FANNP NEWS

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The Publication of the Florida Association of Neonatal Nurse Practitioners

High Dose Erythropoietin Administration for Treatment of Hypoxic-Ischemic Encephalopathy

Perinatal asphyxia is defined as the lack of oxygen and perfusion to the brain and other vital organs during the birthing process (Gomella & Cunningham, 2013). Hypoxic-ischemic encephalopathy (HIE) is the result of a perinatal asphyxia event which can lead to primary energy failure in the brain, cellular necrosis, and death and has been attributed to long term neurodevelopmental challenges (Garg et al., 2018). HIE currently accounts for 22% of neonatal mortality worldwide and nearly all survivors develop some degree of neurodevelopmental disability (Juul et al., 2018). The current treatment for HIE utilizes therapeutic brain and whole-body hypothermia. This therapy has proven to decrease mortality and major neurodevelopmental disabilities by an absolute reduction of 15% (Juul et al., 2018). Alternative treatments have been researched and the use of a high dose erythropoietin (EPO) has become a promising treatment option. This paper provides a brief overview of the literature surrounding the use of high dose erythropoietin and the controversies regarding the undetermined dosing recommendations.

Pathophysiology

Perinatal asphyxia is classified in three periods: the initial injury, reperfusion period and the latent phase. The initial injury is caused by any event that alters the oxygenation to the brain and vital organs of the fetus resulting in cerebral ischemia. This ischemia causes a decrease in the cellular energy phosphate level. Also contributing to the cell death is the impairment of mitochondrial respiration, anaerobic metabolism, an increase in lactic acid and a failure of the intracellular sodium pumps, all caused by the primary energy failure (Juul et al., 2018).

The reperfusion period is the second phase which entails restoring cerebral blood flow about 6 hours after the initial insult and normal cellular energy levels are restored (Gomella & Cunningham, 2013). The mechanism of cell death changes from early necrosis, to later apoptosis with a continuum of phenotypes emerging over time, known as the apoptosis-necrosis continuum (Juul et al., 2018).

Lastly, the secondary phase occurs 6-48 hours after the initial injury but can cause changes to the brain for days following. Neurodevelopmental outcomes are correlated with the degree of secondary energy failure and the severity of the insult (Gomella & Cunningham, 2013). Neuronal cell membrane damage has occurred due to cellular membrane integrity injury and has opened the window for further injury during the secondary period (Juul et al., 2018). Secondary energy

SEE "ERYTHROPOIETIN" on page 3

Conference Update

Greetings Everyone! I hope you all are having a great holiday season, so far! We have recently completed the 32nd Conference and I was so glad to see everyone, both in person and online. The "hybrid" platform turned out great with a big shout out to PlayBackNow for their expertise in making everything go smoothly. And of course, another BIG thank you to our Planning Committee! It truly takes a village, and they are a great one! We hope you gained valuable knowledge, networked with current and soon-to-be NNPs, and had fun! Our editor tells me she has tons of pictures, so I'm keeping this update short; here's to another great conference in the books and onward to the 2022 conference!

Mary Kraus, MSN, NNP-BC
FANNP Conference Chair

SEE "CONFERENCE PHOTOS" on page 7

Letter from the President

I hope this letter finds everyone happy and healthy after what I hope was a wonderful Thanksgiving holiday. I know that this Thanksgiving was particularly special for me as my entire family was able to travel to my home to celebrate. It reminds me just how blessed I am and how important family is to me. I was also extremely happy with our FANNP Symposium this past October. It was wonderful to be back in Clearwater Beach and seeing everyone after such a trying 2020! It was like coming home again. Our Conference Committee's hard work certainly paid off and the conference was a huge success. We were able to seamlessly blend our in person on-site activities with our live streaming. I was truly amazed. I hope you all enjoyed the educational opportunities as well as the fellowship and networking. Our team is already working to make our next conference an even bigger success in 2022. Please follow us on our website to keep up to date on what's happening with FANNP throughout the year. Also, feel free to post on our Facebook page. We love hearing from students who have passed their exams since attending the conference.

As I complete my tenure as President, I am so honored that I was afforded this opportunity. I have been a member of FANNP since 2005 and it has been such a huge part of my professional life. I have served as Newsletter Co-chair, Social Media Chair and now President. I am completely humbled that the members and Board of Directors had faith in me and trusted me to lead this organization for the past 2 years. It is truly one of the greatest honors of my life and I will forever be grateful. I am certainly leaving this office in great hands as Dr. Colleen Moss takes the lead in January. Colleen is also a long-time member of FANNP and has served on many committees and has already shown such leadership. Although I am saddened that my term as President is over, I will continue to be involved as Past-President for another year as well as resume my role as Social Media Chair for the organization. Thank you to everyone for your support and mentorship. I am so very fortunate to call you all my dear friends.

I hope everyone has a blessed holiday and a very Happy New Year. Remember the meaning of the season and hold your family tight.

Gayla Kaye-Steed, NNP-BC, APRN
President, FANNP

EDUCATIONAL OFFERINGS

**Check with individual conferences for changes in dates or cancellations due to Covid-19

Neo Conference
March 2-4, 2022
Manchester Grand Hyatt
San Diego, CA
www.neoconference.com

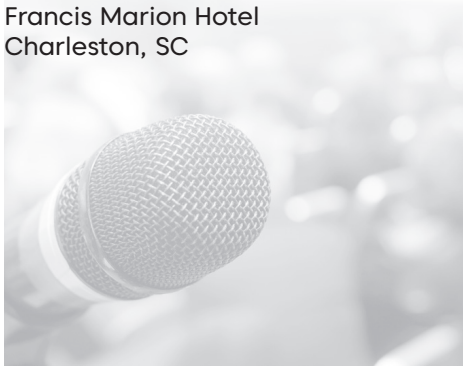
Academy of Neonatal Nursing Spring Conference
May 11-14, 2022
Caribe Royale
Orlando, FL
www.academyonline.org

The 33rd FANNP Neonatal Nurse Practitioners Symposium: Clinical Update and Review
October 11-15, 2022
Sheraton Sand Key
Clearwater Beach, FL
www.fannp.org

Academy of Neonatal Nursing Fall Conference
22nd National Neonatal Nurses Conference
September 7-10, 2022
Renaissance Palm Springs
Palm Springs, CA
www.academyonline.org

NANN 38th Annual Conference
Date to be determined
Las Vegas, NV
www.nann.org

Neonatal Pharmacology Conference
MUSC
November 9-11, 2022
Francis Marion Hotel
Charleston, SC



ERYTHROPOIETIN from page 1

failure occurs during this time causing myelin deficits, reduced plasticity, and altered cellular numbers.

The fetus can tolerate a higher level of asphyxia than adults due to their ability to redistribute blood flow to vital organs, but during periods of intense asphyxia the vital organs will be harmed (Gomella & Cunningham, 2013). When the provider can identify an ischemic event has occurred, therapeutic hypothermia is the proven and first line of treatment (Wang et al., 2019).

Erythropoietin has been researched as an option for neuroprotection for patients diagnosed with HIE. Erythropoietin is a primary growth factor first found in 1906 by Dr. Carnot (Garg et al., 2018). This glycoprotein primarily promotes maturation of the erythroid progenitors for red blood cell differentiation but also has proven to have neuroprotective qualities as well. These qualities involve antiapoptotic, antioxidative, and anti-inflammatory features (Garg et al., 2018).

In recent studies, high doses have been shown to cross the blood brain barrier and EPO receptors have been found to be present in the brain (Garg et al., 2018). In the diagnosis of HIE, the blood brain barrier is disrupted which enhances the ability of EPO to be able to cross the barrier (Frymoyer et al., 2017). Nonhematopoietic effects that have been found are qualities such as antiapoptotic, ant inflammatory, antioxidative and neurotrophic properties. (Frymoyer et al., 2017; Juul et al, 2018; Nair & Kumar, 2018; Wang et al., 2019).

EPO has been found to have effects on both stages of insult through different mechanisms of actions. The primary insult to the brain is caused by acute inflammation and apoptic cell death. The initial insult results in primary energy failure causing anaerobic metabolism, lactic acidosis, failure of cell membrane pumps lea1g to an influx of sodium and calcium, cell swelling and death (Juul et al., 2018). EPO contributes to the formation of new vessels and increased ability to transport more RBC to the hypoxic areas of the brain which will support counteracting the negative effects of hypoxia on the neurons (Garg et al., 2018).

The cascade of inflammation leads to impaired neurogenesis, synaptogenesis and axonal growth (Juul et al., 2018). The anti-inflammatory quality of EPO is important in the treatment of HIE. HIE has the potential to cause injury for months to years after the initial insult due to persistent inflammation in the affected area (Garg et al., 2018; Nair & Kumar, 2018; Wang et al., 2019). EPO is understood to favor neurogenesis due to the increase in bone marrow production and increase oxygen carrying capacity (Juul et al., 2018; Wang et al., 2019). A found, in a study of 500 neonates with moderate and severe HIE, that EPO promotes neurogenesis, oligodendrogenesis and angiogenesis. These qualities directly act upon the characteristics of the secondary injury during HIE. (Garg et al., 2018; Juul et al., 2018; Nair & Kumar, 2018; Wang et al., 2019).

The outcomes of these studies find, that in conjunction with hypothermia, EPO serves as a neuroprotective treatment option and improves short term motor outcomes. Important outcomes for the use of EPO are the decrease of severity of brain injury on MRI as well as reduced neurodevelopmental impairments. (Badr-El Din et al., 2017; Frymoyer et al., 2017; Garg et al., 2018; Juul et al., 2018; Mulkey et al., 2017; Nair & Kumar, 2018; Wang et al., 2019; Wu et al., 2016).

A phase 2, double blind, placebo-controlled trial found that EPO treatment significantly reduced the severity of brain injury on MRI (Wu et al, 2016). These findings have been supported by Din et al. (2017) who completed an interventional randomized control study and found that MRI findings were all normal on discharge to the group treated with EPO. Mulkey et al. (2017) also supported this outcome in a study measuring acute brain injury on HIE patients treated with EPO and a placebo group. Mulkey et al. (2017) found that EPO reduced the volume of acute brain injury on MRI compared to the placebo group.

Additional research is required for the dosing regimen of EPO and the optimal duration of therapy. Frymoyer et al. (2017) compared 47 neonates undergoing EPO therapy and found effective outcomes with treatments started 2-3 days after the brain injury. He also found that higher doses are required to cross the blood brain barrier than dosing in anemia treatment, which is currently 100-500 U/kg/dose. Higher dosing was also supported in a lab rat study which studied outcomes of doses of 5,000 U/kg. The neonates that Frymoyer et al. (2017) studied received doses of 1,000 U/kg and showed favorable outcomes. Contrary to Frymoyer et al., (2017) a study by Garg et al. (2018) reported that doses of 300-500 U/kg were associated with rise of EPO levels in the CSF and the rise of CSF counts will cause neuroprotective qualities. The discrepancies of these studies and dosage amounts proves further research is required.

The dosing frequency has also been discussed in the literature. (Frymoyer et al., 2017; Garg et al., 2018) Frymoyer et al. (2017) recommended treatment of 1,000 U/kg for 24 hours for the first two days due to favorable outcomes. Garg et al. (2018) discusses the positive effects of giving the first dose with 12 hours of injury, but states more research is required to support that theory versus administering within 24 hours of the injury. It should be investigated further the frequency and duration of the most optimal dosing treatments.

Limitations

Limitations to the use of high dose erythropoietin include the need for more research on dosage amount, the timing and frequency administration long term effects, the minimal sample size in the trials. (Frymoyer et al., 2017; Garg et al., 2018). The hypothermia criteria have limited the study of EPO on younger infants which has prevented a population from being researched. Also, long term outcomes have not been studied regarding school readiness IQ scores, executive function and motor function abilities.

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(Frymoyer et al., 2017; Garg et al., 2018; Juul et al., 2018; Nair & Kumar, 2018; Wang et al., 2019; Wu et al., 2016)

Recommend for Further Study

Further research is required to gain consensus on the dosing amount and frequency of high dose erythropoietin as well as time of initiation of treatment. Future studies should aim to increase their sample size as well as focusing on the long-term outcomes of EPO treated patients regarding their neurodevelopmental outcomes. (Frymoyer et al., 2017; Garg et al., 2018; Juul et al., 2018; Mulkey et al., 2017; Nair & Kumar, 2018; Wang et al., 2019; Wu et al., 2016)

Summary

In summary, high dose erythropoietin has been shown to add a strong treatment option to the treatment plan of HIE. This treatment has shown no adverse outcomes and is favorable in the financial regard. High dose EPO has improved and will continue to aid in the long-term outcomes of HIE.

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*All Feature Articles are submitted to the FANNP Scholarship Committee by FANNP members seeking to further their education. This article was edited by the FANNP in conjunction with the student, and with the student's permission. Article review and editing assistance provided by Nicole LaMorte.

2021 Kim Nolan Spirit Award Recipient — Dr. Michele J. Beaulieu

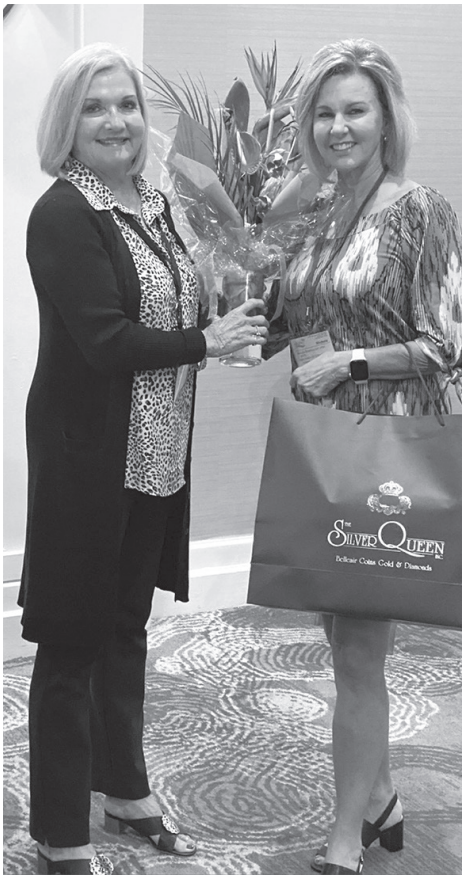
The 2021 Kim Nolan Spirit Award recipient is Dr. Michele Beaulieu. Dr. Beaulieu is a neonatal nurse practitioner at Johns Hopkins All Children's Hospital in St. Petersburg, FL and Assistant Clinical Professor at the University of Connecticut in Storrs, CT. She has been involved in neonatal care for 30-plus years as a nurse, NNP, educator and author. Dr. Beaulieu completed her Doctor of Nursing (DNP) degree from Case Western Reserve University Frances Payne Bolton School of Nursing in 2007.

Dr. Beaulieu's areas of clinical expertise include a full range of newborn care, delivery care and newborn resuscitation, stabilization, parent care, and intensive care from level 1 to level 4 centers. She is one of those people who can walk into any situation, make a quick and accurate assessment, and develop and execute a quality plan of action. Her delivery of care is both efficient and meticulous with attention to detail and follow-through.

Dr. Beaulieu is a quiet leader who models excellence. She is always calm, cool, and collected. Dr. Beaulieu is respectful and can see and consider multiple sides of problems and answers. As needs arise, she is quick to volunteer to work with others to find solutions.

Dr. Beaulieu is an educator every day. She is a sought-after preceptor for new employees, colleagues, and NNP students. She becomes a mentor to colleagues. Staff seek out her advice, and many have expressed a desire to be like her. She has developed and participates in neonatal resuscitation education and quality assurance programs for nurses, RTs, residents, fellows and NNPs.

In addition to her clinical practice and educator role, Dr. Beaulieu is an accomplished author. She co-edited Neonatal Advanced Practice Nursing: A Case-Based Learning Approach. She



has been the column editor for "Pointers in Practical Pharmacology" in Neonatal Network: The Journal of Neonatal Nursing, and co-investigator for several research studies. Her research interests include perinatal safety, extremely low birth-weight infants, neonatal abstinence syndrome, and the management of high-risk newborns in the delivery room. Her doctoral dissertation on "Failure to Rescue as a Process Measure to Evaluate Fetal Safety" was published in MCN: The American Journal of Maternal Child Nursing in 2009.

Dr Beaulieu is a "behind-the-scenes" volunteer for FANNP. She has been involved in conference planning, speaker coordination, scholarship evaluations and assists our Newsletter Editor with the scholarship articles.

Through her collaborative work in clinical practice and education and her "can-do" attitude, Dr. Beaulieu has touched many lives and is an inspiration to all. Congratulations Dr. Beaulieu!

Brag Board

Congratulations and STRONG WORK to the FANNP Conference Planning Committee! Your dedication has paid off, and the conference was a huge success!

Mary Kraus, Conference Chair
Jacqui Hoffman, Speaker Co-Chair
Harry Vannus, Exhibitor and Sponsor Coordinator
Paula Timoney, Virtual Conference Platform Chair
Jennifer Humphries, Poster Session Coordinator
Mary Beth Bodin
Michele Beaulieu
Gayla Kaye-Steed
Terri Marin
Diane McNerney
Colleen Reilly Moss
Sheryl Montrowl
Karen Theobald

Congratulations to Dr. Colleen Moss (FANNP President Elect), Assistant Professor at Vanderbilt College of Nursing on the publication of her Quality Improvement Projects in Advances in Neonatal Care 'Examining Job Satisfaction and Intent to Stay for Neonatal Nurse Practitioners: The Impact of Mentoring' and 'Utilization and Meaningfulness of National Association of Neonatal Nurse Practitioners' Mentoring Toolkit Activities'.

"The results of this project support the positive impact of a formalized

mentoring program on job satisfaction for new graduate nurse practitioners. Recognizing the challenge to recruit and retain NNPs, organizations should explore creative solutions to develop and support formalized mentoring programs."

Further research is warranted to corroborate the use of the Mentoring Toolkit in the development of formal mentoring programs.

These projects were made possible by grant monies awarded by FANNP! Congratulations again on your work!

Do you have a colleague, mentor, or student that you'd like to recognize for the Brag Board section of the newsletter? Or maybe you're the one doing some amazing work in the neonatal realm! Brag about it! Please email newsletter@fannp.org to share these accomplishments.

The Kim Nolan Spirit Award… In Memory and Honor of Kim Nolan

The Kim Nolan Spirit Award is given annually to a NNP who exemplifies Kim's exuberance and "can-do" attitude in service to profession, community, and/or family. This award is a very prestigious honor! To read more about Kim visit www.fannp.org. The deadline for nominations is July 15, 2022. The winner is announced each year at the FANNP Conference.

Kim Nolan

Food for Thought

Submitted by Paula M. Timoney, DNP, ARNP, NNP-BC

The National Task Force (NTF) on Quality Nurse Practitioner Education

At the annual FANNP general membership meeting in October 2021, a motion was approved to send a letter to the 19 member organizations of the National Task Force (NTF) on Quality Nurse Practitioner Education in opposition to the draft of the 6th edition of the revised Guidelines. The following letter was submitted for consideration:

October 26, 2021

Accreditation Commission for Education in Nursing, American Academy of Nurse Practitioners Certification Board American Association of Colleges of Nursing, American Association of Critical-Care Nurse, Certification Corporation American Association of Nurse Practitioners, American Nurses Credentialing Center, American Psychiatric Nurses Association, Association of Faculties of Pediatric Nurse Practitioners, Commission on Collegiate Nursing Education, Gerontological Advanced Practice Nurses Association, International Society of Psychiatric-Mental Health Nurses, National Association of Neonatal Nurse Practitioners, National Association of Nurse Practitioners in Women's Health, National Association of Pediatric Nurse Practitioners, National Certification Corporation, National Council of State Boards of Nursing, National Organization of Nurse Practitioner Faculties, National League for Nursing Commission for Nursing Education Accreditation Pediatric Nursing Certification Board

Re: **The National Task Force (NTF) on Quality Nurse Practitioner Education,** ***Standards for Quality Nurse Practitioner Education, 6th Edition***

Dear esteemed colleagues,

The Florida Association of Neonatal Nurse Practitioners (FANNP), representing over 325 NNPs nationally, stands in opposition to the proposed clinical hour requirement outlined in the proposed 6th edition of the document. FANNP respectfully requests that you reconsider the requirement of "a minimum of 1000 direct patient care clinical hours" (p. 12).

A common challenge in all nurse practitioner programs is the lack of **clinical placements.** Doubling the number of required hours, without sufficient evidence, will exacerbate the lack of available placements. Nurse practitioner students are competing with medical students, residents, and physician assistant students, all of whom are eligible for federal funding. Graduate medical education is funded to the tune of over $15 billion annually. Until we level the playing field, nurse practitioner students will continue to be a low priority for placement. Rather than focus on hours, we need to focus on the type and quality of clinical experiences required to meet population specific competencies, in addition to advocating for federal funding for nursing education.

Clinical hours are linked to credit hours. By significantly increasing the number of credits required, the overall **cost of NP education** will be prohibitive to many; cost has already been identified as a barrier for prospective students. Increasing the required clinical hours will make offering our neonatal specialty cost prohibitive to institutions and many programs will close. This will drive the NNP role into extinction and be devastating to one of our most vulnerable populations.

Surveys have demonstrated a lack of diversity in the nurse practitioner and faculty workforce. An increased length and cost of an advanced degree will negatively impact **accessibility and diversity** in both. With much of the national focus on diversity, equity, and inclusion, it is shortsighted of the task force to neglect to incorporate these important concepts.

Ultimately, the addition of clinical hours will worsen preceptor fatigue and lead to burnout, thus affecting available clinical placements and the quality of nurse practitioner education.

We support the National League for Nursing's (NLN) recommendation to research innovative methods of instruction and effective tools to validate the National Organization of Nurse Practitioner Faculty (NONPF) population-specific competencies, and to ultimately base our approach on evidence.

Thank you for your consideration.

Regards,

Gayla Kaye-Steed, APRN, NNP-BC President
GKS/pmt

Addendum: In mid-November, a second revision of the NTF document was released. The most significant revision was the change in the required clinical hours: "The NP population focused track has a minimum of 750 direct patient care clinical hours that focus on management and diagnosis of health problems…Simulation is not direct patient care and may not be included in the 750 direct patient care hours" (p. 13). See the **Standards for Quality Nurse Practitioner Education,** 6th Edition ***A Report of the National Task Force on Quality Nurse Practitioner Education***
https://cdn.ymaws.com/www.nonpf.org/resource/resmgr/2021/2021_nonpf_resources/20211020_v.2_ntfs_draft_post.pdf

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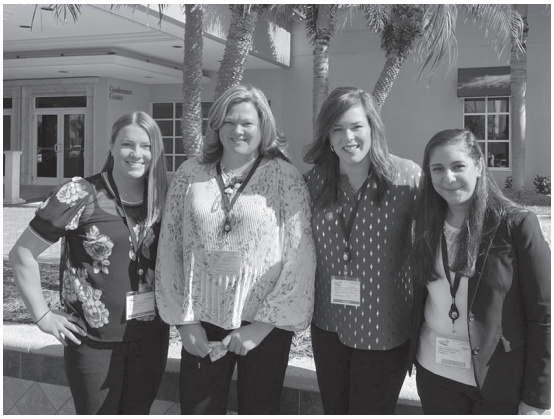


Quotes from the Conference

"What a wonderful conference!"

"An amazing tradition!"

"Loving it! So glad to be back!"

"Watching it from home in Australia with my PJs on! Missing being there! (especially when they announce ice cream during break time)"

"So proud of our colleagues for carrying on FANNP traditions!"

Sponsors and Exhibitors

The FANNP would like to thank our sponsors and exhibitors for their support during this year's conference. Your generosity is much appreciated!

Flamingo Sponsors

Envision Physician Services

Florida Association of Neonatal Nurse Practitioners

Egret Sponsors

Nationwide Children's Hospital

Pediatrix Medical Group

Sobi

Exhibitors

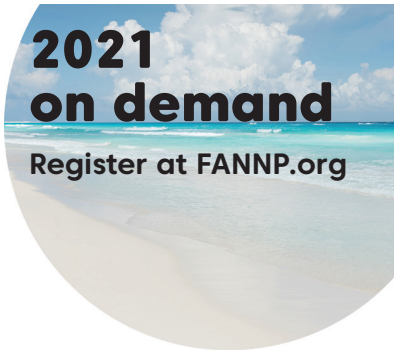
Abbott Nutrition
Advent Health
Alexion Pharmaceuticals
Chiesi USA
Dr. Brown's Medical
Mead Johnson Nutrition
Prolacta Bioscience

Thank You!

If you were unable to be at the FANNP 2021 Annual Conference in October, "attend" sessions and earn CEU credits at your convenience using the On-Demand Library.

You will have the opportunity to:

- Review current concepts, trends, and management practices appropriate for the care of the high-risk neonate.
- Access on-line handouts for download.
- Earn up to 49 CEU credits or study and review for certification exams with an On-Demand Library of audio-visual presentations until September 15, 2022.



FANNP Scholarship Award 2021

FANNP is committed to educational advancement and is proud to be able to award scholarships to nurses and NNPs continuing their educational pursuits in the field of neonatal health care. Scholarship recipients are announced in October at the annual conference business meeting.

Please thank the 2021 Scholarship Committee members Michele Beaulieu, Terri Marin, Stephen Soever, Sheryl Montrowl, and Anecia Carter for their time and expertise reviewing applications.

This year the scholarship award winner is Gustavo Morfin Valencia from Muster, Indiana. He was described as his peers as a quiet, reserved, and approachable communicator with effective leadership skills. He is a hard-working patient advocate and currently involved in a skin integrity QI project. Gustavo plans to graduate from Rush University next spring with a DNP.

Historically, over the past 22 years FANNP has awarded nearly 120 scholarships totaling over $95,000. Last year (2020) FANNP awarded six scholarships. Scholarship awards of $1000 to $2000 are based upon the application criteria and quality of newsletter submission.

Scholarship funds can be used for tuition, books or any expenses incurred while in school. The money is in the scholarship account to benefit FANNP members. Please help us to spread the word. We encourage all RNs or NNPs pursuing a degree in neonatal health care to apply for and utilize this benefit. Contact scholarships@fannp.org for application information.

- FANNP awards scholarships of $1000 - $2000 annually to nurses and NNPs continuing their educational pursuits in the field of neonatal health care.
- Scholarship recipients are announced in October at the FANNP Symposium.
- Scholarship monies can be used for tuition, books or any expenses incurred while in school.
- FANNP members pursuing a degree in neonatal health care are encouraged to apply for a scholarship. Preceptors, mentors, and instructors please encourage students to become a FANNP members and apply for scholarships.
- To obtain an application or for questions, please contact FANNP via email at: scholarships@fannp.org.

Scholarship Application 2022 Eligibility Guidelines

1. Applicants must be FANNP members.
   a. All voting members, student members and associate members are eligible.
   b. Priority for scholarship awards will be given to voting members, followed by student members and then associate members.
   c. Priority for scholarship awards will be based on length of membership and service to FANNP.

2. Applicants must be a licensed RN, ARNP, NNP or equivalent.
   a. Preference will be given to currently licensed NNPs working towards an advanced NNP degree.

3. Applicants must attend an educational program leading to a degree related to the health care field during the application period.
   a. The application period for the 2022 Scholarship is September 15, 2021 to September 15, 2022
   (i.e. to be eligible for a 2022 Scholarship you must have attended classes sometime between September 15, 2021 and September 15, 2022).
   b. An applicant may receive a maximum of two scholarship awards for each degree sought.

4. Applicants will provide a short article, case study, practice pointer, evidenced-based practice update or literature review to be published in the FANNP Newsletter.

Sekinah Ajiboye, NNP-BC

CONGENITAL SYPHILIS

I. **INTRODUCTION:** Syphilis is transmitted by Treponema Pallidum. It is transmitted sexually and can also be transmitted vertically from mother to fetus during pregnancy (Peeling et al., 2017). The rate of transmission to a fetus is highest in mothers with primary and secondary syphilis, with the lowest rates seen in mothers with latent syphilis (Peeling et al., 2017).

II. SIGNS AND SYMPTOMS

- In utero death
- Stillbirth
- Non-immune hydrops
- Prematurity
- Lethargy
- Jaundice
- Hepatosplenomegaly
- Conjugated hyperbilirubinemia
- Rhinitis
- Skin rash (including the palms and soles)

CDC, 2021)

III. DIAGNOSIS

- Infant with Venereal Disease Research Laboratory (VDRL) or Rapid Plasma Reagin (RPR) serum titers that are at least four-times greater than maternal serum titers (e.g. maternal titer 1:4, infant titer 1:16 or higher) is diagnostic of congenital syphilis (Peeling et al., 2017).
- Treponemal tests should not be completed on blood samples from infants due to the presence of maternal antibodies until about 18 months of age (CDC, 2021)
- Infants with a high risk of syphilis (e.g. infants of mothers with a reactive VDRL or RPR who have not been treated) should also be tested for HIV (CDC, 2021)

IV. TREATMENT AND MANAGEMENT

Infant with serum titers that are at least four-fold higher than maternal titer levels AND have physical signs of congenital syphilis	-Aqueous Penicillin G 100,000-150,000 units/kg/day IV q 12 hours x first 7 days of life, then q 8 hours x 3 days (total treatment duration: 10 days) OR -Procaine Penicillin G 50,000 units/kg/day IM q 24 x 10 days
Infant with serum titers less than or equal to four-fold maternal titers AND no physical signs of congenital syphilis AND inadequate or no maternal treatment for syphilis	- Aqueous Penicillin G 100,000-150,000 units/kg/day IV q 12 hours x first 7 days of life, then q 8 hours x 3 days (total treatment duration: 10 days) OR -Procaine Penicillin G 50,000 units/kg/day IM q 24 x 10 days OR -Benzathine Penicillin G 50,000 units/kg x 1 dose
Infant with serum titers less than or equal to four-fold maternal titers AND no physical signs of congenital syphilis AND adequate maternal treatment with no evidence of re-infection	-Benzathine Penicillin G 50,000 units/kg x 1 dose
Infant with serum titers less than or equal to four-fold maternal titers AND no physical signs of congenital syphilis AND adequate maternal treatment with low maternal titers	-No treatment required

- Maternal serologies should be checked for VDRL or RPR status with each pregnancy
- CBC with differential (to assess for thrombocytopenia) and Blood culture
- Lumbar puncture for CSF analysis
  - i. VDRL (not RPR) should be performed on CSF to assess for neurosyphilis
- Liver Function Tests
- Neuroimaging
- Ophthalmologic examination
- Long bone radiographs
  - i. To assess for radiolucencies or delayed ossification
- Follow up every 2-3 months until VDRL or RPR becomes non-reactive
  - i. If VDRL or RPR remains reactive at 6 months, infant should be treated

(CDC, 2021)

REFERENCES

Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention. (2021, July 22). Congenital syphilis - STI treatment guidelines. Centers for Disease Control and Prevention. Retrieved November 8, 2021, from https://www.cdc.gov/std/treatment-guidelines/congenital-syphilis.htm.

Peeling, R. W., Mabey, D., Kamb, M. L., Chen, X. S., Radolf, J. D., & Benzaken, A. S. (2017). Syphilis. Nature reviews. Disease primers, 3, 17073. https://doi.org/10.1038/nrdp.2017.73

FANNP Dates to Remember

Event/Item	*Date/Deadline of Event/Item*
FANNP Grant	Ongoing
Poster Presentation Abstracts	July 15
Kim Nolan Spirit Award Nominations	July 15
FANNP Scholarship	Sept. 15
National Neonatal Nurses Week*	Sept. 12-18, 2022
Annual National Neonatal Nurse Practitioner Symposium: Clinical Update and Review*	Oct. 11-15, 2022
Nurse Practitioner Week*	Nov. 7-13, 2022

**Dates change annually*

FANNP Newsletter Submission Calendar

Edition	Article Submission Deadline	Publish Date
Winter 2021	11/06/21	12/04/21
Spring 2022	02/5/22	03/5/22
Summer 2022	05/07/21	06/04/21
Fall 2022	08/06/21	09/10/21

In addition to the core components of the newsletter, we would love to hear what you have to say! Please send in anything you would like to see added to the newsletter, whether it is an interesting article, a hot topic in the neonatal world, or even a shout out regarding a fellow FANNP member who is doing awesome things! We want to hear from you! Please submit following the above guidelines to newsletter@fannp.org.

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BRING IT ON ANSWERS from page 12

1. A- The fetal biophysical profile (BPP) is a noninvasive antepartum test for evaluating fetal well-being. Ultrasound is used to assess four discrete biophysical parameters: fetal movement, fetal tone, fetal breathing, and amniotic fluid volume. A separate nonstress test of the fetal heart rate can also be performed as a component of the BPP.

2. A- TAR Syndrome (thrombocytopenia-absent radius) is a congenital disorder with the presenting factors of thrombocytopenia and skeletal anomalies. The radius is almost always absent bilaterally, and the ulna is typically underdeveloped or absent. What distinguishes TAR Syndrome from similar malformations involving the radius is the presence of thumbs, although they may be malformed. Thrombocytopenia is also common in infants born to pre-eclamptic mothers, however, the skeletal features in this case indicate TAR Syndrome.

3. B- Coloboma is an eye abnormality that occurs before birth. Colobomas are missing pieces of tissue in structures that form the eye. They may appear as notches or gaps in one of several parts of the eye including the iris, retina, choroid, or the optic nerves. Coloboma is associated with CHARGE (Coloboma, Heart defects, Atresia choanae, growth Retardation, Genital abnormalities, and Ear abnormalities).

References:

1. Manning, Frank. (2021, October). Biophysical profile test for antepartum fetal assessment. Up to Date. Retrieved from https://www.uptodate.com/contents/biophysical-profile-test-for-antepartum-fetal-assessment

2. Thrombocytopenia-absent radius syndrome. Retrieved from https://medlineplus.gov/genetics/condition/thrombocytopenia-absent-radius-syndrome/

3. CHARGE syndrome. Retrieved from https://medlineplus.gov/genetics/condition/charge-syndrome/

Corrections from FANNP 32nd National NNP Symposium Lectures

- From Track A 3b **Dysmorphology in the NICU by Kara Morgan**, DNP, APRN, CPNP-BC, CGC: The VACTERL question's answer is "association" (not sequence). It's correct in the Word document provided, but the recorded session requires correction.

  Question #1: VACTERL is a(n):
  A. Deformation
  B. Sequence
  C. Syndrome
  D. Association
  Correct answer: D.

  It was incorrectly identified as a sequence. We apologize for this error and Dr. Morgan would like to correct it.

- From Tack B 8 **Neonatal Sepsis by Colleen Reilly Moss**, DNP, APRN, NNP-BC
  Slide 120 – Neisseria gonorrhoeae was incorrectly identified as a gram positive organism. It is a gram negative organism, correctly stated on slide 50.

CLASSIFIEDS

Calling for Research Proposals... FANNP Grants Available

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Bring it On...

Practice Questions to Prepare for the NNP Certification Exam

1. The biophysical profile consists of the following categories:
   A. Non-reassuring tracing (NST), body movement, breathing, tone, and amniotic fluid volume
   B. Tone, amniotic fluid volume, and heart rate
   C. Heart rate and blood volume

2. A 35-week-old male infant is born to a mother with pre-eclampsia. On his initial exam, he has petechiae on his chest and shortened ulna with hypoplastic thumbs. The CBC shows a platelet count of 23,000. What is the most likely cause of the thrombocytopenia?
   A. TAR Syndrome
   B. Alloimmune thrombocytopenia
   C. Maternal pre-eclampsia

3. Colobomas of the iris are associated with:
   A. Trisomy 21
   B. CHARGE association
   C. VATER association

Answers on page 10

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