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Florida Chapter of the American Academy of Pediatrics, Inc.
1400 Village Square Blvd #3-87786, Tallahassee, FL 32312 | 850-224-3939 | info@fcaap.org

Stories Behind the Cover

The cover of this issue of *The Florida Pediatrician* features members of the Editorial Board attending the Florida Chapter of the American Academy of Pediatrics' (FCAAP) The Future of Pediatric Practice conference, which includes the Resident Forum. Residents from across the state submit abstracts on clinical case reports, original research, and quality improvement projects for competitive review. Selected projects are presented during the poster session, where judges evaluate the submissions and provide constructive feedback. Several Board members served this year as abstract reviewers and poster judges. The on-site judging process, during which resident authors discuss their work alongside their posters, also offers a valuable mentorship opportunity. The Forum has grown substantially in recent years; abstract submissions have doubled since 2023.

Continuing our tradition, this October issue recognizes winning abstracts and celebrates residents' academic achievements. We congratulate this year's first-place winners:

- Case report
  Yael Sterental – University of Miami, Holtz Children's Hospital
- Original research
  Samuel Mikhail – Nemours Children's Hospital-Orlando
- Quality improvement
  Simone Hunter – Memorial Healthcare System, Joe DiMaggio Children's Hospital

Resident scholarship complements the service of our Editorial Board. Emerging pediatricians bring fresh inquiry into the field, while experienced clinicians provide mentorship and rigorous review. Together, they advance this journal's mission and broaden the forms of scholarship represented in each judged category.

Also, future Board photographs will include two of its newest members: Tanuja Kothinti, M.D., FAAP, a developmental-behavioral pediatrician, Assistant Professor of Pediatrics, and Division Chief of Developmental-Behavioral Medicine at the University of South Florida; and Patricia (Patty) Emmanuel, M.D., FAAP, Professor and Chair Emeritus of Pediatrics at the University of South Florida Morsani College of Medicine, and past president of the Hillsborough County Pediatric Society.

Dr. Kothinti also specializes in leadership education and neurodevelopmental disabilities. Dr. Emmanuel, a pediatric infectious disease specialist whose research has focused on HIV in children and adolescents, brings extensive experience in academic leadership, clinical research, and medical publishing. She has authored 103 medical articles and seven medical textbook chapters, served on three journal editorial boards, and reviewed manuscripts for seven additional journals. Pediatricians and pediatric specialists throughout Florida and across the country recognize her as a leader in the field.



Michael J. Muszynski, MD FAAP FPIDS
Editor, The Florida Pediatrician

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CASE STUDY

Chronic Nonbacterial Osteomyelitis in Pediatric Inflammatory Bowel Disease: A Case Series

Natalie Jennings, DO; Monica Ramirez, MD; Elizabeth Torres Claudio, MD; Lina Felipez, MD
Nicklaus Children's Hospital, Miami, FL

ABSTRACT

Objectives/Background

Chronic non-bacterial osteomyelitis is a rare, sterile bone auto-inflammatory disorder that mainly affects children and adolescents. It can present as an extraintestinal manifestation of inflammatory bowel disease. We present a case series of 12 pediatric inflammatory bowel disease patients diagnosed with chronic non-bacterial osteomyelitis in our tertiary care center in South Florida, analyzing their demographics, symptoms, and imaging findings to explore the association between chronic non-bacterial osteomyelitis and inflammatory bowel diseas

Methods

We retrospectively reviewed the electronic medical records of pediatric inflammatory bowel disease patients diagnosed with chronic non-bacterial osteomyelitis at our institution between 2011 to 2024, assessing demographic data, clinical features, and imaging findings

Results

Of the 12 patients, 6 had Crohn's disease, and 6 had ulcerative colitis. The median age of inflammatory bowel disease onset was 11.7 years, with chronic non-bacterial osteomyelitis onset occurring at a median age of 13.3 years and a median diagnostic interval of 1.75 years. CNO was diagnosed after inflammatory bowel disease in 8/12 (67%), before inflammatory bowel disease in 1/12 (8%), and concurrently in 3/12 (25%) of patients. Chronic non-bacterial osteomyelitis symptoms included multifocal pain (5/12, 42%), swelling (2/12, 17%), and limping (2/12, 17%), with incidental findings in 5/12 patients (42%). MRI showed multifocal lesions in 9/12 (75%), with axial skeleton involvement most common (7/12, 58%)

Conclusion

Our 13-year case series supports the association between chronic non-bacterial osteomyelitis and inflammatory bowel disease, with most patients developing chronic non-bacterial osteomyelitis after inflammatory bowel disease diagnosis. While multifocal pain was the most common symptom, some cases were asymptomatic, highlighting the role of imaging in early detection.

INTRODUCTION

Chronic non-bacterial osteomyelitis (CNO) is a noninfectious auto-inflammatory bone disease that primarily affects children and adolescents. The presentation varies, ranging from mild, isolated, self-limiting lesions to chronic and/or recurrent multifocal disease.[1] The more severe presentation of CNO is referred to as chronic recurrent multifocal osteomyelitis (CRMO).[2] CNO or CRMO most commonly affects females, with an average age of disease onset of 10 years.[3] It has not been reported to be associated with a certain ethnicity. Because CNO/CRMO has nonspecific clinical, laboratory, and radiographic findings, delayed diagnosis is common. A retrospective survey of 284 patients performed in the U.S.A. reported a median duration from first symptoms to diagnosis of two years. However, with increased awareness, median time to diagnosis has decreased over time.[4] The annual incidence rate has increased from approximately 0.4 per 100,000 children in 2010 to approximately 2.3 per 100,000 in 2019.[5]

The clinical presentation of CNO/CRMO is characterized by chronic waxing and waning bone pain. This may include nocturnal bone pain, which can mislead physicians to believe it to be due to other causes such as growing pains or bone tumors.[1] Although lesions may occur in any bone, they are most commonly found in the metaphysis of the lower extremity long bones, as well as the clavicle, vertebra, pelvis, mandible, and long bones of the upper extremities. Patients may also have swelling over bones with little overlying soft tissue and experience fever, night sweats, and/or weight loss, further complicating the clinical picture. Other manifestations may include signs of inflammation in other organs, such as inflammatory bowel disease (IBD), psoriasis, palmoplantar pustulosis, and severe acne.[2] CNO/CRMO is a diagnosis of exclusion, so patients oftentimes have a broad diagnostic workup before coming to the final diagnosis. Because clinicians may initially suspect bacterial osteomyelitis, patients often undergo lab workups that include a complete blood count (CBC), C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR), which are typically normal or slightly elevated. Malignancy is also common in the differential; therefore, blood uric acid and lactate dehydrogenase levels are typically collected, and biopsies are performed, which usually show nonspecific findings revealing fibrosis, immune cells, bone lysis, and/or normal bone.[1] Vitamin C levels may be obtained to test for scurvy, which can present with vague bone pain and limping or refusal to walk.

Goldfarb et al. discussed a case of a 5-year-old male who initially presented with symptoms concerning for scurvy and was later found to have CNO, and endoscopy/colonoscopy confirmed underlying Crohn's disease.[6] Although uncommon, CNO can be an extraintestinal manifestation of patients with IBD and may even explain arthralgia and bone pain in some IBD patients.[7] Lorenze and colleagues described a case where a 10-year-old patient initially presented with signs of Crohn's Disease that was diagnosed via colonoscopy, then presented two years later with vague bone pain and fevers that only improved with the initiation of steroids.[8]

Currently, no confirmatory diagnostic test exists for CNO/CRMO, and it remains primarily a diagnosis of exclusion. Initial diagnostic imaging often includes plain radiographs, which may be normal or reveal sclerotic, lytic, or mixed lesions depending on disease stage.[9] However, isolated bone edema in the absence of structural damage will be missed on plain films.[10] Whole-body magnetic resonance imaging (WB-MRI) remains the gold standard.[11] It is also recommended to obtain WB-MRI rather than localized MRI to identify clinically silent lesions. The use of conventional computer tomography or ultrasound for diagnosing CNO is diminishing with improved knowledge of the condition; however, these methods may be useful in the initial stages of diagnosis to rule out other causes, such as malignancy, and to look for soft-tissue pathology.[10]

No gold-standard regimen currently exists for patients with this disease. Oftentimes, non-steroidal anti-inflammatory drugs (NSAIDs) are first-line therapy, having both anti-inflammatory and analgesic effects. NSAIDs control prostaglandin E production by inhibiting cyclooxygenases, thereby affecting nociception. Prostaglandin E is also essential for osteoclast activity; therefore, NSAIDs may inhibit osteoclasts and reduce pathological bone remodeling.[10] Similarly, for their inflammation-reducing effects, corticosteroids have been used as either singular treatments or as a bridging agent when disease-modifying anti-rheumatic drugs (DMARDs) are used. In addition, anti-TNF agents and bisphosphonates have also been documented. Many of these treatment regimens are the same as medications used in pediatric IBD. The optimal treatment duration and when to discontinue therapy remain unclear, although complete resolution of lesions on MRI may indicate disease control.[9] One of the most important aspects of treatment is monitoring for disease activity and relapse, which historically has been done via pain scores, routine inflammatory parameters, and imaging results via WB-MRI.[2] Although prompt treatment with the correct agent is usually associated with favorable outcomes, there are risks for potential complications of CNO/CRMO. These may include growth/stature delay, limb-length discrepancy, and fractures. We conducted a retrospective chart review at our institution to identify the presentation and characteristics of CNO in conjunction with IBD to promote recognition of this disorder.

METHODS

We conducted a single institutional retrospective chart review from 2011 to 2024 of pediatric patients aged 3-17 years at first diagnosis who presented to Nicklaus Children's Hospital, a 309-bed tertiary care children's hospital, and were diagnosed with both IBD and CNO/CRMO within the last 13 years. All patients were consented for the pediatric IBD research database with IRB approval. We searched the institutional electronic medical records software (CERNER) utilizing the International Classification of Diseases, Tenth

Revision (ICD-10) diagnostic codes: Crohn's disease (ICD-10 K50.9) or UC (ICD-10 K51.6) in combination with the diagnosis of chronic non-infectious osteomyelitis (ICD-10 M86.38).

The Jansson and Bristol criteria are both proposed diagnostic tools for CNO, although they have not been validated to date. The Jansson criteria use a scoring system with major and minor criteria such as multifocal bone lesions, elevated inflammatory markers, and response to NSAIDs to support diagnosis. In contrast, the Bristol criteria offer a more clinical approach, focusing on characteristic imaging findings, symptoms lasting over six weeks, lack of response to antibiotics, and exclusion of infection or malignancy.[12,13] Because neither tool has been validated, our inclusion criteria focused on pediatric patients diagnosed with both IBD and radiographically confirmed CNO via MRI findings associated with active disease, such as bone edema, periosteal reaction, and soft tissue inflammation. There were no exclusion criteria. Two investigators independently reviewed the records and identified 12 unique patients who met these criteria. We analyzed their demographic factors, clinical features, imaging findings, and CNO treatment received.

RESULTS

The study involved 12 participants, divided equally into two groups with Crohn's disease (CD) and ulcerative colitis (UC), as shown in Table 1. Regarding race, 50% (6 patients) were White, 42% (5 patients) were Hispanic, and 8% (1 patient) was Black. The cohort was 58% female (7 patients) and 42% male (5 patients), with a median IBD onset age of 11.7 years and a median CNO onset age of 13.3 years. CNO was diagnosed after IBD in 67% of cases (8 patients), before IBD in 8% (1 patient), and concurrently in 25% (3 patients). The median time between diagnoses was 1.75 years.

CNO symptoms varied, with 42% (5 patients) having incidental findings, meaning their CNO was detected without presenting symptoms. Multifocal pain was the most common symptom, reported in 42% (5 patients), followed by multifocal swelling (17%, 2 patients) and limping (17%, 2 patients). Unifocal symptoms were less frequent, with 8% (1 patient) experiencing unifocal pain and another 8% (1 patient) reporting unifocal swelling.

WB-MRI findings showed multifocal lesions in 75% (9 patients), while unifocal lesions were noted in 8%. The most commonly affected regions were the lower limbs (75%, 9 patients) and axial skeleton (58%, 7 patients), followed by the pectoral girdle (17%, 2 patients) and upper limbs (17%, 2 patients).

Lastly, bone biopsy was performed in 17% of the cohort (2 patients); one showed no significant abnormalities, while the other demonstrated non-specific inflammation, edema, and fibrosis

DISCUSSION

This project summarizes our 13-year experience with chronic nonbacterial osteomyelitis in pediatric patients with IBD in South Florida. The demographic distribution varied in our cohort. While European cohorts have shown female predominance[1,3,4,14], Latin American and Indian cohorts show male predominance.[14] Similarly, our patient population was primarily female. In terms of race, many of our patients identified as White, the group that is most frequently reported to have CNO in previous studies.[1,7]

In other literature, patients were more likely to have CNO as the initial diagnosis[3,7]; in our cohort, most patients were diagnosed with CNO after being initially diagnosed with IBD. This may be due to decreased awareness of CNO or possibly the large population of pediatric patients with IBD seen in our institution. CNO remains a rare disease; thus, it is likely underdiagnosed. Patients with IBD are also known to have other joint symptoms such as arthritis; thus, if imaging is not obtained and suspicion for CNO is low, it could go undetected and may underestimate the coexistence rate of both diseases. Our cohort appears to be comparable to the literature-based cohort described by Costi and coworkers, where 17% of their cohort was diagnosed with IBD and CNO simultaneously.[3] In our study, 25% of patients had a concurrent diagnosis of both IBD and CNO. This supports the idea that though parallel diagnoses are less common, the index of suspicion must remain high.

Although the etiology of CNO is uncertain, some suggest a link to inflammation in other sites of the body, such as IBD. Many hypotheses have been proposed about the exact cause of the disease, but it has been suggested to involve an imbalance of pro- and anti-inflammatory cytokines.[2] Impaired expression of IL-10 and IL-19 has been observed in monocytes from patients with CNO/CRMO.[15] Interestingly, altered expression of IL-10 also plays a role in the pathophysiology of IBD. Reduced IL-10 expression due to promoter region polymorphisms is also a proposed pathophysiological mechanism in IBD[5], and IL-10-deficient mice have been shown to develop chronic enterocolitis.[16] Also, dysregulation of TNF-α, IL-10, IL-12, and IL-23 has been noted in gut immune responses that may affect the joints.[7]

Dysregulation of gut microbiota has been postulated to lead not only to inflammation in the intestinal environment, but also to inflammation in other areas of the body, such as the bones in CNO and the integumentary system. In patients with CNO, a compromised intestinal barrier could lead to inflammation and the release of cytokines. These cytokines may play a role in triggering extraintestinal manifestations of inflammatory bowel disease.[7]

Characteristics		Total IBD Patients (N=12)
Gender, N (%)	Female	7 (58%)
	Male	5 (42%)
Race, N (%)	White	6 (50%)
	Hispanic	5 (42%)
	Black	1 (8%)
Type of IBD, N (%)	Crohn's Disease	6 (50%)
	Ulcerative Colitis	6 (50%)
Median Age of Onset, IBD (years)		11.7
Median Age of Onset, CNO (years)		13.3
Time Between Diagnoses (years)		1.75
CNO Diagnosed After IBD, N (%)		8 (67%)
CNO Diagnosed Before IBD, N (%)		1 (8%)
Parallel Diagnosis, N (%)		3 (25%)
CNO Symptoms, N (%)	Incidental	5 (42%)
	Unifocal Pain	1 (8%)
	Unifocal Swelling	1 (8%)
	Multifocal Pain	5 (42%)
	Multifocal Swelling	2 (17%)
	Limping	2 (17%)
MRI CNO Lesions, N (%)	Unifocal	1 (8%)
	Multifocal	9 (75%)
	Not Available	2 (17%)
Distribution of Involvement, N (%)	Pectoral Girdle	2 (17%)
	Upper Limb	2 (17%)
	Lower Limb	9 (75%)
	Axial Skeleton	7 (58%)

Table 1: Summary of demographic factors, clinical features, and imaging findings in our pediatric inflammatory bowel disease patients diagnosed with chronic nonbacterial osteomyelitis
CNO (Chronic Nonbacterial Osteomyelitis), IBD (Inflammatory Bowel Disease)

Symptoms of CNO vary between patients and may include, but are not limited to, bone/joint pain, swelling, limping, fatigue, or delayed growth.[1] CNO can affect multiple bones simultaneously, a phenomenon known as multifocality. Multifocal pain is the most common documented presenting symptom, with other symptoms such as swelling or limping noted less often.[3,7] Similar to the current literature, the most common symptom in our patients was multifocal pain, followed by multifocal swelling and limping.

Bone biopsies are sometimes performed early in the diagnostic process, primarily to exclude alternative underlying causes. To date, bone biopsies have not revealed any findings specific or definitive for CNO, which is likely why they are not required for diagnosis. Two of our patients had bone biopsies, and neither biopsy provided diagnostic value in confirming the patients' diagnosis of CNO. Since no validated diagnostic criteria for CNO currently exist, imaging is vital to the diagnosis. Because WB-MRI remains the gold

standard, we diagnosed all our patients based on MRI findings consistent with CNO. Nearly half of patients were asymptomatic and had imaging with incidental findings that prompted further exploration and led to a diagnosis of CNO. In both groups, most patients had multifocal rather than unifocal lesions, consistent with previous literature. Historically, CNO primarily affects the clavicle, vertebrae, mandible, and long-bone metaphyses.[1] In our IBD cohort, the most affected bone areas were the lower limbs and axial skeleton.

This case series was conducted at a single institution, focusing on patients diagnosed with IBD who also exhibited radiographic findings indicative of CNO. As a retrospective study, it is subject to selection bias and may lack comprehensive longitudinal data. Since this condition is often underrecognized and requires coexisting IBD and the rarer CNO diagnosis, our sample size was small. Given the absence of validated diagnostic criteria for CNO, we based our assessment on imaging findings, irrespective of whether the patients were symptomatic. Multiple groups have proposed diagnostic criteria/algorithms, but none have been validated to date. The proposed criteria share similarities and encompass a range of major and minor components. These include, but are not limited to, typical clinical and radiographic findings; the coexistence of other autoimmune diseases; the presence or absence of elevated CRP or ESR alongside otherwise normal laboratory results; and a generally good state of health.[12-13,17-19] Biopsy findings consistent with inflammatory changes are also considered. We encourage future studies to refine diagnostic criteria, with the goal of developing a validated diagnostic tool for definitive diagnosis.

Lastly, these patients often had poor documentation and follow-up. Steinborn et al. proposed that the first follow-up MRI should be 6 weeks after the start of treatment. In the further course, intervals of 3-6 months would be sufficient. Radiological follow-up is also important after discontinuation of medication to detect early recurrence.[20] Due to poor follow-up, we were unable to collect strong data regarding improvement with treatment; thus, treatment response was excluded from our data set. Future studies would benefit from examining the treatments utilized and their corresponding responses

CONCLUSION

CNO can be considered a rare extraintestinal complication of IBD and should be considered in patients with IBD who experience chronic bone pain or swelling despite unremarkable initial workup. We presented demographic factors, clinical features, and imaging characteristics. Our case series adds to the literature on previously reported cases and further supports the association between CNO and IBD. Raising awareness among pediatricians, hospitalists, rheumatologists, and gastroenterologists about this potential association is crucial to facilitate earlier diagnosis, improve access to treatment, control symptoms, and reduce complications. Importantly, pediatric CNO/CRMO generally has a favorable long-term prognosis. While most patients experience a relapsing-remitting course, the disease typically resolves over time, often without lasting complications. More data are needed to study the clinical and radiographic effectiveness of different treatment modalities.

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Congratulations to FCAAP's 2026 Resident Forum Abstract Winners

Pediatric residents from throughout the state of Florida gathered for a full day devoted to their education at the Pediatric Resident Forum on Saturday, September 5 as part of the Florida Chapter of the American Academy of Pediatrics' annual conference, The Future of Pediatric Practice 2026.

A highlight of the Resident Forum was the Resident Abstract Presentations. FCAAP invited Residents from across Florida to submit original abstracts in one of three categories: Original Research (including advocacy), Quality Improvement Projects, and Case Reports. Residents presented their posters and ideas to a panel of distinguished doctors who selected the best presentations in each category for top honors. A total of 4 Original Research, 9 Quality Improvement, and 39 Case Report abstracts were accepted.

Congratulations to all of the resident presenters, especially Dr. Yael Sterental - University of Miami/JMH at Holtz Children's Hospital (First Place in Case Report - When Hydrops Signals Malignancy: A Case of Congenital Neuroblastoma with Placental Metastasis), Dr. Samuel Mikhail - Nemours Children's Hospital, Florida (First Place in Original Research - Foreign War or Friendly Fire: Validation of a Risk Calculator in Pediatric Patients with SLE to Differentiate Between Lupus Flares and Infections), and Dr. Simone Hunter - Memorial Healthcare System at Joe DiMaggio Children's Hospital (First Place in Quality Improvement - POCUS in a Pinch: A Boot Camp Curriculum for Pediatric Residents). These winning abstracts are published in this edition of *The Florida Pediatrician*.

Special thanks to our Abstract Reviewers and Judges Drs. Corinne Bria, Brittany Bruggeman, James Burns, Shani Cunningham, Sharon Dabrow, Ritchelle Dubrovskiy, Drew Galligan, Ivan Gonzalez, Lisa Gwynn, Fatma Levent, Michael Muszynski.

When Hydrops Signals Malignancy: A Case of Congenital Neuroblastoma with Placental Metastasis

Yael Sterental, DO; Mariana Nunez Stosic, MD; Lien Morcate, MD; Mikayla Bowen, MD; Adrian Baca Arzaga, MD; Somaiah Ahmed, MD; Tasneem Ezuddin, MD; Shahnaz Duara, MD; Ofelia Alvarez, MD; Karen Young, MD

University of Miami/Jackson Memorial Hospital at Holtz Children's Hospital

RESIDENT - CASE REPORT | FIRST PLACE

INTRODUCTION

Neuroblastoma is the most common extracranial solid tumor in infancy, arising from neural crest–derived sympathetic cells. It develops along the sympathoadrenal axis, most often in the abdomen (65%), particularly in the adrenal glands. About 40% of cases are diagnosed before age one. Congenital neuroblastoma often presents with disseminated disease and rarely, placental involvement, which is typically associated with hydrops fetalis, placentomegaly, and extensive neonatal disease.

CASE DESCRIPTION

Premature female born at 29.6 weeks gestation via emergency cesarean delivery due to a prenatal diagnosis of a 3.8 x 3.6 x 3.3 cm predominantly solid abdominal mass with small internal cystic components and associated hydrops fetalis. After birth, she was intubated and placed on high frequency oscillatory ventilation for a restrictive respiratory pattern secondary to the abdominal mass. She subsequently developed anemia and coagulopathy. Physical exam at birth was notable for pale skin, generalized edema, abdominal distention. Postnatal abdominal ultrasound revealed a large suprarenal mass with multiple hepatic lesions concerning for metastases and ascites. Urinary Homovanillic acid (HVA) and Vanillymandelic acid (MVA) levels were drawn and pending. Given the clinical presentation and objective findings, neuroblastoma was highest on the differential, above alternatives including hemangioma. The diagnosis was confirmed by placental pathology, which demonstrated multifocal intravascular neuroblastic cells within fetal vessels, consistent with metastatic congenital neuroblastoma. The placenta weighed 519g (>90th percentile for gestational age). The patient was diagnosed with stage 4S neuroblastoma. Following multidisciplinary discussion, chemotherapy was initiated per modified protocol ANBL0531 with cyclophosphamide and etoposide given pathology results. Urinary homovanillic acid (HVA) and vanillylmandelic acid (VMA) subsequently resulted and were markedly elevated at diagnosis (HVA 362.8 mg/gCr/12h [RR: 9–36 mg/gCr/12h]; VMA 239.1 mg/gCr/12h [RR: 5–26 mg/gCr/12h]). These values were used as biochemical markers and trended serially to assess response to chemotherapy.

DISCUSSION

In this case, placentomegaly with multifocal intravascular neuroblastic cells supports hematogenous fetal-to-placental spread. The mechanism of placental enlargement is likely multifactorial, including compensatory hypertrophy in response to fetal anemia, impaired venous return from hepatomegaly secondary to tumor infiltration and increased intra-abdominal pressure, and hypoalbuminemia contributing to hydrops and placental edema. The presence of hydrops fetalis reflects a severe underlying fetal pathophysiology such as cardiac dysfunction, anemia, or i mpaired venous return.

Placental involvement in congenital neuroblastoma is rare but has been described in association with hydrops fetalis and extensive metastatic disease at birth. Although some infants with stage 4S disease may experience spontaneous regression (5), those presenting with significant hepatic involvement and hydrops are at increased risk of respiratory compromise, coagulopathy, and hemodynamic instability, increasing mortality therefore requiring urgent therapy.

LESSON LEARNED

Placental pathology can establish diagnosis and guide multidisciplinary management when biopsy is unsafe due to critical instability. Prompt initiation of chemotherapy is crucial to address the tumor's complications.

Foreign War or Friendly Fire: Validation of a Risk Calculator in Pediatric Patients with SLE to Differentiate Between Lupus Flares and Infections

Samuel Adel Mikhail, MD; Tryphina Adel Mikhail, MD; Timothy Michael Maul, CCP, FPP, PhD; Mary Bratovich Toth, MD
Nemours Children's Hospital, Florida

RESIDENT - ORIGINAL RESEACH | FIRST PLACE

INTRODUCTION

Fever in patients with systemic lupus erythematosus (SLE) presents a critical diagnostic challenge: infection and disease flare require opposing management strategies yet can manifest similarly and even concurrently. Infections account for 25–50% of deaths in hospitalized SLE patients. Multiple adult risk calculators exist yet none are validated in children—despite 20% of SLE diagnoses occurring before age 17, often with worse prognosis. This study assesses four adult risk calculators in a diverse pediatric cohort.

METHODS & DESCRIPTION OF INTERVENTIONS

This multi-site retrospective chart review included patients aged 0–18 years with previously diagnosed SLE admitted with fever (≥38°C) at Nemours Children's Health (Orlando, Wilmington) between January 2008 and May 2025. Six hundred eighty-three encounters were queried using ICD-10 codes. Retrospective chart review eliminated 547 admissions for not meeting inclusion criteria, yielding a total of 136 admissions and 65 unique patients. Final disposition (infection, flare, both, or neither) was established through clinical documentation, cultures, and treatment decisions. Laboratory data collected during admission included WBC, CRP, ESR, dsDNA, NLR, PLR, complement levels (C3, C4), procalcitonin, and immunosuppressive medications. Four published adult SLE risk calculators were applied: (1) Beca et al. (flare)—CRP, days of fever, anti-dsDNA; (2) Mehta et al. (infection)—CRP, age, total lymphocyte count (TLC); (3) Littlejohn et al. (flare or infection)—ESR to CRP ratio cutoffs ; and (4) Musunuri et al. (infection)—NLR and PLR cutoffs. Sensitivity, specificity, PPV, and NPV were calculated using SPSS v27. Outputs were compared to final clinical diagnoses via crosstabulation to estimate discriminatory performance.

RESULTS

One hundred thirty-six encounters from 65 unique pediatric patients were determined to be infection (n=42, 31%), flare (n=66, 49%), both (n=18, 13%), and neither (n=10, 7%). Significant differences between disposition were identified for WBC ($p<0.001$), absolute neutrophils ($p<0.001$), NLR ($p<0.001$), ESR:CRP ratio ($p=0.003$), CRP ($p=0.002$), C4 ($p<0.001$), and anti-dsDNA ($p=0.02$). Of the four calculators assessed, three reached statistical significance: Littlejohn flare (sensitivity 72%, specificity 55%, PPV 72%, $p=0.01$), Musunuri NLR infection (sensitivity 66%, specificity 55%, PPV 67%, $p=0.02$), and Beca flare (sensitivity 31%, specificity 88%, PPV 81%, $p=0.04$). Mehta infection did not reach significance ($p=0.056$).

DISCUSSION

Adult SLE risk calculators demonstrated suboptimal performance in a diverse pediatric population. While Beca yielded high specificity and PPV, its low sensitivity (31%) risks missing infections in an immunocompromised patient—a clinically unacceptable trade-off. No single calculator offered sufficient sensitivity and specificity for safe clinical use. These findings underscore the urgent need for a validated, pediatric-specific tool. Logistic regression with GEE is ongoing to develop a novel, accessible calculator using low-cost biomarkers. Future prospective validation will aim to reduce unnecessary antibiotic use, prevent diagnostic delay, and improve outcomes in pediatric SLE.

POCUS in a Pinch: A Boot Camp Curriculum for Pediatric Residents

Simone Hunter, MD
Memorial Healthcare System at Joe DiMaggio Children's Hospital

RESIDENT - QUALITY IMPROVEMENT | FIRST PLACE

BACKGROUND

Point-of-care ultrasound (POCUS) supports timely clinical decision-making and enhances procedural safety in high-acuity pediatric settings. Despite strong interest from trainees and leadership, structured POCUS education is rarely incorporated into pediatric residencies due to limited faculty expertise, equipment access, and competing curricular demands. Consequently, residents report low baseline diagnostic imaging confidence despite recognizing its high clinical value.

AIM

To introduce pediatric residents to foundational POCUS concepts through a structured educational intervention and evaluate its impact on their clinical confidence, perceived competence, and attitudes toward POCUS integration.

METHODS & DESCRIPTION OF INTERVENTION

This quality improvement initiative was a collaboration between the Emergency Medicine and Pediatric Residency Programs at Joe DiMaggio Children's Hospital. The intervention consisted of a four-day curriculum delivered by emergency medicine residents under the supervision of an Advanced Emergency Medicine Ultrasound-trained faculty member. The curriculum comprised three 45-minute didactic sessions covering basic ultrasound principles, extended focused assessment with sonography for trauma (eFAST), lung, renal/bladder, focused cardiac, and ocular ultrasound, alongside ultrasound-guided procedures. On the final day, a 2.5-hour hands-on station-based session was conducted using volunteer pediatric and adult models and five loaned ultrasound machines. Trainees practiced image acquisition for IV access, cardiac, renal/bladder, eFAST, and ocular applications. Approximately 20 pediatric residents (PGY-1 to PGY-3) participated. Pre- and post-intervention surveys utilized a 5-point Likert scale to assess four domains: perceived importance, self-assessed knowledge, clinical confidence, and anticipated utilization.

RESULTS

Survey data were analyzed from participating residents (N = 22 pre-intervention, N = 20 post-intervention). Baseline scores for the perceived clinical importance of POCUS were high and remained stable post-intervention (mean 4.21 vs. 4.30). In contrast, baseline self-assessed knowledge and skills were low across all core applications. Following the boot camp, the composite knowledge/skills domain mean significantly increased from 2.14 to 3.62 (absolute change +1.48, $p < 0.001$). Composite clinical confidence also improved significantly from 1.89 to 3.38 (absolute change +1.49, $p < 0.001$), specifically increasing from 2.05 to 3.75 for integrating findings with physical exams. Anticipated utilization and clinical impact remained high pre- and post-intervention (mean 4.26 vs. 4.44, $p = 0.113$).

DISCUSSION

This brief, targeted POCUS boot camp successfully mitigated low baseline confidence and significantly advanced the clinical ultrasound skills of pediatric trainees. While longitudinal or resource-heavy models pose implementation challenges, this cross-departmental collaborative framework offers a highly practical, reproducible, and resource-efficient alternative to bridging educational gaps within existing residency scheduling constraints. Consistently high baseline and post-intervention scores underscore a sustained enthusiasm among residents for formalized, longitudinal POCUS integration.



FPP2026 Medical Student Forum Wrap Up

The University of Florida Department of Pediatrics, in partnership with the University of Florida College of Medicine Office of Educational Affairs and FCAAP, proudly hosted the 12th Annual Pediatric Medical Student Research Forum on Saturday, September 5, 2026, in Orlando, Florida. This was truly a national stage, with over 50 students across the country and beyond, providing a platform for showcasing innovative pediatric research. The depth, quality, and creativity reflected in the presentations were truly inspiring.

We extend our sincere gratitude to our keynote speaker, Dr. Rachel Leon, Associate Professor at the University of Texas Southwestern Medical Center, for delivering an uplifting and motivational message to the students. We are also deeply appreciative of our dedicated UF faculty judges — Drs. Molly Posa, Maria Kelly, Puneet Tung, Tim Foster, Arwa Saidi, Sarah Marsicek, John Ligon, Derika Schlueter, and Shelley Collins — whose time, expertise, and thoughtful feedback were essential in supporting and inspiring our participants. And a heartfelt thank you goes to our Student Forum organizers Dr. Rashmin Savani, Dr. Thao Vu, and Mr. Larry Compton of the University of Florida College of Medicine for their hard work.

Among the many outstanding oral and "power talk" presentations, we are proud to recognize the individuals below for their exceptional contributions. The winning abstracts are published in this edition of *The Florida Pediatrician* journal.

ORAL PRESENTATIONS

- 1st Place: Julia D'Orazio, University of Kentucky
- 2nd Place: Shivesh Shourya, Duke University
- 3rd Place: Gabrielle Perry, University of Florida

POWER TALK PRESENTATIONS

- 1st Place: Payton Erickson, University of Utah
- 2nd Place: Jade Bowers, Florida State University
- 3rd Place: Sakinah Dewji: University of Central Florida
- 3rd Place: Nishka Jakkidi, Florida International University

We are confident that each participant left the forum inspired to advance pediatric care and discovery. Thank you to everyone who made this event such a success!

Beyond the Classic Phenotype: FGF12-Associated Developmental and Epileptic Encephalopathy Masking as Pulmonary Hemorrhage

Julia D'Orazio MS4[1]; Drew Jennings DO[2]; Hannah McAtee MD[2]; Pooja Utamsingh MD[2]
[1]University of Kentucky, College of Medicine, Lexington, KY
[2]University of Kentucky, Golisano Children's Hospital, Lexington, KY

STUDENT - ORAL PRESENTATION | FIRST PLACE

INTRODUCTION

Neuroblastoma is the most common extracranial solid tumor in infancy, arising from neural crest–derived sympathetic cells. It develops along the sympathoadrenal axis, most often in the abdomen (65%), particularly in the adrenal glands. About 40% of cases are diagnosed before age one. Congenital neuroblastoma often presents with disseminated disease and rarely, placental involvement, which is typically associated with hydrops fetalis, placentomegaly, and extensive neonatal disease.

CASE DESCRIPTION

Premature female born at 29.6 weeks gestation via emergency cesarean delivery due to a prenatal diagnosis of a 3.8 x 3.6 x 3.3 cm predominantly solid abdominal mass with small internal cystic components and associated hydrops fetalis. After birth, she was intubated and placed on high frequency oscillatory ventilation for a restrictive respiratory pattern secondary to the abdominal mass. She subsequently developed anemia and coagulopathy. Physical exam at birth was notable for pale skin, generalized edema, abdominal distention. Postnatal abdominal ultrasound revealed a large suprarenal mass with multiple hepatic lesions concerning for metastases and ascites. Urinary Homovanillic acid (HVA) and Vanillymandelic acid (MVA) levels were drawn and pending. Given the clinical presentation and objective findings, neuroblastoma was highest on the differential, above alternatives including hemangioma. The diagnosis was confirmed by placental pathology, which demonstrated multifocal intravascular neuroblastic cells within fetal vessels, consistent with metastatic congenital neuroblastoma. The placenta weighed 519g (>90th percentile for gestational age). The patient was diagnosed with stage 4S neuroblastoma. Following multidisciplinary discussion, chemotherapy was initiated per modified protocol ANBL0531 with cyclophosphamide and etoposide given pathology results. Urinary homovanillic acid (HVA) and vanillylmandelic acid (VMA) subsequently resulted and were markedly elevated at diagnosis (HVA 362.8 mg/gCr/12h [RR: 9–36 mg/gCr/12h]; VMA 239.1 mg/gCr/12h [RR: 5–26 mg/gCr/12h]). These values were used as biochemical markers and trended serially to assess response to chemotherapy.

DISCUSSION

In this case, placentomegaly with multifocal intravascular neuroblastic cells supports hematogenous fetal-to-placental spread. The mechanism of placental enlargement is likely multifactorial, including compensatory hypertrophy in response to fetal anemia, impaired venous return from hepatomegaly secondary to tumor infiltration and increased intra-abdominal pressure, and hypoalbuminemia contributing to hydrops and placental edema. The presence of hydrops fetalis reflects a severe underlying fetal pathophysiology such as cardiac dysfunction, anemia, or i mpaired venous return.

Placental involvement in congenital neuroblastoma is rare but has been described in association with hydrops fetalis and extensive metastatic disease at birth. Although some infants with stage 4S disease may experience spontaneous regression (5), those presenting with significant hepatic involvement and hydrops are at increased risk of respiratory compromise, coagulopathy, and hemodynamic instability, increasing mortality therefore requiring urgent therapy.

LESSON LEARNED

Placental pathology can establish diagnosis and guide multidisciplinary management when biopsy is unsafe due to critical instability. Prompt initiation of chemotherapy is crucial to address the tumor's complications.

Bridging the Implementation Gap: An Analysis of Barriers to CLABSI Maintenance Auditing in Pediatric Inpatient Units to Support CLABSI Prevention

Shivesh Shourya, MPH[1]; Vani Sistla, MPH[2]; Melissa M. Campbell, MD[3]; Ibukunoluwa C. Kalu, MD[3]
[1]Duke University School of Medicine
[2]Duke University Hospital
[3]Department of Pediatrics, Division of Pediatric Infectious Diseases, Duke University School of Medicine

STUDENT - ORAL PRESENTATION | SECOND PLACE

BACKGROUND & OBJECTIVES

Central line-associated bloodstream infections (CLABSIs) significantly impact pediatric patient morbidity and mortality. High compliance with central line (CL) maintenance bundles may prevent CLABSIs. However, clinical adherence to institutional benchmarks auditing bundle compliance (≥20 audits/unit/month) remain inconsistent. In 2025, overall baseline compliance across seven pediatric units was 85.7%, with dramatic unit-level variance (8.7% to 91.7%) coinciding with 27 CLABSI events. The global aim was to increase average monthly audit compliance to ≥90% by FY2027 through targeted process improvements and removing identified systemic barriers.

METHODS & ANALYSIS

This single-center quality improvement initiative applied a Gemba approach across seven inpatient units. Audit compliance and clinical outcome data (January 2025–January 2026) were extracted from institutional dashboards. Pearson's correlation evaluated the relationship between audit compliance and CLABSI rates per 1,000 line-days. Phase 1 qualitative methodology included direct workflow observations and informal interviews to construct a Key Driver Diagram.

RESULTS

Statistical analysis of baseline data revealed a significant, strong negative correlation between unit audit benchmark compliance and CLABSI rates ($r = -0.85$, $p = 0.016$). Additionally, 921 audits were completed over 6 months with an average monthly compliance of 84.3% SD = 1.95%) during the project. Qualitative analysis across units identified three critical thematic barriers to audit completion: high patient acuity, staffing constraints, and process-related challenges.

CONCLUSIONS

CL maintenance bundle audit compliance strongly predicts lower unit-level CLABSI rates. Operationalizing the Key Driver Diagram through iterative PDSA cycles - focusing on tackling identified barriers - is required to standardize surveillance, mitigate practice drift, and reduce catheter-associated harm.

Teaming up: Development of a Question Prompt List for Caregivers and Adolescents in the Pediatric Emergency Department

Gabrielle Perry, MS3; Ana Barrientos Guevara; Colleen Gutman, MD
University of Florida College of Medicine

STUDENT - ORAL PRESENTATION | THIRD PLACE

Gabrielle Perry, MS3, University of Florida College of Medicine Ana Barrientos Guevara, University of Florida College of Medicine Colleen Gutman, MD, University of Florida College of Medicine

BACKGROUND & OBJECTIVES

Question prompt lists (QPLs), which provide patients with a list of suggested questions to ask their treating clinician, are an evidence-based intervention that increase the inclusion of patient preferences in medical decision-making in adult outpatient settings. Our aim is to assess parent and child perspectives on a QPL developed for the PED.

METHODS & ANALYSIS

We developed TEAM-Q and TEAM-Q Kids and Teens, individually tailorable QPLs adapted to the PED. We enrolled a convenience sample of caregivers of PED patients and of adolescent PED patients (ages 12-17) to pilot test TEAM-Q. TEAM-Q and the pilot test survey were available through REDCap and accessed through a QR code scanned on their device. We used descriptive statistics to analyze responses.

RESULTS

We enrolled 39 caregivers and 15 adolescents (median 14.5 years). Caregivers were predominantly parents (95%) and female (77%); 21% had a high school degree or less, 18% had limited health literacy, and 51% had experienced discrimination in medical settings. All adolescents agreed that 1) doctors and nurses should explain the reason for any tests and medicines, and 2) it is important to know all the information about their care.

TEAM-Q was completed in less than 15 minutes by 83% of caregivers and 100% of adolescents. Overall, 90% of caregivers and 93% of adolescents agreed that TEAM-Q helped to put their questions into words; 90% of caregivers and 100% of adolescents agreed that TEAM-Q would help them ask questions.

CONCLUSIONS

TEAM-Q is feasible and acceptable to caregivers and adolescents during PED care.

Pediatric Outpatient Emergency Preparedness: A Quality Improvement Project

Felix Balak[1]; Jade Bowers[1]; Edwin Mompremier[1]; Valeria Nieri[1]; Stacy McConkey[1,2]
[1]Florida State University College of Medicine, Orlando, FL
[2]AdventHealth Medical Group, Orlando, FL

STUDENT - POWER TALK | SECOND PLACE

BACKGROUND & OBJECTIVES

Pediatric emergencies in outpatient settings require rapid recognition to prevent morbidity and mortality. Non-clinical staff are often the first point of contact, yet frequently lack standardized training in emergency identification and response. This quality improvement initiative aimed to increase self-reported comfort with recognizing and responding to pediatric emergencies through a targeted educational curriculum and simulation-based training.

METHODS & ANALYSIS

A training program was implemented across 3 outpatient pediatric clinics, consisting of an educational curriculum and simulations reflecting common pediatric emergencies. Content emphasized early recognition and role-specific responsibilities. Participants included both clinical and non-clinical personnel. Outcomes were assessed using a 10-item multiple-choice knowledge test and an 11-domain Likert-scale comfort survey, administered pre- and post-intervention. Pre- and post-groups were analyzed as independent samples.

Descriptive statistics and Mann-Whitney U tests were used to evaluate changes.

RESULTS

Thirty-seven responses were analyzed (15 pre-intervention, 22 post-intervention). The composite comfort score increased from 4.02 (standard deviation [SD] 0.95) to 4.46 (SD 0.69), with a 0.44 point improvement ($p = 0.094$). Statistically significant improvements were observed in locating emergency supplies (3.47 to 4.41; $p = 0.031$) and identifying clinic resources (3.80 to 4.50; $p = 0.045$). Non-clinical staff demonstrated lower baseline comfort but experienced the largest gains across domains, particularly in operational tasks. Overall knowledge scores were high at baseline (90%) and did not significantly change post-intervention (88.2%; $p = 0.93$), likely reflecting a ceiling effect. Item-level analysis showed an improvement in recognition of emergency activation protocols (+15.5%).

CONCLUSIONS

Implementation of an educational curriculum and simulation-based training improved self-reported comfort in pediatric emergency recognition and response, particularly in operational domains critical for non-clinical staff. While knowledge scores did not significantly change, likely due to high baseline performance, targeted improvements in key safety behaviors were observed. This intervention represents a low-resource, scalable approach to enhancing outpatient pediatric emergency preparedness, with particular benefit for non-clinical personnel.

Adherence to National Guidelines on the Management of Bronchiolitis

Sakinah Dewji[1]; Adalberto Torres[1,2]
[1]UCF College of Medicine
[2]Nemours Children's Hospital

STUDENT - POWER TALK | THIRD PLACE

BACKGROUND & OBJECTIVE

The American Academy of Pediatrics (AAP) guidelines on treating bronchiolitis includes supportive care and discourages the administration of bronchodilators (i.e., albuterol, racemic epinephrine), corticosteroids, or antibiotics. However, many clinicians may treat without adhering to the guidelines. This study aims to compare the treatments of bronchiolitis patients at two children's hospitals in the United States and their adherence to AAP guidelines.

METHODS & ANALYSIS

Retrospective chart review of 217 patients (100 FL and 117 DE) under 24 months of age with a primary diagnosis of bronchiolitis in 2022 at Nemours Children's Hospital, Florida (NCH-FL) and NCH-DE was performed. EMR data (demographics, treatments, and outcomes) were collected in a REDCap survey. Chi-square testing was done to compare adherence between the two institutions.

RESULTS

There was a significant difference in adherence to treatment guidelines between NCH-FL (33%) and NCH-DE (55.6%, $p=0.039$). In total, 46.1% of patients were treated with bronchodilators, 22.1% with steroids and 20.3% with antibiotics, demonstrating a lack of adherence to the AAP guidelines at both institutions.

CONCLUSION

Adherence rates to bronchiolitis treatment guidelines varied between the two hospitals. Both institutions were non adherent to the AAP guidelines in administration of bronchodilators, corticosteroids, and antibiotics despite extensive research on the lack of benefit.

Natural Fever Remedies and Medical Distrust: A Content Analysis of Pediatric Fever Advice on Social Media

Nishka Jakkidi[1]; Claudia Morales[1]; Isabella Ortega[1]; Diana Lingueno[1]; Carolina Miliancano[1]; Katherine Semidey MD[2]
[1]FIU Herbert Wertheim College of Medicine
[2]Nicklaus Children's Hospital

STUDENT - POWER TALK | THIRD PLACE

BACKGROUND & OBJECTIVES

Social media has become an increasingly popular source of health information for parents and caregivers, many of whom are turning to natural approaches for their children's care. Yet the accuracy of pediatric health content on platforms like TikTok remains largely unexamined, particularly around fever management. This study evaluated TikTok videos promoting natural home remedies for pediatric fever for creator type, remedy prevalence, fever definition accuracy, and the presence of medical distrust and anti-medication messaging.

METHODS & ANALYSIS

A cross-sectional content analysis was conducted of TikTok videos discussing natural remedies for pediatric fever. Videos were identified using two search terms: "Natural Child Fever Remedy" and "Home Remedies for Fever in Kids" (50 videos each, 100 total screened) and coded for creator type, remedy content, fever definition accuracy, medical distrust language, and anti-medication messaging.

RESULTS

Of 100 videos screened, 93 met inclusion criteria. All 93 (100%) promoted at least one natural or home remedy, most commonly detox/warm baths (30.1%), vinegar applications (26.9%), and onion-in-socks (23.7%). Cold bath/compress content, present in 11.8% of videos, generated the highest average views (729,735). Only 20.4% of videos correctly defined fever as ≥100.4°F, and 74.2% never referenced a temperature threshold. Creators were predominantly parents/caregivers (48.4%) or non-medical influencers (40.9%); healthcare professionals comprised only 3.2%. Medical distrust language appeared in 8.6% of videos, 75% from influencers. Anti-medication language was present in 18.3% of videos, mostly from parents/caregivers (70.6%). Healthcare professionals accounted for 0% of distrust or anti-medication content.

CONCLUSIONS

Most TikTok content on pediatric fever is created by non-medical sources and lacks basic clinical accuracy. While overt medical distrust was relatively uncommon (8.6%), anti-medication messaging was more prevalent (18.3%) and warrants attention — parents don't need to reach for Tylenol at every fever, but they do need to know when antipyretics help keep children comfortable, hydrated, and out of the hospital. These findings point to a real opportunity for pediatricians to meet parents where they are, acknowledge natural approaches, and have honest conversations about when medical care matters.

MAKE EVERY BITE & SIP COUNT

- Shred or grate cheese so baby can grab as the pincer grasp is being developed and these sizes will be easier to swallow.
- Melt cheese atop cooked broccoli, cauliflower or carrots and mash or finely chop into bite-sized portions.
- Introduce one new "single-ingredient" food at a time – wait a few days before adding a new food to ensure baby can tolerate each new food. Remember, it might take several attempts to accept and enjoy a new food.
- Once baby has embraced a new food, you can pair it with other complementary foods. Serve plain, unsweetened regular or Greek/Icelandic yogurt and cottage cheese alone or with pureed fruits to introduce a variety of tastes and textures, like a tart taste balanced with something naturally sweeter like fruit.
- Start small, don't stress about having to get a full serving in. Just one bite is a great start to increasing exposure and familiarity, even if more of it ends up on the floor, tray or on baby versus in their mouths!
- By 7 or 8 months, babies should be eating foods from all food groups. Continue offering a variety of foods over the next several months to expand baby's range of tastes and textures.



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