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Editorial Note: Special Edition

Updates in pediatrics

Huei-Shyong Wang*

Department of Pediatrics, Chang Gung Children's Hospital at Linkou, Taoyuan, Taiwan

Birthrates are falling rapidly and globally. Even before the COVID-19 pandemic, urbanization was driving population decline. However, the role of the pediatricians in the delivery of health care services is never over-emphasized. In this special issue of Recent Updates in Pediatrics, I as the guest editor for Biomedical Journal, invite experts from all over the world to update nine important issues in the pediatric care.

First, fecal microbiota transplantation (FMT), a new and adequate route to modify the microbial ecosystem in gastrointestinal tracts of the hosts, refers to the administration of intestinal microbes from a healthy donor into a recipient with the intent of modifying the recipient's intestinal microbiome. Intestinal microbiota is highly associated with human health and disease. The application of FMT ranged from *Clostridioides difficile* infection, inflammatory bowel disease, irritable bowel syndrome, refractory diarrhea, diabetes mellitus, metabolic syndrome, behavioral and neurologic diseases, including Parkinson disease, autism spectrum disorder in pediatric patients. Drs. Chen and Chiu have reviewed well for us [1].

The ketogenic diet (KD) is a high-fat, adequate protein, and low-carbohydrate diet, in which fat, instead of glucose, acts as a major energy source. The KD was introduced in early 20th century to mimic the biochemical changes associated with fasting and regained recognition as a potent treatment for pediatric epilepsy in the mid-1990s. Recent clinical and scientific knowledge supports the use of the KD in drug-resistant epilepsy patients [2]. The KD is also receiving growing attention as a potential treatment option for other neurological disorders, and malignancies, even acromegaly [3].

Brain stimulation is a critical technique in neuroscience research and clinical application. Traditional transcranial brain stimulation techniques, such as transcranial magnetic stimulation (TMS), transcranial direct current stimulation (tDCS), and deep brain stimulation (DBS) have been widely investigated in neuroscience for decades. However, TMS and

tDCS have poor spatial resolution and penetration depth, and DBS requires electrode implantation in deep brain structures. Second-generation brain stimulation techniques that mainly rely on acoustic, electronic, optical, and magnetic signals, such as focused ultrasound, temporal interference, near-infrared optogenetic, and nanomaterial-enabled magnetic stimulation, offering prospects for neuromodulation may pave the way for brain disorder therapy [4]. DBS has become available as an alternative treatment option to reduce symptomatic seizures already. The review by Michael Wong and his colleagues discusses the clinical use and mechanisms of action of responsive neural stimulation and DBS in the treatment of drug resistant epilepsy and highlight recent advances [5].

Adenovirus has been introduced for decades as vectors for the development of new vaccines and gene therapy. I invited Dr. Hsieh to review the adenovirus for us [6]. Human adenoviruses can cause infections at any age but mostly in children. By the time of 10 years of age, most children have had at least one episode of adenovirus infection. Adenoviruses can cause many symptoms similar to common cold, including rhinorrhea, fever, cough, and sore throat. Lower respiratory infections such as bronchitis, bronchiolitis, and pneumonia can be severe and even fatal. Other adenoviral diseases include conjunctivitis, gastroenteritis, cystitis, myocarditis, cardiomyopathy, and meningoencephalitis. A variety of recent advancement of structural and molecular biology methods have revamped the taxonomy of adenoviruses and furthered our understanding of the diversity of related clinical diseases.

Coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2, has affected billions of people globally. In children, COVID-19 infection appears to be associated with mild respiratory symptoms; however, serious neurological complications may occur in conjunction with multisystem inflammatory syndrome. A wide spectrum of neurological diseases has been

* Corresponding author. Department of Pediatrics, Chang Gung Children's Hospital at Linkou, 5, Fusing St., Gueishan, Taoyuan 333, Taiwan.

E-mail address: wanghs444@cgmh.org.tw.

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observed in children with COVID-19 infection including encephalitis, acute necrotizing encephalopathy, acute disseminated encephalomyelitis, cytotoxic lesion of the callosal splenium, posterior reversible encephalopathy syndrome, venous sinus thrombosis, vasculitis and infarction, Guillain–Barré syndrome, transverse myelitis, and myositis. This review contributed by Dr. Huang and his colleagues describes the characteristic magnetic resonance neuroimaging features of these diseases and their differentiations from other imaging mimics [7].

Sepsis remains a major cause of morbidity and mortality among children. Resuscitation based on hemodynamics can provide objective values for identifying the severity of sepsis and monitoring the treatment response. Previous therapeutic guidance of early-goal directed therapy, which resuscitated based on the basic hemodynamics has lost its advantage. Optimization of advanced hemodynamics, such as cardiac output and systemic vascular resistance, has now been endorsed as better therapeutic guidance for sepsis. Dr. Hsia and his colleagues summarized the contemporary techniques for hemodynamic monitoring, listed important hemodynamic parameters related to outcomes, and updated evidence-based therapeutic recommendations for optimizing resuscitation in pediatric septic shock [8].

Magnesium (Mg²⁺), an important intracellular cation and essential to maintain cell functions including cell proliferation, immunity, cellular energy metabolism, protein and nucleic acid synthesis, and regulation of ion channels was reviewed by Dr. Tseng and his colleagues [9]. Consequences of hypomagnesemia affecting multiple organs can be in overt or subtle presentations. Renal hypomagnesemia can be caused by an increased glomerular filtration and impaired reabsorption in proximal tubular cells, thick ascending limb of the loop of Henle or distal convoluted tubules. A combination of renal Mg²⁺ wasting, family history, age of onset, associated features, and exclusion of acquired etiologies pointing to inherited forms of renal hypomagnesemia. Based on clinical phenotypes, its definite genetic diagnosis can be simply grouped into specific, uncertain, and unknown gene mutations with a priority of genetic approach methods.

Air pollution is a global issue that threatens the health of human beings. Epidemiologic reports have shown air pollution exposures to result in millions of deaths annually. Infants and children, in the active periods of organ and lung development, are most susceptible to these environmental hazards; as a result, the risks of respiratory diseases increased after air pollution exposure. These pollutants can originate from indoor and ambient environment, presenting as vapor or

particles, and differ in chemical compositions. Dr. Lai and his colleagues review it well for our readers [10].

Ventriculoperitoneal shunt implantation saved many children and adults with hydrocephalus. However, overdrainage of cerebrospinal fluid is one of its complications, especially in the growing children. Siphon effect plays a major role in the development of overdrainage. Various overdrainage-preventing devices have been invented to counteract the siphon effect. Though some of the devices are designed to reduce the flow instead of providing antisiphoning effect, they are generally called antisiphon devices (ASDs). The review of mechanisms of various ASDs done by Dr. Kuo and her colleagues provides a useful reference for clinical practice [11].

I hope all readers of the Biomedical Journal, especially the ones who are taking care of the children, will enjoy this special issue.

REFERENCES

- [1] Chen CC, Chiu CH. Current and future applications of fecal microbiota transplantation for children. *Biomed J* 2022;45:11–8.
- [2] Ko A, Kwon HE, Kim HD. Updates on the ketogenic diet therapy for pediatric epilepsy. *Biomed J* 2022;45:19–26.
- [3] Coopmans EC, Berk KAC, El-Sayed N, Neggers SJMM, van der Lely AJ. Eucaloric very-low-carbohydrate ketogenic diet in acromegaly treatment. *N Engl J Med* 2020;382:2161–2.
- [4] Liu X, Qiu F, Hou L, Wang X. Review of noninvasive or minimally invasive deep brain stimulation. *Front Behav Neurosci* 2022;15:820017.
- [5] Foutz T, Wong M. Brain stimulation treatments in epilepsy: basic mechanisms and clinical advances. *Biomed J* 2022;45:27–37.
- [6] Shieh WJ. Human adenovirus infections in pediatric population - an update on clinico–pathologic correlation. *Biomed J* 2022;45:38–49.
- [7] Wong AMC, Toh CH. Spectrum of neuroimaging mimics in children with COVID-19 infection. *Biomed J* 2022;45:50–62.
- [8] Lee EP, Wu HP, Chan OW, Lin JJ, Hsia SH. Hemodynamic monitoring and management of pediatric septic shock. *Biomed J* 2022;45:63–73.
- [9] Tseng MH, Konrad M, Ding JJ, Lin SH. Clinical and genetic approach to renal hypomagnesemia. *Biomed J* 2022;45:74–87.
- [10] Wu IP, Liao SL, Lai SH, Wong KS. The respiratory impacts of air pollution in children: global and domestic (Taiwan) situation. *Biomed J* 2022;45:88–94.
- [11] Huang AP, Kuo LT, Lai DM, Yang SH, Kuo MF. Antisiphon device: a review of existing mechanisms and clinical applications to prevent overdrainage in shunted hydrocephalic patients. *Biomed J* 2022;45:95–108.