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From the Editor's Pen

On behalf of ISPN bulletin editorial board I extend greetings to all of you! We welcome two new editorial board members Dr Aliza Mittal from Jodhpur and Dr Radhika from Thiruvanthapuram. World Kidney Day 2022 was celebrated with great enthusiasm in the country and we bring in related news from all over in ISPN Desk. Interpretation of the genetic analysis has been simplified by Dr Anil Vasudevan in his article. We have interesting Blog and Clinical Quiz as well for you.

From next issue, you will get a curtailed version of the ISPN Bulletin as suggested by the advisory board of the bulletin. I thank all the members of the editorial board who have worked hard to bring the issue, and also to all the members of ISPN for writing articles for this issue, all what matters the most is that we work as a **TEAM.**

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In this issue we have published Part II of the educational review on Genetics from St John's Medical College, Bangalore.

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Making Sense of Genomic terminology, Genetic testing methods and Genetic report: Part II

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Keywords

Genomics, Paediatric Nephrology

Introduction

A significant number of kidney disease in children have a genetic etiology. The goal of clinical genetic testing is to identify molecular basis of the disease. Tremendous advances in high-throughput sequencing technologies and the application of massive parallel sequencing (MPS), also known as next-generation sequencing (NGS) have revolutionized genetic testing approaches. MPS based genomic tests (gene panels, clinical and whole exome sequencing) that enable analysis of few hundred to thousands of genes within the same assay are now cheaper than ever before leading to more utilization of these techniques in clinical setting.

Due to easy accessibility, the tests are now usually ordered by treating clinician and the results are received directly by the clinicians requiring them to interpret the genetic test result and convey the results to patient and their families. Notwithstanding the technical advancements which has improved accuracy of sequencing, the natural variability of DNA sequences in humans pose many challenges, mostly related to classification and accurate interpretation of variants and reporting of novel sequence variants with little or no definitive information supporting causation.

The aim of this short review is to familiarize with the variant interpretation process interpretation of genetic reports which would treating clinician to communicate the clinical significance of genetic testing results to patients and their families. Readers can refer to part 1 of the article to understand various terminologies used in the discussion.

Challenges in identifying disease-causing variants by MPS based genomic testing

Genomic testing involves determining the patient's genetic sequence (usually the coding regions of DNA i,e exome) in millions of short segments, called "reads" (each approximately 100 -150 base pairs in length), followed by assembly of the reads into a complete sequence and then determining what clinically relevant genetic variants are present by comparing with "reference sequence" and interpreting what they mean.

The clinical utility of molecular genetic testing relies on comprehensive knowledge about the relationships between genes and diseases (genotype-phenotype relationship) and the accurate discrimination between the benign and disease causing variants. Each human genome has 3-4 million variants (compared to the reference human genome sequence), of which 0.6 million are rare or novel; majority of variants unlikely to contribute substantially to human disease. Thus, the large number of DNA sequence variants detected in clinical samples, many of which have never been seen before, makes the process of identifying disease-causing genetic variants from the multitude of candidate variants a complex and multidimensional task.

Phenotypic variability and locus heterogeneity as observed in many kidney diseases (e.g steroid resistant nephrotic syndrome, ciliopathy poses difficulty in establishing a clear genotype–phenotype relationship. Establishing clear gene associations is important especially when exome sequencing is being used in clinical settings for disease with a suspected genetic basis, but the evaluation has not provided a clinical diagnosis to guide selection of a single gene test or a panel of genes (e,g. child presenting in end stage kidney disease and cause is unclear based on clinical and laboratory details).

Making sense of genetic variation: Evidence base for interpretation of sequence variants

In 2015, American College of Medical Genetics and Genomics (ACMG) and the Association for Molecular Pathology (AMP) published updated standards and guidelines for the interpretation of sequence variants which are widely adopted into clinical practice. The guidelines is restricted to Mendelian disorders and assume a single-variant disease paradigm. The variant interpretation framework consists of (Table I)

(i) qualitatively distinct evidence types which includes population data, computa¬tional and predictive data, functional data and segregation data, and

(ii) strength of evidence for variant classification and interpretation.

A set of rules then combines the evaluated criteria and classifies a variant accordingly to the final ACMG-AMP five-tier system: "pathogenic", "likely pathogenic", "uncertain significance", "likely benign" or "benign" with respect to a disease and inheritance pattern. The classification using multitude of data is based on a probabilistic assertion that indicate the likelihood that the variant is associated with disease and is not a clinical diagnosis. (Table II).

Briefly, if a particular variant has been identified which has been previously consistently associated with the condition, the variant will be classified as "pathogenic." The term "likely pathogenic" means that the variant most likely has a harmful effect, but the variant identified in the patient has not been previously observed i.e novel. As more individuals are sequenced, many "likely pathogenic" variants are reclassified to "pathogenic." Clinically, both pathogenic and likely pathogenic variants are treated similarly. Variant of Uncertain Significance (VUS) has an uncertain relationship to disease either because the effect of the specific variant on gene function has not been elucidated or due to insufficient data to definitively confirm that the variant is associated with risk of developing the disease or patient has different symptoms than those expected based on the variant found. VUS may be reclassified to likely pathogenic or likely benign based on evidence accumulated over time or by testing additional family members and relatives with and without the condition observed in the patient.

The workflow for sequence variant interpretation is divided into five sections (Figure 1): verification of variant nomenclature, evaluation of population data, evaluation of case data, variant-type-specific analysis, and computational predictions. It is not necessary to follow all steps in the workflow. Although all ACMG-AMP lines of evidence are used, PVS1 (predicted truncating), BS1 (allele frequency too high), PP3 (computational evidence), and PM2 (absent in population databases) are the most used criteria for variant classification.

The ACMG_AMP criteria have many limitations. The guidelines use semi quantitative - "met"/ "not met" approach for each evidence and the weight assigned to certain criteria may vary by gene and disease. Besides, threshold that differentiates categories of pathogenicity is also subjective. The guidelines were designed to have general applicability across all Mendelian disorders; however, some rules may be overly conservative in the setting of a specific disease.

Genetic test report

The aim of genomic testing is to provide a genetic diagnosis by identifying (likely) disease-causing variant(s) that explain the clinical presentation.

Key information in a genetic report: The information is provided in the genetic report (Figure 2) includes the gene in which variant has been identified, the location of reported variant, the specific nucleotide and corresponding amino acid change, whether variant is present is present in single allele or both allele (zygosity), disease name as per Online Mendelian Inheritance of Man (OMIM), inheritance pattern of disease and classification of variant as per ACMG_AMP criteria.

In addition, the report contains a summary of evidence supporting the variant classification, OMIM phenotype, brief methodology of sequencing and variant annotation. If gene panels are used, details of genes included in analysis and percentage of coding region covered is provided. Although, the genetic analysis may involve the classification of one or multiple variants, the report and any appendices to that report usually only describe only those that are relevant, or have likely relevance, to the clinical question being addressed by the test. In the situation that the testing does not identify disease-causing variant(s), the report should clearly state that the result does not exclude a genetic diagnosis.

Phenotyping - Achilles heel for clinicians: Phenotype specificity is a key evidence criterion for variant interpretation and hence interpretation of a variant for use in clinical decision making requires comprehensive knowledge of the patient's phenotype (obtained from complete clinical and laboratory/imaging details). While most of the information for variant classification by ACMG_AMP criteria can be obtained from the published literature/databases, phenotype details of the patient can only be obtained from the clinician treating the patient. When requesting genomic tests such as large gene panel or clinical exome/whole exome analysis, providing as many details as possible of the clinical presentation, any specific diagnoses that are being considered and where feasible, a list of genes that are thought to be of relevance according to the clinical presentation can be very useful for the laboratory in prioritization and analysis of filtered variants. The detailed phenotype data is optimally provided as a set of HPO (Human Phenotype Ontology) terms. For disorders where biochemical or other test results are critical for variant interpretation, this information should also be provided. For diseases where there are diagnostic criteria (e.g steroid resistant nephrotic syndrome, Bartter syndrome, hemolytic uremic syndrome), it is helpful if the referring clinician indicates whether these have been met. The specificity of a phenotype may be supported by a group of recognizable clinical/laboratory/imaging features consistent with the genetic finding such as sensorineural deafness and characteristic feature of basket weaving appearance of basement membrane in electron microscopy of kidney biopsy in a patient with COL4A4 variant.

Type of DNA variant and its impact on interpretation: Variants identified by DNA sequencing can largely be grouped into 2 categories: truncating variants and non-truncating variants. Truncating variants consist of nonsense variants, out-of-frame indels, majority of splicing variants, and large gene deletions while non-truncating variants consist of mostly single or few nucleotide substitutions and in-frame indels. Truncating variants, have a more deleterious impact on gene products and are often pathogenic to diseases that are caused by loss-of-function gene products while non-truncating variants can result in either loss of function or gain of function, and is often more difficult to predict their pathogenicity.

Distinguishing variant pathogenicity from genetic diagnosis: A genetic finding is a deterministic and infallible predictive tool is a misconception as variant can be damaging to protein function but not always disease-causing.

Hence it is important for clinicians ordering and interpreting genomic tests to recognize that a genetic testing laboratory's assertion of pathogenicity for a variant is not equivalent to diagnosing the patient with the associated disorder. The key question for the treating clinician is "Does this patient's phenotype fit this gene-disease association?". If so, what is the strength of the evidence of to support the variant classification and how certain is the assessment?

The ordering clinician should integrate the genetic test result with the clinical characteristics and family history of the patient to arrive at a clinical-molecular diagnosis. The critical insight needed by the clinician is to recognize the predictive power of a variant and to properly integrate that prediction with the patient phenotype. Follow-up examination and additional laboratory testing and extended genetic screening of family members may be required to establish the causality of identified variant.

Interpretation of genetic report: Interpretation of genetic report has two components (a) Variant level interpretation which is performed by laboratory with expertise in genetic sequencing- analysis of gene sequences, identify variants, and use all available data to make the best assessment possible of the pathogenicity of relevant variants from the genetic assay (b) Case level interpretation wherein in the candidates identified by variant or gene prioritization tools must be evaluated for causation. Analysis at the case level integrates the variant data with the patient's clinical information and family history to assess whether the diagnostic test has identified a definitive, likely, or possible explanation. Case level interpretation may be further complicated by added complexities of incomplete inheritance, variable expressivity, and phenotype heterogeneity.

A multi-disciplinary approach involving the treating clinician, medical genetics specialist, laboratory scientist and other health care professionals as appropriate is suggested to interpret the report and convey the results to the families especially in complex cases. However, this may not be feasible in many centers due to unavailability of domain experts. In such a situation, using the service of specialist associated with genetic testing centers or seeking advice from appropriate experts remotely via tele consult/e mail is advisable.

Handling VUS: While counselling for genetic testing, family should be informed about the probability of identified variant being reported as VUS. It is important to use clinical judgement and consider discussion in a multidisciplinary team when a variant is classified as VUS. Clinician with help of genetic specialist and laboratory scientist should first determine whether further testing or additional investigations could potentially help reclassify the variant as likely pathogenic. Additional clinical evaluation (e.g. ophthalmological and hearing assessment or requesting electron microscopy of kidney biopsy in a patent with variant in gene associated with Alport syndrome), testing parents to determine whether variant is de novo, testing affected family members or relatives to show co-segregation and biochemical testing (e.g. alpha-galactosidase A enzyme level estimation in Fabry's disease). ClinGen Sequence Variant Interpretation (SVI) Working Group (referred to as SVI) have developed an algorithm using posterior probabilities estimated from a Bayesian approach, on a points scale to subclassify VUS which are used by some of the laboratories to know the likelihood the VUS being disease causing. Sometime no further evidence can be obtained. In such a situation family should be informed that a genetic diagnosis cannot be excluded. VUS should not be used for antenatal counselling or screening at risk asymptomatic family members or relatives. As reclassification of a VUS may occur years after the original test was performed, clinicians and patients may consider re-contacting the laboratory that performed the genetic testing periodically for updates. It is important that family understand that new information may change the classification.

Caveats to genomic testing using MPS method: A "negative" test report does not eliminate the possibility of a genetic diagnosis. The variants of uncertain significance reported may be reclassified based on newer evidence. Several types of genetic variants such as copy number variations, repeat expansions, indels too large to be mapped by short-read sequencing or rearrangements are not robustly detected by MPS methods.

Examples of interpretation of genetic report

Example 1:

A 6-year-old child presents with incidentally detected nephrotic range proteinuria. During further evaluation, child also noted to have mildly elevated serum creatinine for age (1.2 mg/dl) and normal serum albumin. Family history was unremarkable. Kidney biopsy showed feature of focal segmental glomerulosclerosis with no staining in IF. EM showed complete foot process effacement of podocyte with normal basement membrane. Genomic testing was ordered which revealed homozygous variant in NPHS 2 (Podocin) gene judged to be likely pathogenic. The combination of a compatible clinical presentation of nephrotic syndrome (although atypical) and homozygous pathogenic variants would lead the clinician to confidently assert that the detected variants are the cause of disease in this child.

Example 2:

A 14-year-old girl presented with features of end stage kidney disease (ESKD). On further evaluation, noted to have nephrotic range proteinuria and microscopic hematuria with significant hypertension. Complement levels were normal. The kidney sizes in renal ultrasonography were slightly smaller for age with complete loss of cortico-medullary differentiation. Kidney biopsy revealed all sclerosed glomeruli. Genomic testing revealed a homozygous missense variation in exon 2 of the NPHS2 gene which was classified as likely pathogenic. The phenotype of the child is ambiguous in that isolated nephrotic range proteinuria compatible with nephrotic syndrome but not at all specific for, the condition of nephrotic syndrome. Even though the variant is likely pathogenic, there is still a 1% to a 10% chance the variant is not pathogenic, and it would be prudent to withhold the diagnosis of ESKD secondary to podocytopathy until further investigation of the patient and the family were undertaken to develop additional clinical data that support or refute this clinical-molecular diagnosis.

Example 3:

A 2-year-old child presents with history of poor gain in weight since past 1 year along with polyuria and polydipsia. Laboratory evaluation supported the clinical diagnosis of Bartter syndrome. Genomic testing identified a homozygous variant in KCNJ1 gene which is classified based on available evidence as VUS. A VUS has 5 %- 95 % likelihood of pathogenicity. The variant has been identified in the child who has an unambiguous clinical diagnosis and the gene - phenotype relationship is well established. The other known Bartter syndrome genes have been tested and are negative. In this scenario, the clinician should integrate the compelling clinical presentation with a VUS in KCNJI gene and negative test results in the other known Bartter syndrome genes to conclude that the patient has Bartter syndrome on clinical grounds, and that this variant may explain the disease in the child. The VUS, however, should not be used to assess risk for Bartter syndrome in future pregnancies or screen unaffected family members until further evidence is obtained, such as reporting of similar variant in an affected family member or in another family with similar clinical condition or from in vitro experiments. Family should be informed that new evidence may change the classification.

Example 4

A 1-year-old child diagnosed as steroid resistant nephrotic syndrome underwent genomic testing which revealed a heterozygous likely pathogenic variant in NPHS 1(Nephrin) gene. In this situation a single monoallelic (likely) pathogenic variant in a gene associated with an autosomal recessive disorder was identified and the patient's phenotype is compatible with this disorder. However, causality cannot be inferred because of the inheritance pattern of the disease. It may be possible that a second variant has been inherited in trans but has not been detected. Clinician should discuss with the genomic testing provider or geneticist about possibility of a second variant being detected by another diagnostic testing method (e.g Sanger sequencing of NPHS1 gene).

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Table I: Criteria and strenghth of evidence for variant classification (Ref 1)

	Benign		Pathogenic			
	Strong	Supporting	Supporting	Moderate	Strong	Very strong
Population data	MAF is too high for disorder BA1/BS1 **OR** observation in controls inconsistent with disease penetrance BS2			Absent in population databases PM2	Prevalence in affecteds statistically increased over controls PS4	
Computational and predictive data		Multiple lines of computational evidence suggest no impact on gene /gene product BP4 Missense in gene where only truncating cause disease BP1 Silent variant with non predicted splice impact BP7 In-frame indels in repeat w/out known function BP3	Multiple lines of computational evidence support a deleterious effect on the gene /gene product PP3	Novel missense change at an amino acid residue where a different pathogenic missense change has been seen before PM5 Protein length changing variant PM4	Same amino acid change as an established pathogenic variant PS1	Predicted null variant in a gene where LOF is a known mechanism of disease PVS1
Functional data	Well-established functional studies show no deleterious effect BS3		Missense in gene with low rate of benign missense variants and path. missenses common PP2	Mutational hot spot or well-studied functional domain without benign variation PM1	Well-established functional studies show a deleterious effect PS3	
Segregation data	Nonsegregation with disease BS4		Cosegregation with disease in multiple affected family members PP1	Increased segregation data →		
De novo data				De novo (without paternity & maternity confirmed) PM6	De novo (paternity and maternity confirmed) PS2	
Allelic data		Observed in *trans* with a dominant variant BP2 Observed in *cis* with a pathogenic variant BP2		For recessive disorders, detected in trans with a pathogenic variant PM3		
Other database		Reputable source w/out shared data = benign BP6	Reputable source = pathogenic PP5			
Other data		Found in case with an alternate cause BP5	Patient's phenotype or FH highly specific for gene PP4			

Table I: Criteria and strenghth of evidence for variant classification (Ref 1)

For each variant, 28 criteria are checked independently Each criterion code is assigned a direction, benign (B) or pathogenic (P), and a level of strength supported by qualitatively distinct evidence: very strong (VS), strong (S), moderate (M), supporting (P), and stand-alone (A). All assertions are classified with respect to a disease and inheritance pattern.

Table II: Classifiaction of variant based on ACMG-AMP criteria

Classification	Probablity of causality	Comments
Pathogenic	> 99%	Affects function Variant with a recognised deleterious impact. e.g. early termination of the protein Previously reported in similar condition
Likely pathogenic	95% to 99%	Probably affects function Previously unreported but expected to be deleterious
Variant of unknown significane	5% to 95%	Effect on function uncertain ACMG-AMP criteria provide conflicting evidence, some in support of and some against pathogenicity
Likely benign	1% to 5%	Probably does not effect function
Benign	< 1%	Does not effect function

Figure 1: Workflow for interpretation of sequence variants (from Ref 6)

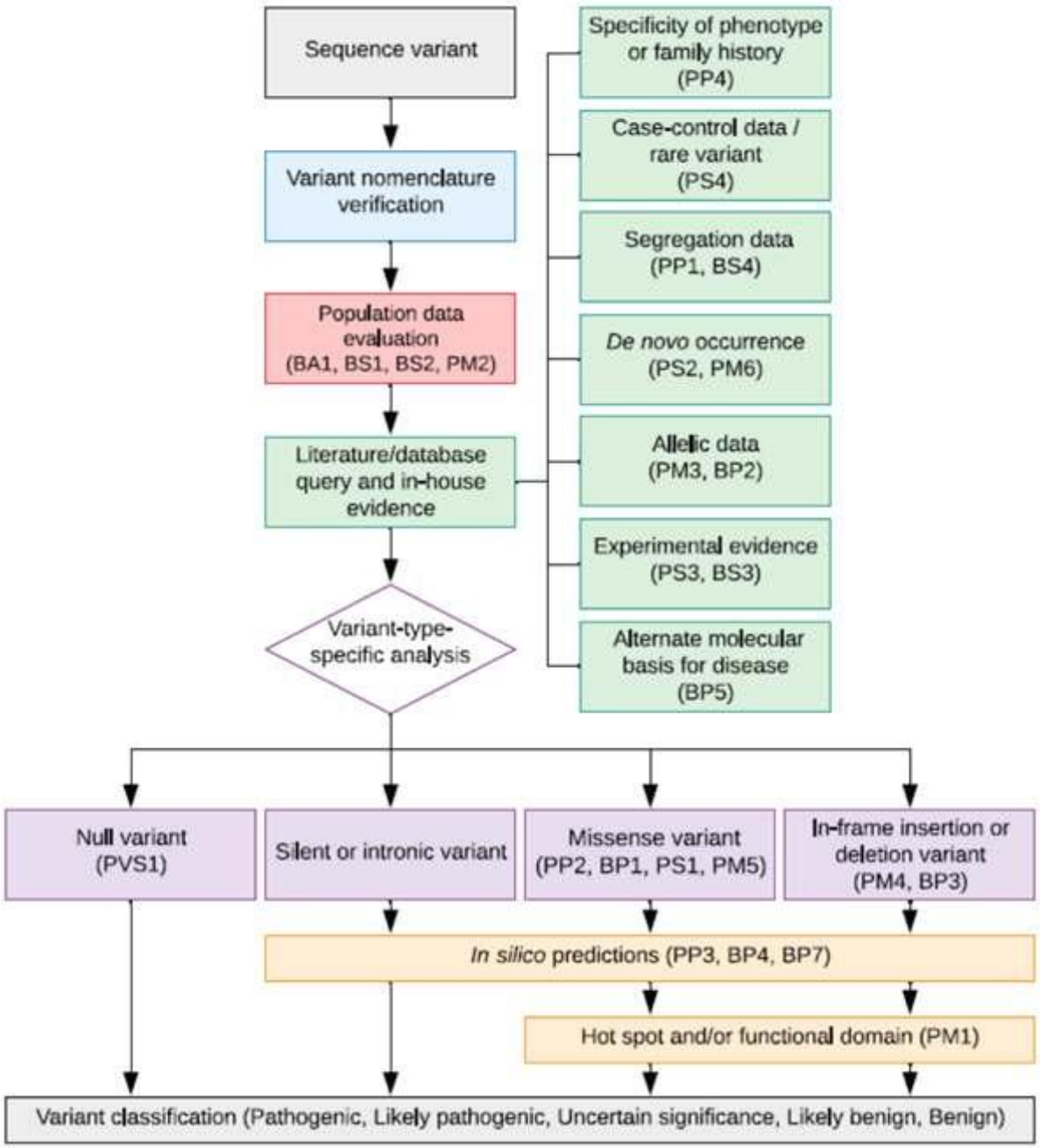

Figure 1: Workflow for interpretation of sequence variants (from Ref 6)

Gene (Transcript)	Location	Variant	Zygosity	Diseaes (OMIM)	Inheritance	Classification
AQP2 (+) (ENST00000199280.3)	Exon 2	c.389C>T **(p.Ala130Val)**	Homozygous	Nephrogenic diabetes insipidus	Autosomal recessive	Likely pathogenic

Figure 2

Bicycle Ride

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SUMANTRA RAUT
(from the wall of Dr Swati Bharadwaj)

Master Arav Bhardwaj is 10 years old, 5th grade student of The Heritage School, Rohini, Delhi. This year our nation is celebrating the 125th birth anniversary of Netaji Subhash Chandra Bose and 75th anniversary (Amrita Mahotsav) of our freedom. In order to pay tribute to the heroes of our independence, Arav is performing a **bi-cycle yatra** from INA Memorial Moirang, Dist- Bishnupur, Manipur to National War Memorial, India Gate, New Delhi, a total distance of 2500 kms. A really thrilled and proud moment for both parents Dr Atul Bhardwaj and Dr Swati Bhardwaj, our ***Pediatric Nephrology colleague*** from Delhi.

Arav's Bicycle event in Bengali Print Media

Chief Minister of Manipur flagging off the Yatra

Arav is being accompanied throughout his journey, by his father Dr Atul Bhardwaj (also on Bicycle), his grandfather and others (in vehicle). The yatra started on 14th April, 2022, the historical day INA reached Moirang in the Year 1944 and hoisted the National Flag and he will be finishing the journey in Delhi, where National War Memorial is completed and the Digital Statue of Netaji has been installed this year only. The Yatra is going to pass through the states of Manipur, Nagaland, Assam, West Bengal, Bihar, Uttar Pradesh and Haryana before reaching India Gate, Delhi on 15th /16th May 2022. En-route he will be paying his respect at the places related to our freedom struggle/sacrifice such as Red Hill, Champaran, Chauri Choura, Kakori and Meerut. Shri Nitin Gadkariji, our Honourable Minister, Road transport and Highways, Officials of Government of India have conveyed the blessings and well wishes to Arav. On behalf of ISPN we wish Arav the proper strength and endurance for successfully completing this mammoth journey.

https://www.facebook.com/105028035515625/videos/547971230101435/

The “bi-cycle boy of India” with his proud parents at

Wishes from Ministry of Road Transport, GOI

Clinical Quiz

In this section we describe interesting cases with some important teaching points. In this issue we have used two formats. Do send me emails, which format do you like.

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QUIZ 1
Urine Dipstick Monitoring in a Child with Nephrotic Syndrome

SUMANTRA KUMAR RAUT

Case Snippet

Master X, 8 years old boy is a known case of SSNS since last 2 years with severe steroid dependence on tacrolimus since last 3 months and in remission since then. He does regular urine dipstick examination for albumin. He is quite cushingoid and on tapering prednisolone currently on 15 mg A/D since last month. His pre-CNI biopsy showed FSGS with minimal tubular chronicity. Since last 3 days his mom noticed urine protein and sugar was abnormal, as shown in *Fig 1.* Lab tests for blood and urine were proposed.

Questions

Q 1) What is/are the possibility?

a) Tacrolimus and steroid induced diabetes mellitus

b) FSGS associated tubular injury

c) Tacrolimus induced tubular injury

d) All of the above

Lab urine routine exam showed similar result of urine albumin trace and urine glucose 2+; fasting blood sugar was 92 mg/dl, urine protein 1.2 gm/day; spot Up : Uc 1.4 mg/mg; blood gas showed normal anion gap mild metabolic acidosis; urine amino-acidogram showed generalised pattern.

Q 2) What is the next step in the management?

a) Tacrolimus level

b) Change tacrolimus to cyclosporine

c) Change tacrolimus to cyclophosphamide

d) Stop steroid now

QUIZ 2 : Sinister in Disguise

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Case summary

A 3 year-old boy presented with respiratory distress and abdominal pain for 3 days, excessive urine and fatigue for 2 weeks. On physical examination the child had weight of 10 kg (below 5th percentile) and height of 94 cm (25th-50thpercentile).The child was severely dehydrated and had features of hypovolemia with associated polyuria. Hepatosplenomegaly was observed with a palpable liver and spleen 3 cm and 2 cm below the costal margin, respectively. Initial evaluation (Table 1) revealed a child with polyuria having hypokalaemia, hypophosphatemia glycosuria, proteinuria and normal anion gap (12) metabolic acidosis. Metabolic acidosis and hypokalaemia persisted despite massive bicarbonate (16meq/kg/day) and potassium (8meq/kg/day) supplementation. Wrist radiography showed widening, fraying, and cupping, all suggestive of rickets. Serum vit D level was 29 ng/ml, alkaline phospatase-1234 u/dl and iPTH level-24 pg/ml. Further investigations when the child is off intravenous fluids (Table 2) revealed normal anion gap metabolic acidosis (NAGMA) and positive urinary anion gap along with phosphaturia (Low Tubular re-absorption of phosphate i.e. TRP, high Fractional Excretion of phosphate, low GFR adjusted tubular maximum for phosphate or TmP/GFR, aminoaciduria and also hypercalciuria without any evidence of nephroalcinosis. Bedside Urine pH was 5.1 and fludrocortisones-furosemide challenge test revealed intact acidification. Subsequently the child developed pallor with significant hepatosplenomegaly.

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Questions

Q1. What is the diagnosis?

Q2. What further investigations would you undertake?

Table 1: Initial Biochemistry

Tests	Results
Hb	10.3 gm/L
TLC	10,200/mm3
ESR	36 mm/hr
Urea	23 mg/dL
Creatinine	0.6 mg/dL
Na+	137 mEq/L
K+	2.9 mEq/L
Ca++	8.3 mg/dL
Phosphate	1.1 mg/dL
VBG.	pH 7.23, pCO2 30 mmHg, HCO-3 12 mEq/L, BE 10 mEq/L
LFT	AST- 25 IU/L, ALT- 34 IU/L
Uric acid	1.1 mg/dL
Urine R/E	albumin ++, glucose +
Blood sugar	87 mg/dL
Spot UPCR	1.1 mg/mg of creatinine

Table 2: Blood and Urine analysis at 96 hours post admission

Blood parameters	Urine parameters
pH:7.24	Urine pH-5.1
PCO2:25 mmHg	Na:81mmol/L
PO2:111 mmHg	K:39 mmol/L
HCO3:16 mEq/L	Cl:115 mmol/L
Na+:137 mEq/L	Cr:80mg/24 hours
Cl-:113 mEq/L	Ca:41mg/24 hours(4.1mg/kg/day)
K+:3.2 mEq/L	Osmolarity:382 mosm/dL
Cr:0.61 mg/dL	PO4-:1137.45mg/24 hours
Ca++:8.7 mg/dL	FEPO4=77.9% (normally <15%)
PO4-:1.3 mg/dL	TRP=28.1% (normally >85%)
Mg++:2.1 mg/dL	TmP/GFR=0.636mg/dl (2.8-4.4 mg/dl)
Alb:3.6 gm/dL	Aminoaciduria:++
Osmolrity:270mosm/dL	

ISPN Desk

In this section we provide you important academic and administrative information from ISPN secretariate. In this issue we have compiled the activities conducted on World Kidney Day around India and important announcements.

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In this section we bring to you the activities conducted across various centres in India and announcement of upcoming events.

World Kidney Day Activities

This year world kidney day was celebrated on 10th March 2022 with the theme “Kidney Health for all”. It was celebrated across the centres in India. We project here the contributions from our ISPN members and would like to applaud everyone involved in the conduct of these activities.

1. Government Medical College, Thrissur

Dr Janaki Menon organised Patient Educational Activities on 12th March 2022. This included a Quiz program conducted by PG students for patients. It also involved home projects on "benefits of exercise" and "balanced diet". They distributed kidney health pamphlets to parents and older children. Their program was benefitted 50 attendees including 25 patients and their parents.

Submitted By: Dr Janki Menon

World Kidney Day Collage

2. King Edward Memorial Hospital, Pune

Dr Jyoti Sharma, Dr Jyoti Singhal, Dr Nivedita Pande and their team celebrated the World Kidney Day 2022 at KEM Hospital, Pune on the 10th of March 2022. The event was supported by IAP Pune branch and KEM Hospital. Keeping in mind the theme of WKD, raising awareness ,this year they conducted a Walkathon, with members of IAP Pune Branch and walked through Saras Baugh, with banners and fliers with information regarding measures that can help protect little kidneys. They also organised an awareness program for parents. Their team of medical social worker, trainee doctors and consultants did role plays stressing the importance of detecting kidney diseases and need of regular follow up and Diet. A quiz session was conducted for children which received enthusiastic participation. With the assistance of IAP Pune Branch, they circulated informative (WhatsApp) messages related to common cases in Paediatric Nephrology, amongst Paediatricians.

Picture Collage of the Walkathon, Quiz and Awareness Activities

Submitted by: Dr Jyoti Sharma and Dr Jyoti Singhal

3. Maulana Azad Medical College, New Delhi

Prof Mukta and Dr Kirti Singh conducted a WKD event on 12th March 2022 entitled ***Glaucoma Prevention in Children on Long term Steroids.*** They organised a talk followed by questions and answers targeted to senior residents and post graduates and the same was attended by 50 delegates.

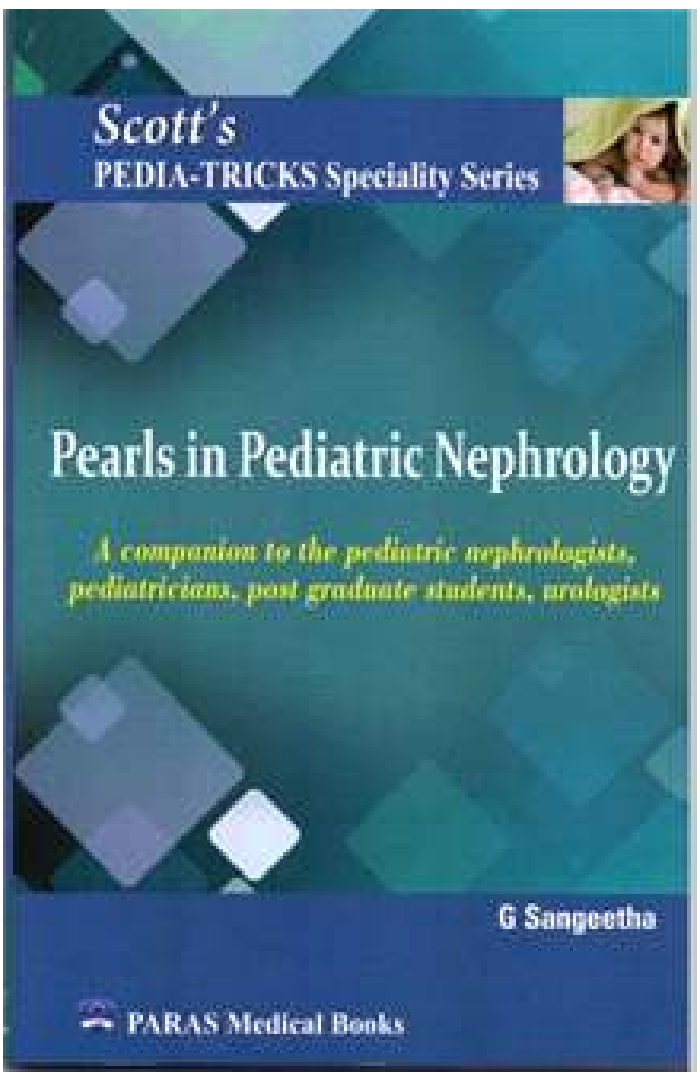
Dr Mukta with her Team at Conclusion of the Event

Submitted By: Dr Mukta Mantan and Dr Kirti Singh

4. Sri Ramachandra Institute of Higher Education and Research, Chennai

Dr G Sangeetha with support from IAP Tamil Nadu state chapter, IMA Tambaram, Chennai branch, organised the WKD event on 2nd April 2022 for benefit of approximately 120 delegates. This virtual program contained series of talks on paediatric nephrology. The awareness program was a physical meet aimed to educate nursing students and staffs. 'Paediatric Nephrology' book for the paediatric postgraduates exam revision was also released.

Key Features Pearls in Paediatric Nephrology includes • Summary of various kidney-related disorders in children based on latest ISPN guidelines • Chapter-specific basic sciences in a brief and point-wise manner • Various diagrams, flowcharts and tables • Compilation of question banks from various universities with chapter-wise answers • Information regarding carrier guidance for paediatric postgraduates in the field of Paediatric Nephrology. Here are some snapshots of the event



Submitted By: Dr G Sangeetha

5. SVPPGIP & SCB MCH, Cuttack, Odhisa

WKD 2022 was celebrated by “Division of Paediatric Nephrology”, SVVPGIP & SCB Medical College Cuttack, Odisha with an aim to raise awareness among the paediatricians, paediatric surgeons and post graduate students about common paediatric nephro-urological problems adhering to the theme of this year 2022 “kidney Health for all- Bridge the gap to better kidney care”. A CME was organised on 12th March 2022 at Sishu Bhawan jointly by Division of Paediatric Nephrology, Department of Paediatric Surgery, SVPPGIP, APNEI and IAP Cuttack District Branch. The first session was “case-based discussions” on topics like “AKI, haematuria, nephrolithiasis and antenatal hydronephrosis”. The next session was on Nephro-uro radiology which highlighted on the role of nuclear scan in paediatric nephro-urology. “Spotters in nephro-uro imaging” was an interactive session with active participation of the audience. In the session on “Vaccination in children with nephrotic syndrome” emphasis was given on importance of various vaccines in preventing infections in children with nephrotic syndrome. A vivid discussion was made by the eminent speakers in the panel discussion on “Bladder dysfunction in Children”. The speaker threw light on various aspects of UTI in children in the session “Management of childhood UTI”. All the sessions were followed by open discussions for clarifications of doubts. The event was attended by 102 delegates.

Inauguration of CME

Inaugural address by Dr. Subal Pradhan

Submitted By: Dr Subal Pradhan

6. Christian Medical College, Vellore, Tamilnadu

The World Kidney Day was celebrated on 10th March 2022 by the paediatric nephrology department - medical and nursing at CMC Vellore. They organised a series of competitions and programs involving inpatient children, nursing staff and students and parents of children admitted in the ward. The nursing staff and students participated in an Essay competition on the theme of this year's World kidney day. A Poster competition for the nurses and a drawing competition for children was held and it created a teaching material for education of parents of children from all wards who were called for an educational session. Issues related to kidney failure, transplant and organ donation were discussed. The Logo competition and slogan competition was resulted in several innovative suggestions suitable for use by the Paediatric Nephrology team!

Live Demonstration Workshop for patients with chronic kidney disease and for those on maintenance dialysis was done. Different techniques and recipes which could enhance the child's appetite and also meet the nutritional requirements, making the diet more interesting were discussed. Live workshop was an instant hit as children could taste many of these recipes.

A special meeting was held for families of children who had undergone transplant, dialysis patients, and also included those undergoing pre transplant workup. Education on basics of kidney disease, principles of haemodialysis and peritoneal dialysis, evaluation for transplant and procedure of transplant was explained. This was followed by Question and Answer session with the parents. The program was very well appreciated by the parents who felt that their knowledge had been enhanced and would definitely help to give better to their children.

Recipes for Children with CKD

Snapshots of Poster Competition

Submitted By: Dr Indira Agrawal

7. AIIMS Bhopal (ISN-SRC Program)

World Kidney day 2022 was celebrated from 7th -10th March 2022 with a number of events such as ISPN endorsed state level quiz for postgraduates where 35 postgraduates participated from various medical colleges across state of M.P. The event was organised as a part of ISN-SRC program at AIIMS Bhopal. College level quiz for undergraduates was also conducted to disseminate the awareness among them. Awareness talks in OPD areas for patients visiting AIIMS Bhopal was also conducted. Various activities for children visiting Paediatric nephrology clinic were organized such as clay modelling, drawing competition and fancy dress competition and best three performers were awarded. It was attended by 72 delegates.

Winners of the Undergraduate Quiz

The post graduate quiz in progress (ISPN Endorsed)

Patient awareness program in the OPD Area

Children's activities in the SMART unit at AIIMS Bhopal

Submitted By: Dr Girish Bhatt

8. Vadodara, Gujarat

Dr Jalpa Dave practicing Pediatric Nephrologist had organised ***Walkathon*** along with women's wing to celebrate World kidney Day along with international Women's day on Sunday 13th march. She also gave a talk show on regional channel to create awareness about kidney disorders in local language. The event was organised on 13th March and attended by 40 delegates

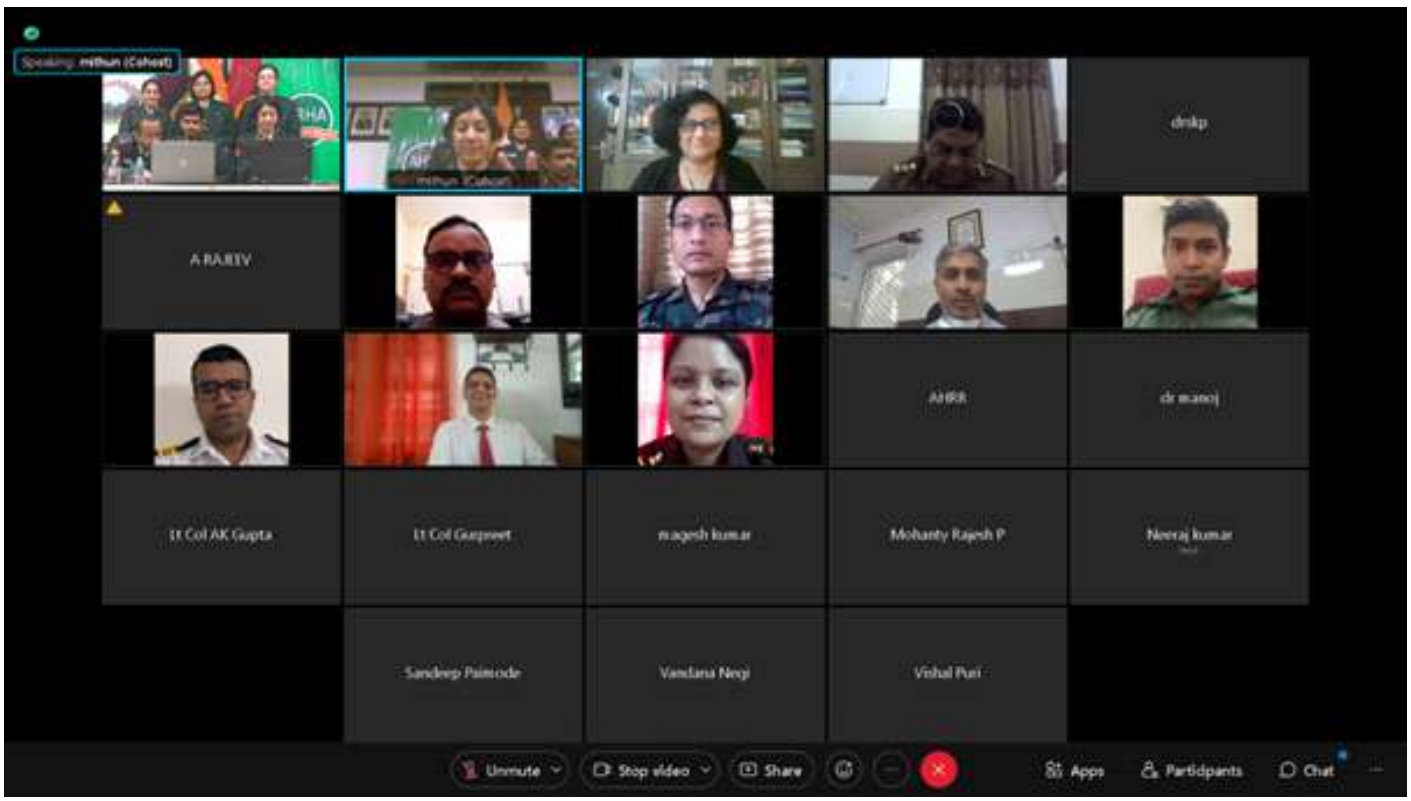
Walkathon….

Regional Media Coverage

Submitted By: Dr Jalpa Dave

9. Army Hospital, Research & Referral, New Delhi

This was a one and a half day meeting as an update of Paediatricians in the Armed Forces. It discussed important aspects of Paediatric Nephrology including a workshop on management of Shock and use of USG on the bedside in critically ill children for fluid assessment. There were interactive sessions by national faculty on various topics like Nephrotic Syndrome, AKI, and Paediatric Hypertension. The program was attended by 50 delegates including 10 faculty and funded through DGAFMS. The program was held on 25th November 2021, entitled "Care of Little Kidneys: Practice of Paediatric Nephrology in Armed Forces" and organised by Dr Suprita Kalra and Dr Aditi Sharma

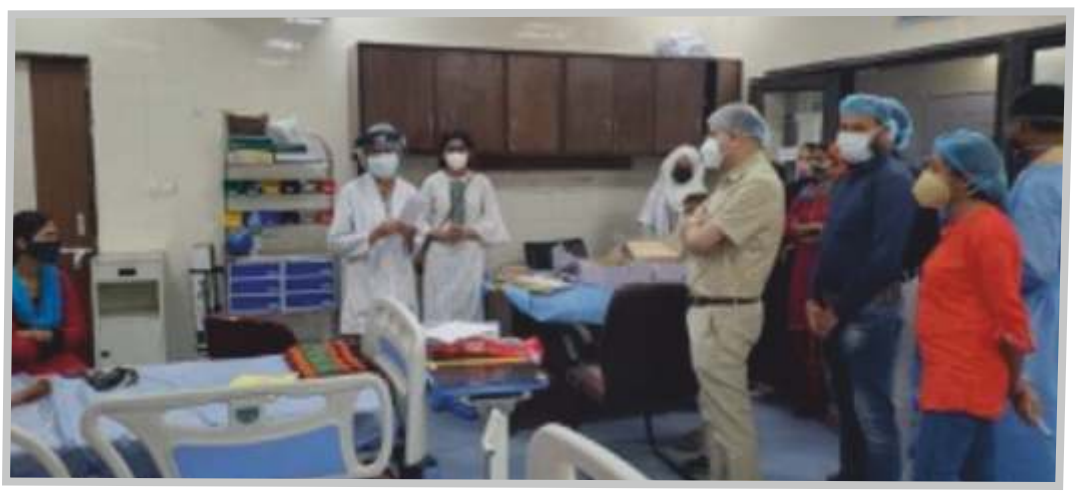


Attendees of the Virtual CME

Submitted By: Dr Suprita Kalra

10. Lady Hardinge Medical College & Kalawati Saran Children's Hospital, New Delhi


World Kidney Day, 2022



Lady Hardinge Medical College & Kalawati Saran Children's Hospital, New Delhi

Every year, we celebrate world kidney day on second Thursday of March. The year 2022, the theme of "Kidney Health for All" was celebrated at division of Paediatric Nephrology, Department of Paediatric, Lady Hardinge Medical College (LHMC) & associated Kalawati Saran Children Hospital (KSCH) with aim for increasing awareness amongst the patients, parents and paediatric residents.

Patient education activities focused at increasing awareness on early detection of kidney diseases including the need for regular antenatal care and follow up of high risk new-borns. The role of healthy diet and adherence to healthy lifestyle was emphasized by our assistant professor and Dietician. A fun activity for children was also organized with drawing activities and painting works.

A multidisciplinary teaching activity for paediatrics and paediatric nephrology students was conducted. It included interactive case presentation and discussions involving our nephrology, pathology, paediatric surgery and radiology colleagues.

The cases were presented by postgraduate students and senior residents from KSCH under guidance of Paediatric Nephrology (Dr Abhijeet Saha, Dr Menka Yadav, Dr Prajal Agarwal), Pathology (Dr Vineeta Batra), Radiodiagnosis (Dr Chirag Jain), and Paediatric Surgery (Dr Archana Puri). Case discussion was followed by a very informative session on "Acute kidney Injury" by Professor Arvind Bagga. A grand round of inpatients in Nephrology ward was also conducted with Dr Priyanka Khandelwal.

We look forward to continuing such education and awareness activities in future so as to ensure preventive and timely therapeutic care to all children with kidney diseases

Submitted By: Abhijeet Saha

11. SAT Hospital, Government Medical College, Thiruvananthapuram

World kidney day was celebrated on 10th April 2022 at SAT Hospital, Government medical college, Thiruvananthapuram. After the public function and awareness class for the hospital staff, cultural program was organized by the department.

Inauguration of World Kidney Day 2022

The event was inaugurated by the famous contemporary Malayalam poet and lyricist Mr. Murukan Katakada. The presidential address was delivered by Dr. Sara Varghese Principal, Government Medical College, Dr. Satish Balan President, Trivandrum Nephrology Club introduced WKD 2022 Theme to the audience. Dr. Susan Uthup took an awareness class for the hospital staff on common kidney diseases and kidney protection strategies.

KIDNEY AWARENESS CLASS FOR HOSPITAL STAFF

The official function was followed by a cultural program performance by children with kidney diseases and staff of SAT Hospital. A short drama with the theme of maintaining kidney health was performed by the children. The theme of the skit was conceived written, directed, acted by children on dialysis and transplant

Cultural Activities by Children with CKD

Protecting Kidneys for Healthy Life Skit by Children on Dialysis

WKD 2022 CME was conducted for practicing pediatricians at Hotel SP grand days. Dr Susan Uthup delivered a talk on Urinalysis in renal disease. Dr. Pankaj Despande talked on Enuresis. Dr Liji R discussed the approach to hematuria and Dr Radhika C Radhakrishnan talked on Infection-related glomerulonephritis. The meeting was attended by around 100 pediatricians.

Submitted By: Dr Susan Uthup

12. All India Institute of Medical Science, New Delhi

A paediatric haemodialysis workshop was conducted on 12th March 2022 at AIIMS New Delhi under leadership of Prof. Arvind Bagga. It was a hybrid event attended by more than 90 delegates. This was a one day event with sessions specifically designed for paediatric haemodialysis nurses and technicians. The program was also attended by Fellows in Paediatric nephrology and residents in Paediatrics.

Proceedings of the workshop with Prof. RN Srivastava and Prof. Arvind bagga

Prof. Arvind Bagga with other distinguished faculty and delegates

Submitted By: Dr Aditi Sinha

13. North Bengal Medical College, Darjeeling

This year "World Kidney Day" rather "Week" was celebrated in various hospitals and PPP centers of West Bengal including the peripheral health centers. North Bengal Medical College, Darjeeling organized a "Sit & Draw" competition with the efforts from Department of Pediatrics & Nephrology involving the little kids with renal ailments from IPD and also attending OPD. The nursing team and the dialysis technologists addressed the parents and clarified their basic doubts regarding renal health as well as nutrition. HOD, Pediatrics also gave a brief outline on how to protect those little kidneys. Govt of WB has also published a "one-pager pediatric renal awareness minutes" to be displayed in different Pediatric Nephrology service stations. A talk on peritoneal dialysis with the help of Baxter was organized.

WKD 2022 events snapshots at NBMC, Darjeeling

Poster endorsed by Govt of WB, Dept of H & FW for WKD 2022

Submitted By: Dr Sumantra Kr Raut

14. Newborn and Child Care Clinic, Siliguri

A ***"Sit & Draw"*** competition was organized by the clinic involving the little kids with renal ailments. The nursing team also addressed the parents. Dr Sumantra Raut and Dr Prince Parakh and gave a brief outline on how to protect those little kidneys. Some simple DOs and DONTs on nutrition and lifestyle, and urine and potty habits were discussed. The event was covered by local print media and as well as local news channels.

WKD 2022 events snapshots at Newborn and Child Care Clinic, Siliguri

Submitted By: Dr Sumantra Raut

15. Institute of Child Health, Kolkata

The Pediatric Nephrology Division of the Institute of Child Health Kolkata celebrated World Kidney Day 2022 with a series of events spanned over a month, aimed at raising awareness about kidney diseases in children and adhering to this year's theme of 'Kidney Health for All' and 'Bridging the knowledge gap across various levels of health care'. It started with a renal health screening programme in a school in Kolkata built for the education of orphaned children and those from the economically weaker sections of the society. Out of the 150 children from this school, 10 children were found to be having some abnormality in the form of elevated BP, presence of microscopic hematuria, proteinuria and urine stream problems. A similar renal health screening program among a group of street children from Kolkata was done. Out of the 50 children examined, 2 were found to be having abnormalities in urine dipstick analysis and elevated BP. The Non-Governmental Organization 'Prantakatha' had collaborated for this venture. An awareness programme for nurses and paraclinical staff, focusing on the principles of BP measurement and importance of urine examination for diagnosis of kidney diseases, was conducted. An interactive session with parents on the World Kidney Day on 10th March 2022 where doctors briefed them about the common kidney problems and the active role that they can play in preventing and treating kidney ailments in children. An online quiz competition for post graduate medical trainees in pediatrics from medical colleges across the state of West Bengal was done. Out of the total 7 teams, Calcutta Medical College emerged victorious with teams from Calcutta National Medical College and Institute of Child Health Kolkata being the first and second runner ups. A Walkathon was organized on the World Kidney Day on 10th March 2022.

Kidney Health Screening Programme in School

The Walkathon

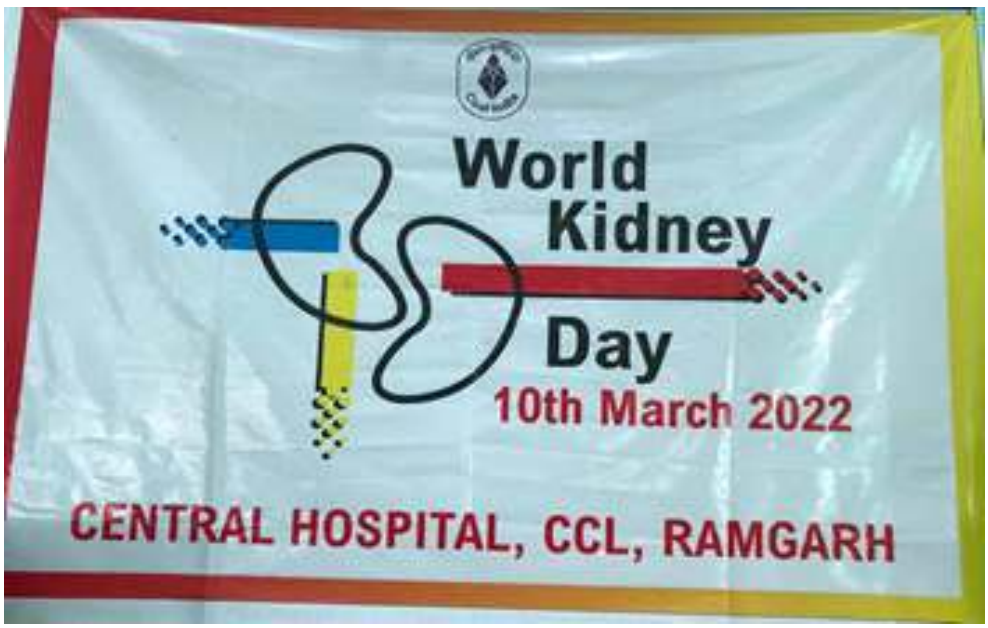
Screening among economically under privileged group

Program for Nurses

Submitted By: Dr Subankar Sarkar

16. Central Hospital, Central Coalfields Ltd. Ramgarh

This was an awareness programme conducted in the premises of Central Hospital Ramgarh for employees of Central Coalfields Ltd working in collieries around Ramgarh. Keeping with this year's theme kidney health for all, a talk about the preventive aspects of UTI & Renal Failure. Deliberations regarding how to stay healthy post-transplant and on dialysis. It was an interactive session. More than 100 employees attended the session.



17. Medical College Kolkata

On the 10th March 2022, World kidney Day was observed at the Paediatric Medicine Department of Medical College Kolkata. Faculties from Nephrology unit of Internal Medicine Department also shared their views . In this awareness programme 25 children and their parents with renal disease were present and had interaction on diet, patient follow-up, screening of BP, blood sugar and CKD. There was a drawing competition and poetry recitation by the children with kidney diseases.

Medical College Kolkata

Submitted By: Dr Shubhankar Sarkar

18. Government & PPP Dialysis Centers in West Bengal

Department of H&FW, Govt of West Bengal for organizing various WKD public events to create awareness. Around 30 centers including 12 Medical Colleges had organized different programs for spreading awareness like public meetings, walkathon, felicitating the dialysis MTs, interactive sessions between parents/ patients and doctors/ nursing staffs, leaflet distributions among parents etc. An online Zoom meeting for discussion on various nephrology topics, including Pediatric Nephrology awareness involving doctors and staffs of all dialysis centers across the state. Approx. 250 participants joined the online session. Director Medical Education, Director Health Service, Technical Officer of State Dialysis Module, and mentors and experts of State Dialysis Group Advisors exchanged their views during the session. The "one-pager pediatric renal awareness minutes" was displayed in different Pediatric Nephrology service stations.

Submitted By: Dr Sumantra Raut

19. Bhagirathi Neotia Women & Child Care Center, New Town, Kolkata

A “Sit & Draw” competition was organized by the hospital involving the little kids with renal ailments at BNWCCC. Director of the hospital Dr Indrani Subramanian addressed the parents. Pediatric Nephrologist Dr Sumantra Raut gave a brief outline on how to protect those little kidneys. Some simple DOs and DONTs on nutrition and lifestyle and urine and stool habits.

WKD 2022 events at Bhagirathi Neotia Woman & Child Care Center, Kolkata

Submitted By: Dr Sumantra Kr Raut

20. Paediatric Nephrology for Post-Graduates

Inspiring students by imparting core knowledge and skills is the responsibility of all teachers. Recently, five young paediatric nephrologists (Jitendra Meena, Georgie Mathew, Sumantra Raut, Christy Catherine Thomas, and Menka Yadav) came together to pass on their knowledge to paediatricians-in-training, celebrating World Kidney Day 2022. The webinar series, inaugurated by Prof Arvind Bagga, was conducted on a virtual platform on the weekends of March 2022. Seventeen interactive sessions were conducted in total, covering the most practical aspects of paediatric nephrology encountered in routine clinical practice and training. Participants from all over the country attended (nearly 500 registrations and 100-150 active participants) and enriched their knowledge of paediatric nephrology. All participants received the lecture material handouts after the conclusion of the program. In a feedback survey, all participants expressed the need to reiterate the sessions periodically and it is planned to conduct the webinar series later in the year, with added topics (as requested by the participants).

It is planned to disseminate the course material in other forms as well (YouTube link: https://www.youtube.com/channel/UC2PZL-E-C8edQnULcV1AtYA) in the future. It is hoped that this program has enthused many postgraduates and inspired some of them to pursue further training in paediatric nephrology.

Submitted By: Dr Jitendra Meena

33rd Annual conference of Indian Society of Paediatric Nephrology (ISPNCON 2021) Hosted by AIIMS, Bhopal

Department of Paediatrics, AIIMS Bhopal hosted 33rd annual conference of Indian Society of Paediatric Nephrology from 10-12 December 2022, which is the annual meeting of Paediatric Nephrologists across the India. The event was supported by the ISN –SRC programme and The ISPN. A total of 12 international faculties and 50 National faculty delivered talks related to kidney disease in children. The programme was attended by more than 800 Paediatricians and paediatric nephrologists from more than 20 different countries. The pre-conference CME was dedicated to Paediatric hypertension and newer technologies for diagnosis of hypertension in children. A total of 109 research papers were presented from students and young researchers from India. Dr Girish Bhatt and Prof Shikha Malik (HOD, Paediatrics) were lauded for their excellent program.

Inauguration of ISPNCON2021

33rd Annual conference of Indian Society of Paediatric Nephrology (ISPNCON 2021) Hosted by AIIMS, Bhopal

Proceedings of the virtual meeting with Prof RN Srivastava addressing the audience

Submitted By: Dr Girish Bhatt

PDHANDSON-2022-An IPNA endorsed AIIMS Jodhpur Pediatric nephrology CME cum workshop

Dr Aliza Mittal at Department of Pediatrics AIIMS Jodhpur, conducted on 27th Feb 2022 this IPNA endorsed teaching course. It was unique in providing hands on-training in instituting and prescribing Peritoneal dialysis in AKI to pediatric residents from all over rajasthan. The CME that carried 2 credit hours was attended by over 80 delgated including 20 faculties. The program started with lectures on common pediatric nephrology scenarios which are of importance to general practitioners and pediatricians such as Nephrotic syndrome by Prof Arvind Bagga, Nocturnal Enuresis by Prof. Susan Uthup, AKI by Dr Suprita Kalra, UTI in Children By Dr Girish Bhatt,Renal Tubular acidosis by Prof. Sriram Krishnamurthy and CKD by Dr Manish Chaturvedy. Dr Mritunjai Kumar and Dr Shilpa Saxena deliberated on the proceedings of handson workshop. The event was also attended by faculties from Dr SN Medical College with full enthusiasm to learn the process of PD. The delegates were also provided with a printed course booklet containing the lectures byfaculty, details of PD procedure and case scenarios for PD prescription as ready reckoner to carry back home.

Prof Arvind Bagga discussing Nephrotic syndrome

PDHANDSON-2022-An IPNA endorsed AIIMS Jodhpur Pediatric nephrology CME cum workshop

PDHANDSON 2022 at the conclusion of event

Learning Handson insertion of PD catheter with Dr Shilpa Saxena

Submitted By: Dr Aliza Mittal

Pediatric PD Workshops in West Bengal

Department of Health and Family Welfare, Govt. of West Bengal has adopted the strategy to improve the current status of RRT services in Pediatrics. The 1st round of training happened at Kolkata (MC, Kolkata; NRSMCH & IPGMER), the 2nd at North Bengal Medical College and 3rd one at BSMC, Bankura. The 4th workshop was held on 21.12.2021 at Burdwan Medical College. 5th workshop was held in Midnapore Medical College. These workshops are a 2 days program with lectures on basics and procedure of PD followed by hands-on opportunity to insert stiff PD catheter by each trainee on dummy abdomen. Baxter India has been helping the organizers with logistics. Faculties from Pediatrics, Medicine, Nephrology and Pediatric Surgery have come together better collaboration of this workshop and future dialysis program. The program is endorsed by the Bengal Society of Pediatric Nephrology, West Bengal Academy of Pediatrics and Burdwan Academy of Pediatrics.

So far through these 5 workshops, 63 Dialysis Technologists, 40 Pediatrics JRs, 15 Medicine JRs involving 27 faculties from various Medical Colleges and from various fraternities have been trained.

4th Paediatric PD workshop at BMC, Burdwan

Pediatric PD Workshops in West Bengal

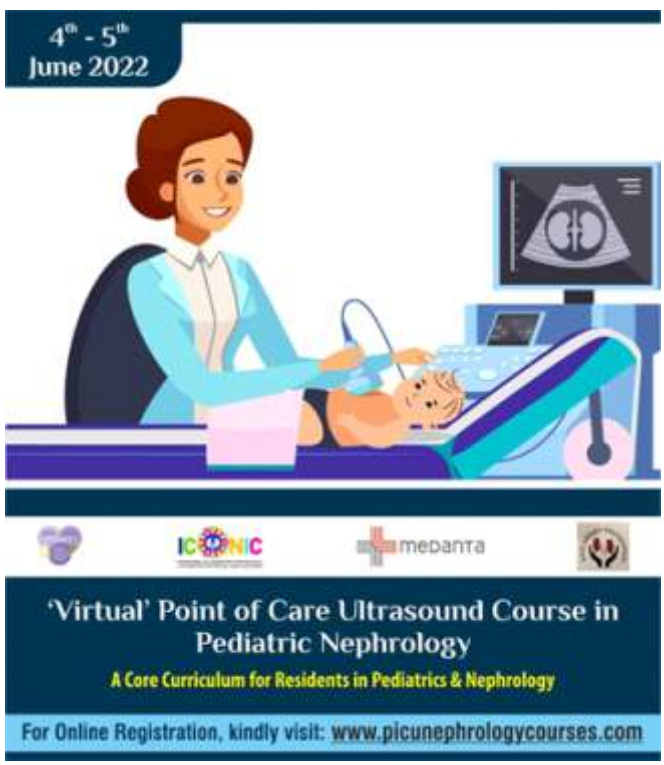
5th Paediatric PD workshop at Midnapore Medical College

Submitted By: Dr Sumantra Raut

Virtual Point of care Ultrasound course in Pediatric Nephrology (4-5 June 2022)

In an effort to incorporate " point of care Ultrasound for assesment of a critical child with Acute kidney Injury, in teaching core curriculum for residents and young faculty, Dr Sethi and Dr Raina with their team have planned an " Online course on Point of care ultrasound in Pediatric Nephrology" with OSCE based assessment after the course. The planned modules for the course are listed in the online brochule which can be accessed at picunephrologycourses.com.

The link for registration is: https://picunephrologycourses.com/



34rd Annual Conference of the Indian Society of Paediatric Nephrology
ISPNCON 2022

The 34rd annual conference of the Indian Society of Paediatric Nephrology 2022 will be held in Mumbai on 2nd to 4th December 2022 with theme 'Journey of nephron from embryo to senescence…'

Organising chairpersons: Dr Shashank Parekhji, Dr Atul Deokar, Dr Parmanand Andankar.

Organizing secretary: Dr Kiran Sathe

Co-organizing secretaries: Dr Prithi Inamdar, Dr Sneha Nagpure

Upcoming Events

Paediatric Bladder and Urodynamics

International Children's Continence Society (ICCS) is conducting an online CME focussed on bladder (20th May- 22nd May , 2022 from 5.30 PM to 9.30 PM IST). All speakers are from ICCS and registration fees is nominal (INR 1000).

For registration you can click on

https://doctor.clirnet.com/mastercast/connect/D0520-pediatric-bladder

Dr Rajiv Sinha

ICH, Kolkata, West Bengal

New Joining's

Dr Rachita Singh Dhull joined as Assistant Professor of Paediatric Nephrology in Division of Paediatric Nephrology, Lady Hardinge Medical College, New Delhi on 27th April 2022. She became the first faculty to join Central Health Services in the Teaching Specialist Cadre as Assistant Professor of Paediatric Nephrology. She has completed 3 years Fellowship in Paediatric Nephrology from Children's Hospital of Michigan, USA. Prof Harish Pemde, Acting Head, Department of Paediatrics welcomed her.

Answers to Quiz

Quiz 1

Urine Dipstick Monitoring in a Child with Nephrotic Syndrome: Answers

SUMANTRA KUMAR RAUT

Discussion: Prednisolone and tacrolimus (but not cyclosporine) both have diabetogenic potential, more so if used in combination. Both tacrolimus and cyclosporine can cause tubular injury which is not dose dependant [1]. It may manifest as glucosuria, low molecular weight tubular proteinuria and normal anion gap metabolic acidosis. FSGS in due course may have tubular involvement per se and manifest with similar features [2]. For patient X all 3 options in Q1 may be possible but normal blood glucose ruled out option 'a'. Secondary tubular injury requires symptomatic management with fluid, electrolytes and alkali therapy titration. Additionally, CNI induced tubular damage merits omission of CNI if feasible. Mostly tubular injury is reversible once CNI is discontinued. But the dependence course with cushingoid features merits some sort of steroid sparing drugs like cyclophosphamide which doesn't cause much tubular damage.

Lesion learnt: Periodic monitoring of adverse events of drugs used for prolong period in nephrotic syndrome is required. Urine glucose testing is an easy way to look for tubular injury or glucosuria in a nephrotic child as most of them are doing regular dipstick examination for albumin. Parents need to be alarmed to note down the urine protein only in their nephrotic dairy to avoid confusion in colours; but to inform the physician if dipstick glucose colour changes. Dipstick need to be preserved well, in order to avoid premature expiry of colour reagents.

Answers: **Ans 1 - d** (All of the above);

Ans 2 - c (Change tacrolimus to cyclophosphamide)

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Quiz 2

Sinister in Disguise

NILADRI BOSE, DEBLINA DASGUPTA, SHAKIL AKHTAR, SUBHANKAR SARKAR, RAJIV SINHA
Division of Pediatric Nephrology, Institute of Child Health, Kolkata, India.

Answer 1

3 years old boy with polyuria with evidence of proximal tubular dysfunction and hypophosphatemic rickets was diagnosed as Fanconi syndrome. Eye and hearing examination was normal, however development of pallor and hepato-splenomegaly without significant lymphadenopathy warranted detailed evaluation.

Answer 2

Repeat blood investigations revealed Hb: 5.6 gm/dl, thrombocytopenia (0.78 lac/mm3) and leucocytosis (17700/mm3,46%neutrophils, 53%lymphocytes), ESR 88 mm/hr, Hb electrophoresis was normal and iron studies showed elevated serum ferritin (978ng/ml). Peripheral blood smear showed atypical cells. Abdominal ultrasound revealed bilateral enlarged kidneys (right kidney 11.4 cm (z+ 4.7) and left kidney 12.1 cm (z +5.1)). In view of bicytopenia, bone marrow biopsy was done showed blast cells and confirmed the diagnosis of precursor B- cell Acute Lymphoblastic Leukaemia by flow-cytometry.

Chemotherapy started by the haematology team. After starting treatment for the leukaemia, there was a rapid improvement in clinical well - being and also the biochemical parameters resulting in reversal of acidosis, electrolyte abnormalities and renal dysfunction. At present the patient is well on chemo therapy and supportive management for RTA has been stopped.

Discussion

Fanconi syndrome (FS) is a rare metabolic disease caused by dysfunction of the proximal renal tubules. There is abnormal urinary excretion of several metabolites, including glucose, phosphate, amino acids, uric acid, and various ions due to low reabsorption capacity of the proximal tubules. Other biochemical findings include hypokalaemia, hypouricemia, and metabolic acidosis (1, 2).

Fanconi syndrome may be a genetic disease with primary or secondary causes, or may be acquired. The causes of FS may also lead to renal tubular acidosis. Dysglobulinemia is a feature of FS, and some studies in the literature report FS in association with myeloma, amyloidosis, and Bence-Jones proteinuria (3). Although renal infiltration is relatively frequent in ALL, nephromegaly at the onset of the disease is unusual. There have been several case reports of ALL presenting as palpable bilateral nephromegaly (4-7). Among the causes of nephromegaly, ALL is an important differential diagnosis in children. Leukemic involvement of the kidneys might cause various symptoms, including acute kidney injury by hyperuricemia (8) and various life-threatening electrolyte disturbances and acid-base disorders (8, 9). Acute leukaemia presenting as FS is extremely rare (10).

In our case, pathogenesis of FS might be related to dense leukemic cell infiltration of the kidneys causing nephromegaly. Rapid restoration of renal tubular function following administration of chemotherapy also suggests this mechanism. To conclude any child with FS with renomegaly should be actively looked for haematological malignancies.

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