JUNE 2024
Volume 28 - Issue 2

CAPE News

Newsletter of
The Indian Society for Pediatric and Adolescent Endocrinology (ISPAE)

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EDITOR'S MESSAGE

Dear Readers,

It is a pleasure to release this issue on Bone and Calcium disorders. The issue covers articles related to endocrinology and allied specialties like orthopedics, neurology and nephrology that affect bone health. We hope this issue will be found enjoyable and informative.

The IDEAL team proudly announces ISPAD's endorsement of IDEAL! This is a big achievement for the hardworking team and faculty of IDEAL. The growing numbers of activities by our dear members, including BEST and ACES, is also rewarding.

Team ISPAE eagerly awaits welcoming you all to New Delhi for APPES 2024. The details of registration and the scientific program can be found at https://appes2024.org We look forward to meeting you at this academic feast.

Hope you enjoy reading this issue! The next issue will be on **Adrenal disorders and DSD**.

Best wishes,

Aashima Dabas

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MESSAGE FROM THE ISPAE PRESIDENT

Dear friends,

It's a pleasure to meet you through yet another issue of CAPE NEWS.

These years of growth of ISPAE & CAPE NEWS have been phenomenal. We had yet another successful quarter with several successful programs around the country.

Our focus for this issue has been on several endocrine aspects of bone. The content in the newsletter is interesting and provides recent updates on many topics.

The ISPAE Pediatric Endocrine Fellowship is a coveted training course with predefined eligibility and exit criteria and a structured curriculum. A few centers are already offering the course, and a few more centers are likely to start the program. This will help us spread our wings across the country to train more students and improve healthcare for children with endocrine issues.

APPES-ISPAE 2024 joint meeting is just around the corner. We hope to meet all of you there to enhance the program.

We are sure that our members will enjoy this issue curated by the fabulous Editorial team.

Best regards,

Ahila Ayyavoo on behalf of the ISPAE-EC 2023-24.

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WELCOME NEW ISPAE MEMBERS

LIFE MEMBERS	
• Dr Sukrutha Surandran, Kerala	• Dr Biswajit Sahoo, New Delhi
• Dr Umesh Garg, Agra	• Dr Akshata A, Bengaluru
• Dr Mampy Das, Shillong	• Dr Smitha Sankal, Bengaluru
• Dr Dolly Madan, New Delhi	• Dr Sukla Samaddar, Kolkata
• Dr Shradha Zutshi, New Delhi	• Dr Bhakti Katariya, Nashik
• Dr Lakshmi Priya TR, Lucknow	• Dr Meena Singh, Dhanbad

WINNER- March 2024 Quiz

Answers have been emailed individually to all those who have attempted.

Congratulations to the first three winners :

1) DR SHAMKIRAN- Pediatric Endocrinologist, Sparsh hospital. Bangalore

2) DR MOUMITA SAHA- Pediatric Endocrinologist, CMC Vellore

3) DR AKSHATHA A- Fellow in Pediatric Endocrinology, IGICH, Bangalore

News

- Dr Tejasvi Sheshadrijoined as Consultant,Pediatric Endocrinology, at Rainbow Children's Hospitals, Bangalore
- Dr Jahnavi Muralikrishnan joined as Senior Specialist,Pediatric Endocrinology, Aster Hospital, Bangalore
- DrSruti Shastri joined as Consultant,Pediatric Endocrinology, Aster Hospital, Bangalore.

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GROWTH MODULATION: THE BASICS

***Joyance James**, Clinical Fellow, Pediatric Orthopedics, Orthokids Clinic;*
***Maulin Shah**, Consultant Pediatric Orthopedic Surgeon, Orthokids Clinic, Ahmedabad.*

The knee undergoes physiological changes in the coronal/frontal plane from birth till about the age of 7 years. There is genu varum at birth, which is usually corrected to neutral by 18 months, followed by genu valgum; finally, the adult knee alignment is attained by 7 years. Any exaggeration of these physiological varus or valgus alignments due to nutritional deficiencies, metabolic causes or congenital limb deficiencies, may need surgical intervention to correct the limb alignment.

Growth modulation is a surgical method in which the residual physeal growth potential around the knee is harnessed to correct the varus/valgus deformity. Distal femoral physis & proximal tibial physis growth is guided by slowing down (hemi-epiphysiodesis) the medial physeal growth for genu valgum, and lateral physeal growth for genu varum: this results in gradual correction of the limb alignment as the child grows. This procedure is different from conventional surgical osteotomy.

Comparison of the two methods to treat coronal plane knee deformities

	Conventional Method (Osteotomy)	Growth Modulation
Procedure	Osteotomy and acute correction of deformity + plating/ gradual correction with Ilizarov fixator	8 plate or screw across the physis to give gradual correction
Prerequisite	After closure of physis	At least =12 months of physis growth
Incision	~15 cm lateral approach for plating	2 cm incision centred over physis for plate and percutaneous for screw
Post-op	Brace/ Cast, ambulation after 4-6 weeks	No bracing, immediate ambulation from next day
Rehab	Extensive physiotherapy and gait training	Minimal or no physiotherapy

Remaining residual growth potential of the physis is a prerequisite for the success of growth modulation, especially in the adolescent age group. The closure of the distal phalanges of the fingers, olecranon apophysis, and Risser 1 sign marks the end of significant lower limb growth. Hence, bone age and evaluation of residual growth before the procedure is important.

Preoperative work up includes a standing full-length radiograph (Scannogram) in which a mechanical axis of the limb is drawn, connecting the center of the femoral head to the center of the ankle joint, passing through the knee joint (**Figure 1**). In normal alignment, the mechanical axis passes near the center of the knee joint (zone I). Depending on the valgus or varus orientation, the axis can pass through zone II (outer half of the tibial plateau) or entirely outside the joint, i.e. zone III. In physiological genu varus, the axis usually passes through zone I; interventions are warranted when the axis passes through zone II/III (**Figure 2**).

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Figure 1: Scannogram

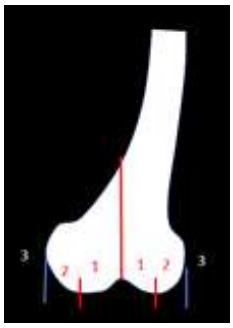
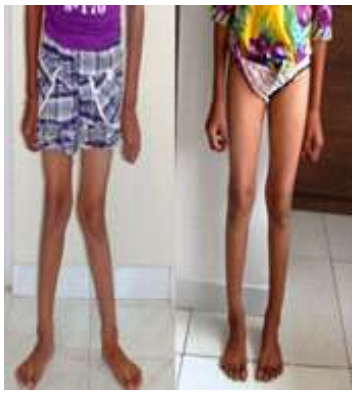


Figure 2: Line diagram of distal femur showing the zones I, II & III.



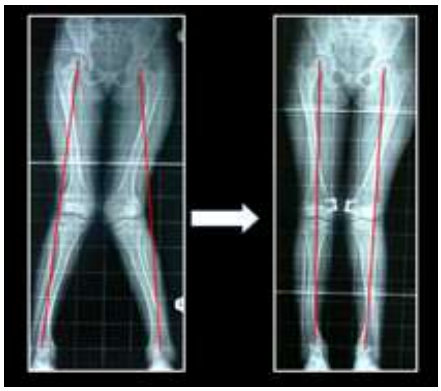


Figure 3: Growth modulation of Genu Valgum

Temporary hemi-epiphysiodesis can be achieved using various implants and methods. Staples across the physis had been used initially, currently tension band plates (8 plates) and percutaneous transphyseal screws (PETS) are being used. Both these procedures are minimally invasive, with quick resumption of ambulation and daily activities.

Figure 3 shows *Genu Valgum pre- and post-treatment Scannogram and clinical pictures. Growth Modulation was done with 8 plates across the medial distal femoral physis.*

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MUSCLE-BONE CROSS TALK IN DUCHENNE MUSCULAR DYSTROPHY

***Dhanya Soodhana**, Pediatric & Adolescent Endocrinologist, Aster MIMS, Kozhikode, Kerala*

Neuromuscular disorders are marked by a progressive deterioration of muscle fibers, resulting in decreased muscle strength, disability, and poor health-related quality of life. Skeletal health is usually compromised as a consequence of modified bonemuscle crosstalk, including biomechanical and bio-humoral issues, resulting in increased risk of bone fragility and fractures. Muscle Dystrophies (MDs) are a broad range of clinical, genetic, and biochemical disorders, of which Duchenne's Muscular Dystrophy(DMD) is the most prevalent and severe form.

Nutritional problems can result from feeding disorders and swallowing difficulties that further compromise bone health in DMD. Associated vitamin D insufficiency and calcium deficiency need to be corrected to improve bone health. Low levels of physical activity or immobility (neuromuscular weakness) may result in overweight or obesity, which further affects bone strength. Lastly, several disease-modifying medications like glucocorticoid therapy that are prescribed for DMDs frequently have deleterious effects on bone health.

The bone-muscle interaction includes several biological factors that could affect bone metabolism in DMD, independently of mechanical load. Myokines are particular molecules released by muscle tissue that may interact with bone in various ways. In pathological situations leading to muscle atrophy, myostatin, a member of the transforming growth factor-beta (TGF-β) superfamily, is a growth and differentiation factor that is strongly expressed in muscle. Contrarily, muscle contraction encourages the release of chemicals such as irisin, that protect the bone by increasing cortical bone thickness, and lower the risk of fragility fractures by stimulating osteoblasts and inhibiting osteoclast activity via the NFkB signaling pathway. The biomechanical interaction between the muscle-bone unit is established. Recently, both tissues were also determined as secretory endocrine organs affecting the function of one another.

DMD is characterized by progressive muscle weakness that begins in childhood; the ambulatory capacity is compromised by adolescence. Physical rehabilitation provides these individuals with supportive therapy, using an interdisciplinary approach. The primary focus is on endurance training, balance control, coordination, cardiovascular exercises, and functional tasks to assist with their independence. This inturn increases their bone strength and reduces the risk of pathological fractures.

a. *Strength training* - Strengthening the biceps brachii, triceps, quadriceps, hamstrings, and gastro-cnemius muscles will enable the child to do a variety of activities such as walking, sitting, and standing. During strength-training sessions, activities such as descending stairs and trampoline exercises should be avoided, to lessen the chance of aggravating muscular strain or damage.

b. *Endurance and functional training*- They include both anaerobic and aerobic workouts. Walking on a treadmill helps improve balance and coordination. Cycling is an aerobic exercise that activates rhythmic lower limb muscles akin to walking.

c. *Aquatic exercises*- For children with altered muscle tone, balance or motor control deficits, or severe contractures, exercises in a pool are helpful. Warm water enables children with muscular dystrophy to perform muscle stretches, exercises, and function-based and play activities that they would otherwise be unable to do on dry land.

d. *Respiratory rehabilitation*- Obstructive sleep apnea (OSA) and hypoventilation become more prevalent as the illness worsens. Inspiratory muscle strengthening increases the volume of air entering the lungs, while expiratory muscle strengthening increases the velocity of air exiting the lungs. Strengthening the inspiratory muscles, either directly or indirectly through the training of the expiratory musculature, can help to delay the requirement for assisted ventilation incases of hypoventilation.

Additional considerations for Bone Health

- Laboratory tests, including serum calcium, phosphorus, alkaline phosphatase (ALP), 25(OH)D, and parathyroid hormone (PTH) are recommended, both at the time of diagnosis and annually. Care is needed with maintaining temperature in collecting the sample for PTH.
- A lateral thoracolumbar spine x-ray should be obtained to evaluate vertebral fractures in the event of referred low back pain, recent trauma history, or spine BMD Z-score reduction >0.5 SD in serial follow-up.
- Dual-Energy X-ray Absorptiometry (DXA) to assess bone mineral density (BMD) and bone mineral content (BMC), should be performed every 12 months in children on glucocorticoids,

or every 2-3 years if without glucocorticoids, for screening osteoporosis.

- Intake of a balanced, calcium-rich diet is strongly suggested, with a calcium intake of at least 1,000-1,300 mg/day in patients aged 918 years. The recommended dose of vitamin D is at least 400 IU/day for infants, and 600 IU/day in older children.
- Bisphosphonates are routinely used to treat low bone mineral density in patients with DMD, and are started after the first pathological fracture. Bisphosphonates increase the areal lumbar spine BMD Z score in patients with DMD and glucocorticoid-induced osteoporosis.
- Denosumab (human IgG2 monoclonal antibody) and teriparatide (recombinant human PTH) are other options that are under consideration.

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OSTEOGENESIS IMPERFECTA - ADVANCES

***Aaradhana**, Associate Professor, Dept of Pediatrics, University College of Medical Sciences, Delhi*

Osteogenesis Imperfecta (OI) is a systemic connective tissue disorder characterized by low bone mass and bone fragility causing significant morbidity due to pain, immobility, skeletal deformities and growth deficiency.

Advances in Genetics: Next-generation sequencing technology, including expanded gene panels and exome or genome sequencing, has identified the genetic aberrations in OI. The targeted panels enable rapid screening of genes associated with OI, but may not be able to detect variants in novel genes. Clinically, different forms of OI share similar features that include connective tissue and systemic manifestations, in addition to bone fragility.

COL1A1 and *COL1A2* genes constitute the maximum proportion of mutations in OI with more than 20 other genes associated with the disease

Genes groups based on their roles in collagen production	**Genes**
Group A: Collagen synthesis, structure and processing	*COL1A1, COL1A2*
Group B: Defects in collagen modification	*BMP1, FKBP10 (FKBP65), P4HB, PLOD2(LH2), SEPINH1(HSP47)*
Group C: Defects in collagen folding and cross-linking	*CRTAP, P3H1(LEPRE1), PPIB(CYPB)*
Group D: Compromised bone mineralization	*IFITM5, PLS3, SRPINF1(PEDF)*
Group E: Defects in osteoblast differentiation and function	*CREB3L1(OASIS),LRP5,MBTPS2,MESD,SEC24D,SP7(OSX),SPARC, TMEM38B,WNT1*
Unclassified	*CCDC134, TENT5A*

Advances in treatment of OI

Drug	Mechanism of action	Side effects	Current status
Nitrogen-containing bisphosphonates- Pamidronate, Alendronate, Risedronate, Zoledronic acid	Inhibition of osteoclast activity and induction of osteoclast apoptosis improve bone mass and architecture, and to some extent, reduce fracture risk	Acute phase infusion reaction, myalgia, transient hypocalcemia, osteonecrosis of jaw (never reported in children.	Mainstay of treatment. Improves bone mass and architecture, and reduces fracture risk
Denosumab - human monoclonal antibody that targets receptor activator of nuclear factor kappa-B ligand (RANKL)	RANKL is a cytokine that mediates osteoclastogenesis and osteoclast survival, inhibits osteoclast activity to suppress bone resorption.	Rebound increased bone turnover and hypercalcemia upon discontinuation of treatment. Hypocalcemia,osteonecrosis of jaw, atypical hip fractures	Currently, data limited regarding clinical use of denosumab in OI
PTH analogues *Teriparatide* (recombi-nant human PTH 1–34) *Abaloparatide* (synthetic analogue of PTH related peptide)	Osteo-anabolic therapies are targeted to increase osteoblast activity and bone formation	Pre-clinical studies in rats that received high-dose PTH 1–34 treatment raised concerns for risk of osteosarcoma	Only approved for use in adults with osteoporosis;experience in OI is limited.
Sclerostin-inhibitory antibodies (SclAb/Romosozumab, Blosozumab)	Target sclerostin, a glycoprotein that inhibits bone formation via inhibition of canonical Wntsignaling pathway in osteoblasts	Nasopharyngitis, arthralgia, injection-site reactions (pain,erythema),headache, cardiovascular side effects	Data not available yet regarding safety and efficacy in OI
Anti-TGFβ antibody.	Targets mechanistic basis of type I collagen and matrix abnormality that underlie bone fragility in OI	Mild bleeding e.g., epistaxis	Clinical trial is currently ongoing to evaluate the safety and efficacy of TGF *β* inhibition in adult OI patients
Cell and gene therapy	Aims to correct the genetic defect. AAV vectors and CRISPR/Cas9 gene editing under trial		Ethical and safety concerns; are still considered experimental
Growth hormone	To address growth deficiency and its potential anabolic effect in bone.	Arthralgia, edema, benign intracranial hypertension, progression of scoliosis, and slipped capital femoral epiphysis.	Not enough data to support its use in the treatment of OI. Currently this approach is not in standard clinical use

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PEDENDOSCAN

Liu J, Lin X, Sun L, et al. Safety and Efficacy of Denosumab in Children With Osteogenesis Imperfecta-the First Prospective Comparative Study. J Clin Endocrinol Metab. 2024;109(7):1827-1836

This trial compared the efficacy of two doses of Denosumab (6 monthly) with a single dose of Zoledronic acid in children with OI (randomized as 42 in each group). The doses were adjusted for age and weight, respectively. At the end of 12 months,BMD was significantly higher than baseline in both groups. The increase in aBMD in the denosumab group was lower than in the zoledronic acid group at femur neck and total hip ($p<0.05$). Rebound hypercalcemia was a major side effect with denosumab, with hypercalcemic crisis seen in 6 patients. Serum ALP levels significantly decreased at 12 months from baseline in both groups, PTH decreased in the denosumab group and β-CTX decreased in the zoledronic acid group.

BONE DENSITOMETRY- Key Points

Richa Arora, *Consultant Pediatric Endocrinologist, Child Clinic & Endocrine Center, New Delhi*

Dual-energy X-ray absorptiometry (DXA) is a widely available and clinically useful tool in the evaluation and management of adult and pediatric bone diseases. Indications for DXA in children [1]:

SECONDARY OSTEOPOROSIS	PRIMARY OSTEOPOROSIS
• Systemic long-term steroids, anti-epileptics, chemotherapy • Endocrine disorders- hypogonadism, Cushing syndrome, adrenal insufficiency • Prolonged immobilization, anorexianervosa • Chronic systemic diseases – Neuromuscular, hematological, systemic autoimmune, lung, renal	• Osteogenesis imperfecta • Idiopathic juvenile osteoporosis • Osteolytic forms- RANK overactivation, OPG deficiency

It is important to note that DXA would be inappropriate for children with skeletal pain, chronic disease and traumatic fractures without any of the additional risk factors listed above. The term osteoporosis should be avoided in children; instead, '***low bone mineral density'*** (BMD) should be used.

Challenges in interpretation

- The result of a DXA examination is both a number and a diagnosis, and the result should be interpreted keeping both in mind.
- There are difficulties in scan interpretation because DXA is an areal, rather than volumetric, density measurement.
- The growing skeleton has an impact on follow-up measurements.
- There is a lack of consensus regarding which of the patient demographic and physiologic factors should be incorporated into normative databases.
- There is a yet to be determined prognostic value of pediatric DXA with regard to fracture risk or peak BMD [2].

Key points

- The sites selected for BMD analysis in children should be lumbar spine (LS) and total-body-less-head (TBLH).
- The height Z-score should be adjusted for interpretation of LS and TBLH DXA in short children.
- The measurements at the proximal femur and 1/3 radius can be used in those who have limited options of scanning the LS or TLBH. Lateral distal femur DXA is an option for non-ambulatory children with increased risk of fragility fractures in the lower limbs. In all these sites, it is essential to have local reference data to interpret DXA values.
- World Health Organization's DXA-based definitions of osteopenia and osteoporosis are in terms of T-scores, T<−1.0 and T<−2.5, respectively [3]. T-score (comparison of the current Z-score with peak adult BMD) is used in interpretation of DXA in adults. It should not be included in apediatric DXA report, as the T-score is a measure of bone density *loss* since early adulthood: it's use in children, whose BMD has yet to peak, will always yield a low result.
- Smaller bones will have lower aBMD than larger bones as measured with DXA, even when the vBMD is the same, because of limitations of the areal bone density technique.

An abnormal BMD Z-score should lead to evaluation of confounding patient factors that influence BMD, including height, weight, and physiologic maturity, before a diagnosis of low bone density is made. The report should include the DXA equipment and software algorithm used (pediatric or adult, low bone density or standard), the source of the normative reference data, the Z-score (not the T-score), and an impression giving a clinical context for the result. The diagnosis of “low bone density” does not rest solely on the DXA numeric result, and the report should indicate which patient factors were incorporated into the final impression. Comparison should be made with previous studies, if any, to ensure consistency of positioning and region selection. In addition, changes in the patient's height, weight, and Tanner stage should be noted.

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RECOMMENDATIONS- DIETARY REQUIREMENTS OF CALCIUM AND VITAMIN D (NATIONAL INSTITUTE OF NUTRITION 2024)

***Archana Hazra**, Dept of Pediatric Endocrinology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow*

Pregnant ladies, Newborns and Infants:

- Maintaining adequate calcium and vitamin D during pregnancy and lactation in the mother is important for proper formation of bones and teeth of the baby, and also to prevent osteoporosis in the mother.

- Recommended dosage of iron-folic acid and calcium supplements must be taken after the first trimester and should be continued through lactation.
- A minimum of 400 ml of dairy products are required by the mother.

Older children and Adolescents:

- **RDA of calcium** 850-1050mg/day, but it is desirable to consume higher amount of calcium to achieve optimal peak bone mass.
- Adequate amount of dairy should be consumed by older children and adolescents to fulfil their high calcium requirements.
- The dietary sources of high calcium and vitamin D are shown in the **Box** below.
- Regular exercise should be encouraged for strengthening of bones and reduction of calcium loss.
- Adequate sunlight exposure (about for 30 minutes, preferably between 11 am to 2 pm) helps to maintain good vitamin D levels.

High Calcium content(per 100 gm raw weight)	High Vitamin D content(per 100 gm raw weight)
Milk products (755 mg); Fish and Sea foods (323 mg); Green leafy vegetables (279 mg); Nuts (212 mg); Milk (128 mg); Pulses (102 mg)	Dry spices (19 ug); Nuts (9 ug); Pulses (8.7 ug); Cereals (6.8 ug); Millets (6.1 ug)

PATIENT CORNER

GROWTH MODULATION

Maulin Shah, *Consultant Pediatric Orthopedic Surgeon, Orthokids Clinic, Ahmedabad;*
Ruchi Shah, *Consultant Pediatric Endocrinologist, EndoKids Clinic, Ahmedabad*


*(This story is an abbreviated English translation of one of the stories from Dr Maulin Shah's book 'Surgeon Ni Samvedana'. In this and his 2nd book, 'Surgeon Ni Safar', he has compiled his journey and experiences as a pediatric orthopedic surgeon in various short stories, written in Gujarati. *The names are modified for print version).*

It was the first time in my life that I got a call to attend my patient's wedding. I couldn't help but recall my first encounter with the family, coming from far, with mother and two daughters in burkhas. The elder one, 8 years old, very shy, Kh*, had severe bilateral genu valgum, secondary to nutritional vitamin D deficiency. I offered them surgery it was a long procedure, requiring prolonged hospitalization, bed rest and most importantly, a long scar. Father, MB*, was not ready for this. With sadness, the family exited my consulting room.

In 2007, we didn't have any other options to correct such major deformities in the bones. Children with such deformities had to undergo 2 surgeries: first to correct the deformity and put the plate inside, and the second one after a year to remove the plate. After the first surgery, the child needed a cast for 2-3 months till the bone healed.

In 2008, I travelled to Canada for my advanced fellowship in Hospital for Sick Kids. One day, my mentor, Dr William Cole gave me a research article by Dr Peter Stevens, who had devised the 'growth modulation' surgery. With this technique, the deformity is corrected using the growth potential of the child's bone, without creating a fracture surgically. I got reminded of Kh and other children like her who had such deformities. After returning from Canada, I called MB at once.

The next morning, I found the entire family in my consulting chamber. The deformity had worsened. I explained 'growth modulation' as a procedure in which a small stapler-like clip is applied across the growth plate, to slow the growth of the bone on one side, while the opposite side continues to grow. This results in gradual correction of the deformity. The main advantages of this procedure were that it did not require surgical fracturing of the bone and fixation with plate, nor post-operative cast application. The child could be made to walk the next morning after the surgery and could re-join school after a week. The scar would be as small as a finger-breadth. The next week, Kh underwent growth modulation on both her knees. They followed up every 4 months, and approximately around 1 year after the procedure, her legs were straight again. We removed the small clips from her knees.

That day, the 8-year-old had turned into a 22-years-old young lady. Small inventions in the medical fraternity make a huge difference in the lives of the patients. I have witnessed this many times and I am grateful to God for this opportunity.

DRUG CORNER

USE OF RECOMBINANT PARATHORMONE IN CHILDREN

Medha Mittal, *Associate Professor, Dept of Pediatrics, Chacha Nehru Bal Chikitsalaya, Delhi*

For most hormone deficiencies, replacement of the deficient hormone is the usual practice, but that is not the case with hypoparathyroidism. The conventional treatment of hypoparathyroidism involves treatment with calcium supplements, along with active vitamin D analog, aiming to keep serum calcium in the low normal range, while avoiding hypercalciuria. The calcium supplements are administered with meals so that they act as phosphate binders, and phosphate containing foods are avoided.

The use of synthetic parathyroid hormone (PTH) injections was first reported in adults in 1996, and in children in 2006; since then, a number of reports have documented its successful use in children [1]. Two forms of PTH are available. PTH(1-34) (Teriparatide) contains the first 34 amino-terminal amino acids of the molecule, that are responsible for binding to the receptor and the effects; PTH(1-84) is the full- length recombinant molecule. PTH(1-34) has been extensively researched in adults and children, while there is only one report using PTH(1-84) in children [2]. An FDA warning against use of PTH in children where epiphyses are open, has been a matter of debate. The warning is based on animal studies that used very high doses(75-150 g/kg/day) and reported development of osteosarcoma. The cost of the therapy is also much more than the conventional therapy; in addition, the formulation being injectable limits its use.

The International Task Force on Hypoparathyroidism recommends PTH replacement in adults who are not adequately controlled on conventional therapy and have symptomatic hypocalcemia, or hyperphosphatemia, or renal insufficiency, or hypercalciuria, or poor quality of

life[2]. It may also be considered in those who are not able to tolerate very high doses of calcium and/or active vitamin D or have malabsorption.

For the pediatric age group, the Task Force suggests PTH may be considered in cases where conventional therapy is not effective or practical. Trials using rhPTH(1-34) have reported good results in children, with use of twice daily doses resulting in improved calcium status. Continuous subcutaneous infusion of rhPTH had better results. Infusion doses of 0.5-2 g/kg/day normalized serum calcium within 48 hours, and conventional therapy could be weaned off. Compared to twice daily doses, PTH when administered by infusion required lower doses and had lesser fluctuations of calcium and phosphate levels. No adverse events were noted even after continuous use over 8 years [3]. Close monitoring of serum and urinary calcium, as well as periodic ultrasounds, are essential.

Long term studies are needed to answer further safety concerns and address optimum dosage needs to attain physiological PTH levels and calcium phosphate homeostasis.

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CASE REPORTS

A RARE CASE OF HYPOCALCEMIA ASSOCIATED WITH UTEROVAGINAL APLASIA

Amritha M Govind[1], Dhanya Soodhana[2], Vijayakumar M[3]

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The 22q11.2 deletion syndrome, known as DiGeorge syndrome, presents with anomalies of the cardiovascular system (74%), craniofacial and palate anomalies (69%), hypoplasia/aplasia of the thymus (77%), developmental delay or learning disabilities (70%), or hypocalcemia associated with hypoparathyroidism (50%)[1].

A 12-year-old girl presented with multiple episodes of painful spasms of both the hands and calf muscles for 3 years. She had documented low calcium levels during these episodes, that were treated with oral calcium supplements. Parents reported poor scholastic performance and learning disability. On examination, weight was 30kg (-1.34 SDS), height 125 cm (-3.2 SDS), BMI 19.2 kg/m^2 with stage 2 puberty. She had an elongated face, bulbous tip of the nose, a long philtrum, and right sided inguinal hernia.

Investigations showed low serum calcium (7.0 mg/dL), low ionic calcium (0.6 mmol/L), high phosphorus (6.5 mg/dL), and low parathyroid hormone (7.68 pg/mL), suggestive of hypoparathyroidism. In view of the facial features, we suspected a syndromic cause; echocardiography revealed a bicuspid aortic valve; ultrasonography of the pelvis showed a hypoplastic uterus, ovaries could not be visualized. Karyotype was 46,XX with polymorphic variant of chromosomes 1 and 14 that is considered a normal variation. Genetic testing revealed a heterozygous microdeletion of size [2318 KB] on chromosome 22, which was likely pathogenic. Her calcium levels stabilized on oral calcium and active vitamin D supplements.

Discussion: We describe the case of a young girl diagnosed with Di George syndrome at age 12y. The average age of diagnosis varies from 0 to 33 years [2]. Typically, the diagnosis is made in early childhood, but may get delayed in the absence of characteristic symptoms, such as diagnosed hypocalcemic tetany, hemodynamically significant heart disease, or obvious cleft palate.

With latent hypoparathyroidism, PTH is secreted in quantities that are enough to maintain normal calcium and phosphorus concentrations under normal circumstances. However, during periods of increased demand for calcium, such as during puberty, its secretion becomes insufficient, which contributes to symptomatic hypocalcemia.

In an uncommon presentation, six girls with 22q11.2 deletion have been reported with uterovaginal aplasia or Mayer-Rokitansky-Kuster-Hauser syndrome. These children present with primary amenorrhea despite normal female karyotype and normal secondary sexual characteristics [3]. It is important to suspect syndromic causes of hypocalcemia and perform a complete systemic evaluation in such cases.

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PYCNODYSOSTOSIS: ARare Case of Dense Bone Disease

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Pycnodysostosis (Greek: *pycnos* = dense; *dys* = defective; *osteon* = bone), also called Toulouse-Lautrec Syndrome, is a rare genetic disorder, first described in 1962 by Maroteaux and Lamy [1]. It is inherited in an autosomal recessive manner,with an estimated incidence of about 1.7 per 1 million births, with no sex predilection. It is caused by mutations in the cathepsin K (*CTSK*) gene, located on chromosome 1q2, which regulates the activity of enzyme Cathepsin K, responsible for osteoclast-mediated bone resorption. This is a lysosomal enzyme predominantly found in osteoclasts, mutation of which causes the bones to become dense, sclerotic, brittle, and thus, prone to fracture [2]. Patients present with short stature, typical facial appearance (frontal bossing, prominent nose with convex nasal ridge, prominent eyes with blue sclera, midface retrusion, high arched palate, small jaw due to hypoplasia of maxilla and mandible), persistently open anterior

fontanelle, dental anomalies (delayed eruption of teeth, persistence of deciduous teeth resulting in a double row of teeth, hypodontia), dysplastic, grooved and flat nails [3].

We describe an 8y9moboy, third-born to a second-degree consanguineous marriage, who presented with complaints of inadequate gain in height and weight since age 2 years. He had past history of fracture of right lower limb at the age of 5 years, which was conservatively treated. On examination, the child had dysmorphic facies with high arched palate, ankyloglossia, beaked nose, wide open anterior fontanelle, hypodontia, grooved, dysplastic nails, koilonychia, and short stubby hands. Weight was 13.6kg (z score -4.20), height 103.5cm (z score-4.56), BMI 12.81(z score -1.85), prepubertal, with normal systemic examination.

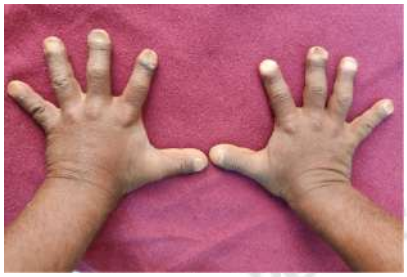

Figure : Brachydactyly with dysplastic, grooved nails and characteristic drumstick appearance of terminal phalanges; Clinical picture showing the characteristic facial appearance

Laboratory evaluation revealed normal complete blood count, thyroid profile, serum calcium 9.8mg/dL, phosphorus 4.6mg/dL, ALP 171.4 U/L and vitamin D 34ng/mL. Based on the clinical findings, pycnodyostosis was suspected. Skeletal survey showed generalised increase in bone density, with diffuse osteosclerosis in all bones. The long bones had thickened cortex with narrow medulla (figure 2A). Lateral cephalogram showed hypoplastic nasal bones and paranasal air sinuses. The mandible was hypoplastic with gonial anglegrossly obtuse (flattened). The dorsolumbar spine showed spool-shaped vertebral bodies, prominent in the anterior aspect (figure 2B). The calvaria and skull base were thick, with persistent fontanelles, and wide-open lambdoid sutures (figure 2C). Acro-osteolysis of terminal phalanges of fingers was observed in both hands (figure 2D). Based on the clinico-radiographic findings, a diagnosis of Pycnodysostosis was made, and the child was advised genetic analysis.

There are no published standard treatment guidelines. Multidisciplinary team management with orthopedician, pediatric endocrinologist, dentist, genetic counsellor, and pulmonologist is essential for enhancing the quality of life. Treatment is individualised, based on the symptoms, and includes orthopedic intervention for fractures, growth hormone (GH) therapy in proven cases of GH deficiency to improve the final adult height, craniofacial/neurosurgical intervention for cleft palate, craniosynostosis, maxillary and mandibular hypoplasia, and orthodontic intervention, as required [3]. Affected individuals have normal cognitive development and life expectancy as the disease in itself is non-progressive, but complications like bone fracture and osteomyelitis may alter the prognosis.

A precise molecular diagnosis is crucial for providing a prognosis in cases where either the clinical and radiographic features are atypical or significantly overlap with other disorders. The differential diagnosis includes other similar sclerosing conditions of the bone like osteopetrosis (high bone density, hepatosplenomegaly, visual, hearing loss, anemia, cranial sutures are normal, and wormian bones are absent), osteosclerotic metaphyseal dysplasia (developmental delay, elevated urinary pyridinoline & deoxypyridinoline, raised serum alkaline phosphatase), dysosteosclerosis (brain abnormalities, progressive neurologic deterioration), idiopathic osteosclerosis (normal bone density and features like upturned nose, hypotelorism, acute

mandibular angle) and cleidocranial dysplasia spectrum disorder (abnormally shaped pelvic, pubic bones, absent clavicles, thoracic deformities)[2,3].

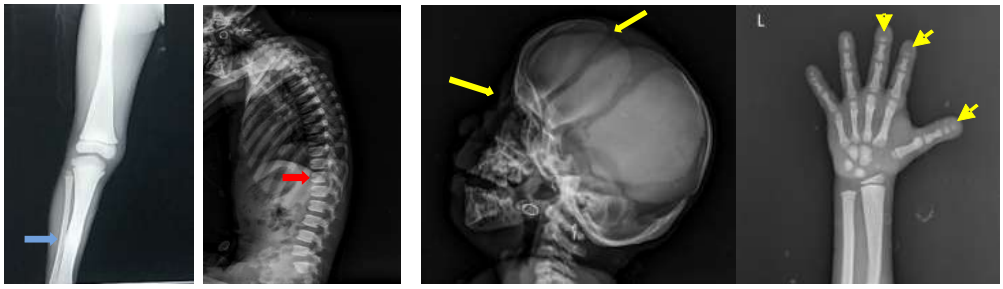

Figure 2A,B, C, D: X Ray showing healed fracture of tibia and calcified fracture with cortical thickening(blue arrow); Spool shaped dorsolumbar vertebral bodies (red arrow); X Ray skull lateral view showing wide opened anterior fontanel, non-pneumatized sinuses, hypoplastic paranasal air sinuses and nasal bone, thick cranial vault, open lambdoid suture (yellow arrow); hand showing dense brittle bones, acro-osteolysis of terminal phalanges(arrow)

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A CHILD WITH SHORT STATURE AND RICKETS- NOT TO MISS SIMPLE THINGS!

***Tejasvi Sheshadri**, Consultant Pediatric & Adolescent Endocrinologist, Rainbow Children's Hospitals, Bengaluru*

A 5.5 years old boy hailing from Yemen, second born to a third degree consanguineously married couple (birth weight 3 kg)presented to Endocrine Clinic with short stature noted after two years of age. There was no lethargy, dry skin, cold intolerance, weight gain, excessive thirst, headache, or visual disturbances. He had a significant past history of multiple admissions in the past 3 years for recurrent urinary tract infection. He was diagnosed with bilateral grade 5 vesicoureteral reflux (VUR) with scarred kidney and had undergone ureteric re-implantation 2 months back. His current weight and height were 10.25 kg (-4SDS) and 83 cm (-5.14 SDS), respectively. His sibling and parents had normal stature.

Examination revealed frontal bossing, pigeon chest, bilateral wrist widening and bilateral genu valgum suggestive of clinical rickets (**Figure**), later confirmed radiologically. He was also noted to have mid facial hypoplasia. The systemic examination was normal.

Thyroid function tests and morning serum cortisol were normal. Renal function tests were deranged (creatinine 2.2 mg/dL, urea 103 mg/dL). Serum calcium was low (7.7 mg/dL) with normal phosphorous (4.2 mg/dL), elevated alkaline phosphatase (797 U/L), elevated PTH (116 pg/mL), normal 25-OH Vitamin D (35 ng/mL), low hemoglobin (10.8g/dL). Bone age was retarded (3 years). Serum IGF-1 Levels were low (48.2ng/mL).

The child was diagnosed with chronic kidney disease (CKD) stage 3b, for which the Pediatric Nephrologist advised conservative management with oral calcium (1300 mg/day), calcitriol (0.25 mcg) and iron supplements. Follow up investigations done after 6 months showed decrease in creatinine (1.48 mg/dL), ALP and PTH levels, with improvement in the radiological features of metabolic bone disease (MBD). The patient fulfilled the criteria of Growth hormone deficiency secondary to CKD (height below 3rd centile with poor height velocity below the 25th percentile). Growth hormone therapy was initiated at 45 mcg/kg/day.

DISCUSSION: CKD-MBD can be described as a systemic disorder of bone and mineral metabolism secondary to chronic kidney disease. CKD is categorized as per severity from stage 1 to 5 (D- indicating need of dialysis). In children it is detrimental, resulting in fractures, skeletal deformities, and poor growth. The pathogenesis involves a complex interplay between the kidney, bone, and parathyroid glands. In the early stages of CKD, FGF23 levels increase while phosphate and PTH remain within the normal range. With progression of CKD, phosphate retention increases levels of the phosphaturic hormones, FGF23 and PTH. Elevated FGF23 levels further decrease 1,25D levels via renal 1α-hydroxylase. Decreased 1,25D levels reduce intestinal calcium absorption, which increases PTH, resulting in secondary hyperparathyroidism.

The following recommendations are suggested by the 2017 KDIGO Clinical Practice Guideline Update for the Diagnosis, Evaluation, Prevention, and Treatment of patients with CKD-MBD stage 3a to 5D.

- In patients with evidence of CKD-MBD and/or risk factors for low bone mineral density, BMD testing is suggested to assess fracture risk.
- Bone biopsy is suggested if knowledge of the type of renal osteodystrophy will impact treatment decisions.
- The treatments of CKD-MBD should be based on serial assessments of phosphate, calcium, and PTH levels, considered together.
- It is suggested to maintain phosphate levels toward the normal range (Dietary phosphate restriction, phosphate binders) and serum calcium in the age-appropriate normal range (calcitriol and vitamin D analogs may be considered).
- Those with persistent or worsening secondary hyperparathyroidism should be evaluated for modifiable factors, including hyperphosphatemia, hypocalcemia, high phosphate intake, and vitamin D deficiency.
- The mainstay of treatment of secondary hyperparathyroidism is active vitamin D sterols (calcitriol or its analogs), that should be initiated when serum PTH is above the target range for CKD stage, provided 25-OH vitamin D are >30 ng/mL, corrected total serum calcium is <10 mg/dL, and serum phosphate is within the age-appropriate range. The target range for PTH in CKD stages 2-3 is 35-70 pg/mL, and in CKD 4 is 70-110 pg/ml. In pediatric patients with CKD stage 5 (not on dialysis), active vitamin D sterols should be initiated when PTH is >300 pg/mL.
- A few cases with severe CKD and refractory to this therapy may need calcimimetics ± calcitriol/ vitamin D analogs, or subtotal parathyroidectomy to achieve lower PTH levels.
- Growth is impaired in CKD. Anemia, acidosis, reduced intake of calories and protein, decreased synthesis of vitamin D and increased PTH levels, hyperphosphatemia, renal osteodystrophy, changes in the GH-IGF and the gonadotropin-gonadal axis are implicated.

- Children with stage 3-5 CKD or on dialysis should be candidates for GH therapy if they have persistent growth failure- height below the 3rd percentile and height velocity below 25th percentile, once other potentially treatable risk factors for growth failure have been adequately addressed.
- In children who have received a kidney transplant and fulfil the above growth failurecriteria, GH therapy is recommended one year post-transplantation if spontaneous catch-up growth does not occur and steroid-free immunosuppression is not a feasible option.
- GH should be given in dosages of 0.045-0.05 mg/kg per day subcutaneously until the patient has reached their final height or until renal transplantation.

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LEARNING PEARLS

27TH ISPAE ACES MEETING: TURNER SYNDROME: 6 April

Prof Claus Gravholt, *Dept of Endocrinology & Molecular Medicine, Aarhus University, Denmark; and*
Dr Vaman Khadilkar*, Jehangir Hospital, Pune*

Compiled by ***Zalak Upadhyay****, Pediatric & Adolescent Endocrinologist, Endocare for Kids, Rajkot*

- Use Turner syndrome (TS) growth charts to plot growth. An Indian growth chart for TS is available.
- Karyotyping is a must in suspected TS. If marker chromosome is present, it needs to be identified if it is from Y chromosome, since then, there is risk of gonadoblastoma. This can be done by FISH analysis with DYZ3, PCR or Array CGH.
- Typical features of TS include short stature, hypothyroidism, hypertension, middle ear infections, hearing disability, hypogonadism, infertility. There may be significant underdiagnosis of TS.
- Indian girls with TS are shorter than their Caucasian counterparts, but comparable to other Asians. Adult height (AH) is ~ 6cm shorter than in Ranke's original paper. Height velocity (HV) is lower and no

puberty growth spurt is observed. Indian TS girls were lighter than others in all other reports at all ages.

- GH therapy can be started at diagnosis, or as early as age 2 years. Indian girls with TS given GH doses in the lower range of 40-50 mcg/kg/day (due to resource limitations), for a mean duration of 5 years, could achieve an AH within the healthy Indian reference range. Short-term studies have shown first-year HV response of 5.4-6.8 cm.
- Height, lean body mass and bone mineral density were significantly benefited by GH therapy.
- Pointers to a good AH with GH treatment are tall mid-parental height, no associated autoimmune disorders, longer duration of GH therapy (i.e. GH started at a relatively young age), delayed bone age, and good response to GH in the first year. Hence early recognition is crucial.
- For screening and follow-up, annual thyroid function test, lipid profile and HbA1c should be done. Every five years, DXA for bone mineral density, mammography, and 2D echo should be done.
- The choice for hormone replacement therapy (HRT) in TS could be one of the following: oral estrogen with oral progesterone; transdermal estrogen with oral progesterone; transdermal estrogen with transdermal progesterone; oral and transdermal estrogen with intrauterine progesterone; and implanted estrogen. There are no studies so far comparing these different treatment regimens.
- Pubertal induction should bed one at age 11-12 years. Suggestions of starting very low dose estradiol at a very early age have not translated into recommendations at present.
- Educational performance of TS girls is comparable to their peers, though significant difficulty in mathematics and geometry may be observed. Art and languages are better retained.

The next meeting was held on **22nd June 2024** on
Early life origins of later health and disease: *Pearls in our next issue.*

IDEAL/ BEST/ IDEAS REPORTS

PROVIDING HOLISTIC CARE - ISPAD - BEST - IDEAS - THE JOURNEY CONTINUES IDEAL marches ahead, now endorsed by ISPAD!

Anju Virmani, *Director, Pediatric Endocrinology, Max Smart Super Specialty Hospital, Saket, New Delhi &Senior Consultant Endocrinologist, Madhukar Rainbow Children's Hospital, New Delhi*

We have now completed 7 batches of IDEAL, with 195 trainees selected, and 159 (81.5%) certified. The **8th batch,** commencing from 16th July, is for 'non-physicians'who are already working with T1D, i.e. nurses, dieticians, and members of the T1D community: parent/ self. Certification is now for 3 years, with recertification required thereafter. This has been done to ensure IDEALites maintain a high quality of knowledge and awareness.

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We are excited to announce that the IDEAL course has been endorsed by **ISPAD**, after taking into consideration all aspects of the way it is being conducted and the ongoing outcomes. A comment was made that it is so labor-intensive that it may not be replicable where faculty is not willing to work this hard. We took that as a huge compliment for our wonderful **Faculty**, for each of whom it is a labor of love. Thank you very much, each one of you! The intensity of the course is something many trainees complain about during the course, but acknowledge at the end that it was worth it.

The **outcomes** and challenges were analyzed recently, and will be present edduring the APPES - ISPAE meeting. IDEAL is successfully reaching out beyond the metros. IDEALites reported greater ability to advise insulin, diet, and exercise-related self-adjustments, motivate for and handle regular intensive SMBG, teach prevention and handling of hypoglycemia and hyperglycemia, and prevention of DKA, handle psychological issues and take on greater responsibilities. Many had higher job satisfaction, greater confidence in motivating for and interpreting CGM, better ability to communicate and deal with manipulative behaviors, better pan-India networking, taking new initiatives, teaching in outreach programs and meetings. Several **challenges** have and are being encountered: we continue to try and overcome them. The wide variability of backgrounds and diverse languages continue to be major issues.

The **WhatsApp group**, *IDEALites,* which is open to IDEAL faculty and the IDEALites after certification, currently has 224 members, including 152 IDEALites. Analysis of the statistics of the WA group showed that work-related messages accounted for over 85% of total messages. Benefits reported accruing from being in the group include ongoing learning, networking, discussing and finding solutions to difficult cases, sharing information (of online meetings, camps, support group activities, whom to refer to, low-cost options, availability of supplies, technology & research); higher visibility; sharing experience with devices; and warnings about quacks and those spreading misinformation. This modality is at zero cost, a major consideration in our limited resource environments of India and Nepal.

All this data will be presented during the forthcoming APPES-ISPAE meeting in Delhi. We look forward to further discussions with all of you there!

What an IDEAS, Sir ji!

Sirisha Kusuma Boddu, *Senior Consultant Pediatric Endocrinologist, Rainbow Children's Hospitals, Hyderabad*

Children with T1D need to go to school, where they spend half their waking hours. They need a safe, supportive, and non-stigmatizing environment to perform diabetes self-care activities. Many, however, face difficulties in self-care in schools, or outright conceal diabetes in school, worsening glycemic control and diabetes distress. Downloadable school resources (information brochures, hypoglycemia treatment cards, diabetes management plan for schools, etc.) are available on the ISPAE website: www.ispae.org.in/diabetescare for easy access. A more proactive initiative is IDEAS: “Initiative for Diabetes Education and Awareness for Schools”, aiming to create awareness among school staff dealing with children with T1D, to empower them to help these children to look after themselves. An online 90-minute interactive session is conducted on the first Sunday of each month, by ISPAE members, including IDEALite PDEs. We have kept it focused by encouraging parents attending our clinics to request their child's teachers to attend the sessions. Sessions discuss basic diabetes self-care in school, interspersed with poll questions to ensure involvement

and assess knowledge, and are aimed at teachers and school staff. Content and session recordings are available for later revision. Initially conducted in English, it has now been delivered in Kannada, Hindi, and Gujarati, with more regional languages planned. Over 300 teachers and school personnel have attended so far: feedback has been heartening. Poll questions revealed several misconceptions among teachers, underlining the urgent need for correct diabetes education and debunking myths. At zero cost to the beneficiaries, this much-needed program is practical and sustainable, allowing upscaling and wide outreach.

BEST to send all parents of children with T1D to join BEST!

Preeti Singh, *Professor, Pediatric Endocrinology, Dept of Pediatrics, Lady Hardinge Medical College & Kalawati Saran Children's Hospitals, Delhi*

Embarking on a journey of education and knowledge can indeed be deeply fulfilling and gratifying. Team BEST envisages training and empowering children/youth with T1D, their parents/caregivers, and assistive health care personnel, mainly from inaccessible and remote areas, with the skills and knowledge needed for ambulatory management of T1D. The BEST T1D self-management educational program offers a viable, easily accessible, and sustainable alternative to a physical program. It provides a platform to build knowledge, foster confidence to empower and improve overall quality of life for children with T1D and their families. So far, we have conducted 7 batches (April 2022- May 2024) and trained 220 participants from different parts of the country. We plan to conduct three batches every year, with an intake of 30-40 participants per batch. Applications are invited one month before the start of each batch via an online application form. The enrolment for the next batch shall begin in July 2024.

The success of BEST has been possible through sustained hardwork, dedication, and commitment of our esteemed BEST faculty across India. The interest in our program has brought people from different streams, age groups and cultural background associated with T1D together. This has facilitated greater interaction and discussion of varied challenges and possible solutions towards improved care and management of T1D across age groups, socioeconomic and cultural background. The zeal and enthusiasm to learn the basics and keep up with the updates and advancements in the field has evoked interest in a few senior members of T1D community to attend the BEST program and contribute from their experience. Physicians, postgraduate residents and newly appointed fellows in pediatric endocrinology found this virtual comprehensive, structured evidence-based program an effective tool to build concepts and develop greater understanding for providing ambulatory care in T1D, and motivated them to undergo further training for the advanced Pediatric Diabetes Educator course i.e., IDEAL, with the BEST program serving as a foundation course for all those who are keen to learn more. An e-Certificate of participation is given to all the participants at the completion of each batch. The overwhelming positive feedback received from our participants has been rewarding and motivated us to strengthen this program.

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AWARDS

ISPAD-JENIOUS (Juniors in Educational Networking and International Research Opportunities: United Sessions)Group is a Special Interest Group that invites young ISPAD members (<40 years of age) for networking, education and research. Dr Manoj Agrawal from India has been chosen among 8 global JENIOUS Ambassadors to encourage further research, networking and social media activities by working in coordination with JENIOUS leaders.

ACTIVITIES BY ISPAE MEMBERS

ADVACED PEDIATRIC ENDOCRINE WORKSHOP

Vaman Khadilkar & Anuradha Khadilkar, *HirabaiCowasji Jehangir Medical Research Institute, Jehangir Hospital, Pune*

An Advanced Pediatric Endocrine Workshop held under the auspices of ISPAE and HCJMRI on 30-31 March 2024, at Jehangir Hospital, Pune, was attended by 65 delegates from all over India (including Bengaluru, Mumbai, Vijayawada, Manipal, Kochi, Nashik, Nagpur, Ahmedabad, Moradabad, Jaipur, Thrissur, Idukki, Kolkata, Udaipur, Lucknow, Chennai and Pune).The faculty was Drs Vaman and Anuradha Khadilkar, Rahul Jahagirdar, Ruma Deshpande, Tushar Godbole, Nikhil Lohiya, Nikhil Shah, Shruti Mondkar, Chirantap Oza, Madhura Karguppikar and Vinay Mukhekar.

Endocrine workshops were conducted on 30 March. The first was on Dual-energy X-ray absorptiometry, with basics, indications and interpretation in children. This was followed by assessment of bone density using peripheral quantitative computed tomography, BoneXpert, lateral vertebral DXA scanand case discussions. The second workshop was on Growth, Bone Age & Height prediction and included sessions on Z-scores (height, MPH &IGF-1), Bone Age calculation and height prediction using Tanner Whitehouse method. The day ended with a visit to the DXA department of Jehangir Hospital. The focus on 31 March was on Type 1 diabetes: CGM, insulin pumps, automatic insulin delivery systems, trouble shooting, and carbohydrate counting; with several hands-on sessions. It ended with a vote of thanks & Certificate collection by delegates.

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PEDENDOCON CONFERENCE

***Dhanya Soodhana**, Pediatric & Adolescent Endocrinologist, Aster MIMS, Calicut;*
***Vijayakumar M**, Professor & HOD, Dept of Pediatrics, Government Medical College, Calicut*

The IAP Kerala Pediatric Endocrinology Subspeciality chapter conference, PEDENDOCON, was organized in Government Medical College, Kozhikode on 20-21 April, 2024 on the theme *Hormones Unleashed! Scaling new heights in Pediatric Endocrinology*. The first day included a growth workshop during which residents and pediatricians received training on plotting and interpretation of growth charts, bone age estimation and assessment of pubertal status, with case presentations and discussion by eminent teachers. The day ended with a delightful cultural program organized by IAP Calicut, with participation by faculty members. The next day covered contemporary topics in pediatric endocrinology. The keynote address was delivered by Professor PSN Menon on approach to short stature. The conference was attended by 160 pediatricians and involved 40 faculty members. Drs Vijayakumar, Rajesh TV and Dhanya, in conjunction with IAP Kozhikode and IAP Kerala, ensured the conference was an academic feast with good learning.

8TH NATIONAL SYMPOSIUM ON GROWTH, PEDIATRIC & ADOELSCENT ENDOCRINOLOGY

***IPS Kochar,** Indraprastha Apollo Hospital, New Delhi*

The 8th National symposium was organized in collaboration IAP Delhi at Indraprastha Apollo Hospital, with the theme "Global trends in pediatric and adolescent endocrinology - bridging gaps". It was preceded by a hands-on workshop on 8th June 2024 on Growth Diabetes and Thyroid, which was attended by more than 60 delegates and conducted by Drs IPS Kochar, Rahul Jahagirdar, Aashima Dabas, Vijay Jaiswal, and Smita Ramachandran. The workshop highlights included case discussions and case-based activities in small groups.

The conference was inaugurated on 9th June by Drs Lt Gen Bipin Puri, IPS Kochar, Sunil Jain, Arvind Bagga, Anju Agarwal, and Mukesh Dhankar. The scientific program included common pediatric endocrine conditions as well as topics related to advancement in growth and Pediatric Endocrinology. There were several paper and poster presentations during the conference by postgraduate students. Attended by over 100 delegates, it had over 30 national faculty, including stalwarts Drs Vaman Khadilkar, IPS Kochar, Shaila Bhattacharya, Sangeeta Yadav, Sudha Rao, Ravindra Kumar, and Rakesh Kumar, and was highly appreciated.

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DISCUSSION ON GENITAL SURGERY IN DSD BY MAGIC FOUNDATION INDIA

***Santhosh Olety Sathyanarayana**, Karnataka Institute of Endocrinology and Research, Bengaluru*

An online conference was organized by the MAGIC Foundation India (MFI) to discuss genital surgery in DSD. MFI, affiliated to the Magic Foundation US, is an endeavor by Mr Shyam Prasad Nair and Ms Deepa Kannan to provide patient/parent support for endocrine disorders. MFI hosts quarterly Zoom educational meetings for parents. The 2 hour long conference had a multidisciplinary panel, including Dr Santhosh Olety, who spoke on the medical aspects of genital surgery in DSD. Dr Sanjay Rao, pediatric surgeon in Narayana Health, spoke about a nuanced approach and the uniqueness of each case. Jeff Cagandahan, co-chair at Intersex Asia spoke about his personal inspirational story growing up as an untreated CAH girl. He was born Jennifer and later officially changed his name to Jeff, and gender. Dr Vijaya Raman, clinical psychologist in St John's Hospital, Bengaluru, spoke about supporting DSD children and adults with psychological support, the need to be open and the right way to handle new diagnosis. Dr Bhargavi Chandrasekharan, an advocate specialized in DSD, spoke about legal aspects. It was well received by the close to 50 participants, including parents, CAH support heads from Austria, core group members at Intersex Asia, and some doctors as well.

ACTIVITIES OF YOG DHYAN FOUNDATION (YDF) - JANUARY TO MAY 2024

***Anil Vedwal**, Chief Functionary, Yog Dhyan Foundation*

YDF has been buzzing with physical and online weekly and monthly classes, meetings and yoga classes, with the active help of Ms Amrita Rupani, Ms Aruna Sharma, Ms Hemani, Ms Ishika, Mr Jitesh Wadhwa, and Mr Kushal. A brief snapshot:

Phone Bank: An ongoing appeal is to contribute to our Bank of NFC enabled smartphones: if you are planning to discard yours, please give it to us!

January: The Annual Health Camp for children with T1D on 7.1.2024, at the YDF Center in Kailash Colony, New Delhi was attended by over 400 people. Those with T1D got full-body examinations, including height, weight, BMI, blood pressure, foot exam, peripheral neuropathy checks, and especially retina and vision checks, for which we are very grateful and thankful to **Shroff Eye Center** and Dr Sharad Rohtagi. Medical supplies (including insulin, insulin syringes, pens & needles, glucose-strips & bags for carrying diabetes essentials) were distributed. Healthy snacks (milk, nuts and seeds) and lunch were provided. Volunteer parents received tokens of appreciation. The monthly online event on 14.1.24 had *Family of Ms Kanak Santosh Jagiya* (she, husband& son have T1D) as T1D Heros. A fun Quiz on "*Main aur Meri Diabetes": Basics of T1D "Kaun Jeetega*?" hosted by Dr Sumeet Arora (Artemis Hospital, Gurgaon) was much appreciated. Panel of Judges: Prof Jyoti Kakkar (Psychologist, Gurgaon), Dr Preeti Singh (Kalawati Saran Children's Hospital, Delhi) and Dr Anju Virmani (Max & Rainbow Hospitals, Delhi). Prize winners were Amayra, Dharnika, Nitu, Gaurvit, Sanjita, Dharnika, Ashmit and Aditya.

February: Health Camps on 4 & 18 Feb, had providing free monthly diabetes supplies, yoga sessions, dietary education, and fun activities: celebrating the month's birthdays with special snacks and a delicious gluten-free cake sponsored by Mr Ravi and Ms Rasneek, and Ms Ruby Rana's successful placement as a medical nurse in AIIMS. A successful Rotary Fund raiser by **Rotary Southend** and **Rotary Southend Next** was held on 11thFeb. The monthly online event had Dr Taher Hossain (Critical Care Physician) as Hero, and *Role of Good Diet to reduce Exam Stress* discussed by Ms Shivangi Sinha(Dietitian). Panellists were Dr Sumeet Arora, Dr Virmani, and Mr Ravi Kumar (Dietitian). YDF alumnus Ms Bhumika Khurana, financial analyst (Mumbai) discussed CGM and insulin pumps on 18thFeb.

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March: An Interactive Awareness Health Camp focusing on T1D care in schools for Teachers &Support Staff was held on 3 Mar. On 10th March, the month's Hero was Ms Riddhi Modi (T1D, Patient Advocate, Blue Circle Voice: IDF). Dr Sumeet hosted part 2 of the Quiz on "*Main aur Meri Diabetes*", with prizes won by Sanjeeta, Dharnika, Aditya, and Ashmit. YDF alumni conducted an Education Camp on 17thMarch. A special get-together on 30thMarchhad a lively skit based on a real-life event of how a casual visitor to YDF became a child's sponsor after hearing her sad story, and honored esteemed contributors to YDF efforts: community leaders, including Mr Siddharth Sehgal (President Rotary Southend) & Ms Ridhika Khanna (President Rotary Southend Next); and medical professionals, Prof Jyoti Kakkar and Dr Virmani.

April: On 7thApril, Ms Sheryl Salis and JDF's celebration of beloved Dr VS Ajgaonkar's birth anniversary and World Health Day in Mumbai, highlighting his journey and sharing life-changing experiences, was attended by Dr Vedwal. The monthly online session had Mr Jitesh Wadhwa (T1D, working in ICICI Bank) as Hero; Dr Lokesh Sharma (Medanta, Lucknow) speaking on *T1D Challenges in School,* with Prof Kakkar and Dr Virmanias panellists. On 21stApril,Mr Harsh Kohli (Diabetes Educator, Founder Blue Circle Pharmacy) discussed new rules for T1D care during exams, and Ms Chhavi taught hypomanagement.

May: On the 5th, Dr Preeti Jolly (endocrinologist, USA) discussed better management of T1D, followed by yoga, discussion on staying fit during summer, and a nutritious meal sponsored by Ms Vani Gupta (Founder of NGO *The Bigger Picture*); Ms Tejal Nair (JDF member, Mumbai) visited us. On 12thMay, our Hero was extra-special: Ms Sudesh Chugh, T1D Mother(of Dr Shuchy Chugh) and Nani. A talk on *Enjoying Eating! Hacks for T1Ds* by Ms Riddhi Modi, was followed by a panel discussion with the entire Chugh parivar sharing more food hacks - exploring, making, eating, sharing food 1Deas! A Camp on the 19thfocussed on foot ulcers and neuropathy resulting from inadequately managed T1D, while welcoming Ms Komal Nayar (T1D mom, diabetes educator).

3RD DOSTCON, KOTA DIABETES WELFARE TRUST

***GD Ramchandani**, Ramchandani Diabetes Care & Research Center, DOST Diabetes Child Care Society, Kota*


संदेशवाहक बनकर सबको अपना अनुभव बताएं, यही सच्ची सेवा : डॉ. अमृता दुहन

The 3rd DOSTON, organized on 21 April 2024,was attended by 120 children with T1D and their families. Supplies distributed included glucometers and strips, lancets and lancing devices, syringes, needles, glargine cartridges and pens, and insulin vials, and education material. Education about carb counting, hypoglycemia, DKA, glycemic index, AGM and many motivational talks were delivered by senior doctors, counselors and psychologists. Dr Saket Goyal, Interventional

Cardiologist and Dr Govind Maheshwari (Director, Allen Coaching Institute) provided motivational messages to the children and their families. Dr Amrita Duhan (Superintendent Police, Kota) was the Chief Guest. The challenges and disparity in treatment of T1D in India were discussed. The children and families were thankful for the nice meeting.

ACTIVITIES AT KIER, BENGALURU

***Santhosh Olety Sathyanarayana**, Karnataka Institute of Endocrinology and Research, Bengaluru*

Summer Camp For Children With T1D: KIER organized a Summer Camp with support from the Novo Nordisk Education Foundation. It included many fun activities such as a magic show, drawing and coloring, musical chairs, diabetes-related crosswords, and an educational practical session on safe disposal of diabetes-related sharps and other waste. The event ended with a balanced nutritious lunch. Organizational support was provided by Ms Syeda Atiba (NN), Ms Sharanya Shetty, Ms Cynthiyal and Ms Beenu.

Academic Financial Aid Sponsorship To Children With T1D: On 23 May 2024, Diabetes Club, Bengaluru supported 13 socio-economically underprivileged kids with T1D by providing Rs 10,000 each as an academic sponsorship. The event was embraced by Dr Munichoodappa (senior Diabetologist and founder member of Diabetes Club), Dr Ravi (KIER Director), Dr Anil Kumar and Dr Karthik Munichoodappa (President and Secretary respectively, Diabetes Club). Our educator/dietician Ms Shruthi R hosted the event, organized with help from Ms Sharanya Shetty, Ms Shilpa P and Ms Cynthiyal. Parents showed their gratitude for the kind gesture and appreciated the event.

DIABETES SUMMER MEET AND GREET

***Tejasvi Sheshadri,** Consultant Pediatric & Adolescent Endocrinologist, Rainbow Children's Hospitals, Bangalore*

The Diabetes Summer Meet & Greet and WISH DAY celebration organized by the Dept of Pediatric Endocrinology & Diabetes at Rainbow Children's Hospital, Marathahalli, Bangalore, on 1 June 2024, was attended by 22 children with T1D and their care givers. The inauguration and welcome speech were followed by cultural event by the children, showcasing their talent with singing, dancing and shloka recital. This was followed by a panel discussion with the parents, addressing diabetes management in toddlers, hypoglycemia, support of school authorities in diabetes care, insulin cold chain and storage, travel checklist and diabetes technology.

The highlight of the day was by MAKE A WISH INDIA Foundation, which gifted cycles, mobile phones, smart watch, and cricket kits to children, bringing a big smile to their faces. The celebration ended with a balanced lunch reinforcing healthy eating, during which the nutrition department reinforced carbohydrate counting.

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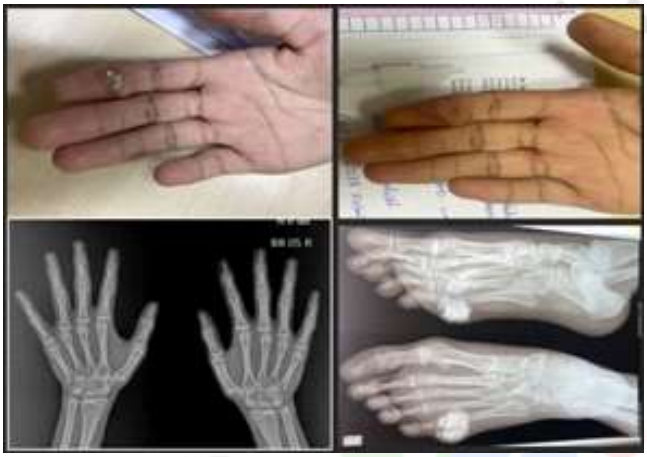
TRAINEES SECTION

IMAGE QUIZ

***Naveen S. Kannur, Subramanian Kannan**, Dept of Endocrinology, Diabetes & Metabolism, Narayana Health, Bangalore*

A 12year oldgirl born to consanguineous parentage, presented with a painless swelling of ~1cm extruding white chalky material on the palmar surface of the right index finger for the past 6 months (Fig 1a). X-ray of the hand showed a calcified osseous lesion in this area (Fig 1b). She had history of a similar swelling of ~ 2cm over the dorsal aspect of the left fifth digit 2 years earlier, which was surgically removed (Fig 1c). There was no history of local trauma, fractures, or renal stones. Biochemistry revealed high serum phosphorus 7.3 mg/dL (3-4.5), with calcium 9 mg/dL (8.5-10.2), PTH 29.7 pg/mL (10-65), and elevated serum fibroblast growth factor (FGF23) 237 RU/mL (21.6-91; ELISA measuring both intact and c-Terminal fragment of FGF-23).



Questions: What is the diagnosis? What are the genes involved in the familial form of this condition?

Read below for the Answer

THE BONE CONUNDRUM: THE EYES CANNOT SEE WHAT THE MIND DOES NOT KNOW!

***Tejasvi Sheshadri,** Consultant Pediatric and Adolescent Endocrinologist, Rainbow Children's Hospitals, Bengaluru &Aashima Dabas, Maulana Azad Medical College & Lok Nayak Hospital, New Delhi*

Please answer the questions below on Bone and Calcium disorders. Correct answers and individual quiz scores will be mailed to the respective email address after the quiz closes

https://forms.gle/v5PVoNX1qRiW7hwbA

"LAST DATE- 20 JULY 2024"

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Answer to Image Quiz:

Hyperphosphatemic Tumoral Calcinosis (HTC),a disorder of phosphate regulation due to defects in the functioning of fibroblast growth factor-23 (FGF-23), is inherited in most patients in an autosomal recessive manner. It is caused by genetic mutations causing defective functioning of FGF-23, either in the stage of its production or post-translational processing, or by causing end-organ resistance with mutations involving GALNT3, FGF23 and Alpha klotho; rarely it can be the result of autoimmune antibodies against FGF-23. The resultant lack of inhibition of the sodium-phosphate co-transporters NPT2a and NPT2c, and increased serum phosphate levels, result in the formation of ectopic calcific masses in peri-articular locations and occasional inflammatory bony pains.

A clinical exome by Next Generation Sequencing panel for the index patient came back negative for known mutations. She has been managed with phosphate binder Sevelamer, and low phosphate diet. The lesion has been stable for about 12 months, as of last follow up.

FORTHCOMING MEETING

Anju Virmani, Director, Pediatric Endocrinology, Max Smart Super Specialty Hospital, Saket, New Delhi &Senior Consultant Endocrinologist, Madhukar Rainbow Children's Hospital, New Delhi

The International Pediatric Association (IPA) will be organizing a webinar on **"Helping the child with diabetes get an education: coping in school"** on **31 July (Wed) at 2.30-3.30pm CET**. The speakers Dr Sirisha Boddu (Hyderabad, India), Prof Emeritus John Gregory (Cardiff, UK) and Prof Farid Mahmud (Toronto, Canada); will be joined by Prof Emeritus Hilary Hoey (Dublin, Ireland) and Dr Naveen Thacker (President, IPA). The session will be moderated by Prof Feyza Darendeliler (Istanbul, Turkey) and Dr Anju Virmani. Interested delegates may join (*link will be informed at official ISPAE Whatsapp group*).

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