

A Knowledge Sharing Initiative by Medanta

Complex Surgery to Treat Renal Cell Carcinoma with Inferior Vena Cava Thrombus and Double Renal Vein

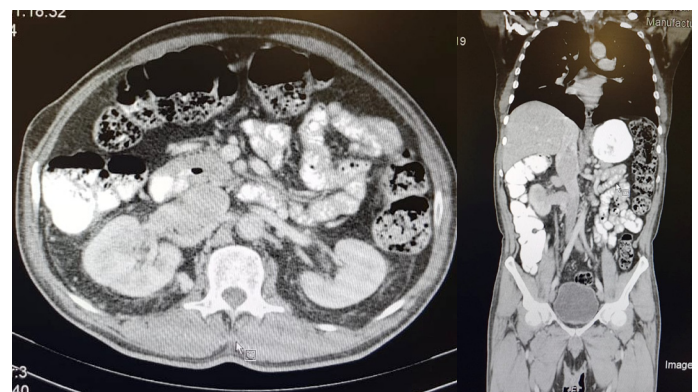
Renal Cell Carcinoma (RCC) is the most common cause associated with inferior vena cava (IVC) tumor thrombus accounting for 18% of all tumors associated with venous thrombi. The two components of the thrombus include the tumor growing into the vein as a thrombus and the 'bland' thrombus - clotted blood - that develops as a result of hampered drainage. Management of RCC with an associated IVC tumor thrombus can be technically challenging depending on the type and the level of thrombus. Traditional classification of IVC thrombi include Level 1 as within 2cm from the renal ostium, Levels 2, 3 and 4 as below hepatic veins, between hepatic veins and diaphragm, and above the diaphragm, respectively.

The gold standard treatment includes a radical nephrectomy with regional lymph node dissection and IVC thrombectomy. Certain pre-operative considerations for this major surgery include anticoagulation to lower the risk for pulmonary embolism, pre-operative angioembolization, and availability of a multidisciplinary team comprising of cardiothoracic and vascular surgeons.

Case Study

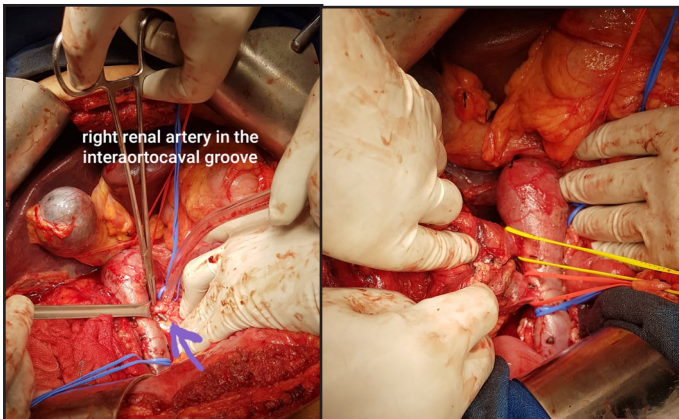
A 57-year-old male with diabetes, hypertension, hypothyroidism and chronic kidney disease presented to Medanta-Gurugram with bilateral swollen feet and fever of unknown origin. He had an incidental finding of a right renal mass, and, on physical evaluation, he was found to have bilateral varicocele as well. His creatinine was 1.5 mg/dl with a hemoglobin of 8.8 g/dl. Initial ultrasound revealed a right renal mass, followed by a CT scan, that revealed a large heterogeneously enhancing mass, 7.6cmx5.3cmx8.2cm in size arising from the

interpolar region of the right kidney, that had two renal veins. This mass was extending into the renal sinus, both the right renal veins and contiguously into the IVC for a length of 7cm, and a width of 4.2cm into the intrahepatic IVC below the hepatic veins. Multiple enlarged collaterals were also seen. Hence, the patient was advised surgery, and he underwent an open right radical nephrectomy with Level 2 IVC thrombectomy.



Axial and coronal sections showing the extent of thrombus in both renal veins and IVC associated with right renal mass

Intraoperatively, a subcostal chevron incision was given and after the initial mobilization of the colon and the duodenum, IVC was exposed and the dissection carried out superiorly to take control of vessels draining into the caudate lobe to gain some extra infra-hepatic IVC length. The right renal artery was carefully dissected in the inter-aortocaval groove and ligated along with the lumbar veins. Once all the vessels were exposed, sequential clamping was performed - infrarenal IVC, the left renal vein and the suprarenal IVC. This was done very carefully to prevent dislodging of the thrombus. Next, both the right renal vein openings were incised circumferentially and the incision



Intraoperative images showing the right renal artery in the interaortocaval groove, the IVC with thrombus and both the right renal veins

extended onto the antero-lateral surface of the IVC. The thrombus was excised en-bloc along with the kidney. The IVC was flushed with heparinized saline and was carefully closed with 4-0 prolene sutures and the clamps were released in the same order as they were applied.

The total intraoperative time was 210 minutes with a blood loss of 300 ml. The patient had an uneventful post-operative recovery. He was observed overnight in a high-dependency unit and was allowed clear liquids orally after eight hours. He was ambulated with support on Day 2 post-surgery and was put on a semi-solid diet. His biochemical parameters remained stable with a marginal increase in creatinine levels to 1.9 mg/dl. He was discharged by Day 5 on a normal diet.



Right radical nephrectomy specimen with tumor thrombus en-bloc

Histopathology revealed a right renal cell carcinoma pT3b N0, Grade 2 and thrombus positive for malignancy. Patient had regular follow up visits and at the end of two years, he is recurrence free as evidenced by interval cross-sectional imaging.

This case highlights the technical nuances and intraoperative meticulous steps that need to be followed in this major surgery to prevent devastating complications, such as thrombus dislodgement, pulmonary embolism, major hemorrhage and potential mortality.

Dr. Pankaj Wadhwa

Senior Director - Urology
Kidney and Urology Institute
Medanta – Gurugram



Medanta@Work

Post Tubercular Healed Severe Kyphotic Deformity with Altered Gait Treated Surgically

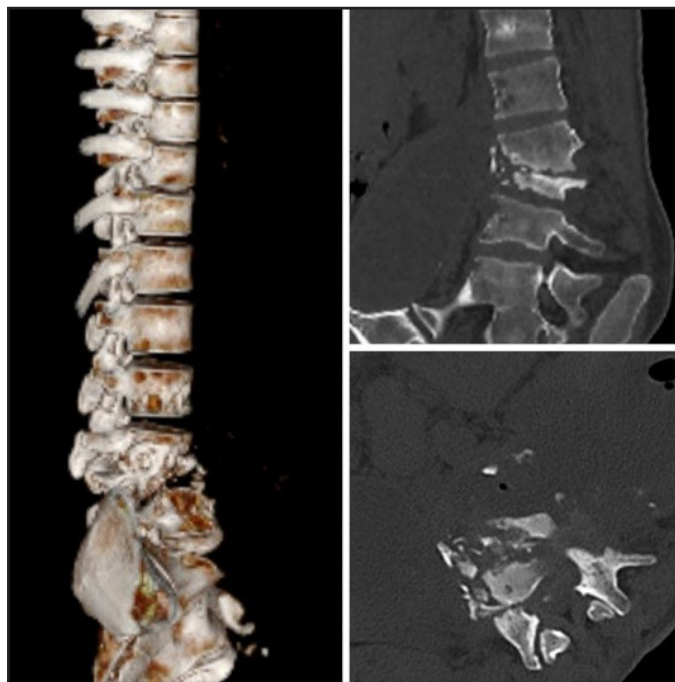
Pott's Spine accounts for about 2% of all cases of tuberculosis (TB), 15% of extrapulmonary cases and 50% of skeletal TB cases. Clinically, it presents with constitutional symptoms, including back pain, tenderness, paraplegia/ paraparesis, and kyphotic / scoliotic deformities. Most of the time, the disease is restricted to the disc space with the collapse of vertebral body, but it can span to multiple levels causing widespread bone destruction and consequently an unstable spine with deformity, mainly kyphosis. It is not very uncommon to see such patients with advanced disease, especially in rural areas where patients do not have access to timely intervention, initiation of anti-tubercular therapy and surgical correction of the deformity. Such healed deformities of the spine present with surgical challenges and might be associated with paraplegia, both in the pre-operative period and also, unfortunately, post-surgical correction.

Case Study

A 24-year-old female presented at Medanta-Lucknow with stooped forward gait and a sharp deformity over lower lumbar for the last six months. She had a history of lower back pain, which was insidious in nature and gradually progressive for the

last nine months. Initially, she responded to local treatment and analgesics, but the pain started to worsen with prominence during the night, causing disturbed sleep. There were multiple episodes of rise in body temperature towards the evening, associated with sweating and loss of appetite. She also reported a history of significant weight loss – about 8kgs in three months.

At the time of presentation, the patient was significantly cachectic and weighed only 38kgs. There was generalized muscle wasting; she walked with her hands rested on the knees and had a stooped forward posture. There was a prominent knuckle deformity around dorso-lumbar spine; all the movements of the spine were painful. Neurologically, her sensory and motor assessment was normal. Her bowel and bladder functions were also normal.



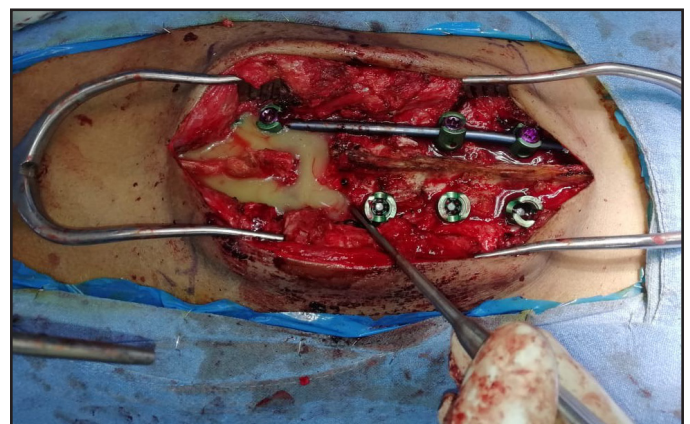
Pre-op CT scan

At another centre she had undergone a series of investigations, including a magnetic resonance imaging (MRI) of the spine. Her initial radiographs of the spine showed spondylodiscitis at L3-L4 with a kyphosis of 25 degrees. Her radiographs of lumbosacral spine were repeated at Medanta-Lucknow. It was found that the kyphosis had progressed to 40 degrees, which did not correct on extension. The CT scans showed extensive bone

destruction with a kyphoscoliotic deformity around L3-L4. The MRI scans showed extensive soft tissue component in the epidural space with pre- and para-vertebral collections around L4.

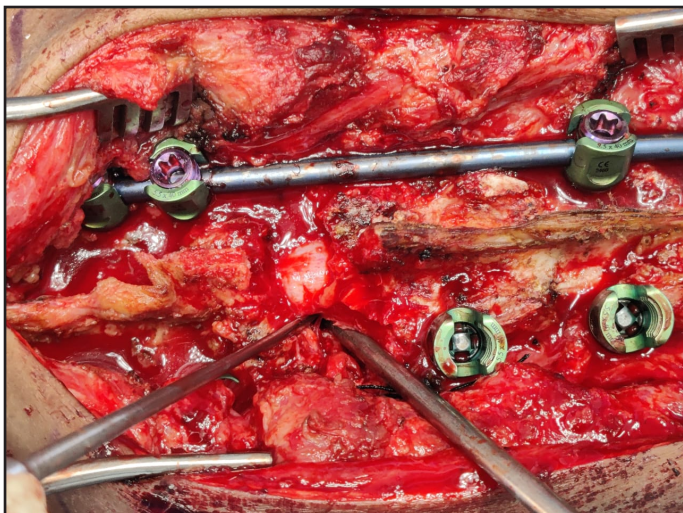
She was diagnosed with post-tubercular sequelae at L3-L4 with severe kyphoscoliotic deformity. We planned to do a thorough debridement of the dead and necrotic tissue and bone, collect biopsy samples and attempt to correct the deformity without jeopardizing the neurological status.

Intraoperatively, as the epidural space was opened, around 40ml of abscess was found, which was collected for culture and drug sensitivity, and all the dead bone was removed. L4 was found almost fully collapsed and a corpectomy was done. We got fixation points, both above and below the involved level, by inserting pedicle screws. A major challenge was to restore the height of L4. The L4 and L5 nerve roots were too close to each other, which hindered putting a mesh cage inside. The nerve roots could not have been sacrificed and hence, it was decided to do further bone resection circumferentially to get that space in front of L4. Finally, the mesh cage was successfully positioned in place of L4 vertebra, jacking it up to restore the height and correcting the kyphotic deformity.

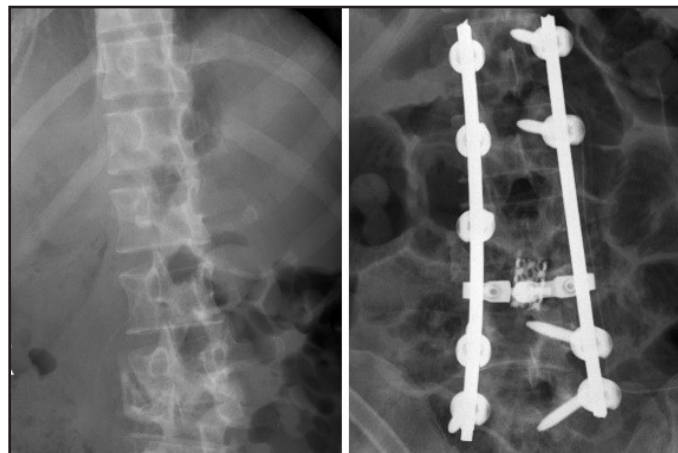


Intra-operative pus evacuation

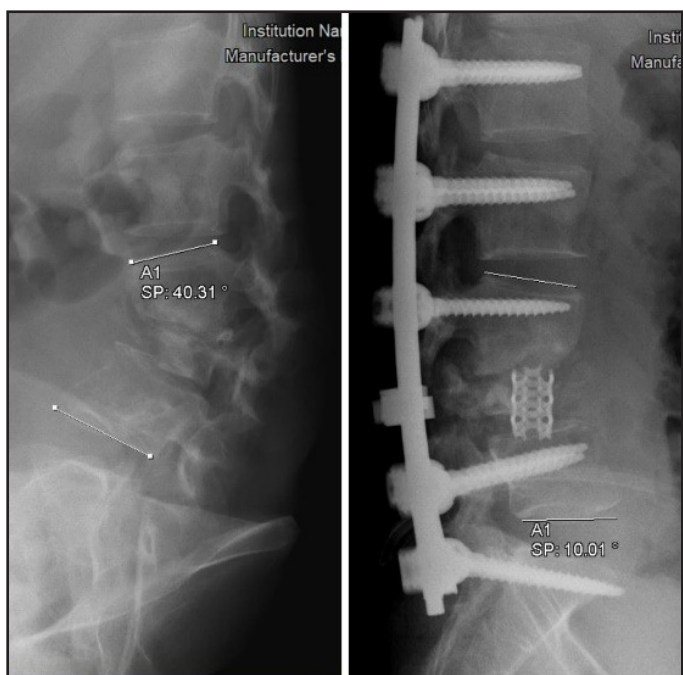
The surgery was uneventful with good clinical outcome. Postoperatively, the patient had normal neurological status and maintained all vital parameters. She was restricted to bed for two weeks and was mobilized after her wounds had healed with the help of a walker.



Spine decompression and cage placement



Anteroposterior view of lumbosacral spine showing deformity correction



Lateral view of lumbosacral spine showing deformity correction



Patient after surgery

Her postoperative radiograph showed correction of deformity to 10 degrees from the earlier 40 degrees at the time of presentation. The abscess culture and genetic experts confirmed the TB as sensitive to first-line of drugs.

At her two-month follow up, the patient showed clinical improvement, had gained weight and was walking pain-free.

The case highlights the importance of prompt diagnosis of spinal TB and alertness towards development of any spinal deformity.

While Pott's Spine is primarily a disease requiring proper and monitored treatment for at least one year, any deformity that is developing needs to be addressed promptly to prevent further morbidity. Surgical treatment options significantly improve patient outcomes, and are now well accepted.

Dr. Swetabh Verma

Consultant - Spine and Orthopaedics
Institute of Musculoskeletal Disorders and
Orthopaedics

Medanta - Lucknow



TechByte

Sacral Nerve Stimulation for Neurogenic Bladder

Losing control over one's ability to urinate can be emotionally and socially devastating. This was the circumstance of a 54-year-old male who presented to Medanta-Gurugram. He was unable to pass urine due to advanced spinal arachnoiditis-induced neurogenic bladder. The patient had been suffering from a neurogenic bladder for more than five years and had not experienced any significant relief or improvement from the medications, pelvic exercises and behavioral therapy. His quality of life was severely impacted and punctuated by suicidal thoughts.

The patient underwent thorough clinico-radiological evaluation. Thereafter, he was advised an ingenious neuro-modulation therapy known as Sacral Nerve Stimulation (SNS) to correct his urinary malfunction.

SNS is a neuromodulation therapy of the sacral nerves to modulate the reflexes that influence the urinary bladder, sphincter and pelvic floor. It acts like a pacemaker and utilizes mild electrical pulses to improve or restore normal voiding function. It is indicated for patients suffering from neurogenic bladder due to a plethora of neurological, urological and/or gynaecological causes, who have failed or did not respond to conservative therapy, such as medications, behavioural therapy, and pelvic exercises. Up to 30%-50% of all neurogenic bladder patients are non-responsive to conservative therapy. Additionally, more than 90% patients who initially respond to conservative treatment become non-compliant in about 24 months. In all such patients, SNS therapy is being seen as an effective solution.

SNS therapy works for urinary urgency-frequency, incontinence and non-obstructive retention. The mechanism of action is multifactorial; it is hypothesized that sacral nerve stimulation works via modulation of spinal and supra-spinal reflexes through afferent signaling rather than direct motor stimulation.

There is an initial trial period to assess the viability of SNS therapy. During the trial procedure performed under local anaesthesia, the right S3 nerve (preferable nerve of choice) is negotiated through the appropriate sacral foramen under fluoroscopic guidance and stimulated for appropriate motor and sensory responses, confirming which the SNS electrode is implanted and secured to an external stimulation system for next 3-7 days. Only those patients who experience at least 50% improvement in their symptoms, during the trial period, are given a final SNS implantation.



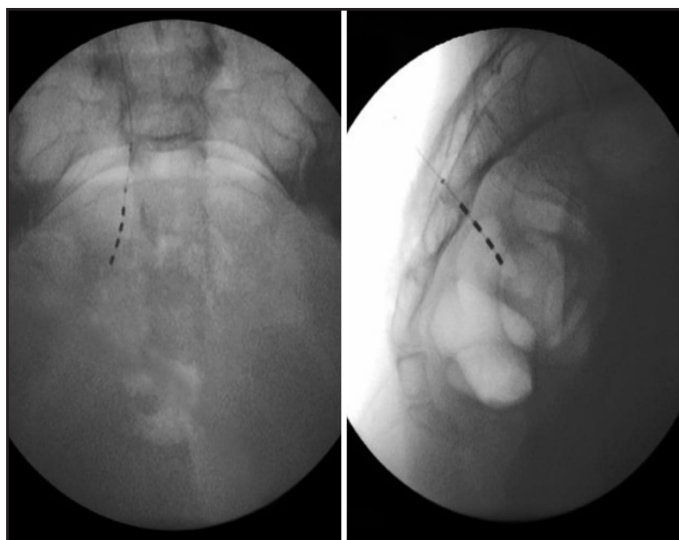
Surface-marking for sacral nerve stimulation surgery



Fluoroscopy-guided precise placement of SNS electrode

During the trial period, our 54-year-old male patient experienced an improvement of more than 70% in his symptom of urinary retention caused by a neurogenic bladder with more than 90% reduction in the volume of post-void residual urine in the urinary bladder as assessed by ultrasound of kidneys, ureters, and urinary bladder (KUB). Subsequently,

he underwent implantation of a permanent SNS pulse generator system as the next step.



Fluoroscopic confirmation of appropriately implanted SNS electrode



SNS electrode connected to the pacemaker following successful trial period

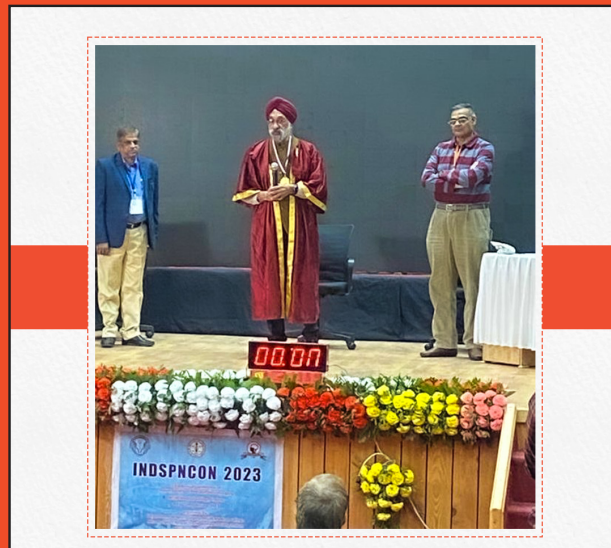
The procedure went well with good clinical outcome. Patient was discharged on Day 3 of the procedure and is doing well just like other satisfied patients who have previously undergone this surgery at Medanta.

Dr. Anirban Deep Banerjee

Associate Director – Neurosurgery
Institute of Neurosciences
Medanta - Gurugram



Kudos



Congratulations Dr. V.P. Singh (Chairman, Institute of Neurosurgery, Medanta, Gurugram) on being appointed the President of the Indian Society of Paediatric Neurosurgery – a body of country's top neuro-experts dedicated to advancing paediatric neurosurgery and knowledge exchange.

Welcome on board



Dr. Thekkinedath Joseph Antony

Director and HOD - Neonatology and NICU
Medanta - Gurugram

Neonatologist with over four decades of experience and expertise in neonatal ventilation (conventional/high frequency), total parenteral nutrition, phototherapy, exchange transfusions and peritoneal dialysis. He specialises in management of complex medical problems in preterm newborns and critically ill neonates.





Dr. Preeti Rastogi

Director and HOD
Obstetrics and Gynaecology
Medanta - Gurugram

Gynaecologist and high-risk obstetrician with over 25 years of experience and expertise in painless deliveries, benign gynaecological disorders, peri and post menopausal care. She also specialises in laparoscopic and robotic surgery such as hysterectomy, myomectomy, ovarian cystectomy, vaginal and pelvic reconstruction surgeries.



Dr. Neha Gupta

Senior Consultant
Obstetrics and Gynaecology
Medanta - Gurugram

Gynaecologist with expertise in minimally invasive gynaecology (laparoscopic and hysteroscopic surgeries), high risk pregnancy care and delivery in addition to gynaecological endocrinology (infertility, PCOS).



Dr. Pooja Mittal

Senior Consultant
Obstetrics and Gynaecology
Medanta - Gurugram

Gynaecologist with expertise in infertility, high risk pregnancy and delivery, complex gynaecological surgeries in addition to laparoscopic procedures.



Dr. Sarita Sharma

Senior Consultant
Gynaecology and Gynaecological Oncology
Medanta - Patna

Gynaecologist with expertise in high risk obstetrics, complex gynaecological surgeries including gynaecological oncology, robotic, laparoscopic and hysteroscopic surgeries.



Dr. Ankit Gupta

Consultant - Neonatology and NICU
Medanta - Gurugram

Neonatologist with expertise in managing extremely preterm neonates including nano preemies, critical medical and surgical newborn cases in addition to neonatal transport.



Dr. Kanika Singh

Consultant - Paediatrics and Clinical Genetics
Medanta - Gurugram

Paediatrician and clinical geneticist with expertise in paediatric genetics and metabolic disorders, genetic counselling, antenatal counselling, fetal anomalies, recurrent pregnancy loss, adult onset genetic disorders in addition to cancer and cardiac genetics.



Dr. Naresh Panwar

Consultant - Neurosurgery
Medanta - Lucknow

Neurosurgeon with expertise in treating various neurological disorders and spine diseases. He specialises in skull base surgery, neuro endoscopy, minimally invasive spine surgery, cerebro-vascular neurosurgery and deep brain stimulation.



Dr. Priyanka Karnani

Consultant - Neonatology and NICU
Medanta - Gurugram

Pediatrician and neonatologist with expertise in managing level 3 NICU including ventilation, complex neonatal procedures and high risk developmental follow-up of newborns discharged from NICU.



Dr. Ruchi Dhall

Consultant - Neonatology
Medanta - Gurugram

Neonatologist with expertise in neonatal ventilation, nutrition of babies with extremely low birth weight, developmental follow-up of high risk newborns, management of various medical and surgical conditions in neonates.



Dr. Deepak Kumar

Consultant - Nephrology and Kidney Transplant Medicine
Medanta - Patna

Nephrologist with expertise in kidney transplant, transplant immunology, critical care nephrology, interventional nephrology and glomerulonephritis.





Dr. Amrita Swati

Associate Consultant - Pulmonology
Medanta - Patna

Pulmonologist with expertise in diagnosing and treating obstructive lung diseases, interstitial lung diseases, pneumonia, tuberculosis, pleural diseases and sleep related disorders. She also specialises in pulmonary critical care and bronchoscopy.



Dr. Richa Garg

Associate Consultant - Breast Services
Medanta - Gurugram

Breast surgery specialist with expertise in breast disease management (benign and cancer), sentinel node biopsies and breast cancer surgeries.



Dr. Tejasvini Vaid

Associate Consultant - Medical Onco and Haemato Oncology
Medanta - Gurugram

Clinical hematologist with expertise in benign hematology, hemato-oncology and stem cell transplantation.



Dr. Madduri Veera Sekharaiah

Associate Consultant - Clinical and Preventive Cardiology
Medanta - Gurugram

Cardiologist with expertise in treating all forms of cardiac illnesses, including coronary artery disease, valve diseases, cardiomyopathies, etc.



Dr. Kumar Pankaj

Associate Consultant - Urology and Kidney Transplant Surgery
Medanta - Indore

Urologist with expertise in laser surgeries for kidney stones, endourology (urolithiasis and prostate), reconstructive urology and laparoscopic surgery.



Dr. Shiepra

Associate Consultant - Dental Sciences
Medanta - Patna

Dentist with expertise in managing maxillofacial trauma, head and neck cancer, oral prophylaxis, dental restorations, dental extractions and impactions in addition to full mouth restoration, dental implant placement and minor oral surgical procedures.



For **EMERGENCY DIAL - 1068**

Medanta - Gurugram

Sector - 38, Gurugram, Haryana | Tel: 0124 4141 414 | info@medanta.org

Medanta - Lucknow

Sector - A, Pocket - 1, Sushant Golf City,
Amar Shaheed Path, Lucknow | Tel: 0522 4505 050

Medanta - Patna

Jay Prabha Medanta Super-Specialty Hospital,
Kankarbagh Main Road, Kankarbagh Colony, Patna
Tel: 0612 350 5050

Medanta - Ranchi

P.O. Irba, P.S. Ormanjhi, Ranchi | Tel: 1800 891 3100

Medanta - Indore

Plot No. 8, PU4, Scheme No. 54, Vijaynagar Square,
AB Road, Indore | Tel: 0731 4747 000

Mediclinic - Delhi

E - 18, Defence Colony, New Delhi
Tel: 011 4411 4411

Mediclinic Cybercity - Gurugram

UG 15/16, DLF Building 10 C, , DLF Cyber City,
Phase II, Gurugram | Tel: 0124 4141 472

Medanta - Mediclinic Subhash Chowk

Plot No. 743P, Sector - 38, Subhash Chowk, Gurugram
Tel: 0124 4834 547