The Newsletter & e-journal of Kairaly Neurosciences Society NSI Kerala Chapter

BODHI 3rd edition
Volume II Issue I - November 2021– April 2022

CONTENTS

HEADLINES

- Kairaly Neurosciences Society launched the DIGITAL PLATFORM for Virtual meetings and Academics to tide over Covid restrictions which was flagged off officially by President (2020) Dr. Gnanadas K. and inaugurated by Dr.P.Sreekumar, Patron , KNS
- The Kairaly Neurosciences Society Mid term meeting 2020 was conducted Virtually in KNS Digital Platform for the first time in history on 13th,14th & 15th November
- Annual Meeting of Kairaly Neurosciences Society 2021 "RENAISSANCE " was conducted at Alappuzha which was organized in a Hybrid format for the first time.
- PG webinar series was launched by President Dr. P.A.Mohammed Kunju in the KNS Digital platform on May 25th 2021 and was inaugurated by Dr. Mohanlal D.,Patron, KNS
- Mid term meeting 2021 was held at Nedumbassery also in the Hybrid format
- Annual Meeting of Kairaly Neurosciences Society 2022 is being held at Trivandrum

PRESIDENT`S MESSAGE

Prof. Dr P A Mohammed Kunju

Dear members of the Kairali Neurosciences Society,

Happy to be the president of the Kairaly Neurosciences Society, the reregistered continuation of the Neurological society of India, Kerala Chapter (NSIKC). I am indeed happy that I am taking over the charge as president of the association which tries to combine both Neurologists and Neurosurgeons as a group to interact and to exchange ideas in the field of neurosciences. My earlier experiences as the president of Kerala Association of Neurologists and Indian Academy of pediatrics will definitely help in strengthening KNS. I may be the only person who is getting the chance to become president of 3 organizations (KAN-Association of Neurologists, IAP- Association of Pediatricians and NSI-Association of Neurologists and Neurosurgeons) due to my unique position as a Neurologist and Pediatrician. Next one year I shall try to do my bit to make the organization visible and vibrant.

The Association is a network of professionals involved in the care of people with neurological ailments. It was established with the objective of academic, scientific and clinical exchanges between neuroscientists, nurses and paramedical personnel. Ultimately this would lead to improved care of people with neurological disorders. It is envisaged that this will be achieved through

Annual conferences of the society

Midterm meetings, workshops and Continuing Medical Education programs

Web based case discussions

Sharing of interesting cases through the website.

Involving the young neurologists and neurosurgeons in the helm of affairs of the organisation

Creating public awareness about neurological and neurosurgical problems.

Advocacy for special facilities for people with Neurological disabilities

Creating training opportunities for young doctors

Creating resource materials for both professionals and caregivers

Creating linkages with other such organizations-national and international

Fostering friendship and camaraderie between neurosurgeons, neurologists and allied specialists.

As we were taking a sigh of relief that covid pandemic is over, by having a semi physical conference at Alapuzha, soon came second wave of covid 19. No one knows how long this second wave will continue. Till then, we have to conduct our all activities online and virtually. It may not be a desirable situation but still let's try to see the positive aspects of it. Any given conference, world over, was attracting a particular number of registrations only but in online webinars and virtual conferences, many times, the number of participants has been amazing! There is hardly any loss in the quality of material presented and discussions are also wholesome and fruitful. Honestly, personally I find the virtual webinars and conferences more educative and informative. I have a feeling, and a desire, that future conferences are going to be hybrid with much wider reach.

We shall convert these adversities into opportunities by having regular webinars to address the needs of our residents through case presentations, seminars and mini conferences.

Requesting all Neurosurgeons and neurologists to be part of KNS. Together we shall convert the society into an organization which will be heard by the decision makers.

Stay Safe. Stay Healthy

Jai hind

Prof. Dr P A M Kunju
MD(Pediatrics) DM(Neurology), WHO Fellowship Ped Neuro (USA), FIAPN, FIAP.
President - Kairaly neurosciences society (Neurological Society of India Kerala Chapter)

Dr.Raj S.Chandran

Secretary's Message

It makes me proud to be in the team of Kairaly Neurosciences Society – NSI Kerala chapter NEWS LETTER and e- journal "BODHI" 3rd edition. This was a much more difficult endeavor as Covid 19 pandemic gave a bad hit to our regular working and academics. Bodhi as everyone knows is an important slice of activities and academic progress had its own difficulties to bring in to the reality. This was a collective effort of our Senior members, Junior members and the editorial team which helped in the release of third edition.

I am happy to announce the launch of our own virtual platform for meetings and the academic programs. The Midterm meeting 2020 was conducted in the Virtual platform for the first time in history. The annual meeting 2021 was conducted at Alappuzha and Mid term meeting 2021 was conducted at Nedumbassery in a Hybrid format. We have also started the clinical webinar for postgraduates to cope with the present situation from the last week of May 2021 on Saturdays.

The website is now upgraded for uploading more academic materials. I would like to request all the readers to go through the educational portal of the website and feel free to send us your academic contributions to our journal.

I wish all the members a great success and request you all to stay safe

Dr.Raj S.Chandran
Secretary ,Kairaly Neurosciences Society

Minutes of Annual NSI Kerala General Body Meeting at Alappuzha on 10/04/2021

Dr.Raj S.Chandran

President Dr Gnanadas chaired the meeting. Secretary Dr Raj S Chandran presented the report of the previous meeting of NSI Kerala Chapter held at Perinthalmanna and the minutes of previous governing body meeting. After discussions, the minutes was passed. Treasurer Dr Tinu Ravi presented the accounts of the society, gave the details of fixed deposits and income from memberships and additional expenses for the up gradation of the website. He expressed concern over the fact that around 4.5lakhs was given as income tax and fine of last year, the reason being not settling the accounts of conferences timely. Dr Jayakrishnan suggested that since we are registered as a charitable organization, there is scope for reduction in tax and it has to be enquired in detail. Dr Sreekumar that the details of accounts may be circulated among the members during general body. Dr Jayakrishnan suggested the possibility of reviewing the tax details with another CA

Dr Mohanlal suggested the change of address to a new one which was accepted by the GB and secretary was entrusted to do the needful

The new address is :- Dr Bhavadasan
115, Vasanthvihar colony, Unity road, Kuriachira, Thrissur, 680006

The GB strongly recommended the need to organize various programmes under KNS for public awareness and academic purposes. The feasibility of having a cadaveric lab was suggested by Dr Ajith

Workshops has to be a compulsory part of the conferences. This has to made as amendment in byelaws, which was accepted by the GB.

Election of New office bearers was conducted by Dr Balakrishnan who was elected as the returning officer by the GB

Dr P K Muhammed Kunju , the existing vice president to take over as the new president.

Dr Jacob Alappatt elected as the vice president proposed by Dr Raymond Morris, second by Dr Suresh Nair

Dr Raj S Chandran to continue as the secretary

Dr Tinu Ravi Abraham to continue as the treasurer

The secretary proposed to increase the number of governing body members for which the byelaw needs to be amended, and was accepted by the GB.

Dr Vijayan Peethakkandi, Dr Jayakrishnan, Dr Parameswaran, Dr Biju Bhadran and Dr Arun Oommen elected as governing body members , which also includes the immediate past president

<u>Next year's academic meetings</u>

Mid term meeting Aluva accepted by Dr Jagath Lal

Annual Meeting to be decided later according to the covid situation. Meeting came to an end at 3 pm

Prof Dr P A M Kunju
Former professor and Head, Dept of Pediatric Neurology
Medical College, Trivandrm
Senior Consultant , KIMS health , Trivandrum

Pediatric Neurology – Palliation to precision

Academic developments and a bit of History

Paediatric neurology in India and of course in Kerala can be considered as a speciality which has developed in small pockets of the country. This is because the speciality was not properly recognised by medical Council of India in spite of DM Ped NEUROLOGY courses were conducted in premier institutions like all India Institute of medical sciences and PGI Chandigarh. It took long 30 years for the specialty to be christened as an independent specialty and to start pure pediatric neuro specialty courses. Till now the pediatric neurologists are trained in Neurology after their MD in Pediatrics. Many who pursued that path didn't want to work as Pediatric Neurologists. Many pediatricians were reluctant to study adult neurology. Because of these reasons trained pediatric neurologists were lacking in number.

In spite of the lack of support from the authorities Pediatric Neurology has developed by the effort by various individuals.

Paediatric neurology started as a separate speciality. The beginning of paediatric neurology as a speciality in Kerala can be credited to Dr Anadam R who after the completion of DM NEUROLOGY from Madras medical College has started a unit in 1981.Her charismatic efforts could convert it in to a full fledged speciality with neurophysiological and paramedical support.

She had to face lots of trouble in the establishment of various facilities like separate ward and supporting staff. It took almost 17 years for the department to be considered as an independent speciality department. Even then starting DM course in paediatric neurology was elusive as the paediatric neurology subject was not included as a speciality by the medical Council of India. Though paediatric neurology DM was started in All India Institute of medical sciences 16 years back medical Council of India has recognised it as a separate speciality only in 2019.

With the relentless efforts and political manoeuvring DM paediatric neurology was started in 2019 just before I retired. In order to circumvent the absence of a post graduate course postdoctoral fellowship in Paediatric neurology was initiated by the support of Indian Academy of paediatrics. It was also done in a circuitous manner. .A project on Cerebral Palsy clinic was got sanctioned from National Rural Health Mission. That project had a facility for taking up of 4 MD pediatric residence as follows. Those residents were taken up as fellowship students and they were allowed to do the IAP neurology fellowship program. That was possible only because of the help of late Principal De Ramdas Pisharady. Later government of Kerala has supported it through the residency scheme till 2018. We can now proudly say that paediatric neurology department of Trivandrum Medical College is the first ever named independent department of paediatric Neurology. Even now the paediatric Neurology speciality of All India Institute and PGI Chandigarh is functioning under the Department of paediatrics.

Academic development of speciality

Though the administrative development of department was tardive, pediaric neurology as a speciality advanced tremendously in the last 4 decades and I could witness the full advances and could use that for the advantage of our patients.

The arm chair specialty

For long the sufferings affecting the nervous system of children were dealt either by pediatricians or neurologists. Pediatric neurology emerged as a new branch and rapidly revolutionized the understanding and management of pediatric cases within a short span of time. Our ability to diagnose, manage and prevent both rare and common disorders depended on the fund of knowledge about the aetiology and pathophysiology of childhood neurologic disorders. This was fast tracked by the rapid advancements in the field of neurogenetics, neuro-metabolism, neuro-electrophysiology and neuroimaging techniques thus proving this leap of faith on paediatric neurology highly successful. On the clinical aspect of the developmental assessment, apart from tone, spasticity and extrapyramidal signs there were also interests for developing a better assessment standard for the neurological status in

healthy and sick children that changes widely from birth to adolescence in normal as well as disease states. Advances in he neurodevelopmental disorders and availability of standard assessment scales have helped in objective assessment of neurodevelopmental disorders.

Trivandum developmental scale for children (TDSC) has helped in simplifying the usage of scales like DenverII (DDST)

Syndromic approach to systematic approach

Neurology has always emphasized on pattern recognition and paediatric neurology demands to go one step further ahead for a "syndromic" approach in most cases. So the popular adage that "the eyes will see only what the mind knows" emphasizes on acquiring knowledge through a proper training in this field. Being an arm chair practise comes with its own perils that even a primary headache syndrome which just for the reason that it occurred in a child could be overlooked or extensively worked up as a secondary headache by the treating doctor as he is in oblivion about its incidence in children. Hence the need for constantly updating and retraining by the clinicians. The evolution of International headache society headache classification system which was periodically revised has helped the pediatric Neurologists and pediatricianss in understanding head ache as a disease of children also

Cerebral Palsy – The real pediatric neurology

Management of cerebral palsy holds an important position in the inception of this super specialty because the real beginning has been traced to 1963 in Eastern Bohemia, when a special Centre for Physiotherapy for Handicapped Children which were mostly cases of cerebral palsy. Things have advanced and now the neurorehabilitation have spread its frontiers to include robotics, virtual reality and artificial intelligence to harness the full potential of neuroplasticity thus effecting a change in their lives. Increased detection of cerebral palsy mimics also is a pointer towards both clinical and investigational precision in dealing with the not so "static" encephalopathy.

The newer concept of at least some CP cases as genetic in nature is helping us to explore the possibility of using gene manipulation as a way of curing them. Comprehensive usage of Botulinum toxin A and the SEMLARASS (an acronym for Single Event Multilevel Lever Arm Restoration and AntiSpasticity Surgery) has already given these children a good

productive life.

Epilepsy treatment- The real precision treatment

Starting with just five drugs to treat seizures the armamentarium of antiepileptic drugs has expanded to give great hope along with the electrophysiology techniques and advancements in epilepsy surgery to conquer and contain this brain
catastrophe. Renewed hope through standardised Ketodiet and never thought about drugs like cannabidiol is revolutionising the management of epilepsy.

Degeneration ?-Not that hopeless!!

Caregivers of children affected with degenerative diseases with grave prognosis had a silver lining with the advancements in neurometabolic and neurogenetic diagnostics and managements as evidenced by enzyme replacement therapy like fabrazyme and elaprase used in storage disorders. Fatal anterior horn cell diseases like spinal muscular atrophy has now been cured with drugs like zolgensma. Though many treatment modalities are beyond the reach of even the affluent one

The elusive subacute encephalitis

The year 2007 was milestone in the neuroimmunology speciality when Dalmau published his studies on autoimmune encephalitis and since then the number of autoantibodies causing various clinical manifestations has been ever expanding. Innovations in treatment of these diseases in the form of newer immunomodulators with fewer side effects brought back the smiles to their faces. Neuroinfections are diagnosed better with microbiological and pathological techniques like real time and reverse transcriptase PCR as well as other molecular assays have enabled early diagnosis and faster recovery. These innovations have definitely aided in saving the humanity and to fight viral epidemics and pandemics we are facing frequently like the nipah and corona .

Finally stroke by stroke innovations are happening

."Children are not just small adults" is a common phrase used by paediatricians and this literally becomes highly relevant while dealing with neurovascular diseases in children. Starting from the etiology ,considering the pathophysiology and starting the treatment of stroke in children everything is different from the adult stroke and valuable information is getting

added on.

Innovations in the field of paediatric neurology have helped in eradicating the fear of a treating doctor when brought face to face with a sick and fretful child, or with an infant who is unable to describe its symptoms with suspected neurological condition and bring hope to the family as a whole. This has been possible because the purview of child neurology has now widened to encompass expanding areas of neurogenetics, neurometabolism, neurovascular diseases, neuroradiology, and neuroimmunology, in addition to the advancements in the traditional fields of epilepsy, neuromuscular and neurodegenerative disorders, and neonatal neurology. With the recent trends it is very evident that the future will see even greater expansion in our speciality spreading hope and spreading happiness to those afflicted.

As a pediatric neurologist of Kerala I am happy that I could be a witness of all these evolutions and was able to provide the most advanced treatment to our children.

Now we are providing high-cost treatments (amounting to crores of rupees) through charity organizations. Some of them are enzyme replacement therapy for Pompe diease, MPS 2, and gene therapy for SMA. All these children are surviving who would have died by 1-2 yrs of age if those treatment were not made available.

I am sure the fully developed speciality with the new generation of enthusiastic youngsters armed with technology will definitely achieve further heights.

Dr BINOY T DAMODAR
MBBS, MS, MRCS, MCh Neurosurgery
Assistant Professor,Department of Neurosurgery
Government Medical College, Kozhikode.

Neurosurgery fellowship experience in Japan

(Courtsey - Calicut Neurological Society , News letter Volume 1 Issue 1 2021)

Pursuing an international neurosurgery fellowship was a dream for me. I am sharing here my personnel experience during my fellowship in Japan (2019-2020).I joined Cerebrovascular and Skull Base fellowship of WFNS in Fujita Health University Bantane Hospital at Nagoya, Aichi, Japan under Professor Yoko Kato (Figure 1). I joined fellowship with another 3 fellows (one each from India, Italy and Uzbekistan).

Figure 1:
With Professor

Prof. Yoko Kato

Prof. Yoko Kato has spent her entire lifetime in the service of neurosurgery and taking it to the remotest corners of the world. Her persistence and conviction have made her one of the most admired neurosurgeons in the world and the most loved neurosurgeon for those in the less privileged countries. She has inspired and trained an entire generation of neurosurgeons (doi:10.3171/2020.12.FOCUS20899). She is the first female neurosurgery professor in Japan.

Japan neurosurgery

Before the World war, Professors of General surgery sporadically performed neurosurgery in Japan as was the case in Western countries. After the war, the time was ripe to establish an academic society of n Neurosurgery (written by Keiji SANO in Japan Neurosurgical Society). The Japan Neurosurgical Society was founded in 1948, and the Japanese Congress of Neurological Surgeons in 1981. As per the data available in 2002, the total number of neurosurgeons in Japan exceeds 7500.There are 1340 training centers for neurosurgery in Japan. A large number of neurosurgeons are engaged in research in various related fields. Japan is blessed with advanced diagnostic and surgical technologies and instruments. They are available as needed throughout the country. Medical insurance is fully covered by the government or public insurance system; there is basically no private insurance in Japan (doi: 10.1097/00006123-200210000-00003).

Majority of the Japanese doesn't know English language. Most of their books and journals are in Japanese language. Most of the conferences are concerned with a single topic, e.g. Microvascular decompression (MVD) conference. Almost all neurosurgeons in Japan are subspecialized. Many of the hospitals are subspecialized neurosurgery centers like NPH hospitals. The neurosurgery departments are equipped with all the advanced equipments. It is routine for neurosurgeons to visit hospitals in various parts of Japan to operate surgeries of their subspeciality. Travelling to any part of the Japan is very easy due to superfast Shinkansen bullet train.

Training

This fellowship under Professor Yoko Kato has taught me many advances in the vascular neurosurgery. During the training period I was exposed to various vascular and skull base surgeries. Majority of vascular cases included unruptured aneurysms, cerebrovascular conflicts and carotid endarterectomies. Kato sensei taught us various techniques like computational fluid dynamics (CFD) (Figure 2), intraoperative use of endoscope in vascular surgery, various techniques of aneurysm clipping, carotid endarterectomy, microvascular decompression, vascular bypass surgeries, carotid stenting, ICG, Flow 800 (Figure 3) and endovascular techniques. Neuroendoscope was used in all the cases of microscopic vascular surgeries. It helps in confirming the complete clipping of the aneurysm and also the accidental clipping of the vessel branches which may not be visualized in microscope. Endoscope is routinely used for surgeries of neurovascular conflict.ICG and Flow 800 are used before and after every aneurysm clipping to look for the blood flow status inside the clipped aneurysm and the distal vessels. CFD study of the aneurysm is done before the surgery and it is compared with the intraoperative findings. Microvascular decompression for trigeminal neuralgia and hemifacial spasm are done routinely. Fusion imaging is done in all cases to look for neurovascular conflict (Figure 4). The department had all the necessary advanced equipements like endoarm, navigation, monitoring, functional MRI and endovascular suit. Patients are very healthy and it is routine to see operative patients of above 80 years of age. I also had opportunity to learn from Dr Hirotoshi Sano, Dr Murayama (Glioma surgeon), Dr Shigeru Miyachi (Endovascular neurosurgeon), Dr Izumi (Endovascular neurosurgeon), Dr Hiroyuki Toyama (Hybrid neurosurgeon), Dr Toru Satoh (Neurosurgeon and CFD specialist) and Dr Suzuki (Endovascular neurologist). Takizawa (Figure 5). He is a Vascular neurosurgeon who operates complex vascular surgeries and by-pass surgeries. Dr Sameshima Tetsuro is the skull base surgeon who operates Skull base and meningioma surgeries. Tadashi Watanabe is
the endoscopic surgeon who operates transcranial and endonasal endoscopic surgeries. He trained us in endoscopic surgeries for intracranial hematoma evacuation and deep seated tumour excision. I feel it is very important for a neurosurgeon to learn endoscopic surgery because of its broad use in neurosurgery.Endoscopic transcranial surgery using specially designed transparent sheath (Figure 6) allows for wide visual field, close observation for deep seated lesions and exploration in the wet field.Figure 5: With Katzumi Takizawa (third from the left) at Fujita Health University Bantane Hospital, Nagoya, Japan Figure 6: Transparent sheath (Viewsite) used for endoscopic transcranial surgery.

Visit to Conferences and other universities

We have visited neurosurgery departments in other universities and attended their surgical and endovascular procedures. We have visited Aichi Medical centre, Aichi Children hospital, Nagoya University, Shizuoka hospital and Fujita University. Various universities in Japan give fellowship to young neurosurgeons from Asian and other developing countries. They promote us to attend various conferences in different parts of Japan. Conferences are well organized. Each subspeciality conduct its conference separately. As part of education, attending conferences and presenting papers are free for foreign fellows in Japan. Maintaining the time is part of Japanese culture. Conferences start at exact time and ends at exact mentioned time. Each speaker finishes their talk on or before their allotted time. Surgical videos shown in the conferences are of very high quality.

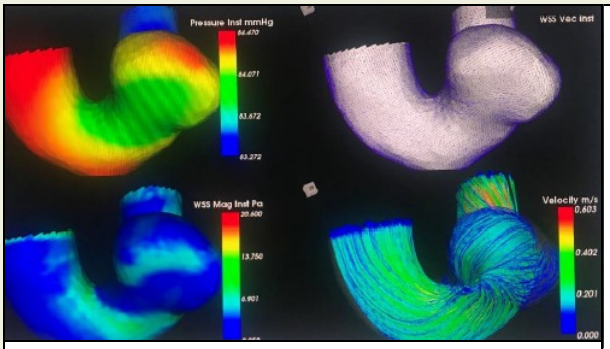


Figure 2: CFD showing various parameters in aneurysm

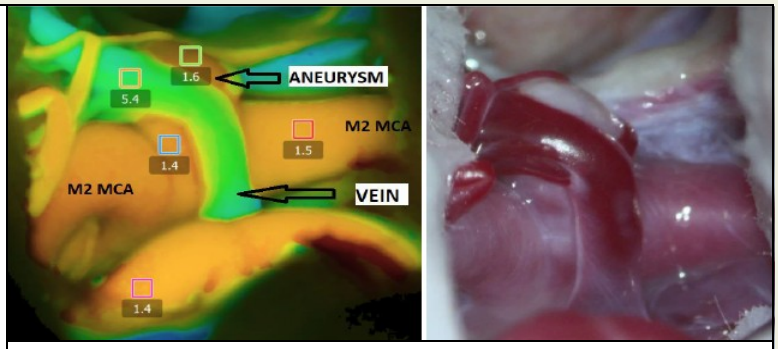
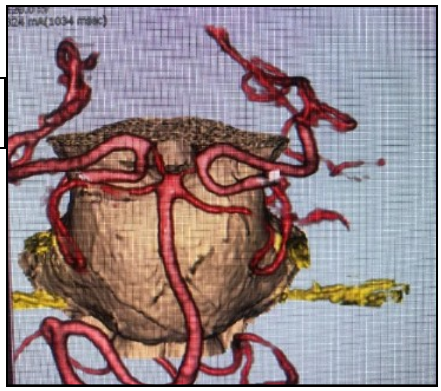


Figure 3a & 3b: Flow 800 showing MCA bifurcarion aneurysm

Figure 4: Fusion image



I had assisted and learnt vascular techniques from Dr Katsumi Takizawa (Figure 5). He is a Vascular neurosurgeon who operates complex vascular surgeries and bypass surgeries.
Dr Sameshima Tetsuro is the skull basesurgeon who operates Skull base and meningioma surgeries. Tadashi Watanabe is the endoscopic surgeon who operates transcranial and endonasal endoscopic surgeries. He trained us in endoscopic surgeries for intracranial hematoma evacuation and deep seated tumour excision. I feel it is very important for a neurosurgeon to learn endoscopic surgery because of its broad use in neurosurgery.
Endoscopic transcranial surgery using specially designed transparent sheath (Figure 6) allows for wide visual field, close observation for deep seated lesions and exploration in the wet field.

Figure 5: With Katzumi Takizawa (third from the left) at Fujita Health University Bantane

Figure 6: Transparent sheath (Viewsite) used for endoscopic transcranial surgery

Visit to Conferences and other universities

We have visited neurosurgery departments in other universities and attended their surgical and endovascular procedures. We have visited Aichi Medical centre, Aichi Children hospital, Nagoya University, Shizuoka hospital and Fujita University. Various universities in Japan give fellowship to young neurosurgeons from Asian and other developing countries. They promote us to attend various conferences in different parts of Japan. Conferences are well organized. Each subspeciality conduct its conference separately. As part of education, attending conferences and presenting papers are free for foreign fellows in Japan. Maintaining the time is part of Japanese culture. Conferences start at exact time and ends at exact mentioned time. Each speaker finishes their talk on or before their allotted time. Surgical videos shown in the conferences are of very high quality.

I had opportunity to present international papers at MVD conference in Hamamatsu, Imaging conference in Nagoya and at Annual meeting of computed imaging in Okayama, Japan. We met Dr Takanori Fukushima (Figure 7) in Micro Vascular Decompression conference at Hamamatsu, Japan. Fukushima gave veryinformative talk on MVD. We visited Emeritus Professor Tetsuo Kanno (Figure 8) at his clinic. He shared his view of neurosurgery and gave me his personally signedcopy of his written book.

Figure 7: With Dr Takanori Fukushima at MVD conference in Hamamatsu, Japan.

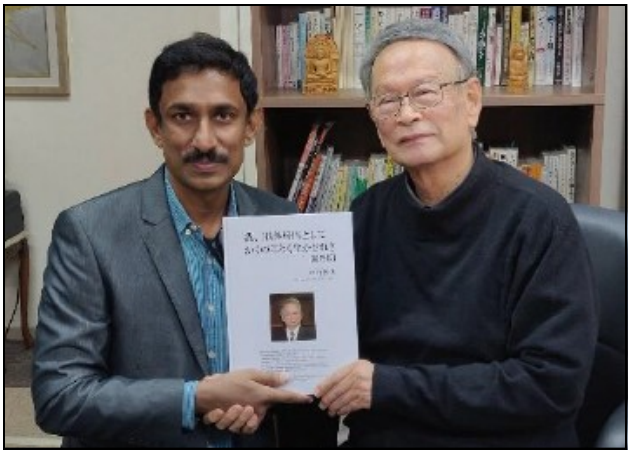


Figure 8: With Dr Tetsuo Kanno at his clinic

Academics

Professor Yoko Kato takes special interest in publication and research. She assigns every fellow with academic and research work and analyse it's progress every day. Every patient's surgical videos are edited and stored in department library for future academic use. I have analysed the surgical outcome of octogenerians following aneurysm clipping which was later published in journal (doi: 10.4103/ajns.AJNS_44_20). I had opportunity to learn about Kinevo neurosurgery microscope (doi: 10.4103/ajns.AJNS_40_20). I have been selected as the member of education committee of ACNS (Asian Congress of Neurological Surgeons). We have completed one year of online education in June 2021 with more than 150 lectures by International speakers through ACNS webinars.

My publications during the stay in Japan are given below.

1. **Thavara BD,** Yamada Y, Joshi G, Tanaka R, Miyatani K, Devareddy G, Nakao K, Kawase T, Kato Y. Analysis of the Surgical Outcome of Unruptured Intracranial Saccular Aneurysms in Octogenarians (80-89 Years). Asian J Neurosurg. 2020 Aug 28;15(3):640-643. doi: 10.4103/ajns.AJNS_44_20. PMID: 33145219; PMCID: PMC7591182.
2. Nakao K, **Thavara BD**, Tanaka R, Yamada Y, Joshi G, Miyatani K, Kawase T, Kato Y. Surgeon Experience of the Surgical Safety with KINEVO 900 in Vascular Neurosurgery: The Initial Experience. Asian J Neurosurg. 2020 May 29;15(2):464-467. doi: 10.4103/ajns.AJNS_40_20. PMID: 32656156; PMCID: PMC7335124.
3. Joshi G, Yamada Y, **Thavara BD**, Tanaka R, Miyatini K, Nakao K, Kawase T, Takizava K, Kato Y. EC-IC Bypass; Our Experience of Cerebral Revascularization with Intraoperative Dual-Image Video Angiography (Diva). Asian J Neurosurg. 2020 Aug 28;15(3):499-506. doi: 10.4103/ajns.AJNS_84_20. PMID: 33145198; PMCID: PMC7591183.
4. Nakao K, Joshi G, Hirose Y, Tanaka R, Yamada Y, Miyatini K, **Thavara BD**, Kawase T, Kato Y. Rare Cases of Contrast-Induced Encephalopathies. Asian J Neurosurg. 2020 Aug 28;15(3):786-793. doi: 10.4103/ajns.AJNS_68_20. PMID: 33145256; PMCID: PMC7591187.

This fellowship experience in Japan is submitted at Calicut Neurological Society, Kozhikode, Kerala, India in July 2021

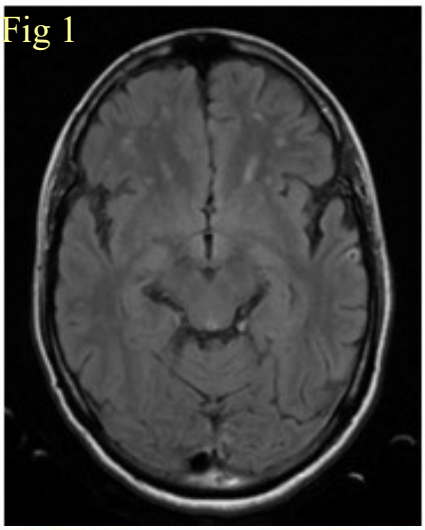
Dr Tushar V.P.
Dr Anoop K., Dr.Shajarin, Professor Abdrahaman P.
Department of Neurology,KMCT Medical College

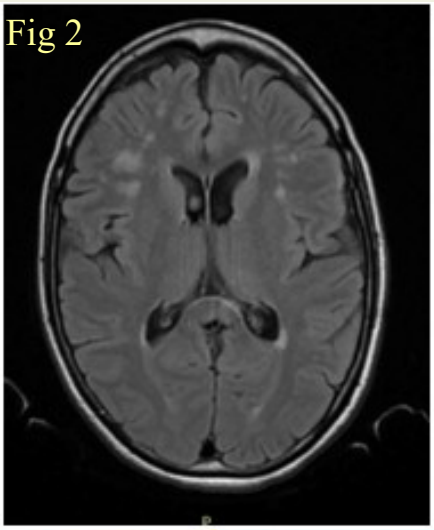
Hashimoto's encephalopathy-a case report

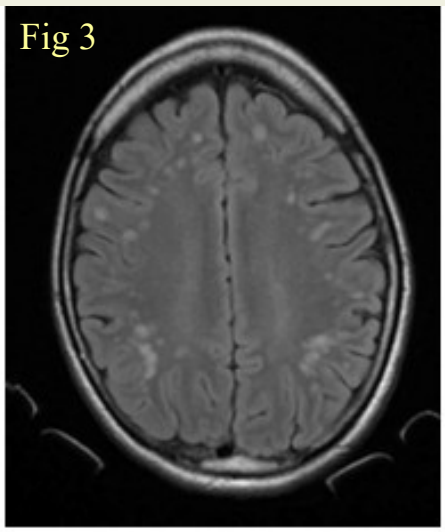
Hashimoto's encephalopathy (HE) is an uncommon neurologic syndrome associated with Hashimoto's thyroiditis. It was initially described in 1966 [1], and it remains a controversial disorder. The cause of HE has been proposed to be autoimmune because of its association with other immunologic disorders (myasthenia gravis, glomerulonephritis, primary biliary cirrhosis, pernicious anemia and rheumatoid arthritis), female predominance, inflammatory findings in cerebrospinal fluid (CSF) and response to treatment with steroids [1, 2]. Other authors suggest that HE may represent an autoimmune cerebral vasculitis resulting from either endothelial inflammation or immune complex deposition [1–3].

45 year old school teacher presented with 3-4 episodes of GTCS in previous 2 days with prior history of irrelevant talks, episodic memory disturbances, agitation, restlessness and behavioural abnormalities since 2-3 years. Her routine blood investigation reports including complete blood count, blood sugar, renal function, liver function, electrolytes, TFT, viral markers showed a minimal elevated ESR(35mm/Hr) and liver enzymes(SGOT-74 IU and SGPT-82IU) and a deranged TFT(elevated fT3,fT4 and decreased TSH). Once her seizures were controlled, her clinical examination showed bilateral exophthalmos without any EOM restriction but did not show any focal neurological deficits, abnormal movements or any thyroid swelling. She was agitated and restless. Her MRI brain showed multiple diffuse T2 Flair hyper intensities predominantly in subcortical white matter of frontoparietal region which were not contrast enhancing(Fig1,2,3). Subsequently her Anti TPO titres done were elevated (>1300IU) and CSF done showed a elevated protein with normal sugar levels and no pleocytosis. CSF OCB was negative. ANA profile, ANCA-C,P and RA factor were negative. She was started on neomercazole 10mg thrice daily, antiepileptics along with a course of methyl prednisolone 1g once daily for 5 days followed by oral steroids, adequate hydration . She improved over the next 1 week and at the end of 1 week, mild restlessness , behavioural disturbances and easy fatiguability was persisting.TFT repeated showed decreased TSH with normal fT3,fT4 values. EEG done at this stage showed intermittent generalised slowing without any epileptiform discharges (Fig4). MRI repeated showed persistence of white matter hyper intensities. She was subsequently discharged with a tapering course of oral steroids, neomercazole 10mg BD, anti epileptics and anxiolytics and with a diagnosis of HE as she satisfied 4 out of the 5 Peschen rosin criteria for HE(at least 3 of 5).

At the end of 1 month, she came for review with generalised well being better than at the time of discharge. No further episodes of seizures or behavioral abnormalities but she still complained of easy fatigability. Her TFT values and EEG normalised (Fig5) but MRI findings were persisting. Her medications were being tapered with a maintenance low dose steroids, AED and is kept under regular follow up with a plan to repeat MRI after3months.







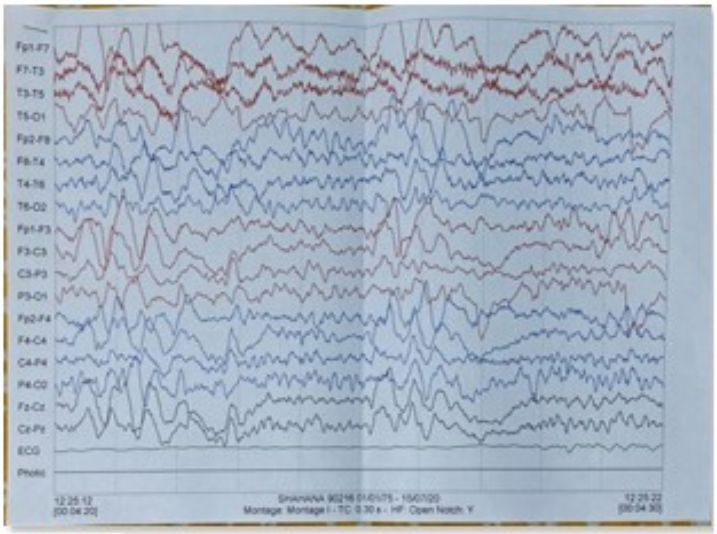


Fig 4

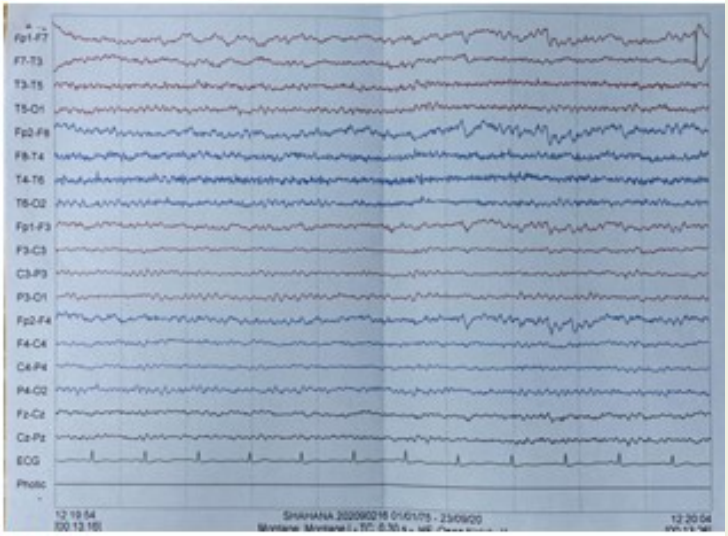


Fig 5

Hashimoto encephalopathy is a rare syndrome associated with autoimmune thyroiditis, as first reported by Brain et al in 1966.2 Peschen-Rosin et al1 described the criteria for the diagnosis of Hashimoto encephalopathy as unexplained episodes of relapsing various neurologic symptoms and at least 3 of the following: abnormal EEG; positive anti-TPOAb; elevated CSF protein; excellent response to steroids; and normal head MRI findings. Anti-NAE antibody has utility as a biomarker of Hashimoto encephalopathy, with a sensitivity and specificity of 50% and 91%, respectively.3 Patients with Hashimoto encephalopathy may demonstrate various symptoms, with normal thyroid function in the majority of cases that may be elevated or depressed. Accordingly, Hashimoto encephalopathy is often misdiagnosed. However, this disease represents a treatable form of dementia that physicians must be aware of. For these reasons, Hashimoto encephalopathy is an extremely important, though rare, diagnosis. Hashimoto encephalopathy should be suspected and screened for in patients with encephalopathy due to unknown causes because responses to treatment are typically excellent.

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Dr. Ajaya Kumar Ayyappan Unnithan
M.B.B.S.,M.S.,D.N.B.,M.Ch.,D.N.B.,
Senior Consultant Neurosurgeon,Department of Neurosurgery,
Muthoot Hospital , Kozhencherry

A Brief Evidence Based Review of Decompressive Craniectomy for Patients with Brain Edema

Abstract:
Introduction: Now decompressive craniectomy (DC) is being done to reduce the elevated intracranial pressure (ICP) in cases of traumatic brain injury (TBI), acute subdural hematoma (ASDH), middle cerebral artery (MCA) infarction, spontaneous intracerebral hemorrhage, and aneurysmal subarachnoid hemorrhage (SAH). The studies by Jaeger et al. and Stiefel et al. showed that the intracranial pressure (ICP) decreased and the partial pressure of brain tissue oxygen (P(ti)O2) increased after decompressive craniectomy.
Methods: A search was done in Pubmed, Scopus, and EMBASSE for the trials of decompressive craniectomy, the current guidelines, complications, and prevention and treatment of complications. A descriptive analysis was done.
Discussion: Primary DC is removal of a bone flap after evacuating an intracranial hematoma or a mass lesion. A secondary DC refers to the procedure done in a patient with raised ICP on monitoring, when it is not responding to medical measures. Decompressive Craniectomy (DECRA) trial tested the efficacy of bifrontotemporoparietal decompressive craniectomy in traumatic brain injury. The functional outcome on the Extended Glasgow Outcome Scale after six months, was worse in the craniectomy group than in the standard-care group. In RESCUEicp trial, the patients with raised intracranial pressure of greater than25 mm Hg for 1 to 12 hours, despite ventilation, sedation, mannitol and ventriculostomy were randomized into surgical or medical group. At 6 months, the patients in the surgical group had lower mortality and higher rates of vegetative state. The DEcompressive Craniectomy In MALignant MCA Infarction (DECIMAL) Trial compared early unilateral large, decompressive craniectomy with standard medical therapy alone in patients with malignant MCA infarction. The absolute death rate reduced significantly. HAMLET (Hemicraniectomy After Middle Cerebral Artery infarction with Life-threatening Edema Trial) study assessed the effect of decompressive surgery within 4 days in patients with hemispheric infarction. Surgical decompression reduced the case fatality.
Conclusions: Although the initial trials were not showing significant good outcome after decompressive craniectomy, the later trials showed a reduction in poor outcome. Now large DC is recommended in traumatic brain injury and MCA territory infarct. The complications related to the procedure are hemorrhagic expansion of contusions, evolution of contralateral hematoma, external cerebral herniation, cerebrospinal fluid (CSF) leak, infections, subdural hygroma, hydrocephalus , paradoxical herniation, and the syndrome of the trephined.
Key words: Decompressive Craniectomy, Brain Edema, Traumatic Brain Injuries, Acute Subdural Hematoma, Cerebral Hemorrhage, Cerebral Infarction.

Introduction:

Harvey Cushing described subtemporal decompressive operation for relieving intracranial pressure due to trauma and tumor[1,2]. Now decompressive craniectomy (DC) is being done to reduce the elevated intracranial pressure (ICP) in cases of traumatic brain injury (TBI), acute subdural hematoma (ASDH), middle cerebral artery (MCA) infarction, spontaneous intracerebral hemorrhage, and aneurysmal subarachnoid hemorrhage (SAH)[3,4,5]. In a comparative study by Polin et al., the postoperative ICP was lower in patients who underwent bifrontal DC than late measurements of ICP in the matched control population from Traumatic Coma Data Bank[6]. DC has been shown to be more effective than craniotomy for evacuation of acute subdural hematoma in unconscious patients[5]. Bilateral craniectomy resulted in dramatic improvement from decerebrate coma due to subarachnoid hemorrhage[7]. The studies by Jaeger et al. and Stiefel et al. showed that the intracranial pressure (ICP) decreased and the partial pressure of brain tissue oxygen (P(ti)O2) increased after decompressive craniectomy [8,9] . The short series by Reithmeier et al. showed that the removal of a large bone flap reduced ICP, and that dura enlargement restored adequate brain tissue oxygenation[10]. Early (within 24 hours) and ultra-early (within 6 hours) decompressive craniectomy for middle cerebral artery terrirory infarction have shown reduction in mortality and neurological deficits[11,12]. The survival rate in cases of spontaneous intracerebral hemorrhage is better after DC, but with increased morbidities[4]. In spite of the beneficial effects on ICP, the patients after DC may remain in persistent vegetative state[8].

Methods:

A search was done in Pubmed, Scopus, and EMBASSE for the trials of decompressive craniectomy, the current guidelines, complications, and prevention and treatment of complications. A descriptive analysis was done.

Discussion:

Principle of decompressive craniectomy:

Primary DC is removal of a bone flap after evacuating an intracranial hematoma or a mass lesion[13]. A secondary DC refers to the procedure done in a patient with raised ICP on monitoring, when it is not responding to medical measures. A part of the skull is removed and the underlying dura opened to overcome the rigid nature of the skull and dura mater [14] . It interrupts the vicious cycle of an increase in ICP, a reduction in cerebral perfusion pressure (CPP), venous hypertension and worsening edema. The methods are large unilateral fronto-temporoparietal craniectomy for lesions or swelling confined to one cerebral hemisphere, and bifrontal craniectomy from the floor of the anterior cranial fossa to the coronal suture to the pterion for diffuse swelling[15]. The large fronto-temporoparietal craniectomy can provide as much as 92.6 cm^3 additional space .

Review of the trials:

Decompressive Craniectomy (DECRA) trial tested the efficacy of bifrontotemporoparietal decompressive craniectomy in traumatic brain injury[16]. The range of age was 15-59 years. The patients selected were of GCS 3 to 8 or those with Marshall class 3 moderate diffuse injury on computed tomography (CT) scan. Those patients with large mass lesions and those with dilated nonreactive pupils were not included.

The indication was elevation of the intracranial pressure above 20 mm Hg, for more than 15 minutes. It was found that the patients in the craniectomy group had a shorter duration of mechanical ventilation and a shorter stay in the ICU than patients in the standard-care group. The functional outcome on the Extended Glasgow Outcome Scale after six months, was worse in the craniectomy group than in the standard-care group.

In RESCUEicp trial, the patients with raised intracranial pressure of greater than25 mm Hg for 1 to 12 hours, despite ventilation, sedation, mannitol and ventriculostomy were randomized into surgical or medical group[17]. The surgery was either unilateral frontotemporoparietal craniectomy for patients with unilateral hemispheric swelling, or bifrontal craniectomy for patients with diffuse brain swelling. At 6 months, the patients in the surgical group had lower mortality and higher rates of vegetative state, lower severe disability, and upper severe disability than those in the medical group. The rates of moderate disability and good recovery were similar.

The DEcompressive Craniectomy In MALignant MCA Infarction (DECIMAL) Trial compared early unilateral large, decompressive craniectomy with standard medical therapy alone in patients with malignant MCA infarction[18]. Those patients under 55 years of age with an infarct volume of >145 cm^3 in Magnetic Resonance Diffusion-Weighted Imaging, were enrolled. The absolute death rate reduced significantly by more than half in the surgical group compared with that in the medical group. There was no patient who sustained severe disability in the craniectomy group. But there was increase in the number of patients with moderate disability.

HAMLET (Hemicraniectomy After Middle Cerebral Artery infarction with Life-threatening Edema Trial) study assessed the effect of decompressive surgery within 4 days in patients with hemispheric infarction[19]. Surgical decompression reduced the case fatality with absolute risk reduction [ARR] of 38%. The functional outcome did not improve when surgery was delayed for up to 96 h after stroke onset.

DESTINY(DEcompressive Surgery for the Treatment of malignant INfarction of the middle cerebral arterY) trial showed that surgery reduced mortality in hemispheric stroke, but without statistical significance[20]. There was a criticism that a reduction in mortality might be outweighed by the dependency of a vegetative state. In a meta-analysis of patients in DECI-MAL, DESTINY, and HAMLET who were randomised within 48 h of stroke onset, surgical decompression reduced poor outcome (ARR 16%) and case fatality (ARR 50%)[19,20].

RESCUE-ASDH study is a multi-centre, randomised trial which compares the efficacy of pri-mary DC with craniotomy for the management of acute subdural hematoma (ASDH)[13]. The primary outcome is measured as the extended Glasgow Outcome Scale (GOSE) at 12-months. The results are expected.

Complications:

Craniectomy size larger than 10-12 cm has been shown to reduce the mortality rate[21,22]. The complications related to the procedure are hemorrhagic expansion of contusions, evolution of

contralateral hematoma, external cerebral herniation, cerebrospinal fluid (CSF)leak, infections, subdural hygroma, hydrocephalus , paradoxical herniation, and the syndrome of the trephined[23,24,25].

Hemorrhagic complications after DC are blossoming of contusions, new ipsilateral hematoma, new contralateral hematoma, and hemorrhagic transformation of ischaemic infarction. The cause of hemorrhagic complication is the loss of tamponading effect of raised ICP. External cerebral herniation can cause kinking of the veins at the edges of the craniectomy resulting in venous congestion, and further herniation. The syndrome of the trephined is due to the altered CSF dynamics.The symptoms of the syndrome are new motor weakness, cognitive deficits, altered level of consciousness, seizures, and cranial nerve deficits.The reasons for hydrocephalus after DC are arachnoid adhesions in the basal cisterns, loss of pulsatile CSF flow, and impaired venous drainage into the sagittal sinus[26].

Current guidelines: The recommendations of Brain Trauma Foundation(BTF) are[27]:

1. Secondary DC performed for *late* refractory ICP elevation is recommended to improve mortality and favorable outcomes.
2. A large frontotemporoparietal DC (not less than 12 × 15 cm or 15 cm in diameter) is recommended over a small frontotemporoparietal DC for reduced mortality and improved neurological outcomes in patients with severe TBI.
3. Secondary DC, performed as a treatment for either early or late refractory ICP elevation, is suggested to reduce ICP and duration of intensive care, though the relationship between these effects and favorable outcome is uncertain.

The American Stroke Association(ASA) recommends to ‘perform decompressive surgery in those ≤60 years of age who deteriorate within 48 hours from cerebral edema associated with unilateral MCA infarctions despite medical therapy’[28].

Prevention and treatment of complications:

Prevention of the progressive brain swelling due to external cerebral herniation is by large bone decompression (12x15cm) and inserting Gelfoam pieces as “vascular cushions” adjacent to large draining veins at the craniectomy margin[23,25.]. Early cranioplasty is recommended for the syndrome of the trephined. The treatment of hydrocephalus is a matter of controversy. Ventriculoperitoneal shunt(VP shunt) may cause paradoxical brain herniation. But CSF diversion is the only procedure for patients with hydrocephalus requiring intervention[26,29]. Early cranioplasty might reduce the incidence of hydrocephalus by restoring the CSF dynamics[30].

Persistent vegetative state after DC:

Decompressive craniectomy may fail to rescue neurological function from a devastating injury[23].

Risks of survival in a persistent vegetative state (PVS) range more than 20%. The factors associated with a high chance of PVS are GCS scores < 6, brainstem dysfunction, older age, and longer time to decompression.

Conclusions:

Although the initial trials were not showing significant good outcome after decompressive craniectomy, the later trials showed a reduction in poor outcome. Now large DC is recommended in traumatic brain injury and MCA territory infarct. The complications related to the procedure are hemorrhagic expansion of contusions, evolution of contralateral hematoma, external cerebral herniation, cerebrospinal fluid (CSF) leak, infections, subdural hygroma, hydrocephalus , paradoxical herniation, and the syndrome of the trephined.

Fig.1. Peroperative picture of congested edematous frontotemporal lobes.

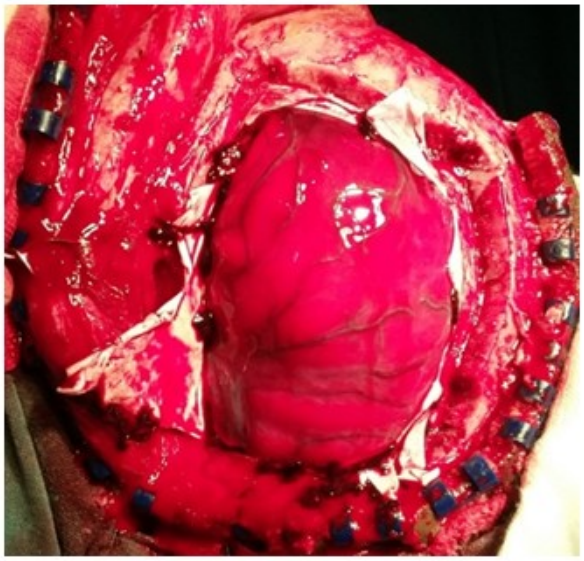


Fig.2: CT scan after bifrontotemporal decompressive craniectomy.

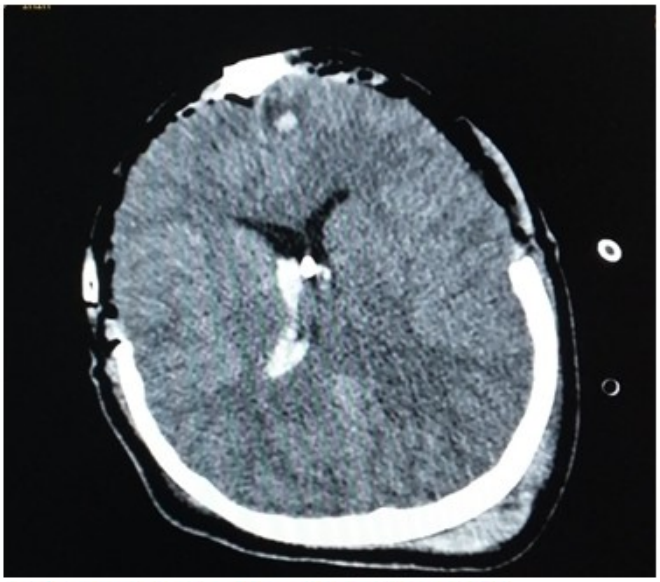


Fig.3: 3D CT after frontotemporoparietal DC.

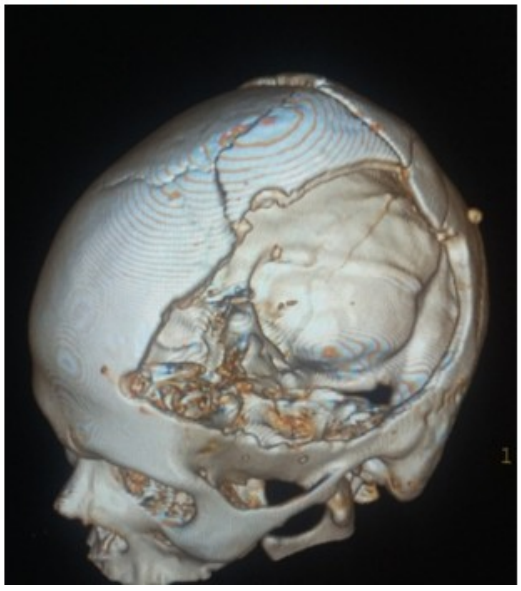
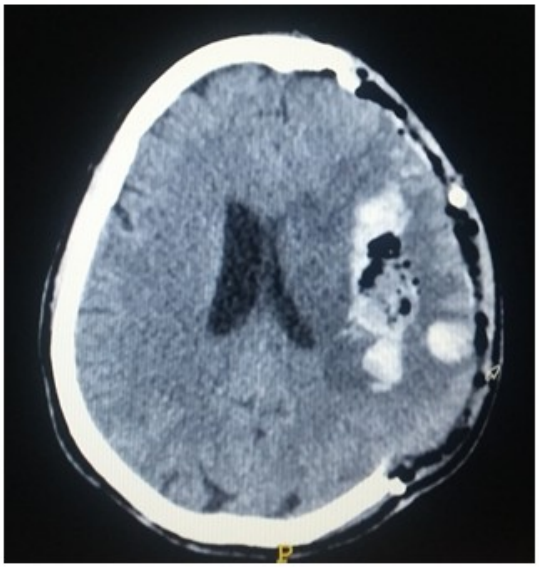


Fig.4: CT brain showing mild cerebral herniation after DC



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Dr. Malini S.,
Neurosurgery DNB resident, Indo-American hospital, Vaikom

BEST PAPER AWARD MIDTERM VIRTUAL MEET 2020

COMPARITIVE STUDY

CT-based navigation versus Conventional C-arm Fluoroscopy in cervical pedicle screw insertion: a retrospective study

Malini. S, Neurosurgery DNB resident, Indo-American hospital, Vaikom
Anu C Thomas and Sajeev S. Vadakkedam.

Abstract

Background

Computed tomography- based navigation systems have recently become popular in guiding pedicle screw insertion during spine surgeries. Pedicle screw insertion in cervical region is, in general, technically more challenging and associated with increased risk of neurovascular complications. CT- based and 3D C-arm based navigation have made these surgeries easier and more accurate.

Objectives

We are reporting a retrospective study comparing the accuracy of pedicle screw insertion and intraoperative radiation exposure in cervical spine using CT- navigation and C-arm fluoroscopy. Any neurovascular complications during the immediate post- operative period were noted and accuracy of screws was measured radiologically. Duration and amount of radiation exposure was noted.

Materials and Methods

The cases done from the period January, 2018 to October, 2020 were considered for comparison. Total number of screws were noted; displacement of screws from the pedicle, if any, was measured from post- operative CT scans. Radiation exposure was compared in both groups. Statistical analysis was done using the collected data.

Results

A total of 64 screws were placed. CT- navigation provided better accuracy (93.3%) compared to fluoroscopy guided technique (64.7%). It was found to be statistically significant ($p<0.05$). There was also significant reduction in radiation exposure.

Conclusions

Cervical pedicle screw insertion using CT navigation was found to be more accurate and technically easier compared to C- arm fluoroscopy. Hence, it is preferable to fluoroscopy, especially in anatomically difficult areas like cervical spine, congenitally malformed pedicles, narrow pedicles, fluoroscopically invisible areas and in high risk of neurovascular complications.

Introduction

Cervical pedicle screw (CPS) insertion is gaining popularity since last few decades, especially with the advent of newer techniques providing assistance in safer and more accurate instrumentation. Abumi et al. reported the first successful CPS placement in the early 1940's [1]. CPS placement is useful in many conditions such as cervical spondylotic myelopathy (CSM) with instability and kyphotic deformity, congenital anomaly, rheumatoid arthritis, infectious or neoplastic lesions. CPS is considered as one of the best methods of posterior segmental fixation. However, it is associated with considerable risk related to neural or vascular injuries [2,3,4]. The purpose of our study was to compare the accuracy of CPS placement and the radiation exposure while using computer navigation system and conventional X- ray fluoroscopy.

Materials and Methods

We conducted retrospective analysis comparing the accuracy of pedicle screw insertion in the cervical region using CT- navigation and C-arm fluoroscopy. The cervical region pedicle screw insertion done from the period January, 2018 to October, 2020 were considered for comparison. A total of 64 cervical pedicle screws were placed during this time period. There were 30 screws placed with CT navigation guidance and 34 screws using X- ray fluoroscopy. The displacement of screws from the pedicle, if any, was measured from post- operative CT scans.

Modified Gertzbein and Robbins classification, consisting of five grades, was considered for categorizing each screw [5]. Grade 1 describes ideal screw position with pedicle wall perforation of 1 mm, grade 2 describes positioning with pedicle wall perforation of 2 mm, grade 3 of 3 mm, and grade 4 of 4 mm. Grade 5 represents a cortical breach of 4 mm and/or obstruction of the transverse foramen by more than half a screw diameter .

Modified Gertzbein and Robbins classification

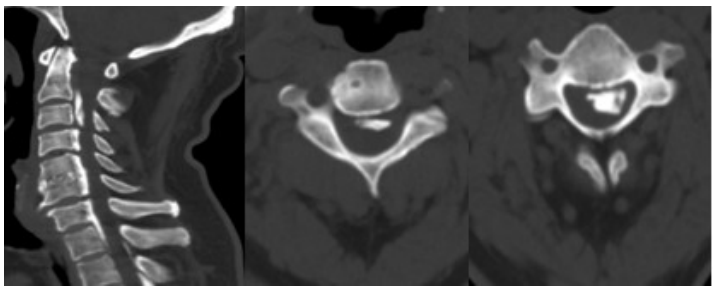
Grade 1	Within pedicle, perforation 1 mm
Grade 2	Pedicle wall perforation of ≤ 2 mm
Grade 3	With pedicle wall perforation of ≤ 3 mm
Grade 4	With pedicle wall perforation of ≤ 4 mm
Grade 5	Cortical breach of 4 mm and/or obstruction of the transverse foramen by more than half a screw diameter

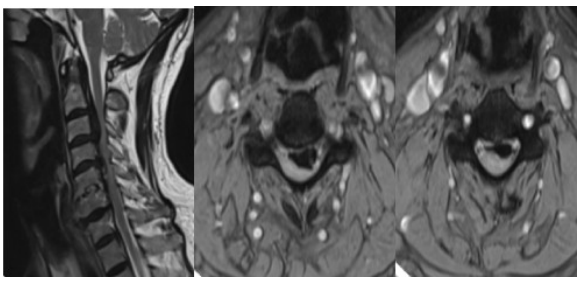
The excellent and good category of screws were considered together as good accuracy group.

Pre- operative CT and MRI of a 68 year old male, who had presented with above C5 myelopathy showing significant OPLL and canal stenosis:

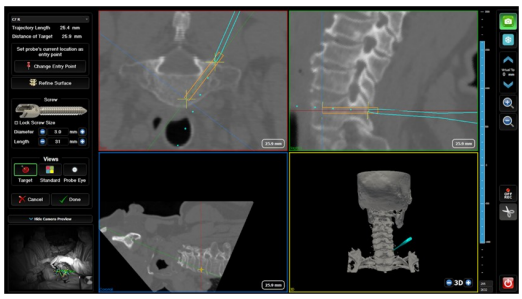
Group	Total number of screws	Excellent	Good	Fair	Poor	Very poor	Good accuracy (E+G)
CT Navigation	30	10	18	2	0	0	28/30 (93.33%)
X Ray fluo-	34	7	15	12	0	0	22/34 (64.71%)

Pre- operative CT and MRI of a 68 year old male, who had presented with above C5 myelopathy showing significant OPLL and canal stenosis:

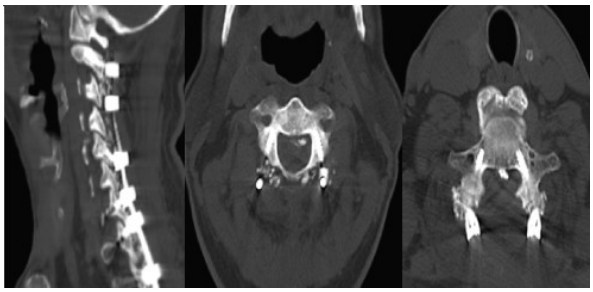




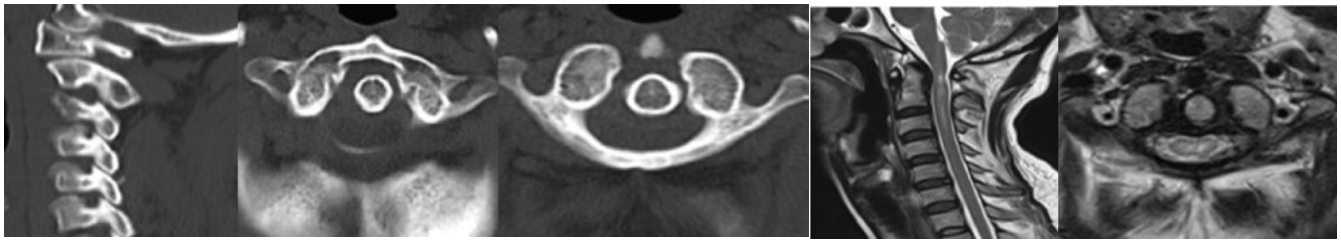
Intra- op CT- based neuro- navigation:



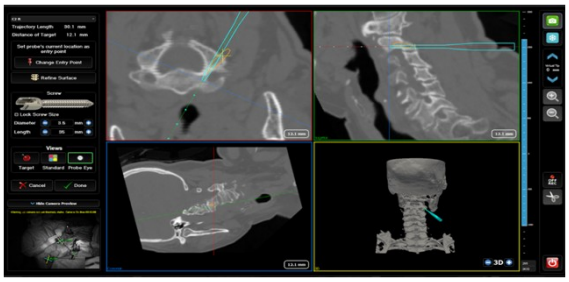
Post operative CT showing excellent placement of screws in C2 and C7 pedicles using neuro-navigation guidance:



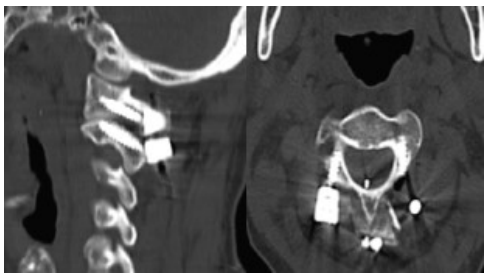
Pre- operative images of a 49 year old female, who had presented with post- traumatic atlanto-axial dislocation and cord contusion at C2, C3 level



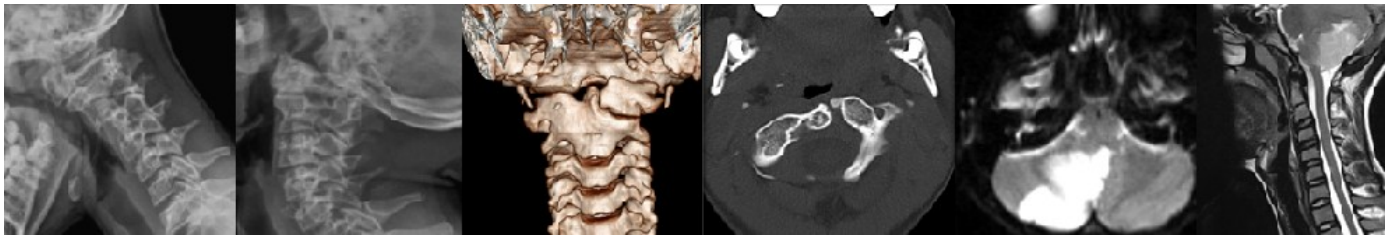
Intra- op CT- based neuro- navigation for C2 pedicle screw placement:



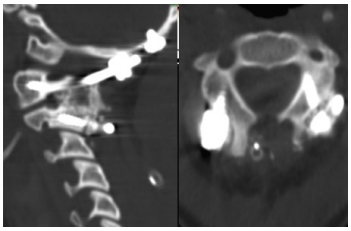
Post operative CT showing good position of screws.

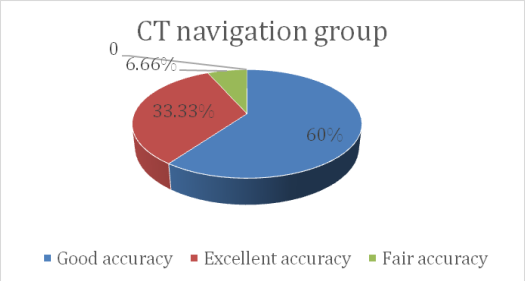


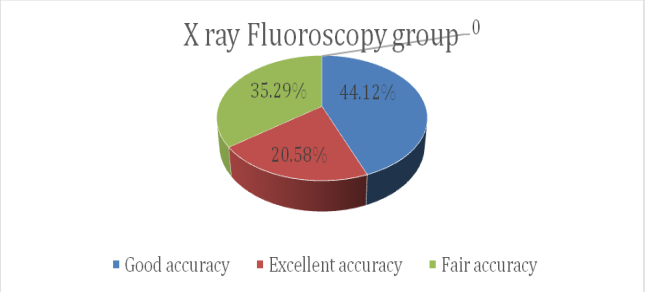
Pre-operative images of a 12 year-old male, who had presented 3 days after an attempted somersault, with atlanto-occipital dislocation, right vertebral artery dissection and right cerebellar infarct. He had congenital hypoplastic posterior arch of atlas, fused C1, C2, C3 vertebrae and narrow C2 pedicle



Post- operative CT showing C2 pedicle screw placement of fair accuracy:







Statistic analysis

Statistical analysis was done by calculating the mean, standard deviation and standard error mean.

Surgery type	N	Mean	Std. Deviation	Std Error Mean
1	30	2.28	.579	.084
2	34	1.93	.721	.113

Independent Samples t-Test was done.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
score	Equal variances assumed	.370	.544	-2.523	86	.013	-.350	.139	-.625	-.074
	Equal variances not assumed			-2.486	76.577	.015	-.350	.141	-.630	-.070

\Radiation exposure was compared in both groups. The average radiation exposure with each AP and lateral X ray images taken with C arm was multiplied by the number of C-arm shots taken for each screw placement. Statistical analysis was done using the collected data using the independent samples t test.

GROUP	Total number of C-arm shots taken	Radiation exposure (0.1 µSv)
CT navigation	25	2.5
X ray fluoroscopy	78	7.8

Results

Cervical pedicle screw insertion using CT Navigation was more accurate (93.33%) as compared to conventional C- arm fluoroscopy (64.71%). Group 1 (using CT Navigation) was found to have more accurate pedicle screw placement which was statistically significant ($p=0.013$). It was also found that radiation exposure was considerably lesser in CT navigation group than X- ray fluoroscopy group ($p<0.05$), which was statistically significant.

Discussion

Pedicle screw insertion in cervical region is technically more challenging due to various reasons including variable anatomy, congenitally malformed pedicles, narrow pedicles, fluoroscopically invisible areas and increased risk of neurovascular complications. Pedicle screw insertion in the cervical spine is desirable due to the benefit of better strength of the construct. CPS insertion can be done in cases of cervical instability, trauma [6,7], neoplasms, spinal deformity, destructive spondyloarthropathy, cervical spondylotic myelopathy, infections, rheumatoid arthritis and others. Several advances have been made over the past decade in the techniques for safe pedicle screw insertion [8,9]. X-ray and CT based navigation systems have revolutionized the CPS placement [10]. There are also still newer methods like intra-op O-arm which can help the surgeon use CT spine taken after surgical positioning of the patient which can be used for navigation during the surgery. These techniques have made CPS insertion much safer and more accurate, reducing the intra-operative complications like neurovascular injury and also reducing the exposure to harmful radiation during the procedure [11, 12, 13].

Advantages of navigation- based system are that we can do a better and assisted pre-operative planning with more precise screw placement, reduction of radiation exposure [11, 12, 13] and it is much helpful in fluoroscopically invisible areas. It is also comparatively safe, thus reducing the incidence of neurovascular complications. However, the system is not without pitfalls. We need a more extensive release of the lateral side of lateral mass and a longer skin incision so as to place the reference arc and movement of reference frame during the procedure can affect the accuracy of the screw placement.

A study by Tauchi et al. and several others [14, 15] showed that the rate of misplacement of CPS is reduced when performing separate registration for each vertebral level and also a distance of three vertebrae or more above or below the reference frame vertebra produced significantly more frequent perforations.

In our retrospective study, we set to compare the safety, accuracy and radiation exposure to the surgeon and OT staff while using CT based navigation and X- ray fluoroscopy in cervical pedicle screw insertion. The results were at par with most other similar studies in that the CT- navigation based technique was found to be significantly safer, more accurate and causing much lesser radiation exposure as compared to the X-ray fluoroscopy- based technique. The limitations of this study were that the sample size was relatively small, various diseases were included in the study, different fusion levels were studied together, retrospective design and lack of follow-up.

Conclusions

CT-based navigation system greatly improves safety and accuracy in CPS insertion. Severe complications could be prevented using this method. Radiation exposure is significantly less while using CT navigation. Firm immobility of the cervical spine and adequate exposure of the surgical region are key points during the procedure. The accuracy can be further improved by performing separate registration for each vertebral level.

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Dr. Rohit P.S.
Sr. Resident Neurology, Jubilee Mission Medical College& RI, Thrissur

PRESENTED IN MIDTERM VIRTUAL MEET 2020

COMMON CAROTID ARTERY INTIMA-MEDIA THICKNESS AS A PREDICTOR OF RECURRENCE IN ISCHEMIC STROKE

Dr. Rohit P.S., Dr Fiju Chacko, Dr. P.C. Gilvaz, Department of Neurology
Dr. Aneesh M.K.Department of Radiology
JMMC & RI, Thrissur, Kerala

Introduction: Stroke is defined by the World Health Organization as a clinical syndrome consisting of rapidly developing clinical signs of focal (or global in case of coma) disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than a vascular origin. Approximately 80% cases of stroke are due to cerebral ischemia. Incidence and prevalence of stroke has risen exponentially worldwide in last few decades and incidence of stroke is also rising among Indians. Ischemic stroke may be thrombotic or embolic. In most of the ischemic strokes, the underlying pathophysiology is atherosclerosis. The common carotid artery intima media thickness has emerged as a reliable independent marker of atherosclerosis and cerebrovascular disease. Measurement of intima-media thickness of carotid arteries by B mode ultrasound imaging correlated well with histopathological examination. The intima-media thickness is at present the best-studied sonographic marker for early atherosclerosis. A thickening of intima-media complex not only reflects local alterations but also corresponds to generalized atherosclerosis.

Aims and Objectives: To study whether common carotid artery intima-media thickness can be used to predict recurrence in first ever ischemic stroke survivors. To find out the association of common carotid artery intima-media thickness with risk factors of ischemic stroke.

Methodology: ***Study Design****:* Prospective study ***Sample Population****:* Patients admitted in the department of neurology, with first ever stroke.

Sample Size: A total of 153 subjects who met the inclusion and exclusion criteria were included in the study.

required sample was met. ***Study Period****: 1.5 years*

Study procedure*:* Ultra sonographic scanning of carotid arteries was performed using higher resolution B mode colour doppler imaging and a linear transducer of 7.5Mhz. A single experienced operator carried out all ultrasound scans. Measurement of common carotid artery intima-media thickness was made at a point free of plaques on the far wall of the common carotid artery, 1.5 cm proximal to the bifurcation, from a longitudinal scan plane that showed the intima-media boundaries most clearly. On the screen displaying the frozen magnified image of the far wall of the common carotid artery, two cursors were positioned on the boundaries of the intima-media. The distance between these cursors were recorded as the CCA-IMT. The procedure was repeated for each side of the neck and the maximal value was used for analysis. The common and internal carotid arteries and the bifurcation were bilaterally evaluated for the presence of plaques (localized echo structures that protrude into the lumen).

Definition of recurrent stroke:All patients were followed up for a period of 12 months post-stroke for recurrence. Patients who developed a recurrent stroke in the follow up period were evaluated when they reported with the recurrent stroke. The patients who did not develop recurrent stroke in the follow up period were interviewed and underwent CT brain at the end of 12 months to look for new silent infarcts. For the definition of recurrent stroke, in addition to the WHO criteria, there has to be either a new neurological deficit or a deterioration of the previous deficit not considered to be due to edema, haemorrhagic transformation or concurrent illness. In those fulfilling the above criteria, brain imaging was done to support the diagnosis of recurrent stroke. Recurrent strokes were classified as ischemic haemorrhagic on the basis of brain imaging. Patients who developed haemorrhagic stroke as recurrent stroke were excluded from the study. A new silent infarct on repeat CT Brain taken at the end of 12 months was also considered as recurrence, even if it is clinically silent. We only considered events that occurred at least 4weeks after the onset of the index stroke. In those who have more than one recurrent stroke, only the first one was considered.

Results: The comparison of CCA-IMT and risk factors did not show any significant statistical association. Recurrent stroke within 1 year showed a statistically significant direct association with CCA-IMT size

with an odd's ratio of 10.326, which means there is 10.326 times more chance of recurrent stroke within 1 year in patients when CCA-IMT size is more than 1 mm. Similarly, new silent infarct showed a statistically significant direct association with CCA-IMT size with an odd's ratio of 8.08. The total stroke recurrences also showed a statistically significant association with the CCA-IMT size, with an odd's ratio of 9.77. Comparison of CCA-IMT with carotid plaque showed that carotid plaque was present more in patients with CCA-IMT size >1 mm (23 patients) and when the CCA-IMT size was < 1 mm there is relative absence of carotid plaque and the association was statistically significant. There was an odd's ratio of 6.064.

Comparison of the total stroke recurrence and the risk factors did not show any statistically significant association. The mean CCA-IMT values showed that all the risk factors were having a higher mean CCA-IMT value when the risk factors were present. Mean CCA-IMT value was highest in the age group of 51 to 60 years. Male patients had a higher mean CCA-IMT value (0.962 ± 0.27) compared to female patients. Recurrent stroke within 1-year, new silent infarct and total stroke recurrence had higher mean CCA-IMT values and all these were statistically significant. Presence of carotid plaque was associated with a higher mean CCA-IMT value and this was also statistically significant.

Conclusion: Higher CCA- IMT value (>1 mm) was found to be a significant predictor of recurrent ischemic stroke in one year in first ever ischemic stroke survivors. The presence of carotid plaque was significantly associated with a higher mean CCA-IMT value. The mean CCA-IMT value was higher among individuals with risk factors like older age, diabetes, hypertension, dyslipidemia and smoking. However, there was no statistically significant association between CCA-IMT value and the risk factors studied.

Dr. Shino P.Ashly
DNB Neurosurgery Resident, Indo American Hospital ,Vaikom
PRESENTED IN MIDTERM VIRTUAL MEET 2020

Multifocal Spinal Ependymomatosis - A rare case series

Dr.Shino .P. Ashly ,Dr. Anu Thomas ,Dr. Sajeev. S. Vadakkedam, Indo American Hospital ,Vaikom

ABSTRACT

Background:
Ependymomas are the most common intramedullary tumors in adults. They account for 60% of all intramedullary tumors. Intradural extramedullary (IDEM) ependymoma subtypes are extremely rare. Multiple IDEM ependymomas are even rarer. They often described as a benign lesion, but they have potential for recurrence, metastasis, and anaplastic transformation resulting in fatal outcome.

Materials and Methods:
Retrospective study of all patients with spinal ependymoma treated surgically over a 9-year period between January 2011 and October 2020 in Indo American Hospital, Vaikom, Kerala; were recorded. Only cases with multiple ependymoma was evaluated and included in this study. Clinical presentation, radiological features, extent of resection, and management were noted.

Case reports:
We are reporting a rare case series of multiple spinal ependymomatosis of six patients ; of which four are extramedullary and two are intramedullary. Multiple ependymomas were seen on magnetic resonance imaging and were confirmed histopathologically. The aetiopathological mechanism and management of this rare occurrence is discussed.

Conclusions:
Ependymoma often described as a benign lesion. There is a need for close follow-up with screening of cranio-spinal axis in such lesions as there is potential for recurrence, metastasis, and anaplastic transformation resulting in fatal outcome. Primary multiple spinal ependymomatosis is a rare phenomenon .Even though the best treatment for this lesion is complete resection with adjunctive radiotherapy in malignant cases, radical excision is unrealistic in some conditions.

Keywords: Ependymoma; multifocal ependymoma; extramedullary ependymoma; intradural extramedullary ependymoma

INTRODUCTION

Ependymomas are the most common intramedullary spinal cord tumors in adults. They are neuroectodermal tumours arising from the ependymal lining of the ventricles and the central canal of the spinal cord. They account for 60% of all intramedullary tumors. Sir William Stewart Halsted did first surgery for ependymoma

Harvey Cushing's refined Halsted's meticulous surgical techniques for facilitated safe resection. Extramedullary ependymoma are extremely rare, till now only 33 cases reported. Multifocal IDEM are even more rare ,only 5 of the 33 cases having multiple lesions.[1] Cooper et al. reported the first case of IDEM ependymoma in 1951.[2] They often described as a benign lesion, But they have potential for recurrence,metastasis, anaplastic transformation resulting in fatal outcome.

MATERIALS AND METHODS

Retrospective study of all patients with spinal ependymoma treated surgically over a 9-year period between January 2011 and October 2020 in Indoamerican hospital, Vaikom ; were recorded. Only cases with multiple ependymoma was evaluated and included in this study. Clinical presentation, radiological features, extent of resection, and management were noted.

We are reporting a rare case series of multiple spinal ependymomatosis of six patients. Four are intramedullary, Two are intra dural extra medullary. Here we are giving three of them. Multiple ependymomas seen on magnetic resonanceimaging and were confirmed histopathologically. Management after surgical intervention is done after discussing it with our Oncologyst.

CASE PRESENTATIONS

Case 1

A 41 year old male patient came with complaints of lower back ache for past six months. There was no radicular symptoms or bowel and bladder symptoms. MRI showed abnormal T2 hyper intense lesion from T12 to S2(fig1) ,Another similar signal intensity lesion in IDEM space at T3-4 vertebral level(fig2) , and both had homogenous intense contrast enhancement. His brain screening showed T2/FLAIR hyperintense lesion in right parapontine and quadrigeminal cistern and another one in left sylvian cistern(fig 3).

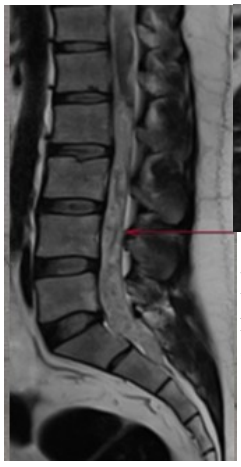


Fig.1. Abnormal T2 hyper intense IDEM lesion from T12

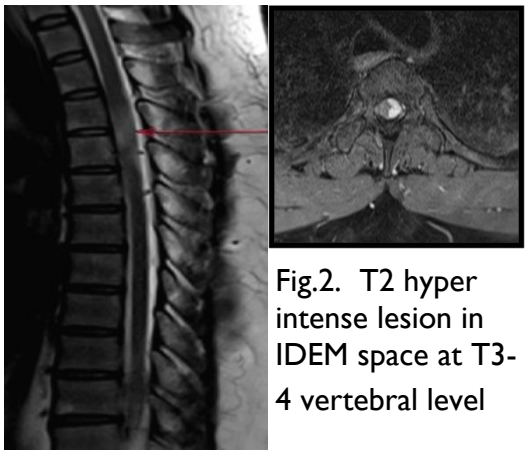


Fig.2. T2 hyper intense lesion in IDEM space at T3-4 vertebral level

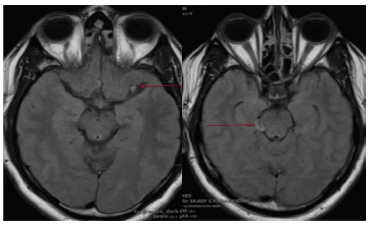


Fig.3. T2/FLAIR hyperintense lesion in right parapontine and quadrigeminal cistern

In first stage he underwent T10- S3 laminectomy and total resection of extramedullary lesion at T12 to S2.Intra operatively lesion found soft, friable, infiltrating filum terminale and densely adherent to cauda equina roots(Fig.4.).

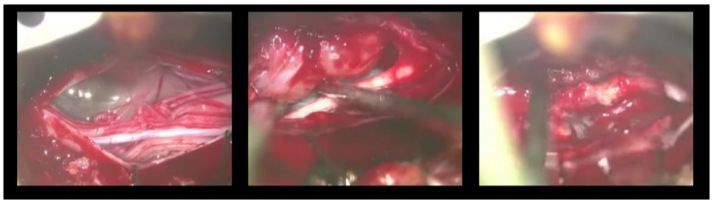


Fig.4. intra op images of T12-S2 lesion

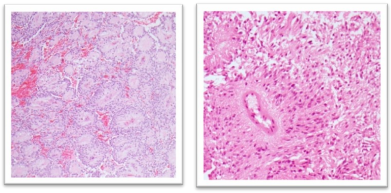
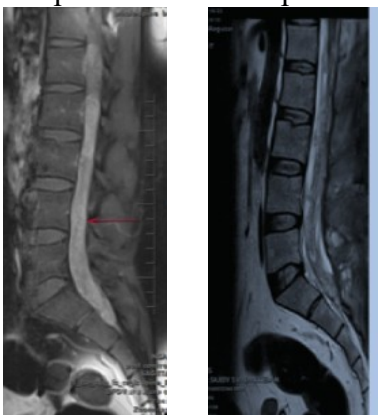


Fig.5. Histopathology slides of myxopapillary ependymoma

Fig.6. Post op image showing no residual lesion at lumbar level

Pre op MRI Post op MRI



Histopathology report came as Myxopappilary Ependymoma (WHO grade I).Post operative MRI didn't show any residuals(fig 6).

After 2 months in second stage he underwent T2- T4 laminectomy and

excison of extramedullary lesion. The histopathology report of T4 tumour was also Ependymoma (WHO grade I). Histologicallytwo tumours had a similar appearance with numerous perivascular pseudorosettes and occasional true ependymal rosettes. Tumor cells were positive for GFAP, S100 vimentin, EMA and CD99 and negative for neurofilament protein. Focal paranuclear dotlike staining was noted with EMA and CD99(Fig.5.).

One month later, according to Oncology suggestion , patient underwent cranio-spinal radiation. There were no immediate adverse neurological effects and he returned to normal life. At last follow up, the patient remains asymptomatic and neurologically intact. He continues full time employment. Routine surveillance MRI continues every 6 months.

Case 2

A 61 year old male patient reported with bilateral lowerlimb weakness , numbness with bowel and bladder involvement , suggestive of T8 Myelopathy (Nurick's Grade IV). His imaging study showed T1 hypointense ,T2 central hyperintense with superior hypointense intra medullary lesion at T8,T9 level with peripheral contrast enhancement and internal septations (fig.7). He also had another Intra medullary lesion of similar radiological appearance with nodular enhancement at C3-4 level (fig. 8).

Fig.7. T1 hypointense ,T2 central hyperintense with superior hypointense intra medullary lesion at T8,T9 level with peripheral contrast enhancement and internal septations

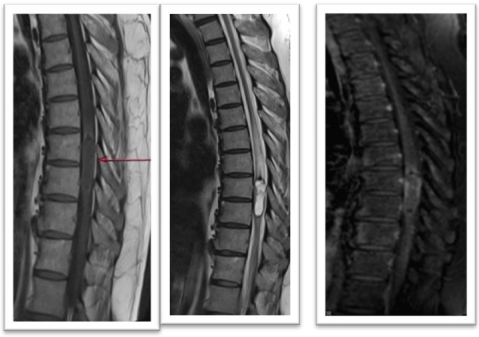
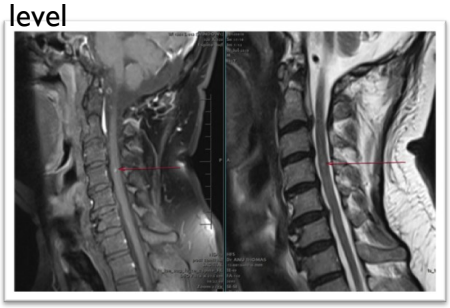


Fig.8. T1 hypointense ,T2 hyperintense intra medullary lesion with nodular enhancement at C3-4 level



He underwent T8-T9 laminectomy and excision of Lesion (Fig.9.). Histopathology report (HPR) came as Ependymoma. His cervical lesion was left alone as it is asymptomatic and very small size.

Fig.9. intra op images of T8-9 intramedullary lesion le-

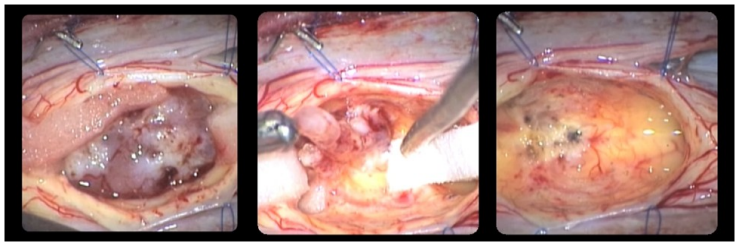
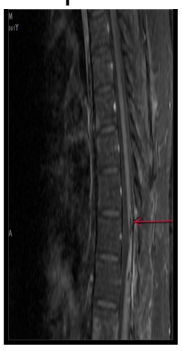
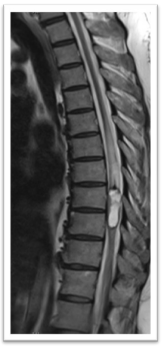


Fig.10. Post op image showing no residual lesion at thoracic level

Preop MRI



Postop MRI



Post op image didn't show any residual lesion at thoracic level (Fig. 10). After discussion with Oncologist , he was planned for regular follow up clinically and radiologically. As, there was no residual at thoracic level and cervical lesion was too small for RT. He got significant improvement with management (Nurick's Grade IV to II)

Case 3

A 48 year old man, an operated T8-T9 intramedullary lesion at another centre and diagnosed to have ependymoma (WHO grade II).Later came to our hospital after 7 years with bilateral lowerlimb weakness and numbness with bowel and bladder affection- suggestive of T8 myelopathy (Nurick's Grade IV).His imaging study showed T1W hypointense, T2 W hyperintense, contrast enhancing intra medullary lesion at T9,T10 level(Fig.11.)

Other cases

In the time span between January 2011 and October 2020, we have another 3 cases of multiple ependymoma. Out of which 2 were intra medullary and 1 was IDEM. All patients underwent gross total resection with post op radiotherapy.

DISCUSSION

Intra dural ependymomas predominate in fifth decade of life. extra medullary (especially IDEM) are extremely rare and seen in women in their 5th decade of life. Our case is very unusual in that the lesions were multifocal. The most common site for ependymoma is filum tereminale, but for extramedullary ependymomas is the thoracic

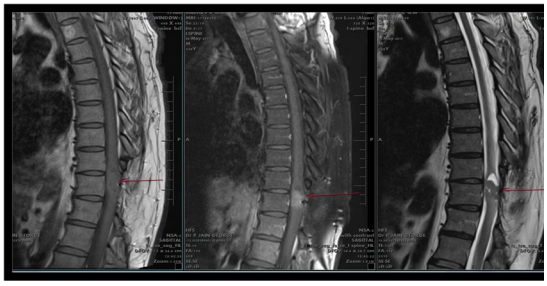


Fig.12. No residual lesion post op

spine , followed by cervical ,and lumbosacral. [3]Intramedullary ependymomas are mostly cervical.

Intra Dural Extra Medullary ependymomas are thought to arise from ectopic cells derived from remnants of neural tube . Pathogenesis remains ill-defined, with recent evidence suggesting glial stem cells may be the cell of origin.[4,5,6]

Pain is the most frequent initial symptom, akin to other tumors of the medullary canal.[7] Magnetic resonance imaging of the entire neuraxis is essential to rule out intracranial and multiple ependymomas.[8] Most cases tumours have been treated with surgical intervention only. More aggressive (grade III) lesions have been given differing regimens of adjuvant radiotherapy with variable success .[3]

Guppy etal. reported recurrence following surgical resection, 14 months following surgery. They describe stable residual disease following total external beam radiotherapy (EBRT) dose of 5,000 cGy, however follow-up was only 6 months[9] .Guppy et al. used external beam radiation with total dose of 5000cGy for grade III disease. Three cases describe using 28 fractions of 1.8 Gy for a total dose of 50.4 Gy, one for a grade II lesion,used 20 sessions of 1.8 Gy, with cervical and lumbar boost to a total dose of 54 Gy for multifocal anaplastic disease.[9]

Severino et al. described the only case of IDEM ependymoma in a child (grade II), and used craniospinal irradiation of a total of 3,600 cGy for a grade II lesion.[10]

Cerase et al. also describe recurrence following surgery/decompression with worsening clinical status; the patient died 1 month after surgical resection. The remaining 2 cases of solitary anaplastic lesions described partial or full recovery at latest follow-up after surgical resection and adjuvant radiotherapy.[11]

Kinsman et al. did not provide a follow-up period at all, however claim neurological improvement following unspecified adjuvant radiotherapy and surgery.[12]

Our patient is neurologically intact and independent 6 months after initial diagnosis. This is in contrast to the case of multifocal disease described by Lunes et al., with the patient dying 18 months after diagnosis despite surgery and adjuvant chemoradiotherapy.[4]

The goal of surgery is maximal resection with preservation of neurological function. Radiotherapy has been used in our case. Treatment for multifocal ependymoma may include surgical resection with adjuvant radiotherapy. Chemotherapy reserved for incomplete resection or recurrent disease.[3] Future studies of molecular characteristics of ependymoma may facilitate more precise prognosis and treatment .[13]

The prognosis seems to be related to the extent of resection and the presence of meningeal infiltration. It is important to note that malignant features do not necessarily correlate with poor prognosis.[14]

CONCLUSIONS

Primary multiple spinal ependymomatosis is a rare phenomenon .There is a need for close follow-up with screening of cranio-spinal axis in such lesions as there is potential for multi-centric origin , recurrence, metastasis, and anaplastic transformation resulting in

fatal outcome. Even though the best treatment for this lesion is complete resection with adjunctive radiotherapy in malignant cases, radical excision is unrealistic in some conditions.

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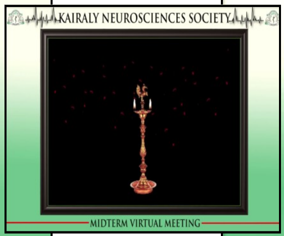

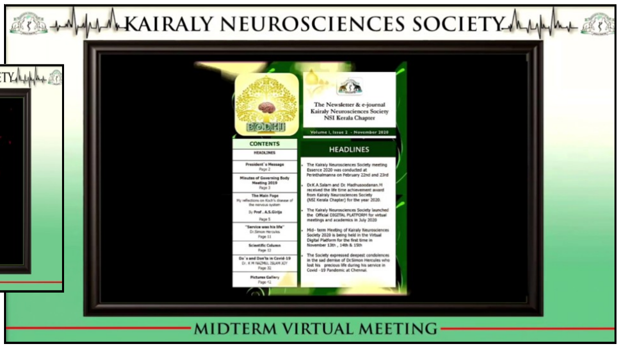

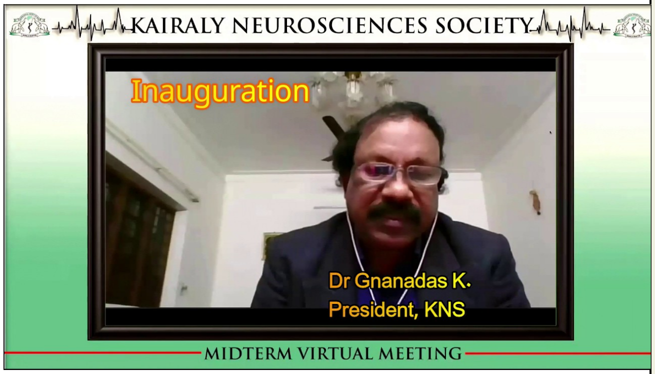

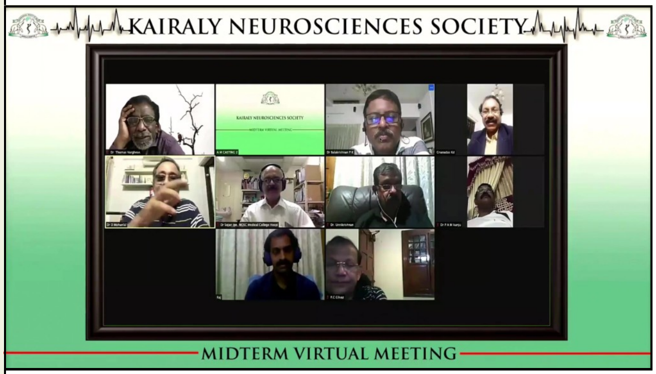

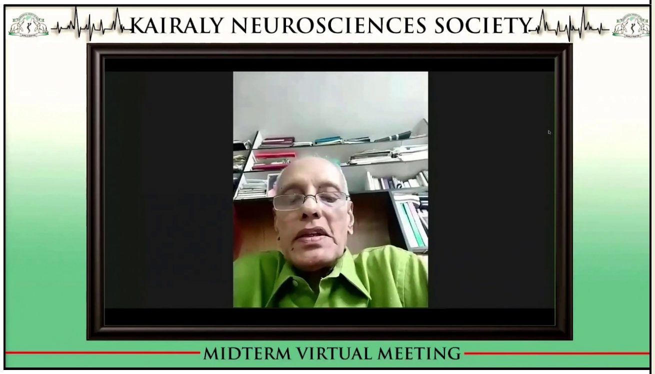

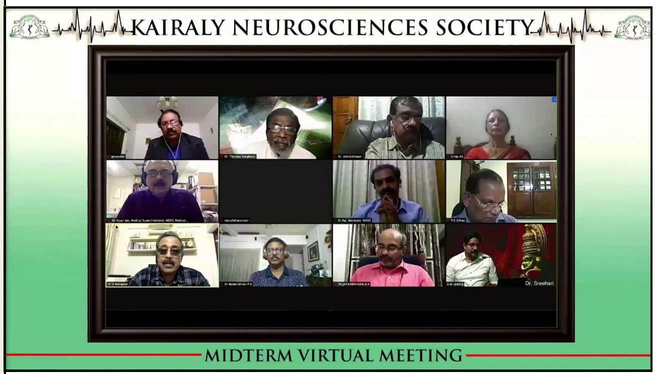

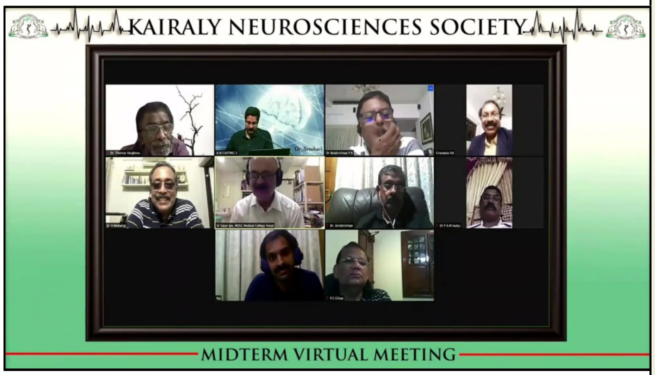

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From the editorial key board .....!

Third edition of `BODHI' required much more hard work from our officials of the Society as the Covid -19 pandemic has given the worst time in the Second wave . The calamity of COVID has taken its toll on the Neuroscientists from all the specialties working in our state .We had to make timely changes in the format of academic as well as official meetings which could be made possible with launch of our own DIGITAL PLATFORM with the support of all Senior Members and Patrons of the Society. This was Officially inaugurated by Dr .P. Sreekumar, Patron of the Kairaly Neurosciences Society in the first Virtual Official meeting invited by Dr.Gnanadas, President of the Society in July 2020.

The DIGITAL PLATFORM is encrypted with most of the live webinar and video transmission options and could be used by the members of the Society all over the state for Academic meetings , teaching programs, Telemedicine, Conferences , PG case discussions etc. The Mid-term NSI Kerala Chapter 2020 was conducted in the Digital Platform in the Virtual format for the first time in the history.

The Annual Conference 2021 was held in at Alappuzha in hybrid format for the first time also laid a landmark for the society. Dr.P.A.Mohammed Kunju started his tenure in April 2021 as President launched the weekly Post Graduate Webinar teaching programmes through our virtual platform which was inaugurated by Dr Mohan lal , Patron KNS on 25 th May 2021. This has successfully involved all the academic institutions and consultants in the State. Post graduates got lot of interactive sessions with different teachers and Academicians all over the state.

We request all the members to make use of it and so that learning process for the younger generations will propagate irrespective of the location.

We also request the members to contribute your scientific manuscripts and interesting cases to the e-journal so that everyone gets know about your dedicated work which is a major uplift for the science in our state. We are looking forward for the enrichment of scientific materials for our future editions with your whole hearted co operation.

We thank all the Specialists who contributed for this edition and all the team members who extended their support in releasing this edition. We have also started Educational portal in the website containing all the PG webinar links for the members who could attend the webinars live. We also invite our members to enrich this page with your academic materials or videos which could be an addendum in the PG teaching programmes.

"The goal of education is the advancement of knowledge and the dissemination of truth." —John F. Kennedy

With Best Regards from Bodhi editorial team
Webmaster KNS

Contact Us
Kairaly Neurosciences Society
Neurological Society of India Kerala Chapter
Contact Numbers:- +91-9447259359, +91-9846010040
Email:- nsikeralaweb@gmail.com
Website :- www.nsikc.com
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