Kerala Journal of PMR

Bird rising up from sea
flutters it's wings to fly up
like The Sun rising after
Sunset...
Resurrection
Glorifying Rehabilitation
In my imagination

2021

Vol 18 issue 4

FROM THE EDITOR'S DESK

Dear Readers, Like a bright star in the night sky Dr. Sreeja is the only one to contribute for this issue's theme. We fell short of authors this time. Likely this is due to events like the recent conference, the delta variant spike etc. In the past I've managed to fill up the journal with contents. At work we spent the last quarter preparing for inspection by three different regulatory bodies. I guess no one had free time. As always KJPMR is teamwork. If no one submits, the journal won't exist. It's a privilege to have an egalitarian Executive Committee that supports this endeavor. Don't waste the opportunity. Many doctors need to learn how to write. This is the place you can make mistakes and grow. I beseech department heads also. Your students will have material to submit. The most common source will be posters etc presented in conferences. Old unpublished thesis, small research works not already/ rejected elsewhere. We accept all with open arms. Luckily now I have Bineesh. Together we've managed to 'put some meat on these bones'.

Due to irregularities in submissions for the 'Members in action' section we had our second board meeting. The outcomes are as follows. 1) prepare your submission as a word document, 2) send it to Dr.Reeba before the deadline at drreebamani @gmail.com, 3) if you've started working somewhere, you can tell everyone, but specifying numbers of injections, absence or presence of staff, days and hours worked are all unwanted information, 4) if your hospital marketing department has made material about you, its not appropriate for this section, 5) submit by the deadline.

The other topic discussed was about how to move forward with this release. Many invited authors failed to contribute this time. You'll note the page count. We thought to either ditch the preset theme (Meningomyelocele) and replace it with a special issue on Cognition, or just move forward. George Sir suggested doing both. You can see results. KJPMR has a five year publication cycle. We are two-fifths of the way through it. Dr.Sreeja submitted her work over a year ago. Replacing topics jeopardizes the work of others like her.

As always submissions are welcome. In fact we are starved for them. Our next issue's theme is Vascular diseases. Happy reading.

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"Articles are the responsibility of the Authors"

Meningomyelocele made easy: A Holistic Approach

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Neural tube defects are caused due to any abnormalities that interfere with the closure of the neural tube during embryogenesis. Meningomyelocele is the most common and severe form of NTD and cause lifelong disability and morbidity in children [(1)]. Its prevalence in India varies from 0.5-11/1000 live births[(2)]. The prevalence of MMC has decreased in the post-fortification era with folic acid supplementation during reproductive age and prenatal screening with elective termination of pregnancy.

Spina bifida occurs due to the failure of closure of the neural tube during the fourth week of embryogenesis.The spinal cord injury caused by MMC is said to be by a two-hit hypothesis.1st hit is by the initial defect of neurulation and 2nd by in-utero acquired damage to the spinal cord, which is openly exposed. Prenatal therapeutic strategies can interrupt the mechanical, degenerative, and inflammatory changes caused by the second hit[(3)].

Genetic single gene defects, environmental factors, folate deficiency, temperature, drug exposure, substance abuse, maternal infection, vitamin B12, zinc deficiency and lot many etiological factors have been shown relation to NTDs[(4)]. MOMS trial sponsored by NIH reported that prenatal surgeries were associated with higher rates of complications like oligohydramnios, chorioamniotic separation, spontaneous rupture of membranes, and preterm delivery.

There is no absolute cure for the condition, and MMC affected children face significant lifelong disabilities like paraparesis, sensory issues, neurogenic bowel, bladder, and issues of Arnold Chiari II malformation with secondary hydrocephalus[(5)]. Nearly 30-50% of patients relies on a wheelchair for mobility and usually requireslifelong rehabilitative support for a better quality of life and reducing the economic burden caused by the condition.

Management of the MMC patient is for entire lifespan.Rehabilitation physician should be well versed in anatomic dysfunction, and its effect in normal development and ageing in a MMC child.The principles in interdisciplinary management of various issues in this condition is elaborated under these headings,

1. Psychosocial and cognitive issues
2. Neurogenic bladder
3. Neurogenic bowel
4. Musculoskeletal issues
5. Latex Allergy
6. Nutrition and Lifestyle issues
7. Sleep-Related Breathing Disorders
8. Hormonal imbalances

1. Psychosocial and Cognitive issues

Children with MMC have comparatively low IQ level. It is said that almost 38% of children after shunt surgeries have an average intellectual function. Cognitive impairment is related to the dysfunction

caused by hydrocephalus and associated malformations. About 75% of treated high-pressure hydrocephalus children required special education services at a later stage. They also have issues in attention, timing, and movement due to associated cerebral changes[1].

Personality traits also vary in children with MMC when compared to age-matched healthy controls. They have better verbal skills than their written skills. They are found to be more introverted, less attentive and easilydistractible.

Timely intervention is required, and the inclusion of a psychologist as a core member in comprehensive treatment is a must. Parents should be counseled on the importance of child socialization,encourage participation in school programs, and train them to keep schedules for routine chores.

Scales useful for social function are:-

Kennedy Krieger Independence Scales-Spina Bifida(KKIS-SB)

Adolescent or Young Adult Self Management and Independence Scale-AMIS II

2. Neurogenic Bladder

About 97%of children suffer from the neurogenic bladder and 40% develop some degree of upper renal dysfunction[6].

Rehab Treatment target-To reduce urinary bladder pressures and minimize urine stasis.

Neurogenic bladder types are:-

a) Flaccid

b) High pressure

c) Hyperreflexic

d) Open bladder neck and or overactive external or internal sphincter

e) Detrusor sphincter dyssynergia

Type and severity of urinary tract dysfunction should be evaluated periodically with USG and UDS because the spinal cord level at which bladder is controlled is below spinal roots concerned with lower extremity function.

Assessment guidelines:- USG	VCUG,CMG,EMG
After birth 3/4months Every 3 m in 1st Yr of life Every 6 m in 2nd Yr of life	Birth 4-6m 1yr 3-4yrs Every 2-3yrs after that

Table -1

Periodical monitoring of renal and bladder USG and urological studies throughout life are required. VUR, bladder wall, bladder capacity, the post-void residual volume should be assessed.

Monitoring is essential due to these reasons:

1. Bladder function may change within 1st few months of life because of healing after initial spine closure. Capacity does not increase as in a healthy child.
2. Tethered cord change lower urinary tract function.
3. CIC compliance may vary size of catheter, dosages change.

2.1. Urinary Tract Infections

Urine routine, urine culture should be sent and treatment should be given only in symptomatic cases.

DMSA/MAG3 is done in unfavorable urodynamics or significant abnormality of the upper tract.

MANAGEMENT

1. Medical management

Anticholinergic oxybutynin dosage
Infants- 0.1 mg/kg orally 3 times a day 1-5yrs- 0.2 mg/kg /dose 3 times a day. >5 yrs-5 mg orally 3 times a day.

Table – 2

Transdermal patch or extended-release preparations can be used

Tolterodine -1-2mg PO BD or long-acting OD dose can be taken

Other agents Mirabegron, fesoterodine, solifenacin, darifenacin, propiverine

2. Ideally, CIC to be started from less than 1yr. Early initiation preserves the need for bladder augmentation for a later stage, and for more compliance with CIC technique.

In night time incontinence, continuously draining catheter during sleep or scheduled night time CIC. If unsuccessful, augmentation cystoplasty should be done.

3. Botox injection-Alternative to augmentation surgery with a more compliant bladder. In a small young fragile child with very high-pressure bladder who cannot tolerate surgery. It is used to postpone augmentation surgery by 1/2yrs.

3. Neurogenic Bowel

Assessment	**Rationale**	**Treatment options**
Stool shape	Ball shaped- due to decreased motility and increased water absorption. Oatmeal consistency – increased motility.	Increase fiber &fluid intake, clean out hard stools.
Stool texture	Hard/formed/soft	Fluid, fiber adjustments, motility aids
Stool quantity	4-6 in for 3-6yr old 6-8 in for 6-8 yr old 8-10 in for 9-11yr old 12-18 in for 12yr and older	Adequate amount ensures an empty descending colon.
The tone of the anal canal	If the tone is adequate, it will respond to the suppository.	If not responding to the suppository, then the internal anal sphincter tone is defective.
Level of Paraplegia	Determines ease of transfer and balance in toilet	If the child can balance, suppository, or enema works better.
Age	<5yrs >6yrs	Parent dependent Independent bowel program
Mobility	Wheelchair fits in the bathroom	Otherwise bedside commode
Fluid intake	It should be adequate to keep stool soft.	If fluid goals not met, encourage intake, evaluate for dysphagia
Fiber	Bulk stools are more comfortable for eliminating.	Supplementation in diet
Medications used	Anticholinergics and anesthetics cause slow motility	Change of management plan by reviewing the dosage.
Caregiver routine	To adjust timing of bowel training	Assist the medical approach for parents to carry out flexible plans in need.

Table – 3

MANAGEMENT

USE	MEDICATIONS	ACTION	DOSE	COMMENTS
Oral	Lactulose	osmosis	Infant:2.5-10ml/d child : 7.5 ml/d	SI – gas, bloating
	Senna	Stimulant laxative	Infant:1.25-2.5mld 1-5y:2.5-10ml/d >6y :5-15 ml/d	Action – from 6hrs
	Psyllium	Bulk laxative	Titrate	Taken with plenty of water
	Benefiber	Bulk laxative	One scoop=3g	Taste free
	PEG	Osmotic laxative	0.8g/kg once/d	Difficult to time. It is used to clean out the bowel.
	Metoclopramide, erythromycin	Motility agent – gastro colonic	0.1-0.2mg/kg 2-3 times/d 2-3mg/kg/dose 3 times/d	Decreases the colonic delay of stool
	Mineral oil	Lubricant	5-11y:5-15ml 1-3 times/d >12yr:30-60ml 1-3times/d	Clean out the bowel. Long term use - loses fat-soluble vitamins.
	Milk of magnesia	Osmotic laxative	6-11y:15-30ml/d >12y:30-60ml/d	Bowel cleanout
Rectal	Docusate	Stimulant	1mini enema added to transanal or MACE irrigation solution	Difficult to hold with incompetent external sphincter
	Bisacodyl-suppository	Stimulant	One suppository	Act within 5-10min
	Phospho-soda enema	Osmotic effect, peristalsis	2-11y: one 2.25oz paediatric enema	CI in renal insufficiency
	Mineral oil enema	Decrease water absorption, lubricate the rectum	2-11y:30-60ml single dose	Used in hard stool, can use in renal insufficiency, difficult in the incompetent sphincter

Table – 4

Practical issues in Bowel training	Troubleshooting
Stool urgency	Lower the dose of oral medications and to be given close to elimination time Diet modification.
Residual stools after finishing	Addition of fiber content, Increase physical activity. Change suppository to transanal enema
Ambulation stools	Use transanal enema
Liquid stool once a month in teenage girls	If stool frequency is related to periods, then 1/4 dose of medication for diarrhea. If it's not related, look for impaction or constipation.

Table – 5

4. Musculoskeletal issues

Congenital deformities seen in MMC are kyphosis, scoliosis, hip subluxation/ dislocation, clubfoot, and vertical talus. Acquired developmental deformities are related to the level of involvement and are caused by muscle imbalance, paralysis, decreased sensation in lower extremities.

Assess the neurological level and strength changes using standardized assessment tools at each visit. Changes in power, gait, sensations, bowel, and bladder function and contractures and deformities should be looked for.Hip subluxation /dislocation, contractures, and rotational deformities are always missed during rehabilitation.

Functional Mobility Scale and Gait analysis are useful in preoperative planning for ambulatory patients and quantitatively assessing surgical results.

The prognosis for ambulation can be roughly made from Spina bifida classification system.

In the natural course of MMC, child will not have worsening of neurological function. Tethered Spinal Cord Syndrome and syringomyelia should be kept in mind when an MMC child presents with new-onset weakness, urologic dysfunction,back pain, gait abnormality and sensory deterioration. The reasons of tethering in post-op MMC children are due to post-op fibrosis,inclusion cutaneous tumors,residual lipoma, lumbar canal stenosis and soft tissue reactions.Imaging such as MRI scan /CT, urodynamics, and sleep and swallow studies should be appropriately done.Timely surgical exploration or rethethering can drastically arrest the deterioration and improve functional outcome[6].

4.1. Orthoses

Almost all children require orthoses for ambulation. They are required to maintain alignment, correcting the flexible deformity, preventing deformity, facilitating independent mobility, and protecting the insensate limb[8].

Thoracic and high Lumbar	Sacral and low lumbar
Hip flexor and Adductor intact. Quadriceps nil Orthoses for upright weight-bearing and mobility. a. Standing frame. At 12 months or	AFO- solid AFO for weak dorsiflexor and plantar flexors. Forearm crutches stabilize weak hip extensor and

when head and neck control is achieved. b. HKAFO c. Reciprocating Gait Orthoses around 24 months when adequate sitting balance without hand support is achieved. d. Wheelchair for energy-efficient mobility.	abductors, improve hip and knee kinematics, and improve functional gait pattern. In rotational deformities- internal or external , AFOs with twister cables as early as 2 yrs until age for surgical correction (6yrs). Knee valgus with rotational malalignment - KAFO with free knee joint.

Table – 6

4.2. Joint Abnormalities

a) Hip joint

Look for:-

1. Contracture -see for pelvic obliquity, compensatory spinal abnormality
2. Subluxation
3. Paralytic dislocation

The goal of treatment - To maintain hip ROM with contracture release

The radiological success of hip reduction leads to restricted ROM and pathological fractures and compromises functional results. Preservation of strength of iliopsoas and quadriceps is a relevant determinant of adult ambulation than the hip joint. Low sacral level with dislocated hip may benefit from a surgical reduction to correct loss of fulcrum.

b) Knee Joint

1. Knee flexion contractures

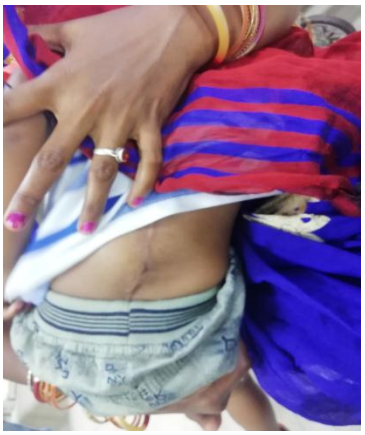
Releases of hamstrings, gastrocnemius, posterior capsule

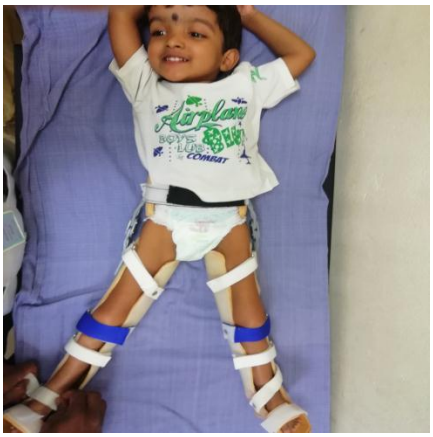
2. Knee extension contractures

Serial casting attempting to achieve 90deg knee flexion
VY quadriceps plasty
Tenotomy of patellar tendon and division of medial and lateral retinaculum.

c) Foot and Ankle deformities[9]

- Club foot - Ponseti method of serial casting →DB splint →CTEV shoes, PMSTR.
- Equinus foot – Serial casting,Night time AFO,TA lengthening.
- Vertical talus – Serial casting ,surgical release and k-wire fixation
- Calcaneo valgus/Ankle valgus/Cavovarus- Rigid AFO for flexible deformity,Surgical release and K-wire fixation for rigid deformities.





5yr old Anaya,post op case of High lumbar MMC,presenting with good trunk control,paraparesis,neurogenic bowel & bladder rehabilitated in our institution .On discharge compliance was attained for CIC,bowel training and child was given gait training with modified HKAFO with adequate parent counseling.

CDC advocates engaging children for 60min or more for physical activity each day. Vigorous-intensity aerobic activity and strengthening exercises to be done at least 3d/wk

5. Latex Allergy

Exposure to Latex maybe by direct contact or inhalation; Latex allergy manifestations are skin irritations, rash, flushed cheeks, itchy eyes,urticaria, wheezing, coughing, periorbital erythema, nausea, and vomiting. Toys, rubber balloons, and other environment latex materials should be screened and avoided. Great care should be given in using emergency medical equipment in MMC child as most of it is made of Latex. Latex-free gloves and urinary catheters should be used to prevent adverse reactions. Avoid food served in public places or parties which are prepared by latex gloves. Avoid foods with high-grade latex allergy associations like avocado, banana, chestnut, kiwi[1,7].

6. Nutrition and Lifestyle issues

MMC children have higher rates of overweight and obesity than the general population leading to lifestyle diseases like metabolic syndrome, cardiovascular disease, and type II diabetes mellitus.Girls present with precocious puberty and PCOD[7].

The guideline for fiber and fluid intake:

Dietary Fiber	Fluid intake
1-3y:19g 4-8y:25 9-13y:F-26g,M-31g 14-18y:F-26g,M-38g	100ml/kg for 1st 10 kg body wt +50ml/kg for next 10kg body wt +20ml for every kg of body wt over 20kg.

Table - 7

6.1. Skin

Daily inspect the skin for changes of any inflammation and pressure effects.

1. Special concern should be given to insensate areas, to avoid harmful effects of heat, moisture, or pressure.

2. Barrier creams must be used to protect the skin from damage due to bowel and bladder incontinence.

3. The skin should be inspected for well-fitting orthoses.

4. Children should wear protective clothing and footwear, including water shoes in the pool.

7. Sleep related breathing disorders

Sleep related breathing disorders in NTDs include central apnea, periodic breathing, obstructive apnea, and central hypoventilation. The prevalence of sleep disorders in MMC is 62-81%. Risk factors for this condition include higher spinal cord lesions, brainstem dysfunction respiratory diseases (Obstructive and restrictive lung diseases), obesity, and metabolic syndrome[3].

Symptoms in children are failure to thrive, delayed growth, mouth breathing, inattention, hyperactivity, snoring, excessive daytime sleepiness and confusion, and hiccups.

Enquire to parents and siblings about the child's quality of sleep, quantity, timing, and distractions noticed.

Questionnaires used in

a) Children: Children's sleep habits questionnaire, Paediatric sleep Questionnaire
b) Adults: STOP-BANG, Epworth Sleepiness Scale(ESS), Obesity Snoring Apnea Age >50 (OSA 50)

Gold standard investigation to assess the condition is Polysomnography. Pulse oximetry can be used in small settings.

Management:

Lifestyle changes,diet,weight reduction,chest physiotherapy.

8. Hormonal Imbalances

Serial monitoring of height,weight,arm span and examination of breast and genitalia is required, and in case of abnormality timely referral to an endocrinologist is required.

Progressive breast development over a 4-6 m period of observation or progressive penis and testicular enlargement, especially if accompanied by rapid linear growth,is abnormal.

Hydrocephalus affects the HPA and the secretion of pituitary hormones responsible for the growth and pubertal development.About 30% of children with MMC have growth hormone deficiency.There will be decreased height spurt, and parents should be counseled about expected height[1,7].

The risks and benefits of hGH therapy, IGF-1, IGF Binding Protein-3, and GH stimulation tests should be informed to parents. Hormonal function(pituitary), scoliosis progression, spinal cord tethering, growth velocity, and pubertal development during hGH therapy should be monitored.

For children, factual information and appropriate sexual education should include information about appropriate versus inappropriate touching. Explain to parents that sexual exploration is a normal and healthy part of early childhood development. Goal of continence for optimal sexual relationships in the future should always be in mind.

Conclusion

There is still no definite cure for Neural tube defects even after so much development in medical technology. The pre and postnatal surgeries do not treat the condition thoroughly and have risks in the life of mother and baby. The prevention of this condition is the only convincing solution in Indian scenario. Awareness of folate intake, food fortification, dietary modifications, and periconceptional intake of 400microgm of folic acid is said to help with reliable studies from all over India. A comprehensive rehabilitation formula should be formulated by institutions to cope up with the demands of these children.

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Journal Scan

Dr Noufal Ali

Predictors of Walking Activity in Children and Adolescents With Myelomeningocele

Brett Lullo [1], Nicole Mueske [2], Carmel Diamant [3], Alexander Van Speybroeck [4], Deirdre Ryan [5], Tishya Wren [6]

Assessed the relationship between real-world walking activity in children and adolescents with myelomeningocele (MMC) and gross measures of lower extremity strength, range of motion, demographics, and medical history. It was a prospective study. Walking activity in children and adolescents with MMC was best predicted by assistive device use and amount of sedentary activity. Other predictors of walking activity from univariate analysis were related to assistive device use. This information can help tailor rehabilitation efforts and educate patients and families. Interventions targeting early prevention of strength loss and contractures may be important to retain or increase walking activity in children and adolescents with MMC.

Arch Phys Med Rehabil. 2020 Mar;101(3):450-456.

Effect of Orthotic Gait Training with Isocentric Reciprocating Gait Orthosis on Walking in Children with Myelomeningocele

Mokhtar Arazpour [1] [2], Farin Soleimani [1], Firoozeh Sajedi [1], Roshanak Vameghi [1], Monireh Ahmadi Bani [2], Masoud Gharib [3], Mohammad Samadian [4]

Evaluated the influence of orthotic gait training with an isocentric reciprocating gait orthosis (IRGO) on the kinematics and temporal-spatial parameters of walking in children with MMC. Five children with MMC were fitted with an IRGO. They walked at their own comfortable cadence using the orthosis. The hip joint angle, spatial temporal parameters, and compensatory motions were measured and analyzed.

The findings showed that orthotic gait training improved hip joint range of motion, increased walking speed and step length, and decreased lateral and vertical compensatory motions during level-ground walking trials.

Top Spinal Cord Inj Rehabil. Spring 2017;23(2):147-154.

Functional Mobility Improved After Intensive Progressive Resistance Exercise in an Adolescent With Spina Bifida

Carol L Baym [1], James B Hedgecock, Mary Jane K Rapport

The use and effectiveness of a novel intensive progressive resistance exercise (PRE) approach to address the functional goals of a 14-year-old adolescent with a myelomeningocele. The child had lower extremity weakness, knee and hip flexion contractures, impaired somatosensation, and cardiopulmonary deconditioning, affecting gait mechanics and functional ambulation. An 8-week intensive PRE-based intervention was designed to improve walking in the home by targeting both power-generating and stabilizing lower

extremity musculature. Secondary intervention focused on cardiopulmonary endurance training. The child demonstrated improvements in gait speed, walking endurance, and functional lower extremity strength. Knee contracture was moderately responsive to sustained stretching and positioning.

Pediatr Phys Ther. 2018 Apr;30(2):E1-E7.

Conventional physical therapy and physical therapy based on reflex stimulation showed similar results in children with myelomeningocele

Carolina Y P Aizawa [1], Mariana P Morales [1], Carolina Lundberg [1], Maria Clara D Soares de Moura [1], Fernando C G Pinto [1], Mariana C Voos [1], Renata H Hasue [1]

Investigated whether infants with myelomeningocele would improve their motor ability and functional independence after ten sessions of physical therapy and compare the outcomes of conventional physical therapy (CPT) to a physical therapy program based on reflex stimulation (RPT). Twelve children were allocated to CPT (n = 6, age 18.3 months) or RPT (n = 6, age 18.2 months). The RPT involved proprioceptive neuromuscular facilitation. Children were assessed with the Gross Motor Function Measure and the Pediatric Evaluation of Disability Inventory before and after treatment. Both groups showed improvement on self-care and mobility domains of both scales. There were no differences between the groups, before, or after intervention.

Arq Neuropsiquiatr. 2017 Mar;75(3):160-166.

Quiz

1. The Stedman Medical Dictionary defines _____as “a general term used to describe a collection of congenital abnormalities that include defects in the vertebrae, and spinal cord or nerve roots.”
   (a) Meningocoele (b) Myelomeningocoele (c) Dysraphism (d) Spina bifida
2. “Near-complete absence of neural tube closure, sometimes sparing forebrain”, is called?
   (a) Encephalocoele (b) Dysraphic defect (c) Anencephaly (d) Craniorachischisis
3. To substantially attenuate the risk for NTD(neural tube defects), women of childbearing age must have RBC folate concentration greater than _____ at least at a population level.
   (a) 100nmol/L (b) 1000nmol/L (c) 500nmol/L (d) 750nmol/L
4. _____is the current “gold standard” for the prenatal diagnosis of Myelomeningocoele..?
   (a) Ultrasound (b) MRI (c) X-ray (d) Serum markers
5. _____ is the dilatation of the central canal of the spinal cord. It is analogous to dilatation of the ventricles in the brain and is a relatively common occurrence in children with MMC, being present in up to 40% of patients.
   (a) Anencephaly (b) Hydromyelia (c) Diastematomyelia (d) Diplomyelia
6. The most common organism causing shunt infection after a VP shunt for Hydrocephalus is..?
   (a) E. Coli (b) Staph. Aureus (c) Pneumococci (d) Staph. Epidermidis
7. Urologic involvement in MMC and other spinal dysraphisms varies but was found to be present in about __% of patients…?
   (a) 20 (b) 50 (c) 90 (d) 40
8. Neurogenic bowel involvement in Myelomeningocoele results in incontinence due to..?
   (a) Impaired rectal sensation (b) Impaired sphincter function (c) Altered colonic motility (d) a & b (e) a, b, & c
9. Calcaneus deformities can be seen at birth or develop postnatally as a response to unopposed dorsiflexion in patients with _____ paralysis.
   (a) Thoracic (b) Cervical (c) Mid-lumbar (d) Sacral
10. According to Hoffer Ambulation Criteria, ambulatory function can be divided into __ groups?
    (a) 2 (b) 4 (c) 3 (d) 5

Key

1. (c)

Raphe (or rhaphe) is a Greek word meaning "the line of union of two contiguous bilaterally symmetric structures." In animal anatomy it is used to describe a ridged union of continuous biological tissue. Dysraphism refers to failure of normal midline fusion. *The Stedman Medical Dictionary* defines dysraphism as *"a general term used to describe a collection of congenital abnormalities that include defects in the vertebrae, and spinal cord or nerve roots."*

Spinal dysraphisms may be *closed or open*. Bony spina bifida occulta with just incomplete closure of the posterior elements of the spine without neurologic involvement is incidentally noted in 17% of the general population and 30% of normal children aged 1 to 10 years.

It is often not included in the group constituting spina bifida because there is no associated neurologic deficit. More complex occult closed spinal dysraphism, including diastematomyelia, lipomyelomeningocele, and tight filum terminale, among others, are a result of disordered secondary neurulation and can present with neurologic compromise or orthopedic deformity. There may be associated cutaneous anomalies such as a hairy patch without any other external anatomic abnormality. Modern imaging studies reveal these underlying defects and provide a system of classification based on neuroradiologic and clinical findings.

2. (d)

Anencephaly: *Degenerate brain* and *absent skull vault and scalp*.

Spina bifida aperta: *"Open spina bifida"* results from *failure of closure* of *lumbosacral neural tube*.

Spina bifida cystica: *Meningeal sac/cyst containing spinal fluid* and may or may not contain *neural tissue herniating through a vertebral defect*.

Meningocele: *A type of spina bifida cystica* that has *herniation of meninges*, *without neural elements*, *through the opening in vertebral column* (defect of skeletal development).

Myelomeningocele: *A more severe type of spina bifida cystica* with *herniation of neural elements and meninges through opening in the vertebral column*.

Encephalocele: *Herniation of the brain through a skull defect* (defect of skeletal development). This condition *may be compatible with life* and *some may even have normal intelligence.*

Dysraphic defect: *Mild end of Neural Tube Defect* (NTD) spectrum, *with closed abnormalities* and is *often associated* with *a tethered cord*.

Diplomyelia: *Spinal cord longitudinally duplicated*.

Diastematomyelia: *Spinal cord longitudinally split*.

Lipomeningocele: *Meningocele with fatty tissue deposit*.

Spina bifida occulta: *Neural arches of one or several vertebrae* are *incomplete in the lumbosacral region*. This *may be associated with neurocutaneous signs* of *a tethered cord.*

3. (b)

The reduction in NTD cases during *the postfortification period inversely mirrors the increase in serum and red blood cell (RBC) folate concentrations among women of childbearing age in the general population.* Fortification has led to a decrease in the prevalence of serum folate deficiency from 30% to less than 1% and a decrease in the prevalence of RBC folate deficiency from 6% to no measurable deficiency.

4. (a)

Prenatal screening now allows for diagnosis of the majority of cases of MMC before birth. *Ultrasound (US) is the current "gold standard" for the prenatal diagnosis of MMC, with three-dimensional US and fetal magnetic resonance imaging (MRI) further enhancing characterization of lesions.* As second-trimester anomaly scanning is becoming routine, and high-resolution ultrasonography offers greater sensitivity and specificity, biochemical screening for alpha-fetoprotein (AFP) and amniocentesis followed by reflex screening for acetylcholinesterase (AChe) is no longer viewed as a cost-effective approach. *Currently, the main indication for biochemical screening is maternal obesity, which can impair detailed US examination of the fetal anatomy.*

5. (b)

Hydromyelia is likely much more common than we are aware because it often does not cause obvious symptoms in patients with MMC. *When symptomatic*, it *usually presents* with *rapidly progressive scoliosis, a change in strength or coordination of the upper or lower limbs, and spasticity.* MRI is the best test to demonstrate this spinal cord abnormality. *When suspected*, *the entire neuraxis should be imaged* because untreated or subclinical hydrocephalus can produce hydromyelia. *Hydrocephalus should be treated before surgical treatment for hydromyelia*.

6. (d)

Hydrocephalus has been shown to have an association with a lower quality of life in children with Myelomeningomyelocele (MMC) and with a lower likelihood of living independently, having a partner, and of reproducing in adults with MMC. Almost all children with MMC require placement of a VP shunt for management of hydrocephalus. The two most common shunt complications are infection and obstruction.

Infections have a greater long-term morbidity than malfunctions. *The overall risk of shunt infection is 12% per child with Staphylococcus epidermidis being the most common culprit.* Symptoms do not usually develop until several weeks after the shunt is placed or revised. Epidemiologic factors seem to influence the incidence of shunt infections more than surgical factors. Aside from skin contamination during shunt placement, shunts can also become infected with gram-negative rods if the distal end of the shunt

erodes into an intraabdominal organ. *Gram-negative infections have a much poorer prognosis.*

7. (c)

Urologic involvement in MMC and other spinal dysraphisms varies but was found to be present in about 90% of patients. Neurogenic bladder results in partial or complete denervation, with poor compliance and contractility, resulting in unacceptable residual urine volumes. *The urethral sphincter is incompetent in 86% of patients, so that incontinence occurs with increases in intravesical pressure*. Approximately one-third of patients have detrusor sphincter dyssynergia, resulting in high intraluminal pressures. The external sphincter is usually partially functional and can improve in the first year after birth. Patients should be observed at least annually because deterioration or improvement can occur in the first year of life and tethering of the spinal cord with a change in bladder function can occur over the years. *Although the majority of individuals with MMC have normal renal function at birth, 40% to 90% will experience a decline by age 10 years if left unattended.*

8. (e)

Patterns of neurogenic bowel involvement in children with MMC vary from normal bowel control in approximately 20%, *to incontinence caused by impaired rectal sensation, impaired sphincter function, and altered colonic motility in the remainder*. *In those with lesions above L3, the internal anal sphincter has low tone, which further contributes to incontinence.* In addition, lesions above this level generally result in absent sensation, although sensation can be present but impaired in lower level lesions.

9. (c)

Calcaneus deformities can be seen at birth or develop postnatally as a response to unopposed dorsiflexion in patients with midlumbar-level paralysis. Calcaneus deformity makes bracing difficult and often ineffective. This deformity predisposes the patient to pressure sores over the heel, which can lead to osteomyelitis. Patients with progressive deformities or a propensity toward pressure ulceration should be treated aggressively because delay in treatment can result in a greatly increased risk of pressure ulceration*. Solid AFOs are the most appropriate orthosis for this deformity. Multiple surgical approaches have been proposed. It is controversial as to whether the anterior tibial tendon should be released or transferred in this setting.*

10. (b)

According to the Hoffer criteria, ambulatory function can be divided into *four groups*: *community ambulation, household ambulation, exercise or nonfunctional ambulation, and nonambulation/nonwalkers*. In general, *most patients with sacral-level involvement are community ambulators* and those with *thoracic-level involvement are nonambulators.*

Quiz

1. ____ is the most commonly prescribed orthotic device for children with MMC.
   (a) WHO (b) KO (c) AFO (d) KAFO
2. There are three core deficits thought to be a direct consequence of the Chiari II malformation described in spina bifida: attention, timing, and_____.
   (a) Movement (b) Memory (c) Language (d) Speech
3. Neural tube defects are known to occur as a result of the failure of neurulation between the __ & ___ days of gestation…?
   (a) 12, 14 (b) 17, 30 (c) 5, 8 (d) 2, 8
4. The rationale for intrauterine surgical intervention for MMC is predicated on the _____ hypothesis..?
   (a) One on one (b) Three-hit (c) Rule of four (d) Two-hit
5. The _____ malformation is characterized by variable displacement of cerebellar tissue into the spinal canal, accompanied by caudal dislocation of the lower brainstem and fourth ventricle easily identified on MRI studies.
   (a) Arnold- Chiari I (b) Klippel Feil (c) Arnold-Chiari II (d) Refsum's
6. Precociuos puberty has been reported in _____ % of patients with MMC.
   (a) 5-8 (b) 12-16 (c) 10-12 (d) 30-50
7. _____ of the patients with MMC present with flaccid paralysis below their anatomic lesion, with the remainder showing a combination of upper and lower motor neuron signs.
   (a) Half (b) One-fourth (c) One-third (d) Three-fourth
8. _____ and _____ are the two most common shoulder injuries in chronic wheelchair users, with MMC…?
   (a) Adhesive capsulitis, shoulder dislocation (b) Rotator cuff disorders, shoulder subluxation (c) Adhesive capsulitis, rotator cuff disorders (d) Rotator cuff disorders, bicipital tendonitis
9. Bladder cancer rates may be considerably higher in adults with Myelomeningocele, with bladder augmentation procedures as well as those who have had over __ years of Foley catheter use..?
   (a) 2 (b) 10 (c) 3 (d)7
10. Early closure of the Neural tube defect reduces the risk of infection in the central nervous system of the newborn. Early closure means closure within __ hrs of delivery..?
    (a) 96 (b) 72 (c) 48 (d) 108

Key

1. (c)
   An AFO is the most commonly prescribed orthotic device for children with MMC. *Three bracing systems* are used that are relatively unique to the child with MMC. *The parapodium* is a device that allows even the child with thoracic-level involvement an opportunity for upright mobility*. A swivel walker* is a modification of the parapodium that translates trunk rotation into forward movement of a dual footplate mechanism. *Finally, a reciprocating gait orthosis (RGO)* combines bilateral hip-knee-ankle-foot orthosis (HKAFO) with a cable system to coordinate hip flexion with hip extension at the opposite hip.
2. (a)
   There are three core deficits thought to be a direct consequence of the Chiari II malformation described in spina bifida: *attention, timing, and movement*. *Deficits* in *attention* relate to problems in the *midbrain, posterior cortex, and corpus callosum*, whereas *timing deficits* are related to *cerebellar volume and movement deficits to spinal cord dysfunction and cerebellar dysmorphology affecting sensorimotor timing and motor regulation.*
3. (b)
   NTDs are known to occur as a result of failure of neurulation between the *17th and 30th* days of gestation. *Primary neurulation* refers to the *development of the neural tube*, which forms *the brain and spinal cord*. *Secondary neurulation* refers to formation of the *remainder of the neural tube* from a cell mass caudal to the caudal neuropore, *which forms the lower sacral and coccygeal segments.*
4. (d)
   The rationale for intrauterine surgical intervention for MMC is predicated on the "two-hit" hypothesis stating that damage to the neural elements is the result of *both failure of neurulation, resulting in an open NTD, and exposure of the spinal cord to amniotic fluid and traumatic injury within the uterus.*
5. (c)
   Although the operative mortality for closure of the spinal defect in children with MMC is very low, the operative mortality for symptomatic A-C II malformations is relatively high (34% to 38%). A symptomatic A-C II malformation remains the leading cause of death for infants with MMC. Signs and symptoms of symptomatic Chiari II malformations *include intermittent obstructive or central apnea, cyanosis, bradycardia, dysphagia, nystagmus, stridor, vocal cord paralysis, torticollis, opisthotonus, hypotonia, upper extremity weakness, and spasticity*. The constellation of stridor, central apnea, and aspiration is sometimes referred to as *central ventilatory dysfunction.*
6. (b)
   The mechanism of this is thought to be related to increased pressure on the hypothalamus resulting in premature activation of the hypothalamic-pituitary-gonadal axis. Treatment with gonadotropin-releasing hormone analogs has proven beneficial in several studies, halting the progression of puberty, stopping menses, and decreasing hormone levels. It is *more common for girls* with MMC to

experience precocious puberty and it is unclear whether patients without hydrocephalus are at risk.

7. (c)
   Many individuals are asymmetric on motor and sensory testing and some have voluntary motor control below other segments of paralysis and sensory loss. The level of neurologic impairment influences the expectations of medical providers on functional outcome, treatment strategies offered, and anticipated musculoskeletal deformities and other complications.
8. (d)
   Shoulder pain is very common in wheelchair users, although it might be less common in patients who began using a wheelchair earlier in life.
9. (b)
10. (c)

What does it take to make an issue?

Dr Ravi Sankaran

The KJPMR was resurrected for the third time just before the National conference at Calicut in January 2020. What follows is an in-depth look at how the issues are currently made. This is designed to be a survival guide for successive editors, and entertainment for the rest. Why a survival guide? The current editor (CE) had no idea how to make a journal. For successors needing guidance, this is a starter. It is set up as an FAQ for ease of reading.

Where do I get started?

In order have a regular release one needs to know what comes next. The CE made a master list of themes from the Braddom table of contents. This was broken over a span of five years with four themes per year. Due to excess of submissions, SCI was made into two issues. We are off cycle by one position. This means for now the successor will have a head start.

How do you get authors?

CE approached each member of the 'PMRs of Kerala' whatsapp group and asked them what they liked to write on. The topics were those in the publication cycle mentioned above. Of these 30% chose topics. The next 20% were coerced into expressing their preferred topic. How? CE assigned odd topics to them, designed to evoke their preferred topic as a defense. CE's favorite provocative tool was sexual rehabilitation. Nobody wanted it. The remaining ambivalent were assigned a topic. The balance refused to respond, acknowledge receipt, or begged to be excluded due to inability to write. The result is KJPMR currently has authors listed to fill the current five year term (2020-2024).

How does one fill up the journal issues?

The journal is divided into sections based on the NMC's competencies for MBBS. The Clinician section has a special article called the Invited Author. The writer takes the stance of an authority and presents a topic of their preference in concordance with the theme. Invited authors need motivation. Consistent reminders via Whatsapp are usually enough. Sometimes colleagues will offer support. One contributor spontaneously and consistently submitted quizzes. Another offered her paintings, which were promptly made in to cover and back art. Surveys are a fun way to fill up space. CE has access to software like redcap to make it easier. In most surveys 75% of the group will participate. To get there reminders are needed. Any contributor can do send survey results. One member posted old pictures of his residency days in the whatsapp group. This prompted nostalgic comments. Requests for the history of PMR in Kerala emerged. Some authors have ideas, but aren't fluent with computers. Helping them is worthwhile. Keep your eyes and ear open for opportunity, work with what you have, and success will follow.

What do I need to know about individual's submissions?

Occasionally special requests come through. The easiest way to handle these is to ensure the requesting party submits the same as a word document. There is a disclaimer on the second page stating

'articles are the responsibility of the authors'. This way, editors are absolved of disagreements in detail, content and style. We've seen issues where the submissions conflict in opinion. This promotes thought, and is acceptable. It's better to avoid censoring articles people submit. It leads to unwanted negative feelings (spoken from experience). The easiest way to control for this is to set submission guidelines. If the content doesn't match, the same can be sent back for corrections by the author or a discussion about the same initiated. This way accusations of nepotism etc. can be avoided.

What is the turnout regarding submissions?

About 30% of article requests will yield something publishable. Be cautious if someone tells you who will submit what. Check with that person directly. Banking on promises someone else makes of others time can be problematic.

Who puts the issue together?

Designers do.

What about formatting and presentation?

KJPMR though a bulletin publication is professionally themed. A homogenous background and style are critical. Dark colors, less fancy backgrounds/ templates are important. A left bias and preserved margins make things look nice. Every line counts. To make money some designers will waste a lot of space, adding to the page count and final bill. Pre-release proof-reading should account for these and other inconsistencies.

What does the editor do before release?

If the deadline is…. date… then articles coming in after that go to the next issue. Be firm there. If not problems will follow. Many submit in the last minute, so ensure you give a weekly countdown to make everyone aware. Convert everything to the same font and size. Ensure each article has citations as needed. What you submit to the graphics team should be free of spelling and grammar problems. That way all you have to do is address the design issues. If there aren't enough articles tell the executive committee. Time and again they've helped CE fill an issue that would have otherwise fallen short.

Why a deadline?

To get the first rough draft it takes a week or two of a designer's time. After that it takes another seven to ten days to get a final copy. It's better to set the deadline one month before the release date. The panel editors should give you their approved version a day after the deadline. Sometimes the small mistakes go under the radar. Often it takes two or three revisions to fix all the listed errors. The last issue had 5 rough drafts. Despite that there were errors. In such case it helps CE to start revised material by reading the past list of corrections. Despite that it's easy to overlook things. An author from a prior issue pointed out how her article's conclusion was truncated, by accident. CE sincerely apologizes to them. Perhaps they'll understand why, now. During the Corona outbreak last year the stand-in designer misspelled CE's name. Post-release a reader pointed out the error, 'Sakaran'. It wasn't a sweet experience. Another reader pointed out how CE allowed the articles to be double-spaced. All that time CE was wondering how the journal had become 80 pages (double the usual). ☺ To err is human. It is more important to consistently get the journal out on time, even if there are small mistakes. Keep a checklist of what went wrong with the previous issue based on feedback. You can

use that to guide the next one. Learn from mistakes, and make new ones.

Who should I work with?

Consider who you are working with. It will determine how much work you will have to do. For your first year don't expect support. CE and Dr. George Joseph pulled the weight until recently. In retrospect it was quite nice actually. Ensure your board members gather/ write/ and process the journal articles for their panels. Otherwise they won't understand the effort taken to make an issue. The KJPMR will always be a team effort. The Editor is the team captain but without contributors there is no journal.

What problems have you faced as CE?

Miscommunication/ misunderstanding were the basis for most of the problems CE has experienced. The next was last minute changes by well intentioned people who underestimate the work required. Making everyone happy is like walking on eggshells. You don't know who will be bothered by what or when. As an editor if some people are upset at you and others happy, chances are you're doing something right. Ensure the issue is released on time. If you want an omelette you have to crack a few eggs.

What are the problem areas?

The most viewed area is the 'Members in action' article. Make it look good. If not it will backfire on you.

Who picks the cover art?

CE randomly picked art from Google images for the first few issues. After that our contributor artist has been our source.

Who pays for all this?

The Executive Committee finally foots the bill. Most designers collect a check after the work is done. When the journal continued into the second issue, funding it became a concern. Designers won't do a job for less than 25 pages of content. It's not worth their time. Currently it seems 40 pages hits the sweet spot. It's enough content to please both designer, reader and the editor. During the COVID outbreak of 2020 our regular designer's office was shut down. Scrambling to get the next issue produced, meant being exposed to predatory designers. One such wanted to charge a lakh for the entire issue. He never heard from CE again. Luckily CE's friend had such skills and agreed to produce the issue, for the usual rate. In the process of finding the subsequent designer, we came across a differently-abled individual born without arms, who did all the work on a laptop with her feet. That is quite the accomplishment. Designers will usually give an advance fee, then an additional bill at the end of the work. She wanted more money per page that our usual designer. Considering her condition, this was ok. When she wanted to add more, it became a problem. On top of lots of unused space, her new rates crossed the maximum allowed expenditure. CE through Dr. George Joseph petitioned the Executive Committee and this lead to raising the upper limit expendable for the journal. End of that problem. As this is basically a pdf layout, if you have an honest designer, 2000 rupees will cover 60 pages of material. This was a lesson learned the hard way. We've gone through 3 different designers until we came to this cost.

What if I can't fulfill the minimum page count for an issue?

Be ready to write articles. If you can't write well, start anyway. You can only get better.

What if I don't know what to write about?

The tug-of-war between Physiatrists and therapists likely won't be solved as you read this. Interaction with allied medical/ surgical services is another topic. Medicine and politics is another. CE wrote about Artificial Intelligence and PMR once. As long as PMR is part of what you write, there are plenty of topics.

Why not print hard copies?

CE only disseminates the journal in electronic format. Printing it means paper waste. Each issue is individually 'whatsapp'ed to the reader. Others have volunteered to help distribute the journal. Seeing the labor involved the interest faded. Only once has the journal been printed. The intention was as a memento for the National conference. A limited print was done by the current President and given to the appropriate people. Printing comes with its own charges naturally.

What is it worth finally?

At the end of all this work comes reality. Twenty-five percent of recipients acknowledge receiving it. Of these most will read something. The majority will look at the picture gallery. Less than half will actually read the entire thing, cover to cover. Regardless, whoever has contributed will be grateful. The real benefit lies elsewhere. Whoever does this work develops leadership skills and talents outside the domain of clinical work. One can't place a value on that experience. In closing here is a quote from Marcus Aurelius 'What we do now echoes in eternity.'

Acknowledgements: Gratitude to all the seniors who've guided me though the process, Special thanks to Dr U Singh for his ongoing support and constructive feedback.

Members in action

Dr Sudheera, Consultant Physiatrist, Malabar Medical College, gave a talk on AIR on how to manage Stroke patients and Spinal cord injury patients at home, as they had difficulty attending OP, getting admitted ,or going to a PMR centre for regular treatment.

She also painted the Cover page picture for this edition of our journal. Cultural events for faculties are getting started in her institution. She's doing active participation as the creative coordinator of her team.

Dr Jaleela HBA,Consultant Physiatrist and Rehabilitation physician,
S.H Medical Center, Kottayam, conducted a monthly awareness class on "HOW TO STAY FIT IN PREGNANCY " to antenatal mothers, as part of SHMC Women's Wellness program.

A Spinal cord injury rehabilitation camp was conducted by **Dr. Jimi Jose**, Assistant Professor, Department of P.M.R on the 7th of September, in Pushpagiri Medical College.

A free Cerebral Palsy Camp was conducted by the Department of PMR, Pushpagiri Medical College, on World Cerebral Palsy Day, October 6th.

ലോക സെറിബ്രൽ പാൾസി ദിനത്തോടനുബന്ധിച്ച് പുഷ്പഗിരി മെഡിക്കൽ കോളജ് ആശുപത്രി പ്രതീക്ഷ ചൈൽഡ് ഡെവലപ്മെന്റ് സെന്ററിന്റെയും ഫിസിക്കൽ മെഡിസിൻ ആൻഡ് റീഹാബിലിറ്റേഷൻ വിഭാഗത്തിന്റെയും സംയുക്താഭിമുഖ്യത്തിൽ സംഘടിപ്പിച്ച സൗജന്യ പരിശോധന ക്യാമ്പ് പുഷ്പഗിരി കാർഡിയോ വാസ്കുലാർ ആൻഡ് തൊറാസിക് സർജറി വിഭാഗം മേധാവി ഡോ. എൻ. അരുൺ ഉദ്ഘാടനം ചെയ്യുന്നു.

സൗജന്യ പരിശോധനാ ക്യാമ്പ്

തിരുവല്ല: ലോക സെറിബ്രൽ പാൾസി ദിനത്തോടനുബന്ധിച്ച് പുഷ്പഗിരി മെഡിക്കൽ കോളജ് ആശുപത്രി പ്രതീക്ഷ ചൈൽഡ് ഡെവലപ്മെന്റ് സെന്ററിന്റെയും ഫിസിക്കൽ മെഡിസിൻ ആൻഡ് റീഹാബിലിറ്റേഷൻ വിഭാഗത്തിന്റെയും സംയുക്താഭിമുഖ്യത്തിൽ സൗജന്യ പരിശോധന ക്യാമ്പ് സംഘടിപ്പിച്ചു.

സെറിബ്രൽ പാൾസി ബാധിച്ച കുട്ടികളുടെ രക്ഷിതാക്കൾക്ക് ബോധവത്കരണ ക്ലാസുകളും ഫിസിയോ തെറാപ്പിസ്റ്റിന്റെയും സ്പീച്ച് തെറാപ്പിസ്റ്റിന്റെയും സൗജന്യ സേവനവും ലഭ്യമാക്കിയിരുന്നു.

പുഷ്പഗിരി കാർഡിയോ വാസ്കുലാർ ആൻഡ് തൊറാസിക് സർജറി വിഭാഗം മേധാവി ഡോ. എൻ. അരുൺ ക്യാമ്പ് ഉദ്ഘാടനം ചെയ്തു.

പുഷ്പഗിരി പ്രതീക്ഷ ചൈൽഡ് ഡെവലപ്മെന്റ് സെന്റർ ഇൻചാർജ് ഡോ. മഞ്ജു ജോർജ് ഇലഞ്ഞിക്കൽ, പുഷ്പഗിരി ഫിസിക്കൽ മെഡിസിൻ ആൻഡ് റീഹാബിലിറ്റേഷൻ വിഭാഗം അസിസ്റ്റന്റ് പ്രഫസർ ഡോ. ജിമ്മി ജോസ്, ഡോ. സിസ്റ്റർ ബെറ്റ്സി തോമസ് തറയിൽ എന്നിവർ ക്യാമ്പിന് നേതൃത്വം നൽകി.

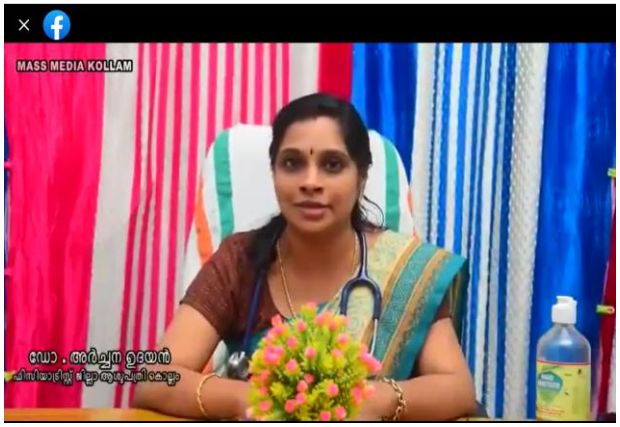
ദീപിക Thu, 07 October 2021 https://epaper.deepika.co

Dr.Santhosh. K.Raghavan, Professor (CAP) and HOD, Department of P.M.R, Government Medical College, Allappuzha, has participated in an online interview being conducted by the research scholars from the department of Haptic Intelligence, Max Planck Institute for Intelligence systems, Stuttgart, Germany. Title of the study is *" Understanding the Potential of Robots in Exercise Therapy "*. Principal investigor is Prof Dr Katherine. J.Kuchenbecker, Director and investigors are Ms Mayumi Mohan, Doctoral fellow, Dr. Haliza Mat Ausin, Post doctoral fellow. It was a nice experience, their study is based on "Baxter" an exercise robot.

Dr.Sivaram.A, Assistant Professor, Department of P.M.R, Government Medical College, Allappuzha, has published a paper titled *" Clinical Predictors of Vibrator assisted ejaculation following spinal cord injury- a prospective observational study"* in the Journal of Neurosciences in Rural Practice.

Dr Archana Udayan, Junior Consultant in PMR, District Hospital Kollam shared a video in social media on post Covid symptoms and Rehabilitation as per the request of District medical Office Kollam in November 2020. The response was overwhelming with multiple shares and likes.

In November 2020, she presented a talk on post Covid symptoms and treatment which was aired on Ananthapuri FM in Radio Health program.



A live Q&A session with her was telecasted on Doordarshan channel about Pulmonary Rehabilitation, which was telecasted on May 2021.She also delivered health tips addressing Pulmonary Rehabilitation in a Zoom meeting organised by the KGMOA and DMO kollam in September 2021.

Dr. Sooraj Rajagopal, is the NMC RCMET coconvenor. Nowadays he is busy with organising revised basic course workshop in all 19 colleges under Kozhikode RCMET. He had gone to Karuna medical College and Yenepoya Medical College as observer for the same. He had a chance to visit the state of the art skill lab at Yenepoya Medical College. Dr. Sooraj is also continuing as Nodal Officer for Iqraa Covid Hospital and JDT dialysis centre.

The Kerala Chapter of IAPMR, in association with the Department of PMR, Government Medical College, Kottayam, conducted 'Rehabcon 2021- Cognitive Rehabilitation: Uncharted Territory'. This was the 14th Annual Conference of the Kerala Chapter. This 2 day virtual conference, on august 28th & 29th, covered Cognitive rehabilitation in a comprehensive way. With reputed national & international faculty, presenting topics & chairing sessions, this event was attended by over 170 participants. The Organising Committee:-

Organising Chairman
- Dr. P.C Muralidharan

Organising Secretary
- Dr. Bineesh Balakrishnan

Kerala Chapter Secretary
- Dr. Selvan P.

Scientific Committee Chairperson
- Dr. Chitra G.

Treasurer
- Dr. Soumya Thankappan

The results from the recently concluded KUHS exams are out. Degree & Diploma exams were conducted in August 2021. **Dr. Vipin Kumar K**, from Government Medical College, Kottayam, topped the exams for MD PMR, while **Dr. Aneesh K.S** from Government Medical College, Kozhikode topped the DPMR exams.

Dr. Aneesh K.S

Dr. Vipin Kumar K.

Dr Ravi Sankaran was the keynote speaker in the **Kairali Neuro-Sciences Summit**

He also presented *'Hyperbaric Oxygen therapy in Autism'* in the 3rd annual national conference of association of neonatal therapists on September 4th, hosted by NIPMR.

For IMA Kottayam, he did a CME on Pelvic Floor Rehabilitation.

He also presented on 'Pelvic Floor Rehabilitation for Urine Flow abnormalities' for the Urology Association of Kerala at **The UAKon 2021**.

Splintered hope

Dr Bineesh Balakrishnan

"Hope is a good thing, maybe the best of things, & no good thing ever dies.."- from the movie 'Shawshank Redemption'

On a breezy Sunday, I decided to update my knowledge about Myelomeningocele. Other than my curiosity which had reached a crescendo, pretty much nothing else was in my favour. For starters, this is one group of congenital defects whose incidence has been declining in the last half century. In my PG days I had managed around 4 cases with this spectrum of defects, & after that none at all. Medical literature relating to this condition dates back to the late 1500s. In this article I have briefly summed up what I learned about this condition while going through Braddom in one reading. I have also shared the accounts of patients & their families who had to face this condition (either themselves or with a loved one being afflicted with this spectrum of defects) &what they learnt about this condition….

Neural tube defects (NTDs) affect 0.5 to 2 per 1000 established pregnancies worldwide and are the *second most common group of severely disabling birth defects*, following congenital heart defects. *Myelomeningocele* (MMC) is the *most complex congenital anomaly compatible with life* and is the *second most common disabling condition in childhood after cerebral palsy*. It makes up more than 98% of the "open" spinal dysraphic states and exists in a spectrum of NTDs, ranging from conditions that are incompatible with life such as anencephaly and cranioschisis (complete failure of neurulation) to disorders of secondary neurulation causing spina bifida occulta with minimal or no neurologic involvement. Survival and quality of life for those with MMC have improved due to advances in medical, surgical, and rehabilitative care during the past 60 years, *with prenatal folic acid food fortification* and *fetal surgical repair having the greatest impact*. *NTDs are known to occur* as a result of *failure of neurulation* between the *17th and 30th days of gestation*. *Primary neurulation* refers to the *development of the neural tube*, which *forms the brain and spinal cord*. *Secondary neurulation* refers to formation of *the remainder of the neural tube* from a *cell mass caudal to the caudal neuropore*, which *forms the lower sacral and coccygeal segment*. Prenatal screening now allows for diagnosis of the majority of cases of MMC before birth. *Ultrasound (US) is the current "gold standard"* for the prenatal diagnosis of MMC, with three-dimensional US and fetal magnetic resonance imaging (MRI) further enhancing characterization of lesions. In the event that fetal surgery is not an option and an infant is delivered with an open NTD, a sequence of events is set in place to preserve neurologic function, prevent infection, and stabilize cerebrospinal fluid flow. *Early closure (within 48 hours of delivery) reduces the risk of infection in the central nervous system*. *Before closure of the open defect*, *the neural elements must be protected to prevent contamination or further damage from trauma*. *Most infants*

with MMC require VP shunting for hydrocephalus after their back closure, and approximately 15% born with severe hydrocephalus require immediate shunting. *Greater than 90% of infants with MMC* will *have a neurogenic bladder*[1]. *Patterns of neurogenic bowel* involvement in children with MMC vary from *normal bowel control in approximately 20%*, to incontinence caused by impaired rectal sensation, impaired sphincter function, and altered colonic motility in the remainder. Although the incidence of latex allergy in the general population is estimated to be less than 1% to 2%, the prevalence among children with MMC ranges from 4% to 72% and varies widely across different countries[1]. According to the *Hoffer criteria*, ambulatory function can be *divided into four groups*: *community ambulation, household ambulation, exercise or nonfunctional ambulation, and nonambulation/ nonwalkers*. In general, most patients with *sacral-level involvement* are *community ambulators* and those with *thoracic-level* involvement are nonambulators. *The most important predictors of ambulation* ability are *quadriceps strength, iliopsoas strength, and the ability to achieve independent sitting*, which is also a predictor of ambulatory potential in patients with higher levels of involvement. The *ability to maintain ambulation* ability into adulthood is dependent on *quadriceps and hamstring strength.*[1]

Now I'll briefly delve into the experiences of a few patients with spina bifida (obtained from the net). These patients are sharing their experiences & advice to benefit others of their ilk. From how to deal with cases of pressure ulcers (now referred to as pressure injuries) to how to deal with the loss of babies born with these defects, these experiences help to shed light on the lessons learnt by the patients & their families…

Randi's story….

Randi was born with a clubfoot, which was not corrected as a child & hence she wears a brace. She has sensory impairment in both feet[2]. On one occasion accidentally bumping her foot started a cascade that ended in the amputation of her little toe. On another occasion she dressed an ulcer by bandaging it, only to discover days later that the dressing was rubbing against the skin so badly that the ulcer kept growing in size. Randi had no option but to keep her career as a Cosmetologist on hold, so that she could make time to schedule doctor's appointments & regain her strength. Randi's advice to patients with spina bifida is**.."Spina bifida is not a one-size-fits-all condition; neither are pressure sores. Some heal by themselves & some will lay you up for months or even a year. People need to understand the severity of what can happen so it doesn't happen to them. Paying attention to yourself is the biggest form of self-care you can do."**

Randi still has her license to practise as a Cosmetologist, & hopes to get back to that profession after regaining her health…

The gift of life…

Jodie's first pregnancy ended in a painful miscarriage[3]. Then she experienced fertility problems. With their last fertility treatment they achieved success. Several weeks into her pregnancy, the doctors found two healthy beating hearts on the ultrasound screen. About halfway through the pregnancy, the couple were informed that Twin A had a neural tube defect. As planned, Twin A, named Eli was rushed to the local children's hospital upon birth, while Twin B, Walker, remained with Jodie. The MRI scan showed that Eli had multiple

problems associated with spina bifida & even if he did survive, he wouldn't be able to eat, speak, or breathe on his own for the rest of his life. Knowing that Eli didn't have long to live, Jodie & her husband contacted an organ donation organization so that Eli might be able to give the gift of life. They were informed that Eli's heart valves could possibly save two other babies. Jodie & family decided to discontinue Eli's ventilator support & say their goodbyes. 3 days after being born, Eli's ventilator support was discontinued. Doctors informed the family that he would survive only for a few minutes without the ventilator. But Eli kept breathing for a full 14 hours. He was transported to the local children's hospital where his twin brother was. Once Eli's hand was placed onto Walker's little body, Eli's color began to return & a slight smirk came across his face. Jodie & family saw proof of the power of twins. And for the first time they were able to enjoy their Eli, celebrate his life & mourn peacefully as a family[3].

Zachary's grit….

Amanda found out at 32 weeks of her third pregnancy that her son would be born with spina bifida. The family was counselled that it was a very serious condition, & that this child would not walk & that he would have a 'poor quality of life'[4]. Zachary was delivered at 37 weeks of gestation as soon as his lungs were ready. Within 24 hours he had surgery to close the defect on his back & for the placement of a VP shunt. He did well & was discharged 5 days after the surgery. At 10 months of age his shunt had to be repositioned. He also underwent muscle & tendon surgeries around his hips & ankles to deal with deformities[4]. Zachary currently uses a wheelchair & rushes past everyone with a beaming smile on his face. Sure, Amanda & family face hurdles while raising Zachary but his enthusiasm feeds their efforts & he is ready to face any problem head on...

Anifa's fate…

Anifa is a boy who lives in Nigeria, who was born with spina bifida[5]. Like most children with spina bifida his legs are paralysed & he has bowel & bladder incontinence. He lives in a village with his family where there is no primary health center. His mother does not own a stroller & cannot buy diapers. She uses leaves & paper to keep him clean. Anifa had to wait until he was 9 months old before he had his first back surgery to close the opening in his spine. In the US the first surgery for a baby born with Spina bifida usually takes place within the first 24 hours of life to avoid infection, other complications or death[5]. As I had mentioned if fetal surgery is not feasible, early closure of the defect within 48 hours of delivery is the best line of action. Anifa had no choice but to wait. Like Anifa many children are not fated to get appropriate & timely healthcare, which in conditions like spina bifida will deleteriously affect the functional outcome…

Everything's possible…

Nikia made a smooth transition from education to employment, in spite of the odds against her. After graduating from high school with honors she even made the Dean's list in her second year of college[6]. Her state had a program for people with disabilities that provided her with the support of a vocational rehabilitation counselor from high school all the way through college. A vocational rehabilitation program is a federally funded, state program (in the US) that helps people with disabilities get or keep a job. After graduating from college she landed a job with a federal agency within weeks, with help from the counselor[6]. What's noteworthy is that she got a job when the

whole economy was in the middle of a downturn.

"One thing I've learned is don't really put limits on yourself. Just because you have this condition, that doesn't mean you have to limit yourself. You can work; you don't want to hurt yourself, but you can work. There's things you can do." - Nikia

For Nikia bladder issues are the most difficult aspect of having spina bifida. She says, "It's almost like it controls your life, and I hate it. Some days, it's like I can go to the bathroom and then five minutes later I'm going back. I just can't help it. No matter where we go, the first thing I program in my mind is 'find the bathroom.' I can't wait because I can't hold it." At work, Nikia manages this by having a desk that is as close to the restroom as possible. She also has the option to work from home when necessary. For Nikia, using braces led to another medical problem: they irritate her sensitive skin. She says, "The braces rub too much. I'm actually recovering from a sore from the braces I was using. It's scary because I didn't notice it at first. I don't have a lot of feeling down there[6]. My foot started swelling and I was like what's going on and I happened to look down and yeah, it kind of rubbed a lot." She says that some days she uses her son's stroller for walking support, or if she has a day with a lot of walking, she will ask someone to push her in a wheelchair[6]. Nikia stays active going to her son's T-ball and basketball practices and to church activities.

Nikia remembers her schooldays which were spent grieving over her condition, & how she had to depend on her mom for emotional support. She says, "My biggest challenge at that age was learning to accept my condition." She says that if she was talking to a teenager today who is living with spina bifida she would say, "Don't worry about who does not accept you just because you may have this birth defect. Be confident in who you are. You are special. Just know that to people who truly care about you and are your true friends, it doesn't matter how you walk or if you're in a wheelchair."

"Wisdom comes from experience, but experience is not enough. Experience anticipated & experience revisited is the true source of wisdom"- John Grinder

References

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2. Real Stories: Living with Spina Bifida | CDC
3. Real Stories: Living with Spina Bifida | CDC
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Seeds of suffering: Health insurance and Kerala

Dr Ravi Sankaran

'All for money'. These were my thoughts as I was signing the hundredth of five hundred bills, while my patient with refractory hemiplegic shoulder pain was wailing in pain. I wanted to go to his side and find out if my recent nerve block had helped or not, but had to keep pushing my pen. The patient whom the bills concerned was itching to return home. Five minutes later I had finished with signatures, therapy ended, and the patient stopped crying. I still spoke with him, but regretted being absent as he suffered.

Though our hospital is rampant with rehab worthy patients, bureaucratic red tape prevents us from getting access to them. That sounds strange, right? Most of these patients have a third-party-pay program/ insurance. Insurance patients almost entirely get a free ride though their stay, and the final bill is re-imbursed by the company at a later date. How late? Many institutes have at least a five year backlog. Essentially they are working for free, if they take such patients. But having a full hospital creates an image of being busy, hence worth coming to. It's a fine balance of providing revenue generating procedures and rapid discharge. As PMR we don't really have much of either. This makes survival in the corporate sector a viability issue. Simply put there is no monetary value in good old fashioned medicine. And we wonder why people get upset at healthcare.

What use are insurance companies? Corporate healthcare costs are not a joke. Add a few MDR nosocomial infections to the admission etiology and a couple more lakhs are lost. When a family taps into 40% of their savings they are likely to go into poverty. What do they get back in return for the cash drain? The first few rounds through the healthcare wringer you'll get a person who can usually do their ADLs and maybe even participate in life as they used to. Too many trips though, means eventually they won't be so great. At some point the balance shifts, and expenses go to paying for complications of the main problem instead of recovery. This is modern medicine in a nutshell. Pessimistic yes, but it is reality. An insurance company acts a buffer for such families so they can tide through the rough patches. That of course is good. It's a problem though when insurance will pay for the mechanical thrombectomy but not the residual aphasia and hemiplegia rehabilitation. To that, add the money-making culture some hospital chains enforce and the patient-party gets upset. Who gets the brunt of their frustration? Doctors do. Physiatry is the counter balance to this madness.

As an internal medicine resident in the US one of the hardest concepts to digest was the Diagnosis Restricted Group (DRG). This was the label patients came up to the floor with from the Emergency Room. Simply put the DRG decides how much money the insurance company will give the

hospital for its services. In example: if a patient came to the floor with a DRG of acute decompensated CHF exacerbation the hospital would get $5000 for the entire stay. Not so bad right? The details are where things get tricky. Hospital administration will always push Doctors to make as much money for them as possible. If one night in the hospital is $1000, I roughly have five days to get the patient discharged. Anything more and the hospital runs at a loss, and will punish me. This makes for 'good' and 'bad' doctors. The 'good' make the hospital money, and the 'bad' don't make enough. If the acute CHF patient gets discharged in 3 days the hospital has gained $2000. So the 'good' Dr puts in a foley catheter and aggressively diureses the patient. Within 2 days the IV diuretic is made oral and the patient gets a therapist to walk them to the nursing station. Presto, discharge! The 'bad' doctor talks with the patient, slowly corrects the fluid balance, lets them void whichever way they are comfortable and may not order excessive tests over 3-4 days of care. This means less revenue generated overall. This is the sad reality of American healthcare and the reason why so many physicians there are burnt out. Things have worsened with the new RVU system. And this is what is coming to India.

As our family drove to temple on Saturday mornings in the 1980's I recall my Dad (a General Practitioner) shaking his fist at the new insurance building at the Linden and Corunna road junction. Many stores in the area came and went, but Health Alliance Plan (the company) has persisted for three decades and is still going strong. It took me a few decades to understand what my Dad's issue was. Insurance won't pay what you ask. They will pay as they please (often 70% of your rates). The rationale is they cover areas from urban to rural statewide. A non-uniform reimbursement rate will make customers feel discriminated against. While rates in a city will be higher than a village, often those charges are for infrastructure and support staff, not the doctor. This is not the insurance company's problem though. On the other hand charging too high scares patients off, or can become a legal problem. For a young immigrant doctor trying to ensure his kids go to a good school, and support his family back home though, insurance companies are parasites.

So how did things get so bad? Bill Clinton made a vow to reduce drug error related deaths in the 1990's, and the Electronic Medical Record (EMR) came next. As doctors were never really a part of its formation, this has come back to bite us. To fill the new documentation needs, Nurse Practitioners and Physician Assistants became Physician Extenders. Pharma companies smelled opportunity and lobbied to get them prescribing privileges, as mid-level care providers. Physician Extenders now are becoming Physician replacements. It takes much less time and investment (nursing vs medical school) to achieve the same relative outcome (pushing pills), if you live a money-hungry society. The result is market disruption, designed to promote unwanted use of drugs. While anyone in healthcare can do anything now, Doctors alone are held liable and persecuted stringently. All the others enjoy the benefits without the pain. The biggest winner has been the advanced practice Physiotherapist. As most doctors are unconcerned with function and rehabilitation, they've remained unchecked all this time. Now they too can order MRIs and prescribe analgesics, all without the fear of legal repercussions. Is the EMR all that great? It has systematized our profession, made data retrieval/ storage

efficient and it makes billing easy. Regardless it has issues. A lawyer's wife had a headache. The ER doctor ordered a MRA suspecting aneurysm. The computer failed to process it, and she was promptly discharged without his knowledge. She came back four hours later, dead. The suspected aneurysm had ruptured.[1] One of my staple podcasts 'Medicine and the Machine' opened with a story about a resident 48 hours into a shift who not seen a patient yet, just the EMR screen. We are being made into the highest paid secretaries in the hospital, while NPs, PAs, etc get to spend time with patients.

So how do we prevent the corruption of the field we love? What can we do to not become victims to the same scams? How do we keep our patients safe from these parasites?

There are two options.

The first is concierge care. A simple example is the ortho surgeon who set up a total knee replacement surgery centre independent of a hospital.[2] His patients fly in from all over the US, and stay for 2 weeks of rehabilitation post-op also. He has a rate much lower than hospitals, simply because he doesn't have to pay insurance companies.

Some of us are forced to deal with insurance companies already. What we see now are the early stages: denial of rehab services, repeatedly asking for documentation of the treatment plan/ progress, and using this information against the patient and doctor. Often they tell the patient my page long letters are not enough detail to warrant paying for rehab. Short of confabulating we usually find a way to be more explanatory. One company refused botulinum toxin for a spastic diplegic patient, citing it is cosmetic only. The deciding individual didn't even have a healthcare degree, much less the sense to Google indications for the drug. We have to work with the companies to streamline our services, reduce nosocomial infection, and set achievable time bound goals. All that isn't too terrible, until you start treating Severe Brain Injury.

Is there a solution where everyone wins. Of course not, especially where money is concerned. Can we use it to improve ourselves. Yes. Insurance companies force standardization of care and implementation of guidelines. This may be the best possible outcome. Outside of Modern Medicine other practitioners with degrees have wild variety of practices. No two agree with each other. We have a degree of this too. When healthcare is monetized we are sowing the seeds of suffering. As the pendulum swings towards allowing anyone to prescribe modern medicine drugs to anyone else, there is one result. We rapidly learn the limitations of the said. Luckily we aren't confined to being only pill pushers. All of this is a chance to grow professionally.

1. (https://khn.org/news/death-by-a-thousand-clicks/)
2. (https://www.orthoindy.com/UserFiles/File/Total%20Knee%20Replacement%20Guide.pdf)