms characteristic of autism in a particularly high-risk group of young children: those born prematurely. Observing early behaviors may give researchers and clinicians indicators to look for early in life so they can recommend timely diagnostic testing and interventions to improve a baby's adaptive responses and outcome.

The researchers evaluated 62 premature infants hospitalized in the neonatal intensive care unit (NICU) at St. Louis Children's Hospital. The infants were born at least 10 weeks before they reached full term and were evaluated close to the dates they were supposed to have been born.

The researchers focused on whether the infants made eye contact or averted their gazes; responded to objects or people around them; interacted socially; and calmed themselves when upset. They also looked at whether the babies exhibited a horizontal repetitive eye movement called nystagmus.

Of the 62 preemies, 58 were observed for visual cues; the others were asleep during visits from the researchers. Of those 58 babies, 41 averted their gazes, and 21 showed nystagmus. Nearly all of the infants with nystagmus — 19 — also averted their gazes.

When the babies in the study were screened for autism at age 2, using a recognized screening checklist for Autism in toddlers, 13% — or 21% — screened positive. A positive finding indicates a child is at risk and should receive diagnostic testing. The researchers were surprised to find that many of the babies who had averted their gazes and showed signs of nystagmus as infants did not display warning signs of Autism at age 2.

"Surprisingly, we found that the children who later screened positive for autism were more likely as infants to not avert their gazes during social interaction," Pineda said. "They were more likely to sustain eye contact."

Pineda speculated that premature infants in the Neonatal Intensive Care Unit (NICU) may avert their gazes as a coping mechanism to help them deal with the stress of an intense environment during a vulnerable period of development. So absence of gaze aversion, she said, could signal an inability to avoid stressors.

"This could explain why some infants behave differently in social interactions as babies than later, as children," Pineda said. "Better understanding how autism traits emerge along the developmental pathway is an important area for future research."

With nearly one in 68 children in the U.S. diagnosed with autism, according to the Centers for Disease Control and Prevention, Pineda and her colleagues hope the new study will motivate researchers to better define differences in development across the lifespan, including the neonatal period.

Screening tools for Autism spectrum disorder don't exist for infants, but research is needed to improve understanding of how autism traits emerge, she said. This would help pave the way for early interventions aimed at improving life skills and allowing those with autism to lead more productive lives.

This work was supported by the National Institutes of Health (NIH), grant number ROI HD 057098; the Washington University Intellectual and Developmental Disabilities Research Center, via NIH, grant number P30 HD062171; the National Center for Advancing Translational Sciences, grant number UL1 TR000448, sub award KL2 TR000450; the Comprehensive Opportunities for Rehabilitation Research K12 award, K12 HD055931.

Pineda R, Melchior K, Oberle S, Inder T, Rogers C. Assessment of Autism Symptoms During the Neonatal Period: Is There Early Evidence of Autism Risk? T*he American Journal of Occupational Therapy. July/August 2015 edition.*

Hospital to Create Emergency Experiences Using Virtual Reality: Walk Around Inside Crisis Situations, Educate Medical Professionals

The Next Galaxy Corp. recently announced the signing of an agreement with Miami Children's Hospital. Next Galaxy will develop immersive Virtual Reality medical instructional content for patient and medical professional education using the company's VR Model. Per the multi-year agreement, Next Galaxy and Miami Children's Hospital are jointly creating VR Instructionals on cardiopulmonary resuscitation (CPR) and other lifesaving procedures, which will be released as an application for smartphones.

Incorporating eye gaze control, gestures, and voice commands while "walking around" inside an emergency medical experience or crisis, Next Galaxy's Virtual Reality Model engages participants far beyond today's methodology of passively watching video and taking written tests.

"Assessments are incorporated directly into the medical VR models. We will design situations where participants are required to make the appropriate decisions about proper techniques. The Virtual CPR instructional will measure metrics and provide real-time feedback ensuring participants accurately perform CPR techniques. Further, the instructional will explain any mistake and prompt users to try again when errors are made. Supportive messages are delivered upon success," states Mary Spio CEO, Next Galaxy Corp.

The medical VR models will be viewable through smartphones and desktops as 3D, and via VR devices such as Google Cardboard, VRONE and Oculus Rift.

Next Galaxy Corporation is a leading developer of innovative content solutions and fully Immersive Consumer Virtual Reality technology. For further information, visit www.nextgalaxycorp.com.

Lactobacillus Reuteri May Have Multiple Benefits as a Probiotic in Premature Infants

A new study finds that supplementing enteral nutrition with Lactobacillus reuteri (L. reuteri) DSM 17938 as a probiotic may reduce the risk of necrotizing enterocolitis (NEC) in premature infants. NEC is a condition where portions of the bowel undergo tissue death. It is the second most common cause of death among premature infants.

The study, published today in the OnlineFirst version of the *Journal of Parenteral and Enteral Nutrition* (JPEN), the research *journal of the American Society for Parenteral and Enteral Nutrition* (A.S.P.E.N.), is a systematic review of randomized controlled trials (RCTs) and non-RCTs of L. reuteri DSM 17938 supplementation in premature infants born at a gestational age of less than 37 weeks. Studies comparing enteral administration of any dose of L. reuteri DSM 17938 or

mother strain L. reuteri ATCC 55730 within the first 10 days of life and continued for at least 7 days with placebo or control were eligible for inclusion. Studies comparing L. reuteri DSM 17938 with another probiotic were also included. In the end, 6 RCTs and 2 non-RCTs were included.

The results from the RCTs showed a statistically insignificant improvement in NEC, while the non-RCTs showed significant improvement. Overall, this systematic review suggests that L. reuteri DSM 17938 supplementation has the potential not only to reduce the risk of NEC but also to facilitate enteral nutrition in premature infants. However, larger definitive studies are needed to confirm these findings.

A publication of the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.), the J*ournal of Parenteral and Enteral Nutrition* (JPEN) is the premier scientific journal of nutrition and metabolic support. It publishes original, peer-reviewed studies that define the cutting edge of basic and clinical research in the field. It explores the science of optimizing the care of patients receiving enteral or intravenous therapies. All published JPEN articles are available online at http://pen.sagepub.com.

For more information about American Society for Parenteral and Enteral Nutritio (A.S.P.E.N.), visit www.nutritioncare.org.

Extremely Preterm Infants Enrolled in RCTs Do Not Experience Worse Outcomes

In a group of more than 5,000 extremely preterm infants, important in-hospital outcomes were neither better nor worse in infants enrolled in randomized clinical trials (RCTs) compared with eligible but non-enrolled infants, findings that may provide reassurance regarding concerns about performing RCTs in this vulnerable population, according to a study in the June 16 issue of *JAMA*.

It has been unknown whether participation in a neonatal RCT is independently associated with differences in outcomes. Elizabeth E. Foglia, MD, of the University of Pennsylvania, Philadelphia, and colleagues compared in-hospital outcomes between extremely premature infants enrolled in RCTs and those who were eligible but not enrolled in RCTs conducted by the National Institute of Child Health and Human Development Neonatal Research Network between Jan. 1999 and Dec. 2012.

Six RCTs met the inclusion criteria. Of 5,389 eligible infants, 3,795 were enrolled in at least 1 RCT and 1,594 were not enrolled in any RCT. The researchers found that the primary outcome (a composite of death; bronchopulmonary dysplasia [a chronic lung disorder in infants]; severe brain injury; or severe retinopathy of prematurity [a sight-threatening abnormality of the eye] did not differ significantly between groups [68% in enrolled group vs 69% in eligible, but not enrolled group).There were no differences in the secondary outcomes (individual components of the primary outcome, culture-proven late-onset sepsis, and necrotizing enterocolitis [severe inflammation due to decreased blood flow that occurs in the intestines of premature infants] in the adjusted analysis. In addition, the primary outcome did not differ between groups when analyzed by individual trial.

"The present study did not find differences in mortality or neonatal morbidity between trial participants and nonparticipants. Similarly, meta-analyses of studies of adults and older children have demonstrated no significant differences in outcomes between trial participants and nonparticipants who were treated similarly outside trials," the authors write.

The National Institutes of Health and the Eunice Kennedy Shriver National Institute of Child Health and Human Development provided grant support for the Neonatal Research Network's Generic Database Study via cooperative agreements. The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

Minor Surgical Procedure Common in O&G Associated with Increased Risk of Preterm Delivery

Dilatation and Curettage (D&C) is one of the most common minor surgical procedures in Obstetrics and Gynaecology, used mainly for miscarriage or terminations.(1) Today, use of the 15-minute procedure is declining in favour of less invasive medical methods, but it still remains common in O&G.

Although D&C is generally considered safe and easy to perform, it is associated with some serious (if rare) side effects, including perforations to the cervix and uterus, infection, and bleeding. Now, an analysis of 21 cohort studies, which included almost 2 million women has found that a D&C performed in cases of miscarriage or induced abortion increases the chance of preterm birth (under 37 weeks) in a subsequent pregnancy by 29%, and of very preterm birth (under 32 weeks) by 69%.

With a background population risk of preterm delivery of about 6% in women without a D&C, these results suggest that an earlier D&C would increase the risk to 7.6%. This increase of 1.6% corresponds to 16 extra preterm births per 1000 women treated by D&C.

Results of the study were presented at the Annual Meeting of ESHRE in Lisbon by gynaecologist Dr. Pim Ankum of the Academic Medical Centre of the University of Amsterdam, the Netherlands.

These statistically significant increases in incidence were measured against control groups of similar women without a D&C prior to pregnancy, but the risk remained similarly increased (+28%) for D&C even when the control groups were limited to women with a medically-managed miscarriage or termination. And the risks were even higher in women with a history of multiple D&Cs.

The results, says Dr. Ankum, "warrant caution in the use of D&C after miscarriage and induced abortion", and add further weight to the case for less invasive procedures in such circumstances.(2)

In proposing an explanation for the increased risk from D&C, he suggested that dilatation of the cervix may cause permanent damage which affects cervical tightness, with premature opening of the cervix and subsequent premature birth a consequence. Other intra-cervical procedures, such as cervical

biopsy or cauterization, may also cause an increased risk of subsequent preterm birth. Cervical damage might also impair the anti-microbial defence mechanism in the cervix, which could lead to ascending genital tract infection, a known cause of preterm birth.

In the light of this study, whose results were described as "robust", and with the availability of less invasive medical treatments (such as misporostol), Dr. Ankum called for a more "restrained use" of D&C. Indeed, this decline in use appears already to have begun, reflected in the increased popularity of misoprostol either as an alternative to D&C or for cervical priming prior to curettage. Nevertheless, gynaeoclogists in the Netherlands still treat 50% of all miscarriages with D&C (around 10,000 surgical procedures a year) - and this, said Dr. Ankum, probably reflects usage in other countries.

Dr Ankum described preterm birth as "the biggest challenge in western obstetrics", with severe neonatal morbidity (and a need for intensive care treatment for infant respiratory distress syndrome, feeding problems, neonatal jaundice and cerebral palsy) and infant mortality. Adoption of alternatives to D&C for termination and miscarriage would, in theory, reduce this risk to the basic background level.

Abstract O-169, Tuesday 16 June 16.00 WEST

Does dilatation and curettage (D&C) increase the risk of preterm birth in the subsequent pregnancy? A systematic review and meta-analysis

Notes

1. *Dilatation refers to widening the cervix, and curettage to the removal of tissue from within the uterus.*
2. *Among the less invasive alternatives suggested by Dr Ankum are the prostaglandin misoprostol, widely used to induce labour during pregnancy and treat postpartum bleeding as a result of inadequate uterine contraction during labour.*

Nationwide Children's Hospital Joins Nationwide to Make Safe Happen Easier for Parents and Caregivers

Newswise — Nationwide Children's Hospital is joining Nationwide – one of the largest and strongest diversified insurance and financial services organizations in the U.S. – in their effort to prevent childhood injury. According to the Centers for Disease Control and Prevention (CDC), many injuries occur in and around the home. Through this new *Make Safe Happen* initiative, Nationwide Children's researchers developed a new *Make Safe Happen* app to help prevent childhood injury. The app, now available for free on both iOS and Android, aims to help parents make their home safer. Parents can learn as they go with customized room-to-room safety checklists and links to safety products for the home.

"I have been an injury researcher for more than a decade, but it wasn't until I was pregnant with triplets that I realized the need to make safety easier for busy parents," said Dr. Lara McKenzie, a principal investigator with Nationwide Children's Hospital's Center for Injury Research and Policy (CIRP). "We created something that I needed as a mom, and that would give parents and caregivers the tools they needed to make their home safer for their family. You can create shopping lists, set reminders and track your progress towards making your home as safe as possible for your family. And you can do all of this on your smartphone."

Since the 1930s, Nationwide has played an active role in supporting this issue, including their engagement with CIRP, founded by Dr. Gary Smith, an internationally-recognized pediatrician and author of more than 150 child injury-related articles in peer-reviewed journals. Contributions made by the Nationwide Foundation to Nationwide Children's have supported important child safety research, and most recently the development of the *Make Safe Happen* app.

"Nationwide has always been committed to protecting what matters most to our members, and for parents, there's nothing more important than the safety of their children," said Matt Jauchius, Nationwide's Chief Marketing Officer. "This is an issue we've been passionate about as a company for more than 60 years. We're dedicated to devoting resources to help prevent these tragedies from taking place through our new Make Safe Happen program."

"We are grateful to Nationwide for their long-standing support of our mission to conduct innovative research and make discoveries that will prevent injuries in children," said Dr. Smith, pediatrician and founder and director of CIRP. "We commend Nationwide for bringing the important issue of child injury to the forefront through Make Safe Happen and are grateful for the support of Nationwide and the Nationwide Foundation in bringing the Make Safe Happen app to life as an empowering tool for parents everywhere."

For more information on child home safety visit MakeSafeHappen.com.

For more information on Nationwide Children's Hospital visit Nationwidechildrens.org.

Survey Finds Miscarriage Widely Misunderstood Guilt, Shame and Lack of Emotional Support Are Common after Miscarriage

Newswise —A survey of more than 1,000 U.S. adults has found that misperceptions about miscarriage and its causes are widespread. Results of the survey, conducted by researchers at Albert Einstein College of Medicine of Yeshiva University and Montefiore Health System, show that feelings of guilt and shame are common after a miscarriage and that most people erroneously believe that miscarriages are rare. The findings were published online today in the journal *Obstetrics & Gynecology.*

Nearly one million miscarriages occur in the U.S. each year. Miscarriages end one in every four pregnancies and are by far the most common of all pregnancy complications. Yet 55% of respondents to the Einstein/Montefiore survey believed that miscarriages are "uncommon" (defined in the survey as less than 6% of all pregnancies).

"Miscarriage is a traditionally taboo subject that is rarely discussed publicly," said Zev Williams, MD, PhD, Director of the Program for Early and Recurrent Pregnancy Loss (PEARL) at Einstein and Montefiore. "We initiated this survey to assess what the general public knew about miscarriage and its causes and how miscarriage affects them emotionally." Dr. Williams is also Assistant Professor of Obstetrics & Gynecology and Women's Health, and of Genetics, at Einstein.

Dr. Williams and colleagues devised a 33-item survey to assess perceptions of miscarriage; 10 items were specifically directed to men or women reporting a history of miscarriage. The survey was posted online using Amazon.com's MTurk, a crowdsourcing web service. The anonymous participants—adults 18 or over from 49 states—received 25 cents as compensation. Of the 1,084 valid survey responses collected over a 3-day period in 2013, 45% were from men and 55% from women. Fifteen percent reported that they or their partner had suffered a miscarriage. Participants generally mirrored 2010 national census statistics with respect to gender, age, religion, geographic location and household income.

Among other significant survey findings:

- Twenty-two percent of participants incorrectly believed that lifestyle choices during pregnancy (such as smoking or using drugs or alcohol) are the single most common cause of miscarriage, more common than genetic or medical causes. Actually, 60% of miscarriages are caused by a genetic problem – abnormal chromosomes. Other established causes include structural abnormalities of the uterus, endocrine disorders such as hypothyroidism, and autoimmune disorders such as anti-thyroid antibodies. Less-educated respondents – defined as not having completed college – were twice as likely as higher-educated respondents to believe lifestyle choices are the most common cause; men were 2.6 times likelier than women to have this misperception.
- Twenty-eight percent of those suffering a miscarriage reported that celebrities' disclosure of miscarriage had eased their feelings of isolation, and 46% said they felt less alone when friends disclosed their own miscarriages.
- Participants incorrectly believed that a stressful event (76%) or longstanding stress (74%) can cause miscarriage. Other incorrectly perceived causes of miscarriage included lifting heavy objects (64%), having had a sexually transmitted disease (41%), past use of an intrauterine device (IUD) (28%), past use of oral contraceptives (22%) and getting into an argument (21%).
- Of men and women reporting that they or their partner had experienced a miscarriage, 47% reported feeling guilty, 41% felt they had done something wrong, 41% reported feeling alone and 28% reported feeling ashamed. Only 45% felt they had received adequate emotional support from the medical community.
- Thirty-six percent of participants—including those who had never experienced pregnancy loss—reported that suffering a miscarriage would be extremely upsetting, equivalent to losing a child.
- An overwhelming majority (88%) of participants would want to know the cause of a miscarriage if something could be done to prevent a future miscarriage, and 78 % would want to know the cause even if nothing could be done to prevent a miscarriage in the future.

"The results of our survey indicate widespread misconceptions about the prevalence and causes of miscarriage. Because miscarriage is very common but rarely discussed, many women and couples feel very isolated and alone after suffering a miscarriage. We need to better educate people about miscarriage, which could help reduce the shame and stigma associated with it," said Dr. Williams. "We want people who experience miscarriage to know that they're not alone—that miscarriages are all too common and that tests are available to help them learn what caused their miscarriage and hopefully to help them in subsequent pregnancies."

The article is titled "Public Perceptions of Miscarriage: A National Survey." Other PEARL-affiliated authors were former Einstein medical students, lead author Jonah Bardos, MD, MBE, now a resident at Mount Sinai Medical Center, New York, NY; and Jenna Friedenthal, MD, now at New York University-Langone Medical Center, New York, NY. Additional authors were Daniel Hercz, MSc, at University of Sydney Medical School, Sydney, Australia; Stacy Missmer, ScD, at Harvard School of Public Health, Boston, MA.

The research was supported by the department of obstetrics & gynecology and women's health at Einstein and Montefiore and the National Institutes of Health (HD068546). The authors report no conflicts of interest.

For more information please visit www.montefiore.org.

Premature Birth Alters Brain Connections

Premature birth can alter the connectivity between key areas of the brain, according to a new study led by King's College London. The findings should help researchers to better understand why premature birth is linked to a greater risk of neurodevelopmental problems, including Autistic Spectrum Disorders and Attention Deficit Disorders.

The NIHR-funded study, published in the journal PNAS, used functional magnetic resonance imaging (fMRI) to look at specific connections in the brains of 66 infants, 47 of whom were born before 33 weeks and were therefore at high risk of neurological impairment, and 19 born at term. The brain connections investigated were between the thalamus and the cortex, connections which develop rapidly during the period a preterm infant is cared for on a neonatal unit.

Researchers found that those born in the normal window of birth (37-42 weeks) showed a remarkably similar structure to adults in these brain regions, strengthening existing evidence that the brain's network of connections is quite mature at the time of birth.

However, infants born prematurely (before 33 weeks gestation) were found to have less connectivity between areas of the thalamus and particular areas of the brain's cortex known to support higher cognitive functions, but greater connectivity between the thalamus and an area of primary sensory cortex which is involved in processing signals from the face, lips, jaw, tongue, and throat.

The greater the extent of prematurity, the more marked were the differences in the pattern of brain connectivity.

The authors suggest that the stronger connections involving face and lips in babies born preterm may reflect their early exposure to breastfeeding and bottlefeeding, while the reduced connectivity in other brain regions may be linked to the higher incidence of difficulties seen in later childhood.

Dr Hilary Toulmin, first author from the Centre for the Developing Brain at King's College London, said: 'The next stage of our work will be to understand how these findings relate to the learning, concentration and social difficulties which many of these children experience as they grow older.'

Professor David Edwards, senior author from the Centre for the Developing Brain at King's College London, said:

SEPTEMBER MEDICAL MEETING FOCUS

Second Annual Basic & Advanced Fetal Cardiac Symposium and Workshop

Sep 10-12, 2015; Rush University Medical Center, Chicago, IL

www.FetalCardiacSymposium.com

This symposium will discuss various concepts and common CHD malformations encountered in the fetus, with emphasis on imaging and practical tips for diagnosis. In particular, it will include sessions focusing on the following areas:

- Fetal Cardiovascular Physiology and Pathophysiology
- Latest Guidelines in Prenatal Screening and Red Flags in the Diagnosis of Fetal CHD
- Live Demonstration on Performing a Fetal Echocardiogram
- Practical Tips in the Diagnosis of Commonly Encountered Cardiac Defects
- Evaluation of Fetuses with Borderline Cardiac Findings
- Diagnosis and Management of Fetal Arrhythmia
- Updates on Fetal Genetic Evaluation

The symposium will provide the audience with the unique experience of hands-on and live demonstration sessions, as well as opportunities for the audience to discuss interesting cases and interact with experts in the field. Registrants will have the chance to submit interesting cases to be presented during the course of the symposium.

Hands-on Scanning Workshop: There will be two separate sessions focusing on scanning the fetal heart under the supervision of experienced faculty and using various up-to-date machines.

The objectives of completing both hands-on sessions are to have participants become familiar with the following: Identifying Situs; Obtain the 4-chamber View; Demonstrate Pulmonary Venous Flow; Obtain the Right and Left Ventricular Arterial Outflow Tracts View; Obtain the 3-vessel View; Obtain the Arch Views

The symposium is sponsored for CME credit by Rush University Medical Center which designates this live activity for a maximum of 19.25 AMA PRA Category 1 Credit(s)™ & 19.25 Continuing Nursing Education credit(s). This activity is also approved by the Society for Diagnostic Medical Sonography (SDMS), and is eligible for up to 19.25 SDMS credits

Course Director: Karim A. Diab, MD

Invited Faculty: Alfred Abuhamad, MD; Ernerio T. Alboliras, MD; Lisa Hornberger, MD; Edgar Jaeggi, MD; Mark Sklansky, MD; Wayne Tworetzky, MD; Luciana T. Young, MD

Local Faculty: Ra-id Abdulla, MD; Sawsan M. Awad, MD, MSC; John Bokowski, PhD, RDCS, FASE; Massimo Caputo, MD, Mch, FRCS; Xavier Pombar, DO; Michelle Rexilius, RDCS; Carolyn Jones, MD, PhD

'The ability of modern science to image the connections in the brain would have been inconceivable just a few years ago, but we are now able to observe brain development in babies as they grow, and this is likely to produce remarkable benefits for medicine.'

Loyola Study Provides Further Evidence That Premature Girls Thrive More Than Premature Boys - Findings Also Help Predict When Preemies Will Go Home from the Hospital

Newswise — A new study from Loyola University Medical Center provides further evidence that female infants tend to do better than males when born prematurely.

The study found that female infants independently orally fed one day earlier than males. The ability to suck, swallow and breathe simultaneously are reflexes that many premature infants are unable to do. Learning to master these skills and eat independently without feeding tubes is necessary before an infant can safely go home from the hospital.

Researchers set out to determine the mean age when premature infants are able to eat orally from a bottle or the breast and whether gender, gestational age, delivery route or birth year affects this reflex.

They conducted a retrospective review of 2,700 preterm infants born before 37 weeks of pregnancy who were admitted to a Level III Neonatal Intensive Care Unit between 1978 – 2013. They found that premature infants achieved independent oral feeding at 36 weeks and four days on average. In addition to their gender findings, researchers revealed that being born before 29 weeks of pregnancy negatively influenced the infants' ability to eat independently (37 weeks and three days versus 36 weeks and one day for babies born between 29 – 33 weeks of pregnancy and 36 weeks and three days for babies born late preterm between 34 – 36 weeks and six days of pregnancy). Preterm infants born with severe complications also experienced a delay in independent oral feeding.

Babies born vaginally transitioned to independent oral feeding three days earlier than babies born via C-section. Preterm infants born before 2000 also achieved independent oral feeding two days later than babies born more recently. These findings were published in the latest issue of the Journal of Neonatal-Perinatal Medicine.

Since 1981, the preterm birth rate in the United States has increased by more than 33%, and in 2012, 11.5% of all births were preterm (<37 weeks of pregnancy), with 29% of preterm births occurring before 34 weeks of pregnancy. Many advances in medical care have led to improved survival of extremely preterm infants. However, despite increased survival, those born at less than 28 weeks continue to have a high incidence of medical complications. The average length of stay in the NICU has risen due to the increasing survival of extremely preterm infants.

This study confirms that the majority of preterm newborns can be safely discharged three to four weeks before their due date. At this time, newborns are mature enough to maintain their temperature, consistently gain weight and coordinate sucking, swallowing, eating and breathing without gagging or choking.

"This study gives us insight into the factors that influence when an infant is likely to eat independently without complications," said Jonathan Mu-

raskas, MD, senior author, and Co-Medical Director, Neonatal Intensive Care Unit, Loyola University Health System, and professor, Loyola University Chicago Stritch School of Medicine. "This information will allow parents and the healthcare team to better plan for when the infant will go home from the hospital."

Other study authors included: Sarah Van Nostrand, DO, Larry Bennett, MD, medical student Victoria Coraglio and biostatistician Rong Guo from Loyola University Health System.

MEDNAX Announces Acquisitions of Neonatology Practices in Virginia and Mississippi

Business Wire--MEDNAX, Inc. on June 3rd announced the acquisitions of Commonwealth Neonatology, Inc., a private neonatal physician group practice based in Richmond, Va., and Natchez Trace Neonatology, Inc., a private neonatal physician group practice based in Tupelo, MS.

"MEDNAX was particularly attractive to our practice, not only because of the infrastructure and long-term stability a national medical group can provide, but also because of the impact its research, education and quality initiatives will have on our physicians, hospital partner and, most importantly, our patients."

Commonwealth Neonatology, one of the largest neonatal providers in the mid-Atlantic, was incorporated in 2001 and employs 19 full-time clinicians (10 neonatologists and nine advanced practitioners). Practice locations include the Bon Secours Health System facilities of St. Mary's Hospital, a Level III, 21-bed Neonatal Intensive Care Unit (NICU) in Richmond, Memorial Regional Medical Center, a Level III, nine-bed NICU in Mechanicsville, St. Francis Medical Center, a Level III, six-bed NICU in Midlothian and Mary Immaculate Hospital, a Level III, six-bed NICU in Newport News. Additionally, the practice provides services at Southside Regional Medical Center in Petersburg.

"Bon Secours is pleased to bring to our NICUs the resources and knowledge base derived from MEDNAX's experience nationwide," said William Lennarz, MD, Chief Medical Officer, Pediatrics and Vice President, Children's Services at Bon Secours Health System. "We are confident that our patients will benefit from our partnership with a patient-focused, outcomes-driven company that invests in collecting and implementing quality data."

Four neonatologists have joined MEDNAX with the acquisition of Tupelo-based Natchez Trace Neonatology, which was established in 1994. The practice provides Neonatal Intensive Care Services at North Mississippi Medical Center, a 650-bed regional referral center with a Level III, 34-bed NICU that can expand to 50 beds. The hospital is the largest, private, not-for-profit hospital in Mississippi and the largest non-metropolitan hospital in America. North Mississippi Medical Center is the flagship hospital of North Mississippi Health Services, which serves 24 counties in north Mississippi and northwest Alabama and was a 2012 recipient of the prestigious Malcolm Baldrige National Quality Award.

"MEDNAX was particularly attractive to our practice, not only because of the infrastructure and long-term stability a national medical group can provide, but also because of the impact its research, education and quality initiatives will have on our physicians, hospital partner and most importantly, our patients," said Bryan Darling, MD, who will serve as Medical Director for the practice. "We look forward to collaborating with a distinguished national leader in neonatal care that encompasses the expertise and resources we need to navigate this rapidly changing healthcare environment."

These practices were acquired for cash and the transactions are expected to be immediately accretive to earnings. No additional terms of these transactions were disclosed.

NEONATOLOGY TODAY

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