



# PSG Medi Pulse

■ News ■ Medical ■ Surgical ■ General

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அவற்றையம் பசித்த பிறகு உண்ண வேண்டும்.

# Medical

## Next Generation Advanced Cardiac Mapping System and Cure of Cardiac Arrhythmias

Dr Vidyakar R B, MD, DM., PDF., (Electro Physiology)  
Assistant Professor, Department of Cardiology

### “A Permanent Cure To A Frustrating Cardiac Illness”

Electrical mapping of the heart is a procedure that is used to diagnose the mechanism and origins of arrhythmias. This procedure uses an electrically sensitive catheter to map the electrical activity in the chambers of the heart. Arrhythmias are caused by problems with heart's electrical conduction system. Abnormal electrical signals can originate in different areas of the heart (such as the atria or ventricles) causing arrhythmias. Catheter ablation is a curative procedure for not only simple arrhythmias like AVNRT, AVRT, WPW Syndrome but also for complex arrhythmias like atrial flutter, atrial fibrillation, ventricular tachycardia both in structurally normal as well as abnormal heart and cure for reversible tachycardia induced cardiomyopathy.

To begin an electrical mapping procedure, a thin tube called a catheter is inserted into cardiac chamber through a small puncture in the upper thigh through femoral vein or through the internal jugular vein in the neck. This process is usually visualized using x-rays and without the need of angiographic dye. This catheter is carefully guided through the blood vessels until it is inside the heart. This catheter can be used to sense electrical activity and map it on a 3D model of the heart's chambers. Accurate spatial, anatomical, electrical orientation is required for mapping arrhythmias with complex substrate especially in post surgical and structurally abnormal heart. The various developments in technology has given rise to current state of art Ensite 3D mapping system, and this is available at PSG Super-Speciality Hospitals, Peelamedu, Coimbatore.

The EnSite Precision cardiac mapping system (fig-1) offers next-generation technology that allows as shown in for a high level of automation, flexibility and precision to diagnose a wide range of arrhythmias. Advanced mapping is complex. You need precise information quickly to make sound decisions. The

EnSite Precision cardiac mapping system helps in decreasing mapping time using intelligent automation tools like live advisor HD (High Density) mapping catheter (Fig 4). The system uniquely combines impedance and magnetic field technology to enable precise navigation and accurate tracking of conventional and sensor enabled electrophysiology catheters during the creation of three-dimensional maps based on the anatomy of the cardiac chamber. Catheter location and navigation of all compatible tools, both conventional and Sensor Enabled, is based on the impedance field generated by the EnSite surface electrodes. When the surface electrodes are connected to the EnSite Precision System, an 8 kHz signal is sent alternately through each pair of surface electrodes to create a voltage gradient along each axis, forming a transthoracic electrical field. EnSite Precision System calculates the three-dimensional position of each catheter electrode for all electrodes simultaneously with real-time navigation. It permits the simultaneous display of multiple catheter electrodes and also reflects real-time motion of ablation and diagnostic catheters in the heart. By tracking the position of the catheters, the system enables the creation of 3-D electro-anatomical models of the cardiac chambers and precisely localises the origin and mechanism of arrhythmias, which can be cured by application of radiofrequency current. This promises to be a cure for some of the frustrating and devastating cardiac diseases.

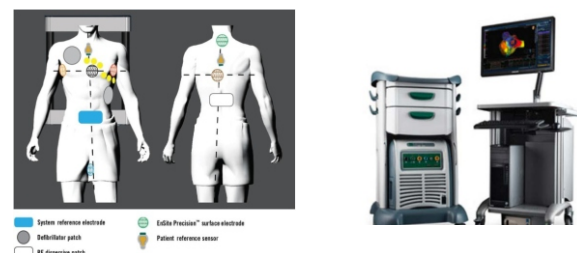


Fig. 1 Shows Electro placement and EnSite Precision Cardiac Mapping System

# Medical

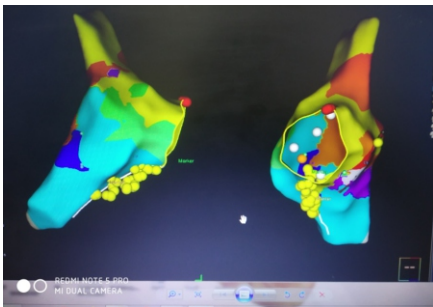


Fig 2 shows atypical atrial flutter formed by surgical scar of ostium secundum ASD closure not responding to any anti arrhythmic medications and repeated failure to respond to cardioversion and development of drug related side effects.

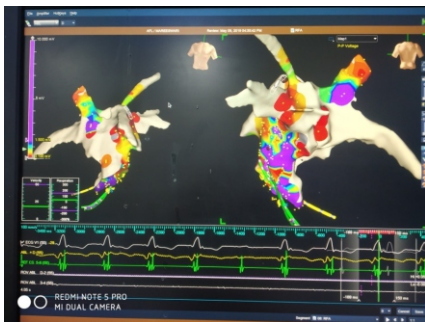
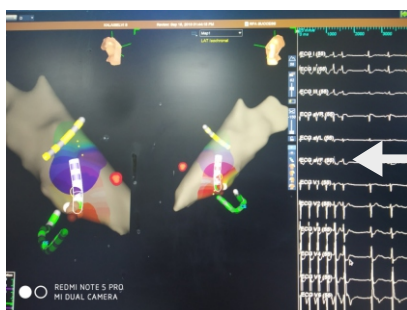


Fig 3 shows 3D activation mapping of the complex left atrial flutter due to scar



HD grid mapping catheter

Fig 4 shows fluoroscopic images of advanced live mapping of complex scar related atrial flutter circuit using (High-Density) HD grid mapping system.



Termination of tachycardia during RFA

Fig 5 shows successful termination of re-entrant tachycardia using left free wall Accessory pathway and permanent cure of the arrhythmia by application of radiofrequency current using advanced cool flow system.

Fig 6 Flexible sensor enabled ablation catheter



Ampere™ RF Generator

Fig 7 Radio frequency current generator for ablation

We at the department of cardiology PSG Hospitals are regularly performing cardiac electrophysiology study for both simple and complex arrhythmias and RF Ablation using the state of the art advanced Ensite Precision 3D mapping system with Philips Biplane Azurion cath lab. In case of simple arrhythmias like AVNRT, AVRT, WPW syndrome as shown in (Fig 5) both mapping and RF Ablation had done in near zero fluoro environment with precision and success. In case of complex arrhythmias as shown in (Fig 2) where a 42 yr old male patient with post surgical ASD closure status with recurrent episodes of scar related right atrial flutter with recurrent admission for syncope and right heart failure and failure of anti arrhythmic medication was managed successfully with EP Study and radio frequency ablation using advanced sensor enable ablation catheter as in (Fig 6). In another 38 yrs old female patient admitted due to atrial flutter and tachycardiomyopathy advanced HD Grid mapping system (Fig 4) in addition to regular catheters was used to precisely localize and ablate the arrhythmia (Fig 3) and during follow up she had no symptoms of heart failure with recovery of normal LV function.

### Summary:

Catheter based mapping and ablation using radiofrequency current shows the future for treatment of many of the simple as well as complex arrhythmias with permanent cure. The advanced 3D mapping systems like Abbott's Ensite Precision Velocity system with advanced automap technology and combined magnetic sensor enabled and impedance based mapping with non contact or contact mapping fluoroless system is the future of cardiac arrhythmia management in adult and paediatric population.

# Medical

## State-of-the-art emergency and intensive multidisciplinary treatment in PSG Super Speciality Hospital saves life of an engineer with massive intestinal bleeding

**Dr BALU K**, MS, DNB, MRCS, DNB (SGE)  
Senior Consultant  
Surgical Gastroenterologist & Laparoscopic Surgeon

The prevailing Corona virus pandemic throws challenges to the healthcare delivery system. However, effective treatment can be provided to save precious lives. Recently, a patient got his life saved by the timely treatment he received at PSG Hospitals (including blood donated by one of his treating doctors).

A 57 year old engineer, hailing from Sular, developed blood vomiting and blood in his motions. He developed giddiness and low blood pressure due to massive bleeding and was rushed to PSG Hospitals. When he was received in the emergency department, he had a very low blood pressure. Due to corona crisis, blood donors were scarce and volunteers including the doctor in charge of emergency, donated blood, which was transfused. 8 units of blood products were given. He needed ventilator and medical support to maintain his blood pressure. Emergency endoscopy showed blood in his stomach and intestines and CT scan revealed bleeding from a tumor in the first part of the small intestine. As his condition would not withstand an emergency surgery, an emergency angiography, following which angio embolization and coiling of the bleeding blood vessel was done in the middle of night to arrest his bleeding completely.

He improved and was shifted out of ICU after 1 day. He underwent a laparoscopic surgery for removal of the tumor from the region of duodeno jejunal flexure with duodeno jejunostomy for restoration of intestinal continuity. Performance of the key hole surgery for this technically difficult operation ensured that the patient had a quick recovery. He was able to walk and take oral liquids from the next day and went home after full recovery on fifth day.

Effective treatment received by the patient right from the time of arrival of patient in shock to the emergency department, timely blood transfusion after donation by volunteers including his treating doctor, emergency angiography and coiling to block the bleeding vessel by interventional radiology team in the middle of the night, accurate diagnosis and treatment by the medical gastroenterology and ICU team, key hole surgery for a tumor located in a difficult location were all very crucial in his recovery.

PSG Superspeciality Hospitals is very happy that despite the COVID 19 pandemic crisis, the team of doctors including Dr.Karthik (EMD), Professor Dr. L. Venkatakrisnanan, Dr. Prudhvi (Medical Gastroenterology), Dr.Kapil, Dr.Karthikeyan, Dr.Vinoth (ICU), Dr. Ilango and Dr Maheshwaran (interventional radiology), Dr. K Balu and Dr.R.Karthigeyan (surgical gastroenterology and advanced laparoscopy) were able to save a precious life. PSG Superspeciality hospitals continue to offer routine and emergency treatment for all patients across all specialties. Covid 19 patients receive treatment in a separate hospital block.



## Non Functioning Paraganglioma of the Urinary Bladder presenting as Micturition Syncope – A Case Report

Dr Bhalaguru Iyyan (Consultant Urologist)

Dr M Banu (Postgraduate Dept of General and GI Surgery)

### A case report on micturition syncope:

A 48-year old post menopausal woman presented with severe dysuria and recurrent post-micturition syncope for 2 months. Physical examination was unremarkable. Urine analysis showed plenty of red blood cells and few pus cells hence Urine culture was done which did not grow any microorganisms. Ultrasound KUB demonstrated a homogenous mass in the Right lateral wall of the bladder, measuring 2.5 × 2.0 cms. [Figure 1] . MRI Pelvis was done which showed a 3x2 cms growth in the right lateral wall of the urinary bladder. [Figure 2].



USG KUB: Figure 1



MRI Pelvis: Figure 2

She was on alpha and beta blockade for 14 days on an outpatient basis for hypertensive crisis. In view of post-micturition syncope, urinary catecholamine levels were estimated and were found to be within normal limits. Urine cytology was negative.

Cystoscopy revealed a smooth, well-vascularized mass on the Right lateral wall of the bladder, close to the ureteric orifice. In view of the tumour located near to the right ureteric orifice patient underwent Partial Cystectomy with complete excision of the vesical mass (negative frozen section) and Right Ureteric re-implantation in view of its proximity to the Right ureteric orifice. During handling of the bladder mass intraoperatively, the patient became severely hypertensive. Her blood pressure raised up to 280/180 mmHg and pulse rate dropped to 38/min. Intraoperatively the Hypertensive crisis was managed with intravenous beta blockers and atropine. Postoperative recovery was uneventful and she was weaned off the antihypertensive medications.

Histopathology showed bladder wall lined by attenuated transitional epithelium overlying a well circumscribed, encapsulated neoplasm composed of cells arranged in organoid nests and alveolar pattern. The cells were round to oval with vesicular nuclei, mild pleomorphism, fine chromatin and inconspicuous nucleoli. (Figure 3) Many of the cells showed fine granular eosinophilic to clear cytoplasm. (Figure 4). The thin stroma in between the cells showed thick walled capillaries and mild inflammation. HPE report was consistent with bladder pheochromoctoma with deeper tissues showing no evidence of tumor.

# Medical

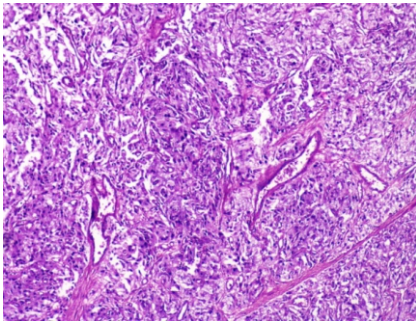


Figure 3 : Bladder wall with organoid nests of tumor cells (H&E 40x)

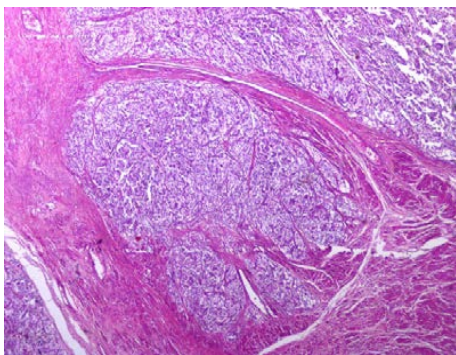


Figure 4 : Tumor cells with abundant granular cytoplasm, mild pleomorphism and fine chromatin (H&E 40x)

## IMMUNOHISTOCHEMISTRY REPORT:

- The neoplastic cells expressed strong cytoplasmic staining for Synaptophysin and NSE.
- Most of the cells were S100 positive.

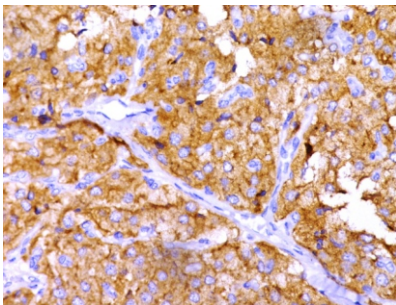


Figure 5: Neoplastic cells expressing strong cytoplasmic staining with synaptophysin( IHC: 40x)

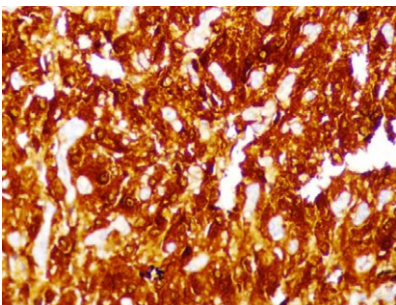


Figure 6: Neoplastic cells expressing strong cytoplasmic staining with NSE ( IHC: 40x)

Patient is on regular follow - up with physical examination, plasma and urinary metanephrine levels, Ultrasonography and Cystoscopy. For the past 12 months, on follow up, there is no tumor recurrence and no antihypertensive medications.

## DISCUSSION

Vesical Paraganglioma are tumors of chromaffin tissue originating from the sympathetic innervations of the urinary bladder wall which are extremely rare and are most commonly situated at the trigone of the bladder - may be nonfunctional or functional. Vesical Paraganglioma is usually a benign tumor, but 5–10% of Vesical Paraganglioma tumors may have malignant changes. 10% of Vesical Paragangliomas are nonfunctional tumour and can be asymptomatic.

Usually patients will present with hypertensive crisis, headache, micturition syncope and palpitation. Elevated Urinary and Plasma metanephrines are more sensitive and specific for these lesions.

Micturition syncope is a situational type of neurally mediated syncope syndrome. Emptying of a full bladder stimulates the mechanoreceptors in the bladder wall. The afferent stimulus passes to brainstem through the vagus nerve, parasympathetic activity is triggered and bradycardia occurs. The inhibition of sympathetic activity results in arterial dilation and hypotension. Voiding in full bladder stimulates the mechanoreceptors in the bladder wall. The afferent stimulus passes to brainstem through the vagus nerve, parasympathetic activity is triggered and bradycardia develops. The inhibition of sympathetic activity results in arterial dilatation and hypotension.

Ultrasonography, CECT Urogram, Magnetic Resonance image of the pelvis are useful noninvasive imaging modalities. For the detection and spread of the Paraganglioma of the bladder tumor Metaiodinebenzylguanidine (MIBG) scan has shown to have a very high sensitivity and specificity.

Partial cystectomy or wide local excision of the bladder tumour is the better option over Trans-urethral resection of bladder tumor as majority of these tumors extend in the deep layers of the detrussor muscle. Chance of recurrence is high following deep resection. Following complete surgical excision, frozen biopsy will show negative margin.

## KEYWORDS

Micturition syncope, bladder pheochromocytoma