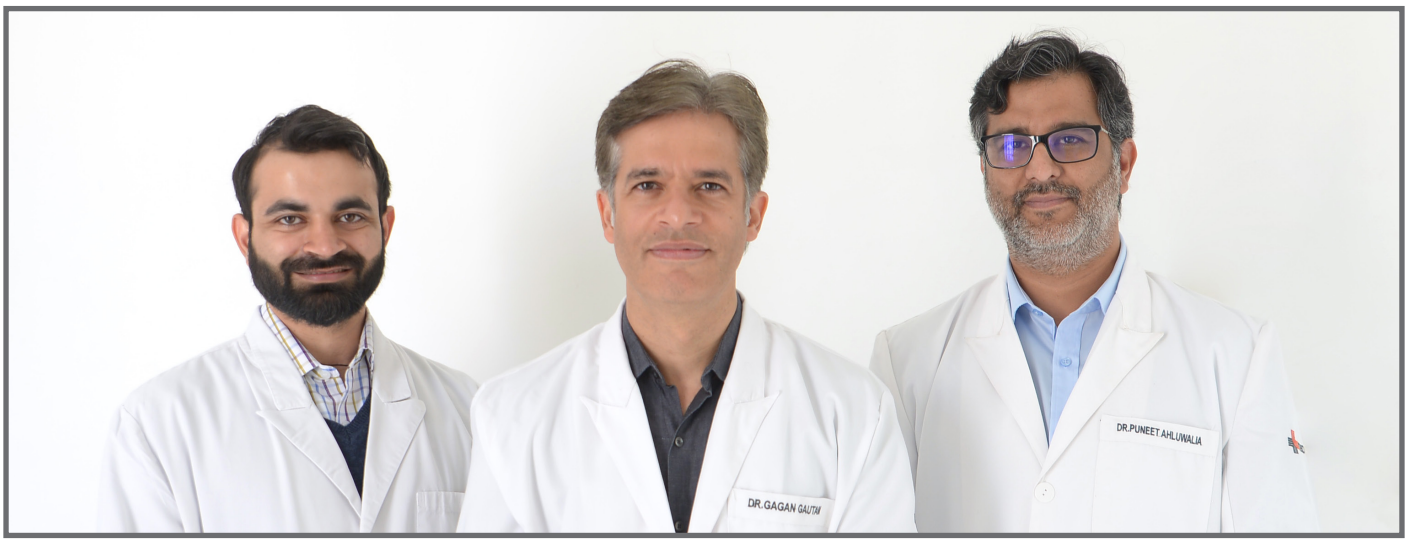
THE EXCHANGE

Issue 59
February 2023

A Knowledge Sharing Initiative by Medanta

Medanta Enhances its Urological Expertise

Appoints Leading Surgeon Dr. Gagan Gautam and Team to Further Strengthen its Robotic Uro-Oncology Surgery Program



Expanding its pool of clinical experts who deliver holistic, advanced healthcare, Medanta has appointed renowned robotic uro-oncological surgeon Dr. Gagan Gautam as Vice-Chairman of Uro-Oncology and Robotic Surgery. Dr. Gautam and his team of robotic surgery specialists - Dr. Puneet Ahluwalia (Director) and Dr. Gopal Sharma (Consultant) - have joined Medanta's accomplished clinicians at the Kidney and Urology Institute, led by Group Chairman Dr. Rajesh Ahlawat. At the forefront of delivering cutting-edge treatments, the institute is one of the highest-volume robotic kidney transplant centers in India, and is known for its exceptional success rate in robotic and laparoscopic uro-oncology procedures.

An accomplished robotic surgeon, Dr. Gautam has over two decades of experience in treating cancers of the urinary system, including kidneys, bladder and prostate gland. Him and his team have done over 1,500 robot-aided uro-oncological surgeries, and specialise in robotic prostatectomy, robotic partial nephrectomy and robotic cystectomy.

The team will further strengthen Medanta's collaborative approach of providing end-to-end diagnosis and treatment of urinary cancers with its extensive experience in minimally invasive (robotic and laparoscopic) and open surgeries, development of new treatment techniques, and initiating and developing urological robotic surgery programs all over the country.

"Appointment of senior doctors like Dr. Gagan Gautam and team is in line with our commitment to always deliver the highest standard of care by expanding our team of accomplished doctors. Strengthening our clinical leadership, we welcome Dr. Gautam and team to the Medanta family."

Dr. Naresh Trehan
Chairman & Managing Director, Medanta

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Medanta@Work

India's First Simultaneous Three-Way Paired Exchange Liver Transplant without Non-Directed Donation

Novel Strategy to Expand the Donor Pool

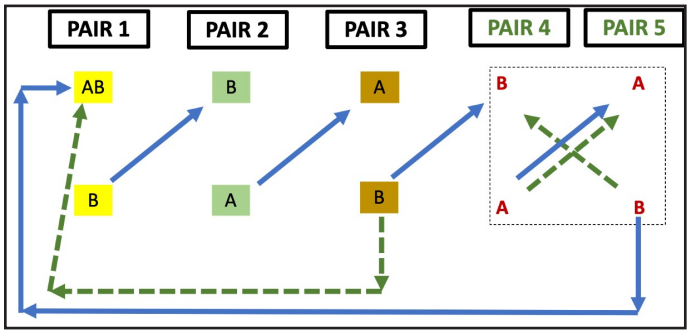
ABO (blood group) incompatibility, donor liver steatosis (fatty liver) and low graft-to-recipient body weight ratio (GRWR) - inadequate volume of partial liver graft from living donor - are the most common reasons for living donors getting rejected for living donor liver transplantation (LDLT). Apart from ABO-incompatible liver transplants, and dual lobe LDLT - wherein partial livers are taken from two donors and transplanted in the recipient - the problems of blood group incompatibility and low GRWR can be overcome with paired exchange LDLT (PE-LDLT).

In 2009, the Medanta Liver Transplant Team introduced the concept of living donor organ swap (or paired exchange) between two recipient-donor pairs. Such exchanges help save lives of recipients whose relatives, despite being medically fit, are unable to donate due to blood group and/or liver size incompatibility.

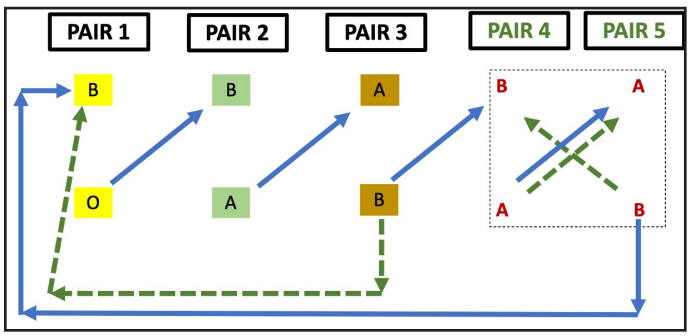
In India, the Human Organ Transplantation Act does not permit non-directed donation, and allows PE-LDLT only between recipient-donor pairs who are spouses or first-degree relatives. After performing 46 such two-way swaps (92 transplants) over 13 years, the Medanta Liver Transplant Team successfully performed the country's first three-way liver transplant swap without a non-directed donor recently. Three patients suffering from terminal liver disease received life-saving liver transplants simultaneously. Two recipient-donor pairs participated to overcome ABO incompatibility, while in the third pair (recipient AB / donor O blood groups) the estimated GRWR with the right lobe was too low (0.57%), but was adequate for another recipient who sought a blood-group matched donor.

Concept

As shown in the figures below, a three-way, or longer, PE chain can be initiated in LDLT by a recipient-donor pair wherein the recipient's blood group is AB or the donor's is O (or both), the estimated GRWR is too low, but adequate for another recipient who seeks a blood-group matched donor.



In this example, the paired exchange chain starts with pair 1, with recipient and donor of blood groups AB and B, respectively, where the estimated GRWR is low. It can involve five recipient-donor pairs (blue arrow option), or may stop at three, and the fourth and fifth pairs can participate in a separate two-way swap (green dashed arrow option).



In this example, the paired exchange chain starts with pair 1, with recipient and donor of blood groups B and O, respectively, where the estimated GRWR is low. It can involve five recipient-donor pairs (blue arrow option), or may stop at three, and the fourth and fifth pairs can participate in a separate two-way swap (green dashed arrow option).

Recipient (R) / blood group	R- age (years)	R-weight (kg)	Donor (D)/ blood group	D-age (years)	D-height (cm)	D-weight (kg)	Donor BMI	Donor LAI (liver attenuation index: Liver - pleen attenuation in HU)	Donor steatosis	TLV (total liver volume in cc)	Right Lobe (RL) - excluding middle hepatic vein (MHV) in grams	Left Lobe - including MHV in grams	RL-GRWR %	Remnant %
R1/AB	51	98	D3/A	31	156	70	28.8	+13 (65-52)	Nil	1494	914	580	0.93	38.82
R2/O	58	55	D1/O	49	157	79	32.0	+6 (59-53)	Nil	1019	564	455	1.02	44.65
R3/B	31	69	D2/B	29	180	59	18.2	+13 (66-53)	Nil	1024	651	373	1.18	36.43

Illustrating how three-way paired exchange benefitted all the recipients; R1/D1 (recipient 1/donor 1) were husband and wife, R2/D2 (recipient 2/donor 2) were mother and son, and R3/D3 (recipient 3/donor 3) were husband and wife.

While longer than three- or four-way chains are logical when Good Samaritan donors initiate it and one of the recipients does not have a live donor, they are often not needed in PE-LDLT. In this case, all recipients contributed a donor to the exchange, and no non-directed donor was involved.

All recipients underwent pre-transplant evaluation, including assessment of severity of liver disease, and detailed systemic, psychiatric, and dietetic assessment. All donors also underwent detailed liver assessment with triphasic contrast enhanced CT scan. Prior to transplant, all LDLTs in India require an Ethics Committee (Authorization Committee) clearance, which was duly obtained for this triple swap as well.

Post-transplant, recipients were managed on triple immunosuppression with tacrolimus, mycophenolate and steroids, and were administered prophylactic antibiotics for five days and fluconazole for 14 days.

Recipient/ Donor Pair Characteristics	Recipient 1/AB Blood Group	Donor 3/A	Recipient 2/O	Donor 1/O	Recipient 3/B	Donor 2/B
Age	51	31	58	49	31	29
BMI (body mass index)	29	28.8	20.37	32	20.57	18.2
Etiology of Liver Disease	NAFLD with HBcAb positive	-	NAFLD	-	Cryptogenic	-
CTP Score/ MELD Score	10/22	-	8/17	-	9/12	-
Co-morbidity	DM, HT	Nil	DM	Nil	None	Nil
KPS*	70-80	100	80	100	90	100
Graft WIT / CIT (minutes)	17/80	-	17 / 86	-	33/120	-
Actual GRWR	0.85	-	1.13	-	0.87	-
Acute Cellular Rejection	Nil	-	Nil	-	Nil	-
Vascular Complications	Nil	Nil	Nil	Nil	Nil	Nil
Biliary Complications	Nil	Nil	Nil	Nil	Nil	Nil
Other Complications	Intracerebral hemorrhage, managed conservatively	Nil	Right pleural effusion with underlying consolidation, percutaneous drainage	Nil	Intraabdominal collection, percutaneous drainage	Nil
Length of Stay (days)	32	5	13	6	11	5
Status at 50 Days	Discharged, well	Well	Discharged, well	Well	Discharged, well	Well

Recipient and donor pre-transplant status and post-transplant outcome parameters

(CTP: Child Turcotte Pugh; MELD: Model for End-Stage Liver Disease; KPS: Karnofsky Performance Status; WIT: Warm Ischemia Time; CIT: Cold Ischemia Time; GRWR: Graft to Recipient Body Weight Ratio; NAFLD: Non-Alcoholic Fatty Liver Disease; HBcAb: Hepatitis B Core Antibody; DM: Diabetes Mellitus; HT: Hypertension)

All LDLTs were elective, modified right lobe transplants in stable recipients, and donors were all younger than 50 years with no significant hepatic steatosis, and adequate future liver remnant (FLR). Two of the recipients and all three donors recovered uneventfully. The third recipient suffered a post-transplant hemorrhagic stroke that led to prolonged ICU and hospital stay, but is now functionally independent with normal liver graft function.

A simultaneous three-way PE-LDLT poses significant ethical, logistical and technical challenges. The ethical challenge is to ensure fairness in donor safety and recipient outcome for all the participating recipient-donor pairs. As regards logistics and technical expertise, at Medanta - Gurugram, we have a liver operating room (OR) complex comprising of six ORs, a team of 19 liver transplant surgeons (nine surgical consultants and 10 fellows), enough trained anesthesiologists and ICU facilities

to simultaneously manage three LDLTs peri-operatively. Having previously performed three LDLTs on the same day a few times, we felt we were adequately equipped, and hence proceeded with it.

In future, simultaneous inter-center PE-LDLTs between experienced, large-volume centers within the same city could be envisaged, using mutually acceptable management protocols. Towards this, the regulatory procedure for these LDLTs needs to be defined.

Dr. Prashant Vilas Bhangui
Associate Director
Institute of Liver Transplantation and Regenerative Medicine
Medanta – Gurugram

Dr. Amit Nath Rastogi
Director
Institute of Liver Transplantation and Regenerative Medicine
Medanta – Gurugram

Dr. Narendra Singh Choudhary
Senior Consultant
Institute of Liver Transplantation and Regenerative Medicine
Medanta – Gurugram

Dr. Neeraj Saraf
Senior Director - Hepatology
Institute of Liver Transplantation and Regenerative Medicine
Medanta – Gurugram

Dr. Arvinder Singh Soin
Chairman
Institute of Liver Transplantation and Regenerative Medicine
Medanta – Gurugram

TechByte

Medanta Pioneers Advanced TAVI Technique

New Technology Offers Hope to Patients with Narrow Vessels

Dr. Praveen Chandra, the Chairman of Interventional Cardiology at the Heart Institute in Medanta - Gurugram has performed India's first Transcatheter Aortic Valve Implantation (TAVI) using the newly launched Evolut Pro+ TAVI technology - an advancement of the existing TAVI technologies to treat severe symptomatic aortic stenosis. The complex implantation was done recently for a 65-year-old patient suffering from severe aortic stenosis.

Calcific aortic stenosis - the most common valvular heart disease - is a major public health burden. TAVI is a novel procedure that brings hope to those suffering from severe aortic stenosis, which narrows the aortic valve acutely causing breathlessness and fatigue. The disease limits everyday activities of patients and worsens rapidly.

Unlike surgical aortic valve replacement, which requires a long incision down the chest (open-heart surgery), TAVI is a minimally invasive procedure done using a thin, flexible tube (catheter) passed through a few small incisions to reach the heart. The patient's hospital stay, pain and chances of complications are minimized with this latest transcatheter technique to replace aortic valve. The new technology helps optimize procedural outcomes and future access.

Evolut Pro+ is a self-expanding valve made of nitinol frame and porcine pericardial tissues. Nitinol is an alloy that can be crimped in cold solution and once it comes up to normal temperature, through contact, it expands to its previous shape. A catheter with crimped valve is inserted into femoral artery, and guides the valve into the heart. Moving X-ray images in Cath Lab help the doctor place the catheter to the correct position. The catheter is removed once the new valve is securely deployed in place.

The next generation Transcatheter Aortic Valve System provides top notch safety and is a recapturable system, hence it can be retrieved and repositioned to achieve best results. This new system offers the lowest delivery profile for 23-29 mm valves, excellent hemodynamics allowing patients to return to activity sooner, the broadest annulus range, and advanced sealing with an external tissue wrap on all valve sizes.

With a reduced delivery profile for 23-29 mm valves, it is indicated to treat patients with vessels as small as 5.0 mm. With the ability to treat the broadest

annulus range of any other available TAVI system, these new valves can treat annulus ranges from 18 mm to 30 mm.

Dr. Praveen Chandra

Chairman
Interventional and Structural Heart Cardiology
Heart Institute

Medanta – Gurugram

In Focus

Deep Brain Stimulation to Treat Drug-Resistant Epilepsy in 7-year-old

Epilepsy is a common neurological problem in India. However, with advancements in investigations and medicines, the disease is manageable in majority of the cases. About two-thirds of all epilepsy patients exhibit good control over symptoms and disease progression with medication. However, the remaining one-third continue to experience seizures despite medication, and come under the category of patients with drug-resistant epilepsy.

Management of drug-resistant epilepsy requires a comprehensive workup, including a special epilepsy protocol involving use of magnetic resonance imaging (MRI) and video electroencephalography (EEG) of the brain to identify the root cause. If a clear focal point is found in the brain, which is responsible for these seizures, an epilepsy surgery can be done offering excellent outcome at centres with experienced surgeons. But, in some patients, no such foci are found despite extensive workup, including MRI, video EEG or positron emission tomography (PET) scan, etc. However, satisfactory improvement can be achieved in such patients with the use of stimulation techniques including Deep Brain Stimulation (DBS) and Vagal Nerve Stimulation (VNS). Here, we discuss the case of a young girl with recurrent seizures since childhood.

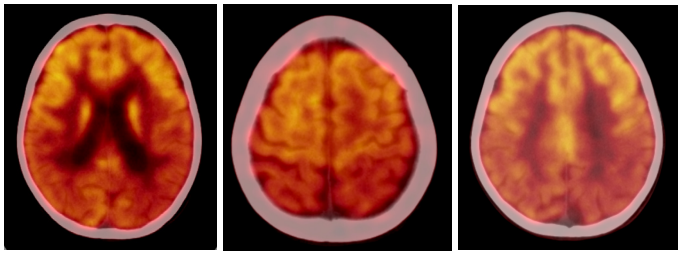
Case Study

A 7-year-old girl presented at Medanta - Gurugram with a history of recurrent seizures since 10 months of age. All her seizures were grand mal seizures – involving loss of consciousness and violent muscle contractions lasting for 2-3 minutes followed by prolonged confusion in the recovery phase. Her seizures were frequent, with one to two episodes being reported in a week. The patient was born after a full-term, normal delivery with age-appropriate developmental milestones. She did not have a history of head injury or any family history of epilepsy. The patient was on multiple anti-epileptic drugs without significant improvement in her condition.

The patient was worked up in detail for drug-resistant epilepsy using clinical assessment followed by MR imaging and video EEG. Using video EEG, her seizures were recorded and correlated with EEG changes at the time. This helped in diagnosing the type of epilepsy she suffered from. However, we could not establish a single focal point of origin, and multiple areas showed abnormal firing or spikes.

Her MRI brain epilepsy protocol was done, and it only showed diffused brain atrophy in view of non-localization of epilepsy. PET-CT brain was also done which showed diffused hypometabolism in bilateral temporal, parietal and left occipital lobes. Overall, the MRI and PET scan indicated that the brain was significantly abnormal at multiple points.

No clear seizure foci could be found indicating diffused brain changes and hence epilepsy surgery to remove such foci was not feasible. Such cases of diffused brain damage with drug-resistant epilepsy pose significant challenge for the treating neurologists. They remain a major cause of morbidity for majority of the population suffering from epilepsy.



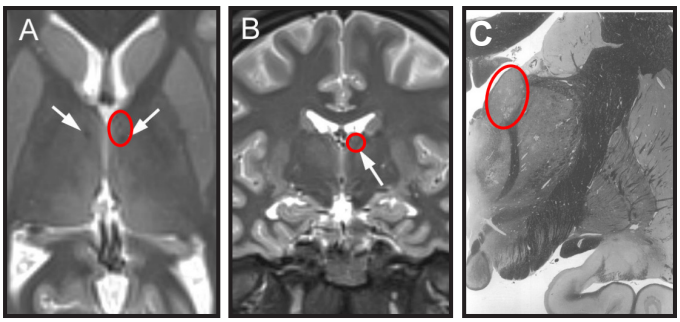
PET scan showing diffused hypometabolism

Earlier done for managing movement disorders, DBS is now being done for intractable drug-resistant epilepsy targeting various cortical and subcortical structures. For the procedure, very thin

electrodes are placed deep in the brain to stimulate certain parts. But electrode placement in cases of childhood epilepsy can be challenging as the targeted area is ventral thalamus – a crucial area of the brain surrounded by numerous critical nuclei and white matter tracts in addition to ventricles. Even the smallest error in the trajectory can cause significant morbidity, besides leading to sub-optimal outcomes.

Our patient underwent DBS targeting bilateral thalami. To control the seizure frequency, two trajectories were planned - tranventricular and subcaudate paraventricular. Target was the anterior nucleus of the thalamus (ANT). The anterior nucleus of the thalamus is used as target for limbic seizure disruption. It is around 4x10x5.5 mm in size and located at the floor of the lateral ventricles surrounded by the choroid plexus, thalamostriate vein and the internal cerebral veins. In our case, we used the right side tranventricular trajectory to hit the sweet spot, and for the left side we used paraventricular trajectories as shown in the images.

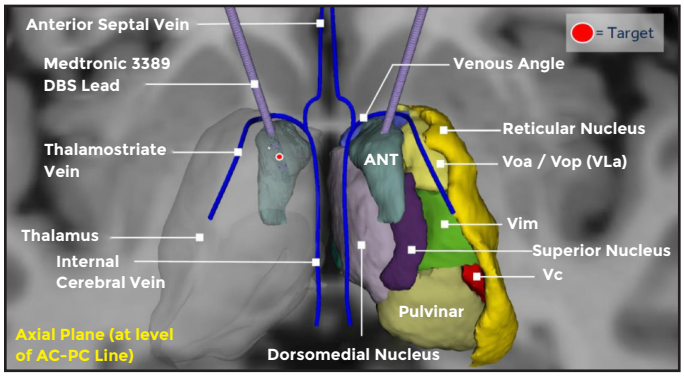
After careful planning and submillimeter checks, the electrodes were placed in the brain by tranventricular and subcaudate trajectories under neuro-navigation guidance. The surgery was uneventful with good clinical outcome. In the post-operative period, the patient regained consciousness on the same day. She was shifted to room on Day 1 of surgery and was discharged on Day 3 in stable condition. During her post-operative hospital stay, she did not have any seizures.



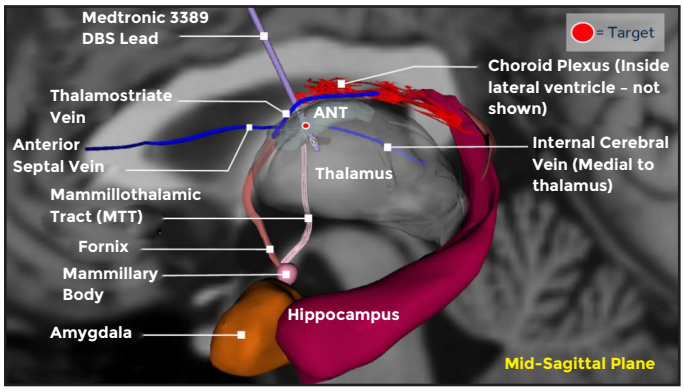
A. Axial MRI brain image highlighting the ventral thalamus (red circle), B. Coronal MRI brain, C. Magnified coronal MRI brain

On her one-month post-operative follow up as well, the child was doing well and did not report having any major seizures. Initial results for DBS in epilepsy treatment were promising in this case and we expect it to offer good control of seizures in the long run.

DBS has emerged as a safe and effective treatment modality for the management of drug-resistant epilepsy non-amenable by surgery showing excellent results.



3D representation of the thalamic nuclei and the target superimposed on the axial MRI



Sagittal MRI with anatomy

Medanta-Gurugram is pioneer in DBS surgery for epilepsy in India and has done four such procedures after extensive patient evaluation for optimal outcome.

Dr. Atma Ram Bansal

Associate Director - Epilepsy Programme
Institute of Neurosciences

Medanta - Gurugram

Dr. Sudhir Dubey

Chairman - Endoscopic Portal Minimal Invasive Neurosurgery
Institute of Neurosciences

Medanta - Gurugram

THE EXCHANGE

Issue 59
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Welcome on board

Dr. Praveen Khilnani

Chairman – Paediatrics, Paediatric Pulmonology and Paediatric Critical Care

Medanta – Gurugram

Pioneer of paediatric critical care with over four decades of experience and expertise in paediatric pulmonology, neonatal and paediatric bronchoscopy, and specialised care of critically ill infants.

Dr. Gagan Gautam

Vice Chairman
Uro-Oncology and Robotic Surgery

Medanta - Gurugram

Pioneer of robotic surgery in India with over two decades of experience in the surgical treatment of urological cancers. His areas of expertise include robotic prostatectomy, robotic partial nephrectomy and robotic cystectomy.

Dr. Rajiv Uttam

Director and Head of Department Paediatrics, Paediatric Intensive Care Unit and Paediatric Emergency

Medanta - Gurugram

Paediatric critical care specialist and pulmonologist with nearly four decades of experience and expertise in paediatric ventilation, neonatal and paediatric bronchoscopy, pulmonary asthma, childhood allergies, chest diseases and chronic illnesses from birth till 18 years of age.

Dr. Rajiv Ranjan Prasad

Director - Radiation Oncology

Medanta – Patna

Radiation oncologist with over 30 years of experience and expertise in treating breast cancer, gastro intestinal cancers, urogenital cancers and cancers of the central nervous system.

Dr. Puneet Ahluwalia

Director and Head
Uro-Oncology and Robotic Surgery

Medanta - Gurugram

Uro-oncologist with expertise in robotic surgeries for treating urological cancers. He specialises in radical prostatectomy, partial nephrectomy, radical cystectomy, adrenalectomy, retroperitoneal lymph node dissection and video endoscopic inguinal lymph node dissection (VEIL).

Dr. Kishore Jhunjhunwala

Director - Critical Care

Medanta – Patna

Intensivist with expertise in managing critically ill patients. He specialises in extracorporeal therapy, haemodynamic monitoring, mechanical ventilation and managing difficult airway.

Dr. Roma Pradhan

Associate Director
Endocrine and Breast Surgery

Medanta - Lucknow

Endocrine and breast surgeon with expertise in breast surgery (benign and cancerous), oncoplastic breast cancer surgery, thyroid cancer surgery, adrenal and parathyroid surgery besides diabetic foot management.

Dr. Gopal Sharma

Consultant
Uro-Oncology and Robotic Surgery

Medanta - Gurugram

Uro-oncologist with expertise in management of urological cancers including prostate, kidney and bladder. He is a trained robotic surgeon.

THE EXCHANGE

Issue 59
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Dr. Resham Srivastava

Senior Consultant - Radiation Oncology
Medanta - Lucknow

Radiation oncologist with expertise in image-guided radiation therapy (IGRT), intensity-modulated radiation therapy (IMRT), volumetric modulated arc therapy (VMAT), stereotactic body radiation therapy (SBRT), stereotactic radiation therapy (SRT) and brachytherapy.

Dr. Gaurav Bharadwaj

Consultant - Liver Transplant Surgery
Medanta - Lucknow

Gastrointestinal surgeon with expertise in hepato-pancreato-biliary malignancies, redo surgeries and advanced laparoscopic surgeries for GI malignancies.

Dr. Neeraj Bharti

Consultant - Internal Medicine
Medanta - Patna

Physician with expertise in managing and treating infectious diseases, such as COVID-19, and non-infectious lifestyle diseases including diabetes, hypertension and thyroid disorders.

Dr. Gaurav Kumar

Consultant - GI Surgery, GI Oncology and Bariatric Surgery
Medanta - Patna

Gastrointestinal surgeon with expertise in advanced laparoscopic surgeries, especially of cancers of the upper and lower gastrointestinal systems. He specialises in laser proctology, laparoscopic colorectal surgery and hernia surgery including laparoscopic cholecystectomy appendectomy, and hepatobiliary surgeries.

Satish Kumar Ranjan

Associate Consultant
Urology and Kidney Transplant Surgery
Medanta - Patna

Urologist with expertise in treating urological problems in patients of all ages. He specialises in endourology, uro-oncology, andrology and kidney transplantation.

For EMERGENCY DIAL - 1068

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*Upcoming