KUMARAN

MEDIBYTES 2024

KUMARAN MEDICAL CENTER

YOUR GATEWAY TO WELLNESS

- THE WEEKEND WARRIOR'S ACHILLE
- HEALTH HUMOR AND FACTS
- ENHANCED TREATMENT FOR GASTRIC CONDITIONS
- EXPLORING THE PCB VARIANT OF GUILLAIN-BARRÉ SYNDROME
- UNRAVELING THE COMPLEXITY OF SNAKE ENVENOMATION

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I feel blessed and privileged to pen on this page and I thank our beloved respected Chairman Dr. Hari Prasad and our family of Kumaran Medical Center for shouldering the responsibility. Stepping into the Sixth year, after completing a five-year Metamorphosis from a crawling Larva to a Flying colorful Butterfly with wings stretched, we celebrate our fifth Anniversary, which has garnered another feather i.e., KUMARAN MEDIBYTES, and is glowing in your hands deciphering our commitment towards patient care and healthcare and our involvement in Academic Contribution.

Again, I wish to your blessings and support towards nurturing our institution.

Dr. S. SHANTHANAM

MS., MCH., DNB

NEUROSURGERY

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Thanking you

TENDO ACHILLES - THE WEEKEND WARRIOR

The calcaneal tendon is the strongest and thickest tendon unit in human body. Hippocrates(460 BC) termed Calcaneal tendon as neuromagna(tendon magnus). In reference to Greek myth calcaneal tendon was termed as ACHILLES.

The two heads of gastrocnemius and soleus muscle together fuse to form triceps surae which acts to plantarflex the ankle joint via its conjoint tendon, the Achilles tendon(TA) inserted at calcaneal tuberosity. The average length of TA is 15 cm, width 6cm and at its insertion it becomes rounded at posterior surface of calcaneus. The Achilles tendon has no tendon sheath ,but a highly vascularised paratenon that facilitates tendon gliding between subcutaneous tissue and posterior fascia.The blood supply is from posterior tibial artery which is rich at proximal and

distal section whereas in midsection, there is relatively poor blood supply and so more vulnerable to degeneration and rupture.

Achilles tendon rupture is the most common tendon rupture(20 % of all large tendon ruptures),commonly occurs in adults in 3rd to 5th decade. Acute ruptures often present with sudden onset of pain associated with a "snapping" or audible "pop" heard at the injury site,had the feeling of being kicked in the back of the ankle.

It is most commonly seen in individuals engaging in sporadic physical activity often termed as “weekend warrior”.

According to AAOS,the diagnosis is made by positive Thompson test,decreased Plantar flexion,palpable defect and increased passive dorsiflexion with gentle manipulation.

The diagnosis is based on history and clinical examination, USG and MRI if necessary. The conventional conservative treatment entails 6 to 8 weeks of cast immobilization. Conservative management has been associated with a higher re-rupture rate compared with operative repair. Tried mostly in partial AT ruptures

In acute TA ruptures,the operative treatment includes open end to end tendon repair.

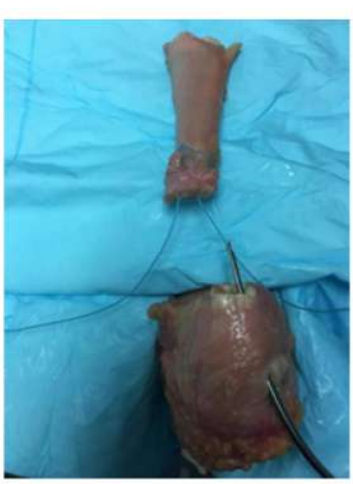
The classical end to end tendon repair i.e.,Modified Krackow sutures, has poor tensile strength and tendency to get re- rupture is common because of poor vascularity.

The suture anchor(SA)–augmented repairs are biomechanically stronger for couple of reasons

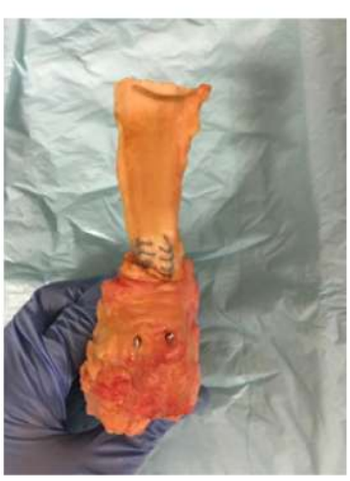
The SA repair bypasses the short distal stump of tissue and has primary fixation through the anchor in the calcaneus.

2. In biomechanical studies, it is found that there was an increase in repair strength with increasing purchase length in SA. Because of the short distal stump, there is a limited amount of tendon for the suture to pass through and therefore there is a shorter purchase length, thus a weaker construct.

For postoperative rehabilitation, the patients were subjected to immobilization for 6 weeks followed by weight-bearing exercises on the ground. The main benefit of a good surgical repair like Suture Anchor fixation is an early return to activity and reduced risk of re-rupture.



End to end repair using sutures only



End to end repair using suture anchor

MEDICAL FACTS & JOKES

01

Why did the king go to the dentist?
To get a new crown.

02

A person spent 3 days at a hospital and was absolutely healthy. However, he had to be carried out of the hospital. Why?
It was a new-born baby.

03

I am a building that you leave without ever having entered
The hospital where you were born.

04

IWhy did the bee go to the doctor?
Because she had hives!

- A Nerve impulse travel at over 400km/hr
- A sneeze generates a wind of 166km/hr
- A cough moves out at 100km/hr
- Our heart beats around 1,00,000 times a day and 30 million times a year
- Our blood is on a journey of 60,000 miles a day

POTASSIUM-COMPETITIVE ACID BLOCKER: NOVEL CLASS OF ANTI- ACID DRUG

ABSTRACT

Over the past several decades, great progress has been made on understanding mechanisms of gastric acid secretion for developing new anti-acid drugs. Until now most commonly used anti-acid drugs are histamine-2 receptor antagonists and proton pump inhibitors (PPIs) for patients to control acid related disease. However, several clinical limitations of these drugs had been reported. Recently, a new generation of potassium-competitive acid blockers (P-CABs) were launched for clinical use. It has been shown that these new drugs are more convenient and powerful to treat gastric acid-related diseases. In this article, we briefly reviewed the clinical use of this new anti-acid drug P-CAB.

INTRODUCTION

Over the past several decades, great progress has been made on understanding mechanisms of gastric acid secretion for developing new anti-acid drugs. Until now most commonly used anti-acid drugs are histamine-2 receptor antagonists and proton pump inhibitors (PPIs) for patients to control acid related disease. However, several clinical limitations of these drugs had been reported. Recently, a new generation of potassium-competitive acid blockers (P-CABs) were launched for clinical use. It has been shown that these new drugs are more convenient and powerful to treat gastric acid-related diseases. In this article, we briefly reviewed the clinical use of this new anti-acid drug P-CAB.

DISCUSSION

CLINICAL LIMITATION OF PPIS

Since proton pump inhibitors (PPI) were first discovered in 1981, several types of PPIs have been used in the treatment of acid–related diseases such as peptic ulcer disease (PUD), gastroesophageal reflux disease (GERD) for the past 30 years . PPIs bind irreversibly to the gastric H+/K+-ATPase and inhibit potassium recycling, thus this inhibition is long-lasting and dose not show rapid tolerance which allows acid rebound following withdrawal that had also appeared in histamine-2 receptor antagonists. However, they have short plasma half-life of about 2hrs and are rapidly degraded in vivo and bind only to activated proton pump. Therefore, these drugs require daily dosing of 4 to 5 days to achieve the maximum efficacy. There were many cases in which they were unable to demonstrate sufficient effect when the medication time was not properly maintained before a meal. PPIs binding only to active form of proton pump have been known clinically to be limited to increase the pH to only around 4.0. Meanwhile, it has been reported that increasing the pH to 6.0 instead of to 4.0 for Helicobacter pylori eradication is more effective.

NOVEL P-CAB CLASS DRUGS

Potassium-competitive acid blocker (P-CAB) reversibly inhibits acid secretion by competing with the potassium ion on the luminal surface of the gastric wall H+/K+-ATPase. The first developed compound was SCH28080 in 1982. Animal and early clinical studies have shown that P-CAB is highly selective for gastric H+/K+- ATPase and inhibits gastric acid secretion with fast onset of action. SCH28080 has been used extensively to reveal the mechanism of proton pump inhibition. However, the first-generation drugs did not come out due to its brief action time and hepatotoxicity.

The new generation of P-CAB drugs, Vonoprazan (TAK-438) and Tegoprazan (CJ-12420) that overcome these shortcomings were recently launched. These drugs block not only the proton pump in the active form but also the inactive form proton pump, thereby effectively increasing intraluminal pH to 6.0. In the case of vonoprazan, 98% of H. pylori eradication treatment results were reported

PCAB	PPI
ACTS DIRECTLY AFTER PROTONATION ON THE H+K+ ATPASE ENZYME.	REQUIRES TRANSFORMATION IN TO ACTIVE FORM SULPHENAMIDE
SUPER CONCENTRATES IN THE PARIETAL CELL SPACE (100000 FOLD HIGHER THAN IN THE PLASMA).	CONCENTRATES IN THE PARIETAL CELL SPACE (1000 FOLD HIGHER THAN IN THE PLASMA).
PCAB BINDS COMPETITIVELY TO THE K BINDING SITE OF THE H+k+ATPASE	SULPHENAMIDE BINDS COVALENTLY TO THE H+K+ATPASE SITE
REVERSIBLE BINDING TO THE PROTON PUMP	IRREVERSIBLE BINDING TO THE PROTON PUMP
DURATION OF EFFECT RELEATED TO THE HALF LIFE OF THE DRUG IN THE PLASMA	DURATION OF EFFECT DEPENDS ON THE SULPHENAMIDE ENZYME COMPLEX.
FULL EFFECT FROM THE FIRST DOSE	FULL EFFECT AFTER MULTIPLE REPEATED DOSE.

CONCLUSION

Advantages of P-CAB versus PPI include the rapidly and more potent acid suppression, stable in acid condition, meal independent, able to elevate pH to 6.0 and better treatment of PUD, GERD, and H. pylori eradication. It is predicted that P-CAB drugs will be widely used as next generation drugs overcoming the shortcomings of existing PPI drugs.

PHARYNGEAL-CERVICAL-BRACHIAL (PCB) VARIANT OF GUILLAIN-BARRÉ SYNDROME (GBS)

History – A 27 years old male presented with the complaints of Difficulty in holding objects in both hands since 2 days followed by inability to sit and stand, Slurred speech and Difficulty in swallowing since 1 day. He had cough and loose stools 2 days back. Initially he was managed at nearby hospital for loose stools.

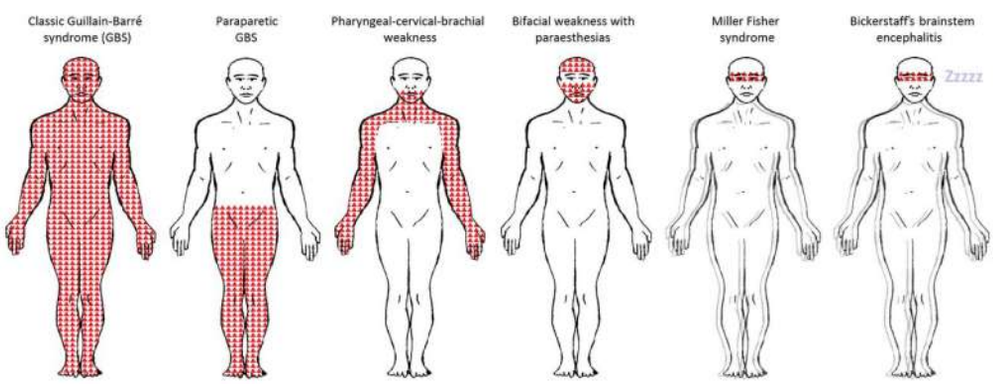
On receiving, he was conscious, alert, with stable vital signs with bilateral upper limb Paraparesis of power 3/5, Areflexia of Both UL, with Facial and Bulbar weakness.

Course in the hospital - With this Background he was Started on IV Pulse Steroids and Other Supportive Measures. MRI Brain with whole spine screening revealed No significant abnormality. Nerve Conduction Study revealed bilateral facial palsy and normal study of both upper and lower limb, and CSF Analysis was normal.

In due course, patient developed breathlessness with desaturation requiring ICU care and NIV support. His clinical picture favours Acute Inflammatory Demyelinating Neuropathy and so was started on IVIG after which patient started to improve. Over the course, patient recovered completely with no residual deficit.

Pharyngeal-Cervical-Brachial (PCB) variant of Guillain-Barré syndrome (GBS) is a rare, acquired peripheral neuropathy disease characterized by rapidly progressive oropharyngeal (facial palsy, dysarthria) and cervicobrachial weakness, associated with upper limb weakness and hypo/areflexia, in the absence of ophthalmoplegia, ataxia, altered consciousness, and prominent lower limb weakness.

Serial nerve conduction studies suggest that PCB represents a localised subtype of GBS syndrome characterised by axonal rather than demyelinating neuropathy. Many neurologists are unfamiliar with PCB, which is often misdiagnosed as brainstem stroke, myasthenia gravis or botulism.



It is an autoimmune-mediated peripheral neuropathy most often triggered by an antecedent infection, with the most common pathogen being Campylobacter jejuni though Influenza, Cytomegalovirus, Epstein-Barr virus, and Zika virus have also been implicated. The etiology of GBS is incompletely understood, but the most accepted hypothesis is that molecular mimicry is the immunopathogenic mechanism behind peripheral nerve fiber damage.

Diagnosis of GBS is made based on clinical symptoms and confirmed with cerebral spinal fluid (CSF) analysis and nerve conduction studies. CSF testing shows increased protein levels with a normal white blood cell (WBC) count, and nerve conduction studies show conduction slowing or blockage in peripheral nerve fibers.

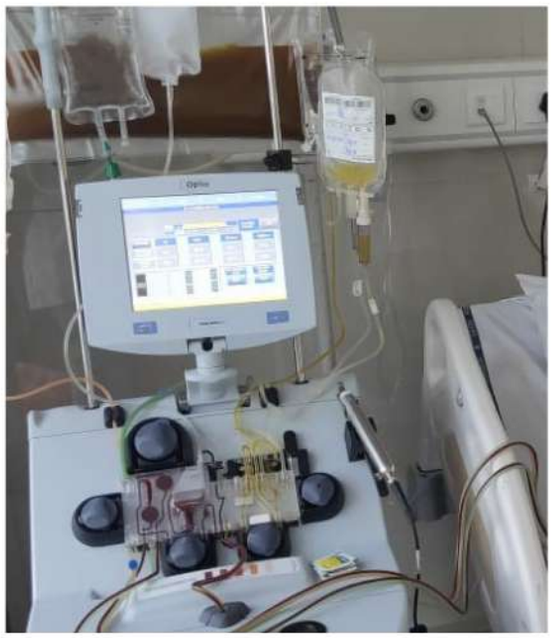
Also, serum anti-ganglioside antibodies are found in some GBS patients. More specifically, patients with pharyngeal-cervical-brachial (PCB) variant carry Immunoglobulin-G (IgG) anti-GT1a antibodies, which often cross-react with GQ1b antibodies.

The presence of additional ophthalmoplegia and ataxia indicates overlap with Fisher syndrome. Half of patients with PCB carry IgG anti-GT1a antibodies which often cross-react with GQ1b, whereas most patients with Fisher syndrome carry IgG anti-GQ1b antibodies which always cross-react with GT1a. Significant overlap between the clinical and serological profiles of these patients supports the view that PCB and Fisher syndrome form a continuous spectrum.

Plasma exchange and intravenous immunoglobulin (IVIg)

are the mainstays of treatment for GBS, with both forms shown to be equally effective. Treatment benefits from IVIg when initiated within two weeks of symptom onset and plasmapheresis within four weeks. Treatment should be considered in patients with rapidly progressive weakness, autonomic dysfunction, bulbar failure, or respiratory insufficiency.

Antimicrobial or antiviral therapy should also be considered. However, in most cases, the antecedent infection usually resolves before the onset of motor weakness. Patients with PCB variant are more likely to require intubation due to bulbar involvement and require ongoing assessment of bulbar function and respiratory effort to guide the use of nasogastric feeding and ventilator support .



IT IS NOT ALWAYS ABOUT THE "FOUR"

A 45 year old male from Walayar had an alleged history of snake bite in his left lower limb and was admitted in a local hospital. He was transfused with 50 vials of ASV over 2 days and was referred to here at Kumaran Medical Centre in view of his deranged PT, APTT values. On admission, his vitals were stable. Local examination revealed swelling at the site of bite, minimal cellulitis with no bleeding from the site.

S.NO	INR	APTT	UREA	CREA TININE	HEMO GLOB IN	PLAT ELET COUNT
DAY 1	5.6	68	48	1.2	13.8	1,60,000
DAY 2	3.4	59	67	2.3	12.2	1,20,000
DAY 3	1.7	42	108	4.1	10.5	90,000

Blood investigations were as follows Cbc: platelet counts: 1,60,000 cells/ul, Hb: 13.4 g/dl, Urea: 48 mg/dl, Creatinine: 1.2 mg/dl, INR: 5.6, APTT: 68 sec's, Urine routines: no hematuria. He was admitted in MICU and was transfused with 5 units of FFP on the day of admission. The next day his INR, APTT were in reducing trend but not in the target zone and he was transfused with 5 more units of FFP. On day 3, he started to have oliguria with derangement of Renal parameters, Platelet counts, Hemoglobin. (as shown in Table 1)

In view of worsening renal parameters, decreasing platelet counts, hemoglobin, rising indirect bilirubin levels diagnosis of micro angiopathic hemolytic anemia/thrombotic microangiopathy was made. Nephrologist consultation was obtained and he was taken for 2 cycles of hemodialysis on two consecutive days. His renal parameters, platelet counts started to improve,

S.NO	INR	APTT	UREA	CREA TININE	HEMO GLOB IN	PLAT ELET COUNT
DAY 1	1.6	41	91	3.4	10	60,000
DAY 2	1.3	39	78	2.5	10.2	75,000
DAY 3	1.1	37	42	1.7	10.4	90,000

oliguria got settled (as shown in Table 2) and was discharged on day 7 in a hemodynamically stable condition. The patient came for a review after 3 days of discharge with a normal renal parameters, hemoglobin, platelet counts, PT/INR, APTT values.

DIAGNOSIS:

A VASCULOTOXIC ENVENOMATION WITH MICROANGIOPATHIC HEMOLYTIC ANEMIA AND ACUTE KIDNEY INJURY (THROMBOTIC MICROANGIOPATHY) from a snake not belonging to the big "four" which include

- **Common Indian cobra (Naja naja)**
- **Russell's viper (Dabola russelii)**
- **Common krait (Bungarus caeruleus)**
- **Saw-scaled viper (Echis carinatus)**

WHO regards Snake bite to be among "Top 20 neglected tropical diseases". There are more than 3500 species of snakes in the world and about 300 species in India out of which 52 are venomous. The venomous snakes found in India belong to three families which include 1. ELAPIDAE (Common Krait, Common Cobra: Neurotoxic), 2. VIPERIDAE (Russel's viper, Saw scaled viper, Hump nosed viper: Vasculotoxic/Hemotoxic) 3. HYDROPHIDAE (Sea snakes: Myotoxic)

Total cases - 4.2 to 18.4 lakh's snake bites annually worldwide.
Deaths-1.25 lakhs annually
India- Highest number of deaths 46,000 annually (UP>Andhra Pradesh>Bihar)

People at risk:

1.Farmers, Labourers, Fishermen

2.Open habitation, open defecation, sleeping on floor

3.MALE >FEEMALE , age group: -20-40 yrs

Anti-venom is immunoglobulin (refined F(ab)2 fragment of IgG) purified from the serum or plasma of a horse or sheep that has been immunized with the venoms of one or more species of snake. Monovalent neutralizes the venom of only one species of snake. Polyvalent neutralizes the venoms of several species of snakes. Polyvalent anti snake venom in India contains immuno globulins pertaining to the above mentioned four snakes alone. The current potency of Indian antivenoms is 0.60 mg/ ml for cobra, while prior to the 1950s, it was 4 mg/ml. In Russell's viper venom, it was 2 mg/ml and is now a mere 0.45 mg/ml. This issue of antivenom potency needs urgent attention. Since the start of antivenom production in India over 100 years ago, conventional wisdom was that the 'big four' are responsible for the majority of serious bites. While this is still true at the generic level, current taxonomy now recognizes four species of cobras, eight species of kraits, one species of Russell's viper one species of Russell's viper and two subspecies of saw-scaled vipers. Also, considerable regional variation has been found in Russell's viper venom which requires further study. In our Case the snake bite was a vasculotoxic envenomation for which Poly valent Anti Snake venom was not helpful. The patient was managed with Fresh Frozen Plasma and Haemodialysis due to worsening acute kidney injury due to Thrombotic microangiopathy. Low platelet counts indicate consumption coagulopathy and DIC. Low fibrinogen/high FDP will require fibrinogen/FFP infusion.

Guidelines for management of coagulopathy in a snake bite include fresh frozen plasma (FFP) administration after 1st dose of ASV rapidly restores clotting function in the most. FFP 10-15 ml/kg over 60min given within 4hr of 1st ASV with a target INR < 2.0 (at 6hr after1stFFP). Lots of research studies are going on for species identification through blood investigations like measurement of enzymatic activity of toxins, molecular biology methods and immune assays. The pros and cons of these methods make them differentially suited for different uses. Mono valent Anti snake venom will be of much help if the species identification is made.

HEART PATIENTS IN INDIA HAVE ACCESS TO ADVANCED TECHNIQUES SUCH AS IVUS

HD IVUS (INTRAVASCULAR ULTRASOUND) GUIDED ANGIOPLASTY ENABLES ACCURATE STENT SIZING AND PLACEMENT

Dr. A. ESWARAN & Dr. K. KARTHIK IS KNOWN FOR HIS PIONEERING WORK AND SUCCESS IN CARDIAC INTERVENTIONS USING HD IVUS TECHNOLOGY

With the advancement of medical technologies in the country, Dr. A. Eswaran & Dr. K. Karthik, urges heart patients in India to have better awareness about the many advanced technologies available today for superior cardiac care.

Medical technologies are ever advancing and surgeons now advice cardiac procedures that are less invasive, less traumatic and reduce the chances of re- occurrence of cardiac events. So, stent deployment done under the guidance of Intravascular Ultrasound (IVUS), ensures optimal result even in the most complex cases and results in better patient outcome.

The highly advanced HD IVUS system works on the principle of ultrasound waves. It comprises of the catheter, a tube equipped with a special probe or camera at one end which has ultrasound properties to capture the image of the inner aspect of blood vessels on a real-time basis. The other end of the tube is attached to a machine which converts the image captured through the ultrasound mechanism and displays them on a monitor, offering the surgeon a complete 360-degree internal view and far greater clarity.

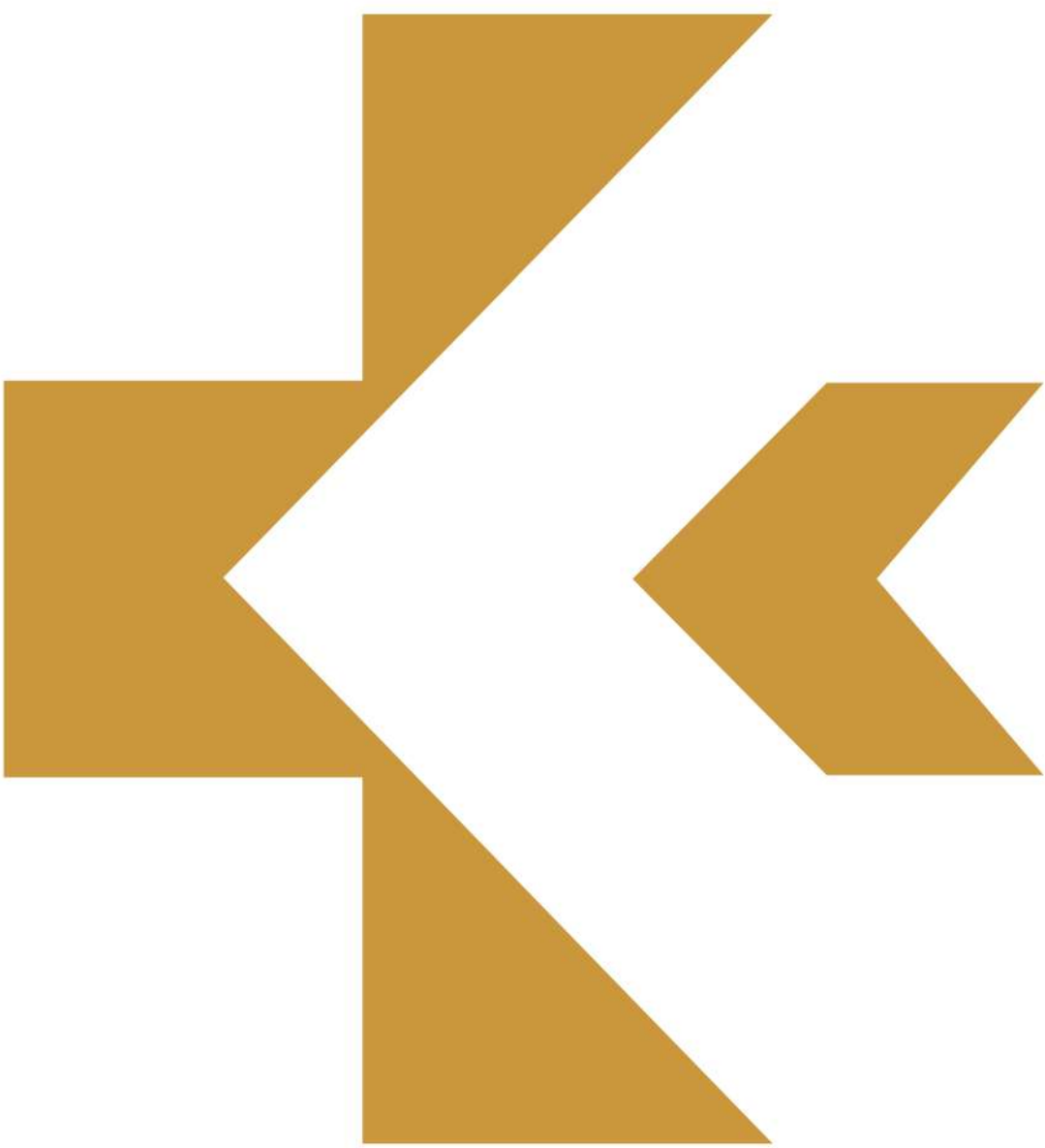
Referring to HD IVUS, Dr. A. Eswaran & Dr. K. Karthik said "Intravascular Ultrasound (IVUS) allows us to see a coronary artery from the inside-out. This unique view provides us with critical clinical information that is not possible with routine imaging methods, such as coronary angiography, performed in the cath lab, or even non-invasive CT scans."

Several studies conducted around the world also highlight that IVUS guided procedures are more accurate and even more cost effective. The superiority of HD IVUS lies in its three-dimensional detailed internal image transmission of all the layers of the blood vessel viz-a-viz angiography that offers only an external two-dimensional view. This enables the identification of the blockage, selecting the right stent size and confirming its right placement post-stenting to minimize future risk for the patient

Recently there have been further advances in IVUS imaging with the introduction of newer generation catheters which provide even sharper and high-definition imaging of the arteries, which further improves the diagnosis and treatment plan.

With new advancements in technology for treating artery blockages in the heart, it is also advisable to use products such as drug eluting stents which have proven to be of immense benefit to heart patients. The latest generation Platinum Chromium stents helps in optimizing PCI results and provide better clinical outcomes even in complex patient cases. The procedural results can be further optimized using IVUS for successful therapy results.

Elaborating the significance of HD IVUS Dr. A. Eswaran & Dr. K. Karthik says, “This cross-section view enhances the understanding of the nature of the blockage or the composition of the plaque, to take informed decisions on treatment plan and stent size. It further supports in determining the optimal placement and expansion of the stent post the procedure to help reduce complications and the incidence of stent thrombosis.



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