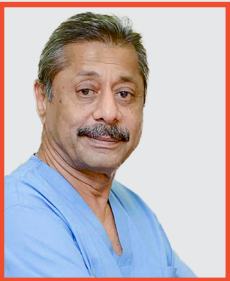


A Knowledge Sharing Initiative by Medanta

## Medanta Gurugram Patents Brachytherapy Device MAOLO for Advanced Cervical Cancer Treatment



“ At Medanta, our foremost priority is the well-being of our patients. The MAOLO template exemplifies our dedication to developing high-quality medical technologies that improve patient outcomes. This patent is not just a milestone for Medanta, but a significant step forward for cervical cancer care in India. We will continue to innovate and provide solutions that cater to the needs of our community. ”

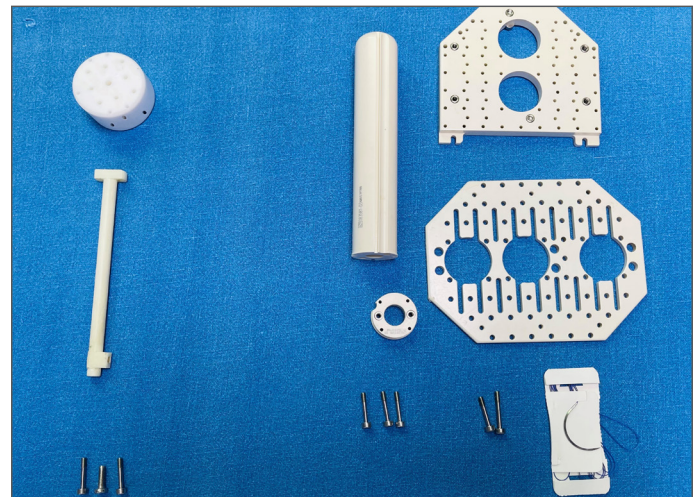
**Dr. Naresh Trehan**

Chairman and Managing Director, Medanta

In a pioneering clinical milestone in treatment of advanced cervical cancer, Medanta, one of north India's largest tertiary and quaternary care centres, has been awarded a patent for Medanta Anterior Oblique Lateral Oblique (MAOLO) template. The innovative template was conceptualised by Medanta Gurugram Cancer Institute's Dr. Susovan Banerjee (Associate Director, Division of Radiation Oncology) and developed alongside Dr. Tejinder Kataria (Chairperson, Division of Radiation Oncology) and the Medanta Medical Physics Team.

This innovation marks a significant improvement in the treatment of cervical cancer, which is the second most common cancer among women in India. Despite being 98% preventable with vaccines and PAP smear tests in the pre-disease stage, and 95% treatable in the early-disease stage, cervical cancer in India claims almost 2/3rd of all patients due to presentation in advanced stages when large and bulky tumours have spread to the lateral pelvic wall. Advanced stage presentation mandates the use of interstitial brachytherapy to adequately cover the target rather than intracavitary technique alone. Interstitial brachytherapy requires a certain level of skill and clinicians are not very comfortable using it as compared to intracavitary method.

Surveys on the practice of brachytherapy in India show that there is a mismatch between the number of locally advanced cervix cases and the interstitial applications. One of the reasons may be the reluctance to use the bulky



(Left) The Medanta Anterior Oblique Lateral Oblique (MAOLO) template and the commercially available multiple-site perineal (MUPIT) applicator.

MUPIT / perineal template available with most centres in their limited armamentarium for brachytherapy of advanced cases. Perineal templates can achieve the desired dose distribution but their widespread use is hampered by the need for prolonged patient admission, patient discomfort, and chances of dislocation apart from cumbersome assembly at the time of application. There is also need of an indigenous template designed as per the built of Indian women. The Medanta AOLO vaginal template could prove to be an important addition in the cervix brachytherapy applicator arsenal.

Approved by the Medanta Institutional Review Board and Independent Ethics Committee, the MAOLO is a high-precision, patient-friendly template to deliver image-guided adaptive Brachytherapy to larger areas in the pelvis that was previously not possible with commercially available intracavitary templates.

One of the key advantages of the template is its uniqueness as a single cylinder that can be assembled with ease on a tandem compared to the commercially available applicators with ring (and its cap) or ovoids (see figure). The cylindrical template also ensures ease of reconstruction of the needles during planning as it utilises only straight needles.

The MAOLO allows for the maximum possible number of catheters to be placed in three directions. This design makes it useful in addressing some of the largest tumours presented clinically. Being cylindrical, MAOLO can be placed securely in the vagina making it more comfortable and eliminates adverse effects like major bleeding, pain, discomfort, or geometrical asymmetry (geographical miss), issues that can lead to abandon the procedure.

Currently, it is only CT compatible as it is used with the commercially available metallic tandem. CT-based image-guided brachytherapy is a robust clinical solution for treatment of all advanced gynaecological cancers. The authors have successfully used the template in their own clinical practice with case results shared in national and international fora.

MAOLO especially emerges as a ray of hope for patients of advanced disease in whom the chances of recurrence, especially in the lateral parametria, are high even after complete treatment with chemoradiation and conventional Brachytherapy. Such recurrences cannot be properly salvaged by either surgery or chemotherapy alone. The MAOLO was conceptualised especially to help patients of advanced-stage cervical cancer stay disease-free for longer.

The template will serve as an important addition to our gynaecology brachytherapy practices in near future. It may well be a reasonable indigenous alternative to the commercially available applicators in resource constrained regions of our country.

Medanta's commitment to healthcare innovation is highlighted by the development and patenting of the MAOLO device, a culmination of collaborative efforts, rigorous research, and meticulous testing. The MAOLO's integration of intracavitary and interstitial applications in a single, user-friendly instrument promises to enhance gynaecological Brachytherapy, particularly in resource-limited regions of India.

## Spotlight

### Genicular Artery Embolization Shows Promise in Managing Osteoarthritis Pain

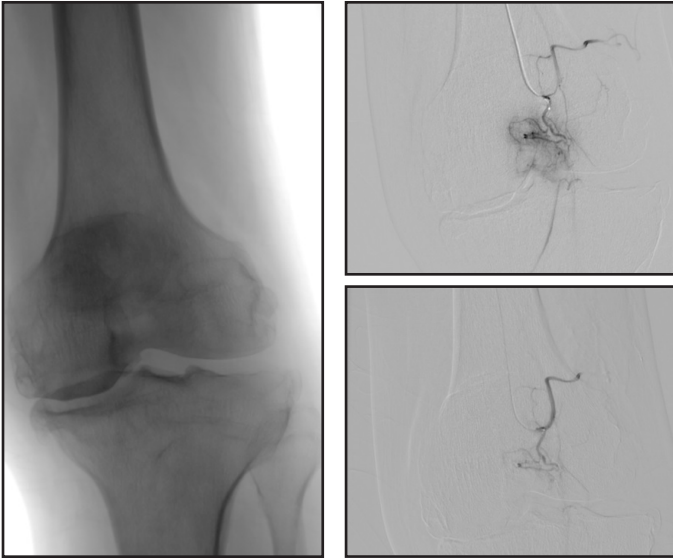
Musculoskeletal pain encompasses discomfort arising from bones, joints, muscles, ligaments, and tendons. Common etiologies include arthritis, injuries, degenerative disorders, and various pathological conditions. Interventional radiology (IR) leverages image-guided, minimally invasive techniques to manage these conditions effectively, offering a patient-friendly alternative to traditional medical and surgical interventions. Knee osteoarthritis (OA) is a significant contributor to morbidity and disability, affecting 25-30% of the general population. Chronic knee pain secondary to OA necessitates a comprehensive management approach aimed at symptom alleviation and quality-of-life enhancement. Standard therapeutic strategies include pharmacologic agents and intra-articular injections for patients not yet suitable for total knee arthroplasty. However, chronic pharmacotherapy is associated with adverse effects such as hepatotoxicity, nephrotoxicity, and gastrointestinal ulceration.

Furthermore, the effectiveness of corticosteroid and hyaluronic acid injections is variable, often requiring repeated treatments.

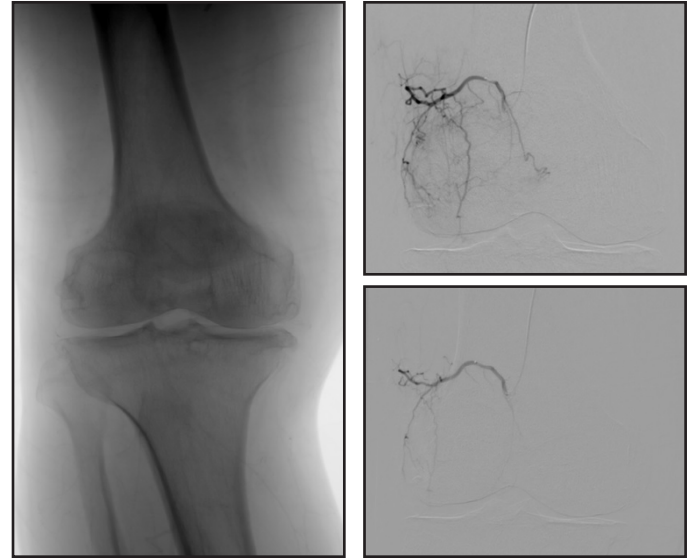
Synovial inflammation in OA is strongly associated with neoangiogenesis, exacerbating joint space degeneration and pain. Geniculate artery embolization (GAE) is an emerging minimally invasive technique entailing the selective occlusion of pathological neovessels to mitigate pain and improve patient outcomes. This procedure was first described by Okuno et al. from Japan, who demonstrated significant pain relief by embolizing geniculate arteries with particulate embolic (imipenem). Various embolic agents such as imipenem, gel foam beads, and polyvinyl alcohol (PVA) particles have been used since.

#### Case Report

A 72-year-old male patient with a history of hypertension, diabetes mellitus, and prior percutaneous transluminal



(Clockwise from left) Left knee Grade-III osteoarthritis. Pre- and post-*imipenem* injection



(Clockwise from left) Right knee Grade-II osteoarthritis. Pre- and post-*imipenem* injection

coronary angioplasty (PTCA) presented with bilateral knee pain (left greater than right). The pain intensified with prolonged standing and walking more than 30 meters. Radiography indicated Grade II changes in the right knee and Grade III changes in the left. Due to the debilitating pain and the patient's reluctance to undergo surgery, we opted to perform GAE.

Bilateral antegrade common femoral artery access was achieved under ultrasound guidance, and geniculate artery branches were selectively cannulated using a 1.9F microcatheter. Angiography revealed neovascularisation, which was embolised using *imipenem*. The patient was discharged within two hours post-procedure. Follow-up visits indicated a substantial reduction in pain during standing and walking. The patient is very happy with the treatment result.

## Discussion

In the past three years, research teams from Japan, the UK, China, and the USA have evaluated multiple patients undergoing GAE procedures for knee osteoarthritis (OA). Their findings consistently support GAE as an effective management option for knee pain associated with chronic OA, reporting clinical success rates ranging from 80% to 100%. Clinical success is typically defined by a 25% to 50% reduction in pain scores, maintained between six months and two years post-embolization. Moreover, some patients reported significant clinical improvements as early as Day 1 to Month 1 after the procedure. Okuno et al.'s comprehensive study on the largest cohort with the longest follow-up demonstrated that Genicular Artery Embolization (GAE) provided up to 85% pain relief at two years post-treatment.

Patients with grade 1-3 OA experienced the most significant responses. Studies by Bagla et al., Little et al., and Lee et al. observed statistically significant improvements in Visual Analog Scale (VAS) scores for durations of 6 months, 12 months, and 10 months, respectively. WORMS analysis by Okuno et al. indicated no progression in structural degenerative OA. Furthermore, both Okuno et al. and Little et al. reported significant decreases in synovitis at 1 and 2 years following GAE, respectively.

Multiple clinical trials corroborate GAE's efficacy in reducing pain and improving the quality of life for knee OA patients.

## To be considered for this treatment, patients should meet the following criteria:

**Diagnosis:** Have moderate to severe osteoarthritis confirmed by X-rays within the last 3 months.

**Pain Level:** Experience moderate to severe pain (pain rating above 3 on a scale of 0-10).

**Duration:** Have had this pain for at least 6 months, despite trying other treatments.

**Surgery Status:** Cannot undergo or do not want knee replacement surgery.

**Medications:** Are currently taking pain medications/joint injections but want to stop.

**Quality of Life:** Are tired of constant pain, prolonged medication intake, and recurring pain when treatments wear off.

Globally, GAE is gaining acceptance as a patient-friendly, non-surgical intervention for chronic OA pain. Its outpatient procedure nature ensures quick and efficient

pain management, making it a preferred option for many patients.

While GAE is a promising technique, other interventional radiology (IR) procedures also play crucial roles in pain management. These include image-guided injections (corticosteroids and hyaluronic acid), nerve blocks (selective nerve root blocks and radiofrequency ablation), vertebroplasty and kyphoplasty for spinal fractures, various ablation techniques, and regenerative therapies like platelet-rich plasma and stem cell therapy. Each of these minimally invasive procedures offers targeted treatment for specific musculoskeletal conditions, expanding the arsenal of pain management options available to patients.

## Conclusion

Interventional radiology is integral to the modern management of musculoskeletal pain, providing minimally invasive, precise, and effective treatment options. The benefits of IR procedures include reduced trauma, high precision due to imaging guidance, rapid recovery, decreased reliance on opioids, and cost-effectiveness. As technology and techniques evolve, the role of IR is anticipated to expand, offering enhanced therapeutic options and improved outcomes for patients with various musculoskeletal conditions.

### Dr. Soumil Singhal

Consultant - Radiology & Imaging  
Medanta - Gurugram



### Dr. Anubhav Khandelwal

Associate Director - Radiology & Imaging  
Medanta - Gurugram



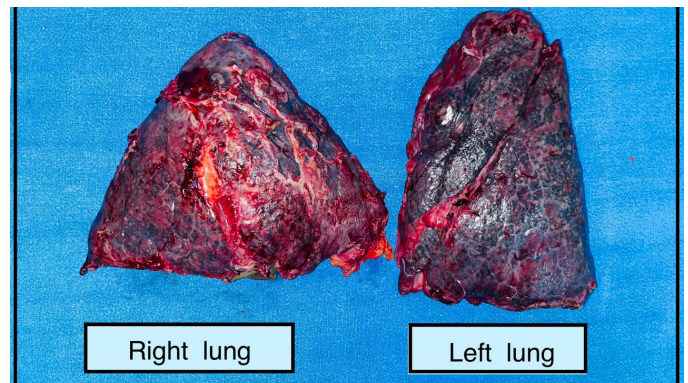
### Dr. Sanjay Saran Bajjal

Chairman - Radiology & Imaging  
Medanta - Gurugram



## Medanta@Work

# Bilateral Lung Transplantation in Patient with Interstitial Lung Disease and Polymyositis



Explanted lungs of the patient.

Lung transplantation is the ultimate life-saving treatment option for patients with end-stage respiratory failure unresponsive to other medical and surgical interventions. Since the first lung transplant in 1963, significant advancements have been made in candidate selection, operative techniques, critical care, immunosuppression, and long-term follow-up. Despite these advancements, lung transplantation remains challenging, requiring meticulous donor selection, organ harvesting and transport, intraoperative precision, and management of early postoperative issues like primary graft dysfunction due to ischemia-reperfusion injury, as well as long-term complications like chronic lung allograft rejection. Data from the International Thoracic Organ Transplant Registry and the US Organ Procurement and Transplantation Network report patient survival rates of 85% at 1 year, 68% at 3 years, and 55% at 5 years, showing the procedure's life-saving potential.

Interstitial lung disease (ILD) encompasses a diverse group of pulmonary disorders characterized by varying degrees of inflammation and fibrosis. Polymyositis is an autoimmune inflammatory myopathy disease that can be associated with ILD, leading to significant respiratory compromise. We present a rare instance of ILD with polymyositis necessitating the bilateral lung transplantation. This report highlights the

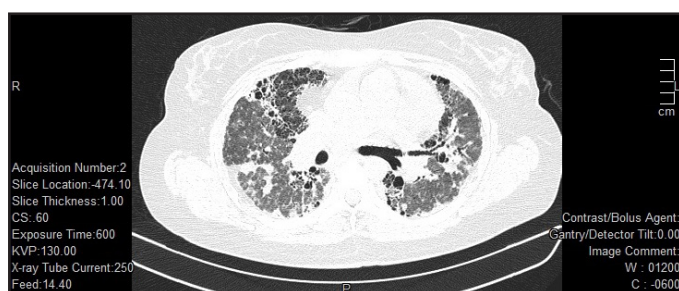
importance of a multidisciplinary approach in managing advanced ILD and the role of timely lung transplantation.

## Case Study

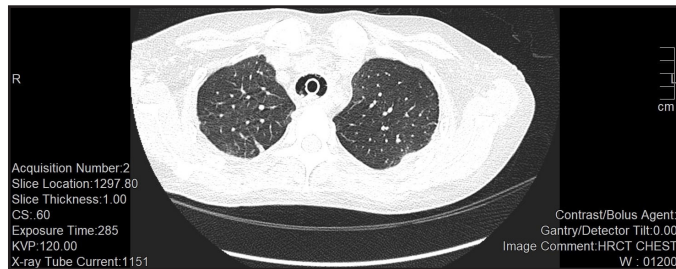
A 39-year-old woman was diagnosed with ILD based on clinico-radiological findings in March 2013. She also suffered from polymyositis and respiratory failure because of which she was on oxygen support since September 2020. In September 2023, she presented at Medanta with complaints of shortness of breath on exertion, generalised weakness, and increased need for supplemental oxygen over the past week, accompanied by episodes of desaturation. She was evaluated and listed for a double lung transplant in October 2023. On January 11, 2024, the patient had admitted with exacerbation of symptoms of shortness of breath, peripheral edema, and increased oxygen requirements. She was managed with diuretics, antibiotics, and supportive treatment. Despite these measures, her condition deteriorated, leading to severe respiratory distress and hyponatremia, necessitating transfer to the ICU on January 14, 2024.

In the ICU, she developed hypoxic seizures which required immediate intubation and mechanical ventilation. Given the prolonged need for ventilatory support, she was electively tracheostomised on January 18, 2024. Donor lungs became available on January 28, 2024. Following evaluation, the donor lungs were deemed suitable, and the patient underwent a bilateral lung transplant next day.

Post-operatively, the patient was weaned off extracorporeal membrane oxygenation (ECMO) in the operating room and transferred to the transplant ICU on positive pressure ventilation (IPPV) with 40% FiO<sub>2</sub> and dual vasopressor support. Immunosuppression therapy was initiated with a triple-drug regimen of steroids, calcineurin inhibitors (CNI), and cell cycle inhibitors (CCI), alongside intravenous antibiotics and antifungal prophylaxis. The donor bronchoalveolar lavage (BAL) tested positive for *Aspergillus* and *Mucor*, leading to the initiation of intravenous Amphotericin B and voriconazole. Levels were monitored and maintained within the therapeutic range. Regular surveillance bronchoscopies were conducted, and BAL samples were taken to investigate for infection. The patient



Pre-transplant CT Scan



Post transplant CT scan

was weaned off mechanical ventilation by post-operative Day 7. She was then started on high protein diet and active physiotherapy. By post-operative Day 8, a T-piece trial was given and she was able to maintain saturation on 1-liter/min oxygen. By Day 10, she was shifted to the ward and continued on pulmonary rehabilitation and exercises. Amphotericin B treatment continued for a total of 30 days with subsequent BAL samples testing negative for fungal elements.

The patient was successfully decannulated on post-operative Day 28. The patient was hemodynamically stable, maintaining oxygen saturation on room air, consuming a normal diet, and mobilising independently. She was discharged on post-operative Day 30 in a stable condition with scheduled follow-up in the lung transplant outpatient department to monitor her progress and manage any long-term complications.

## Discussion

This case highlights the complex management of a patient with ILD and polymyositis, culminating in a successful bilateral lung transplantation. The diagnosis of ILD in conjunction with polymyositis presents a significant clinical challenge. Polymyositis, an inflammatory myopathy, is known to have pulmonary manifestations, with ILD being a notable complication. The combination of these conditions often leads to a more rapid progression of respiratory insufficiency. In this case, the patient's ILD progressed to Type-1 and Type-2 respiratory failure, necessitating the long-term oxygen therapy since September 2020.

Upon presenting with acute exacerbation of symptoms, including increased shortness of breath, peripheral edema, and heightened oxygen requirements, the patient required immediate medical intervention. Initial management with diuretics and proton pump inhibitors, along with supportive care, aimed to stabilize her condition. However, the development of severe respiratory distress and hyponatremia necessitated ICU admission and mechanical ventilation.

Post-operatively, she experienced significant challenges, including risk of infection and the need for continued mechanical ventilation. The positive BAL for aspergillus and mucor necessitated aggressive antifungal treatment

with intravenous Amphotericin B, along with monitoring and maintaining therapeutic levels of Voriconazole. Regular surveillance bronchoscopies and BAL samples were critical in managing and mitigating infection risks.

The patient's gradual weaning off from mechanical ventilation by post-operative Day 7, and subsequent removal of intercostal drainage tubes, reflects the success of comprehensive post-operative care. The shift to a high-protein diet and active physiotherapy were integral to her recovery, promoting respiratory muscle strength and overall physical rehabilitation.

This case emphasises the importance of a multidisciplinary approach in managing advanced ILD with polymyositis. Early diagnosis, regular monitoring, and timely referral for lung transplantation are critical steps in optimizing patient outcomes. The role of comprehensive post-operative care, including infection control, immunosuppression management, and rehabilitation, cannot be overstated.

## Conclusion

The successful bilateral lung transplantation in this patient underscores the potential for improved quality of life and extended survival with advanced ILD and polymyositis. This case contributes valuable insights into the management strategies and challenges associated with lung transplantation in complex clinical scenarios. Continued research and clinical vigilance are imperative to further enhance outcomes for similar patients in the future.

### Dr. Arvind Kumar

Chairman - Chest Surgery, Chest Onco Surgery and Lung Transplantation  
Medanta - Gurugram



### Dr. Belal Bin Asaf

Associate Director - Chest Surgery, Chest Onco Surgery and Lung Transplantation  
Medanta - Gurugram



### Dr. Harsh Vardhan Puri

Consultant - Chest Surgery, Chest Onco Surgery and Lung Transplantation  
Medanta - Gurugram



### Dr. Mohan V. Pulle

Associate Consultant - Chest Surgery, Chest Onco Surgery and Lung Transplantation  
Medanta - Gurugram



## MEDICON-2024

## Pulmonology Conclave Sees Robust Participation

Medanta Gurugram's Institute of Internal Medicine, Respiratory and Sleep Medicine hosted the Interventional Pulmonology Conclave, a pivotal event showcasing advanced minimally invasive procedures in respiratory medicine. The two-day event was held at Medanta Gurugram. It saw enthusiastic participation from over 150 delegates who benefitted from the insights and developments shared by internationally acclaimed experts.

Day one featured a series of enlightening talks, including discussions on bronchoscopic management of benign tracheal stenosis, innovative diagnostic techniques for peripheral pulmonary nodules, and the latest in vapour ablation treatments for COPD. There were dedicated hands-on sessions where participants engaged directly with advanced technologies like cryotherapy and airway recanalisation.

Day two continued with practical applications and case studies, highlighting techniques like glue therapy for airway diseases and management strategies for endobronchial fistulas. Interactive sessions allowed attendees to practice with radial EBUS, stenting, and the SPiGOT method under expert guidance.

The conclave reinforced Medanta's commitment to medical excellence and provided a comprehensive platform for practitioners to enhance their skills and knowledge in treating complex pulmonary conditions.

Medicon-2024 was organised under the guidance of Dr Randeep Guleria (Chairman) and Dr Anand Jaiswal (Senior Director) with Dr Ashish Prakash (Senior Consultant) as the organising secretary.



## Welcome Onboard



### Dr. Manoj Kumar Mishra

Director - Division of ENT & Head-Neck  
Medanta - Lucknow

An ENT and head-neck surgeon for over 24 years, he is an expert in otoneurology. He is known for his dexterity in hearing reconstruction surgery, endoscopic sinus and skull base surgery, head and neck cancer surgery, and laryngeal and voice surgery. He has contributed immensely through his work in charitable hospitals, restoring lost hearing in children in Kenya and India.



### Dr. Shailendra Mohan Shukla

Senior Consultant - Urology & Kidney  
Transplant Surgery  
Medanta - Ranchi

He specialises in endourology (PCNL, URSL, TURP, TURBT), female urology, renal transplantation, laparoscopic urology, reconstructive urological procedures, and andrology.



### Dr. Amit Garg

Consultant - Dental Sciences  
Medanta - Gurugram

With 17 years in the field of periodontics, Dr. Garg is an expert in soft tissue surgeries, dental implants, laser-assisted surgeries, and smile designing. He was given the Excellence in Periodontology award by Global Professional Award in 2022.



### Dr. Nikhil Puri

Director - Plastic Surgery  
Medanta - Lucknow

With 12+ years of experience, he specialises in the field of plastic, aesthetic, reconstructive and maxillofacial surgery. He also does hair transplantation surgeries.



### Dr. Mohd Suhel

Consultant - Medical Oncology  
& Haematology  
Medanta - Lucknow

An expert in management of haematologic malignancies and stem cell transplant, he also specialises in immunotherapy, targeted therapy and chemotherapy for solid malignancies.



### Dr. Tanzilur Rahman

Senior Consultant - Urology & Kidney  
Transplant Surgery  
Medanta - Patna

Skilled in endo-urology procedures (PCNL, URSL, Cystolithotripsy, TURP, TURBT, VIU), and andrology, reconstructive urology and renal transplant surgery, he specialises in uro-oncological surgeries (radical nephrectomy, radical cystectomy, ilio-inguinal block dissection, palliative cystectomy with urinary diversion), minimally invasive urology surgery, AV fistula creation, female and functional urology.



### Dr. Rajeev Krishna Choudhary

Consultant - Cardiology  
Medanta - Lucknow

Dr. Choudhary specialises in diagnostic coronary and peripheral angiography, IVUS / OCT guided complex coronary angioplasty, permanent pacemaker and ICD implantation and Balloon Mitral Valvotomy (BMV). He is experienced in structural heart interventions (ASD, VSD and PDA device closure), and diagnosing, treating, and managing a wide range of valvular heart diseases and heart failure.





## Dr. Mayoori Sharad

Associate Consultant - Cardiology  
Medanta - Ranchi

Dr. Sharad specialises in non-invasive heart procedures including transthoracic echocardiography in adults with congenital heart diseases. She provides comprehensive care throughout different life stages.



## Dr. Rahul Kumar

Consultant - Respiratory & Sleep Medicine  
Medanta - Patna

Experienced pulmonologist with an experience of more than 10 years, he specialises in the management of difficult-to-treat asthma, severe and very severe COPD, bronchiectasis, interstitial lung disease, pleural diseases, pulmonary vascular disease, interventional pulmonology (bronchoscopy, medical thoracoscopy, EBUS), sleep-related breathing disorder, pneumonia and pulmonary infections, and respiratory failure.



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-Speciality 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

#### Medanta - Mediclinics

##### Defence Colony

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

##### Cybercity

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

##### Subhash Chowk

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

##### Cyber Park

Shop No. 16 and 17, Tower B, Ground Floor, DLF  
Cyber Park, Plot No. 405B, Sector-20 Udyog Vihar,  
Gurugram | Tel: 93541 41472

**Medanta Helpline: 8904395588**

Medanta Network: Gurugram | Delhi | Lucknow | Patna | Indore | Ranchi | Noida\*