Pedia Companion

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Determination of Normal Range and Incidences of Hypothermia and Hyperthermia during First 24 hours in term-born Infants under standardised care

Introduction

Hypothermia (HT) is defined as a core body temperature of less than 36.5°C and its classified into three types based on severity: mild HT (36.0-36.4), moderate HT (32.0–35.9°C), and severe HT (less than 32°C).[1] Hypothermia is a significant concern in preterm infants, linked to severe morbidities and mortality. It was associated with acid-base disturbances and hypoglycemia. Hyperthermia and temperature instability may be due to overheating but are also common symptoms of infection. The WHO has provided guidelines for thermal protection, defining normal body temperature as 36.5–37.5°C, but specific normal ranges for term infants have not been scientifically established.[2] So, this study aimed to determine the normal ranges for rectal temperature and the incidence of hypothermia and hyperthermia during the first 24 hours after birth in term infants, adhering to WHO thermal protection recommendations, and to identify significant risk factors for these conditions.

Methods

This was a prospective observational study conducted on healthy term-born infants. Infants were considered small for gestational age (SGA) if their birth weight was below the 10th percentile. Midwives, gynecologists, and pediatricians were responsible for immediate newborn care, and temperatures were measured by trained nurse assistants and midwives. Rectal temperatures were taken at 2, 4, 8, 16, and 24 hours using a standardized low-reading rectal thermometer. Room temperatures were also recorded. Data analysis included creating percentile curves and estimating the effects of covariates using linear mixed effects models.

Results

This study included 951 infants, with 258 (27%) born during the night shift, 422 (44%) during the day shift, and 271 (28%) in the evening. The median rectal temperature was 36.9°C at 2 hours, 36.8°C at 4 hours, and stabilized at 37.1°C by 24 hours (Figure 1). Hypothermia occurred in 270 (28.4%) of infants, 23.8% had mild, and 4.5% had moderate hypothermia, while hyperthermia was observed in 115 (12%) of infants, typically after 8 hours. Significant risk factors for hypothermia included low birth weight, male sex, night births, and being nursed in a cot instead of skin-to-skin. Hyperthermia was associated with high birth weight, being awake, and staying with parents.

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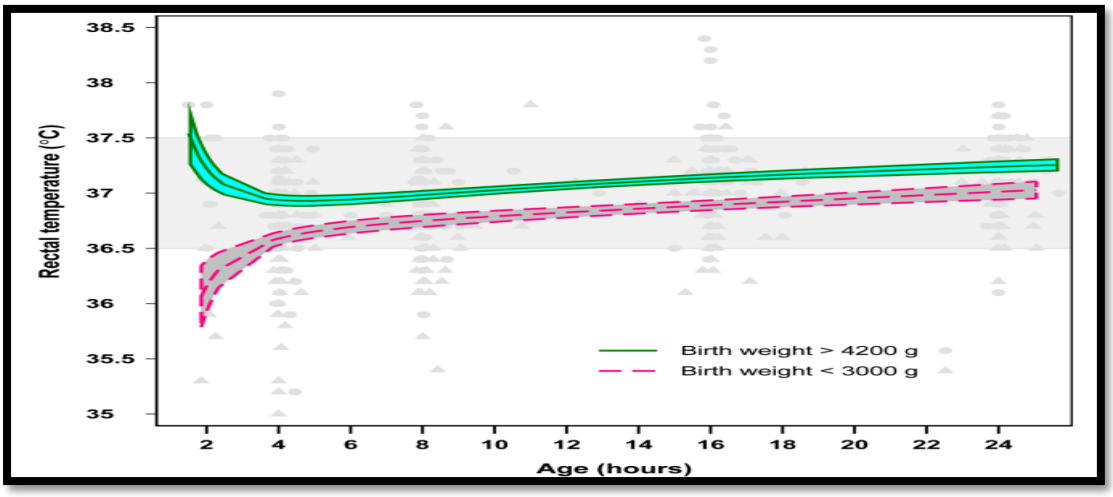

Figure 1. Mean rectal temperatures in healthy newborns born at term

Discussion

Maintaining a delivery room temperature of 26–30°C and rooming-in temperature of 24°C, while adhering to WHO thermal protection guidelines, resulted in median rectal temperatures close to 37°C during the first 24 hours. Despite these measures, a high incidence of hypothermia was observed in 28% of infants, particularly in the first 8 hours. Low birth weight was the major risk factor for hypothermia.[2] This results align with the previous study results which showed that lower birth weight and gestational age were the risk factors for hypothermia.[3] This underscores the vulnerability of newborns to hypothermia even under controlled conditions. Hyperthermia was more common in heavier, awake infants and typically after the first 8 hours. The study highlighted the need for continuous monitoring and thermal protection strategies, especially for more vulnerable infants.[2]

Conclusion

Term infants were at risk of hypothermia during the first hours after birth, even in an adequately controlled thermal environment, emphasizing the high risk under less optimal conditions. Hyperthermia was associated with high birth weights and activity levels, typically occurring after 8 hours.

Maintaining WHO recommended thermal protection practices is crucial for preventing hypothermia and hyperthermia in term infants during first 24 hours of life

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Effect of Screen time on Parent Child Communication in Children's aged 12 to 36 months

Introduction

Increases in screen time were associated with decreases in measures of parent-child talk.

The early years of a child's life are critical for development. Being in a language-rich home helps with language skills, emotional growth, IQ, and brain development. Programs that encourage parents to talk more with their children have shown positive results. One major issue is screen time, which leads to "technoference" where technology interrupts family interactions. Excessive screen time was increasingly recognized as a factor that could potentially disrupt these essential interactions, leading to adverse developmental outcomes. When parents use smartphones, they often pay less attention to their children, engage less, respond more harshly, and talk less.[1] Recent studies have shown that while digital devices can offer educational benefits when used appropriately, unsupervised or excessive use can interfere with the parent-child bond and subsequent child development.[2] This study aimed to evaluate the association between long-term effects of children's screen time and parent-child conversations such as adult words, child vocalizations and parent child interactions during the first three years of life.

Methods

The Language in Little Ones (LiLO) study was a prospective cohort study followed 302 families from when their children were 6 months old to about 5 years old, collecting data every six months. The goal was to measure how much parents and children talk at home using the Language Environment Analysis (LENA) technology. The Electronic Use in Little Ones (EUiLO) study, part of LiLO, specifically measured how much screen time the children were exposed to. Inclusion criteria were children had to be born in 2017, live in homes where English is mainly spoken, be full-term single births, and have no language impairments. The outcomes were measured in three ways: conversational turns, adult words, and child vocalizations. For each of the three outcomes, separate models were run with adjustments for

child sex, child age, mother education level, number of children at home, number of activities at home, and psychological distress of the primary caregiver.

Results

A total of 220 families were included for final analysis. At the age of 12 months, the children experienced an average of 87.8 (107.6) minutes of screen time, 14 997.8 (6873.4) adult words heard, 1394.7 (522.7) vocalisations produced, and an average of 369.4 (167.4) conversational turns per day. As the children got older screen time, child vocalization, and conversational turn counts increased but number of adult words remained relatively stable across time, only increasing slightly as children grew up. When the children were 36 months old, they had experienced an average of 172.1 (134.7) minutes of screen time, heard 16,302.6 (6654.7) adult words, produced 3306.7 (1612.8) vocalisations, and had 734.4 (404.2) conversational turns on average each day (Figure 1). Unadjusted mixed-effect models showed an overall negative association between the amount of screen time children were exposed to and the number of adult words children heard at all ages. Adjusted models showed that increases in screen time were associated with decreases in parent-child talk in all variables and ages, the only exception was screen time at 12 months, which had no correlation with any of the three parent-child talk outcomes. At 36 month's results showed largest association when an additional minute of screen time was associated with a reduction of 6.6 adult words, 4.9 child vocalizations, and 1.1 conversational turns.

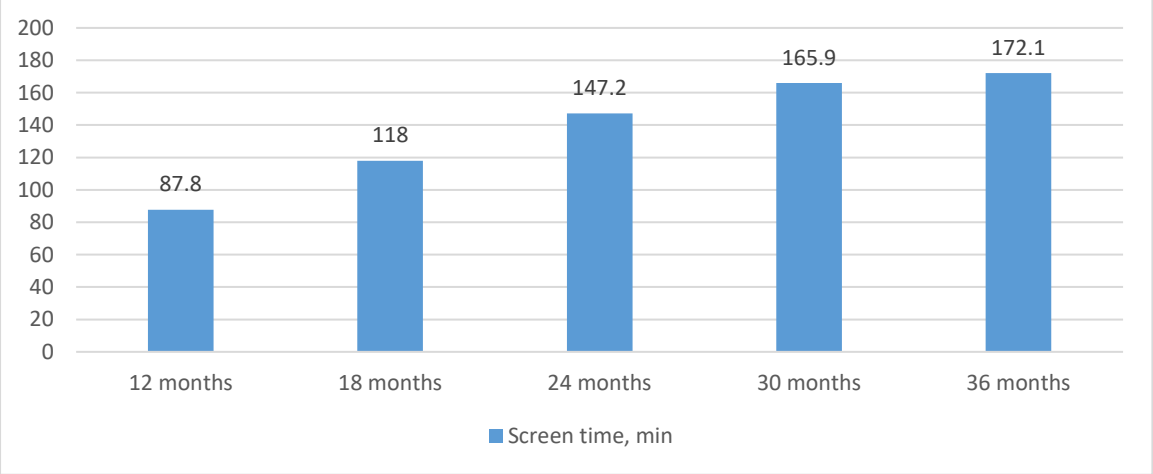

Figure 1. Screen Time usage and Parent-Child Talk Variables at Each Time Point for 220 Families

Discussion

This study finding showed that screen time can significantly reduce the amount of talk between parents and children. With the growing use of technology in homes, it was important for parents to be aware of its potential negative effects. Reducing screen time might help improve communication and the overall development of children. Mixed-effects models showed that

for every additional minute of screen exposure, parents and children were generally talking or vocalizing less and were engaging in fewer back-and-forth interactions.[1] This results aligned with the previous study results which showed that increases in screen time decrease parent-child interactions.[3]

Conclusion

Increases in screen time were associated with decreases in adult words, child vocalizations, and back-and-forth interactions for children aged between 18 and 36 months, after controlling for known confounders. Parents should be mindful of their technology use and try to limit screen time to promote better communication and development for their children.

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Impact of Telemedicine and Home Spirometry in Cystic Fibrosis disease progression and care

Introduction

Introduction of telemedicine and home spirometry in combination with in-person visits may be tolerable and effective in a pediatric cystic fibrosis setting.

Cystic fibrosis (CF) is a genetic disorder defined by variants in the cystic fibrosis transmembrane conductance regulator *(CFTR)* gene, which affects more than 30,000 individuals in the US and approximately 89,000 worldwide.[1] Children with cystic fibrosis and their care givers are often facing problems to access specialised multidisciplinary CF team. The COVID-19 pandemic disrupted traditional healthcare delivery, prompting a shift to telehealth and home monitoring methods to maintain patient care while minimizing infection risk.[2] Further, there was no sufficient evidence to support that home spirometry in combination with telehealth and physical visits could provide CF care as effectively as exclusively physical visits. So, this study aimed to investigate the effectiveness of telehealth and home spirometry in managing pediatric CF, comparing health outcomes during the COVID-19 pandemic on the progression of CF related disease.

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Methods

This was a prospective, interventional, multicenter study involving pediatric CF patients who used home spirometry and participated in telehealth visits over one year. Key health indicators, including lung function, airway pathogens, and nutritional status, were monitored. Data were collected from home spirometry and compared with traditional hospital-based spirometry. The primary outcome was to measure FEV1 with lung clearance index serving as a secondary endpoint. Nutritional status including weight, height, and BMI, was evaluated during all in-person visits. Using Cystic Fibrosis Questionnaire-Revised (CFQ-R), health related quality of life was evaluated at the start and end of the study.

Results

A total of 59 children aged between 6 to 17 years were included for final analysis. FEV_1% assessed during the pre-pandemic period and intervention period were –0.6% and -0.9% whereas Lung Clearance Index (LCI) were 0.1 and 0.2. Hospital-based spirometry showed a difference of −0.4 during pre-pandemic period and the study period. Incidence of Haemophilus influenza was reduced by 60% in study period compared to pre pandemic period. The mean difference between the hospital and home spirometry was 3.9. Participants and the caregivers appreciated both telehealth and in person visit. Around 93% of the participants and 96% of the caregivers expressed desire to continue with home spirometry and telemedicine (Figure 1).

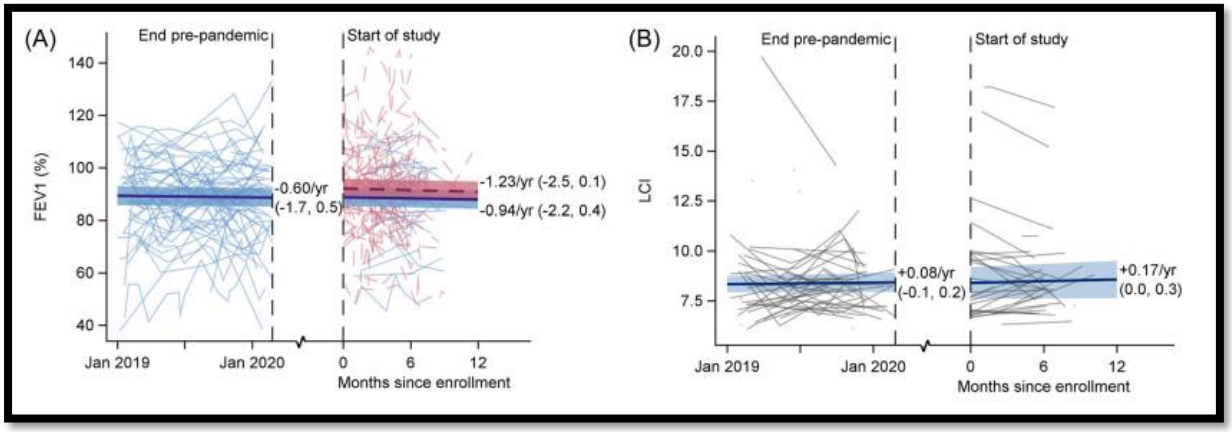

Figure 1. (A) Lung function measured by FEV_1 (%), (B) Lung Clearance Index (LCI) assessed during the pre-pandemic period and intervention period. Hospital spirometry (blue lines) and a Home spirometry (red lines).

Discussion

The study found that telehealth and home spirometry were as effective as traditional in-person care for managing pediatric CF. Both participants and their care takers benefited from the use of home spirometry, which improved their understanding of how to monitor CF lung disease without affecting their anxiety levels. Positive impact on daily lives of participants and their

caregivers were seen with telehealth visits.[2] This study results align with the previous retrospective study which confirmed the safety and feasibility of telemedicine as a compliment to in-person outpatient clinic visits.[3] Patients and caregivers appreciated the convenience and reduced burden of telehealth visits. Home spirometry, despite some variability, effectively tracked lung function trends. Challenges included improving adherence to home spirometry.[2]

Conclusion

Telehealth and home spirometry offer a viable, effective alternative to traditional in-person CF care, maintaining health indicators and being well-received by patients and caregivers. The study supported the continued use of these methods, with a focus on improving adherence and exploring long-term outcomes.

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Case report on Anti-Sulfatide Antibody Associated Guillain–Barre syndrome

Introduction

This case highlights the potential effectiveness of steroid therapy in anti-sulfatide antibody-associated Guillain–Barre syndrome

Guillain–Barré syndrome (GBS) is defined as an immune-mediated peripheral nerve disease characterized by a symmetrical ascending weakness that can lead to paralysis with associated hyporeflexia or areflexia.[1] GBS spectrum disorders in children are a group of autoimmune diseases that damage the central and/or peripheral nervous system. The exact cause and development process of GBS are not entirely understood, but they are thought to be related to infections and immune system abnormalities. Anti-perineurial surface glycolipid antibodies, including anti-ganglioside and anti-sulfatide antibodies, are significant biomarkers for diagnosing GBS spectrum diseases.[2] This case report described the diagnosis and treatment of child with anti-sulfatide antibody-related GBS.

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Case Presentation

A 7-year-old girl was admitted to the hospital with a 12-day history of headache and abdominal pain and a 4-day history of limb numbness and pain. She had symptoms of a cold, such as a low fever and itching, treated with cetirizine. Despite slight improvement in itching, her other symptoms persisted. Brain CT revealed dilatation of the temporal horn, lateral ventricle, third ventricle, and fourth ventricle. Abdominal ultrasound showed no abnormalities. Patient had a history of milk protein allergy and a previously operated suprasellar cisterna cyst. Physical examination showed normal psychomotor development, but had tenderness in the groin and lower limbs, absent deep tendon reflexes, and other signs of neurological dysfunction. Auxiliary examinations showed normal routine blood, biochemical, autoimmune, and etiological screening results, except for elevated Anti-Streptolysin O (ASO) levels (2320 IU/ml). Cerebrospinal fluid (CSF) analysis showed elevated protein levels (1687.6 mg/L) but normal cell counts and glucose levels. Electrophysiological studies indicated severe multifocal demyelination, especially in the lower limbs. Brain MRI showed prepontine cisterna and suprasellar cisterna widening and the dilatation of the fourth and third ventricles and bilateral lateral ventricles, especially the left lateral ventricle (Figure 1). The diagnosis of GBS was confirmed based on clinical, laboratory, and electrophysiological findings. Despite treatment with intravenous immunoglobulin (IVIG) (400 mg/kg × 5 days), nerve growth factor, and vitamins, patient's symptoms worsened, necessitating a second round of high-dose IVIG (1 g/kg) and mannitol for intracranial pressure reduction. Subsequent tests showed progressive increases in CSF protein levels of 3411.8 mg/L and positive serum anti-sulfatide IgM antibodies. MRI of the spinal cord showed no definitive abnormalities. The child experienced severe pain, heart rate fluctuations, hyperhidrosis, and persistent limb numbness. Adding prednisolone (1 mg/kg, gradually reduced after 1 week) to the treatment regimen led to significant improvement in muscle strength and symptom relief. After a month, CSF protein levels and serum anti-sulfatide IgM were significantly reduced, and her overall condition improved. Over a 10-month follow-up, she showed no paraesthesia or other symptoms, and her nerve conduction function returned to normal.

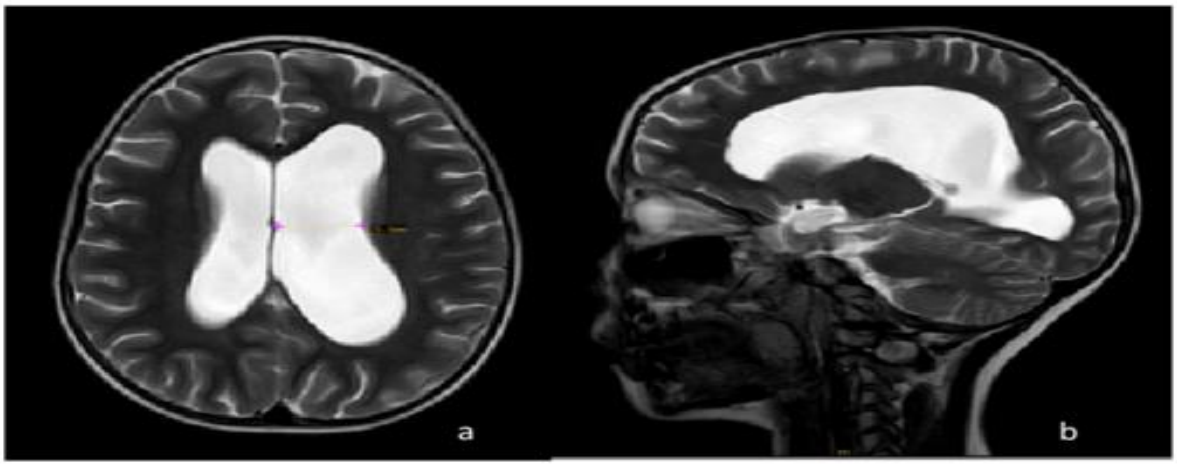

Figure 1. Brain MRI showing dilated ventricles, especially the left lateral ventricle

Discussion

GBS is an immune-mediated acute inflammatory peripheral neuropathy. Anti-sulfatide and anti-ganglioside antibodies play a crucial role in its pathogenesis. Sulfatide, an acidic glycolipid in peripheral nerve tissues, is vital for maintaining nerve sheath structure and function. The exact pathogenic mechanism of anti-sulfatide antibodies in inflammatory peripheral neuropathy was not fully understood. The patient's initial infection likely triggered the disease, consistent with known disease mechanisms. Her clinical manifestations included severe neuralgia, limb numbness, and autonomic dysfunction, which aligned with typical features of anti-sulfatide antibody-associated GBS. CSF protein-cell separation was a key feature of GBS, with protein content increasing within 2-4 weeks of onset. The patient's headache and hydrocephalus, rare complications in GBS, were likely due to elevated CSF protein levels affecting reabsorption. Despite initial IVIG treatment, significant improvement was seen only after the addition of steroids, suggesting that short-term low-dose steroid therapy may be beneficial in cases where immunoglobulin alone was insufficient.[2] In some patient's treatment for severe GBS includes short term application of glucocorticoids that may reduce the process of inflammation and edema in diseased tissues.[3]

Conclusion

Anti-sulfatide antibody-associated GBS in children is characterized by autonomic and peripheral sensory nerve changes, with pain and autonomic dysfunction as prominent symptoms. Muscle weakness may develop as the disease progresses. Ventricular dilatation and urinary calculi in this case suggest autonomic dysfunction's involvement in pain. When immunoglobulin therapy was ineffective, short-term low-dose steroid therapy might be a viable second-line treatment. This case highlighted the potential effectiveness of steroid therapy in anti-sulfatide antibody-associated GBS.

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