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THE EXCHANGE

Issue 88
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Medanta@Work

Severe Paediatric Asthma with Recurrent Pneumothorax

A Suspected Case of Marfan Syndrome

Asthma is a common chronic respiratory condition in children, characterised by variable airflow limitation, airway inflammation, and bronchial hyperresponsiveness. While most cases follow a predictable course, the presence of an underlying systemic disorder-such as Marfan syndrome-can alter the trajectory significantly. Marfan syndrome is a heritable connective tissue disorder caused by mutations in the fibrillin-1 gene, with systemic manifestations that predispose individuals to structural lung abnormalities like blebs and bullae. These features can increase the risk of spontaneous pneumothorax, particularly in poorly controlled or severe asthma. This case highlights the complexities of diagnosis and management when these two conditions overlap in a paediatric patient.

Case Study

A 14-year-old female with a known history of bronchial asthma for over 12 years presented to the Emergency Department of Medanta – Patna in a severely breathless state. She had been experiencing difficulty in breathing for two days and had been initially admitted to a local private hospital in Begusarai. There, she was found to be in respiratory failure with hypercarbia evident on arterial blood gas (ABG) analysis, necessitating endotracheal intubation. She was subsequently referred to our hospital in Patna for advanced care.

The patient had a documented history of pneumothorax a year prior, for which a chest tube had been inserted.

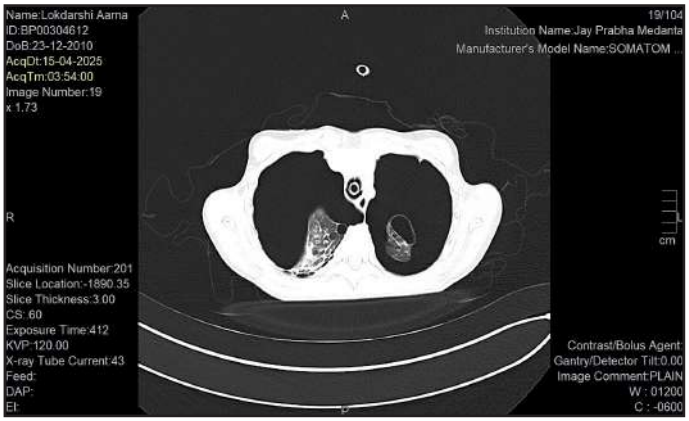
On clinical examination, her vital parameters were: temperature 98°F, blood pressure 90/60 mmHg, pulse

rate 132 bpm, respiratory rate 20 per minute, and SpO_2 98% on room air. Auscultation revealed bilaterally diminished air entry with diffuse wheezing. Cardiovascular and abdominal examinations were unremarkable.

Notably, her physical appearance was suggestive of marfanoid habitus. She exhibited long, slender fingers (arachnodactyly), pectus carinatum, a positive wrist sign, and crowded maxillary dentition - classical phenotypic features consistent with Marfan syndrome.

A contrast-enhanced CT (CECT) of the thorax performed on 15 April 2025 revealed bilateral pneumothoraces with near-complete collapse of both lungs. Multiple blebs and bullae were identified, particularly in the apical segments of the upper lobes and the basal segment of the right lower lobe. Patchy peripheral consolidations were also noted.

A high-resolution CT (HRCT) performed nine days later showed complete resolution of the pneumothoraces, but with persistent subpleural reticulation, ground-glass opacities, and para-septal bullae. Compensatory hyperinflation of the lower lobes and subcutaneous emphysema on the left chest wall were also observed, along with prominent pectus carinatum.



HRCT at admission showing bilateral pneumothorax, pneumatoceles, collapsed lungs, and ET tube in situ

The clinical findings, imaging features, and physical phenotype strongly suggested an underlying diagnosis of Marfan syndrome, likely contributing to her recurrent pneumothoraces and chronic lung changes.

The patient was admitted to the Paediatric Intensive Care Unit (PICU) and initiated on mechanical ventilation. Management included continuous bronchodilator nebulisation, intravenous aminophylline, intravenous methylprednisolone, and broad-spectrum antibiotics. Bilateral chest tubes were placed for pneumothoraces. Inotropic support was started for hypotension.

Post-extubation bubble CPAP trial failed due to desaturation and CO_2 retention, necessitating re-intubation. Ventilatory management was complex, requiring careful balancing of pressure settings to avoid worsening pneumothorax while ensuring adequate oxygenation - akin to a 'double-edged sword'.

With gradual improvement, the patient was successfully weaned off mechanical ventilation. She progressed from CPAP to NRBM, nasal prongs, and finally to room air. Chest physiotherapy and inhaler training were provided. ABG parameters improved and follow-up imaging showed resolution of pneumothoraces.

At discharge, the patient was stable, maintaining SpO_2 on room air with equal bilateral air entry. Chest X-ray was near-normal. She was discharged on inhaled corticosteroids, tapering steroids, and advised genetic testing for Marfan syndrome. The family was counselled on long-term risk and follow-up.

Bilateral complete lung expansion with resolution of pneumothorax after treatment, at the time of discharge

Conclusion

This case represents a rare and severe manifestation of asthma complicated by bilateral pneumothorax in a background of suspected Marfan syndrome. Early diagnosis of systemic conditions in paediatric asthma patients is essential to guide management and prevent complications. A multidisciplinary approach is vital in managing such complex cases.

Dr. Vivek Ranjan
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Robot-Assisted Bariatric Surgery

Percision Where It Matters!

While bariatric surgery, also known as weight loss or metabolic surgery, has routinely been performed laparoscopically (minimally invasive), robotic technology now offers added precision where it truly matters.

Bariatric surgery is performed in patients suffering from morbid obesity to treat obesity and associated metabolic conditions such as type 2 diabetes, obstructive sleep apnoea (OSA), and more. Patients with a Body Mass Index (BMI) over 50 are considered to have super morbid obesity. In such cases, surgery can be particularly challenging due to a significantly heavy abdominal wall.

Laparoscopic surgery is essentially "straight-stick" surgery, with instrument movement restricted to a single axis at the tip. This is where robot-assisted surgery has proven to be a boon, as the surgeon's hand movements on the console are replicated inside the patient's abdomen across multiple axes—referred to as endo-wristed movements. This means that the torque from the patient's abdominal wall is neutralised, allowing for highly precise manoeuvres.

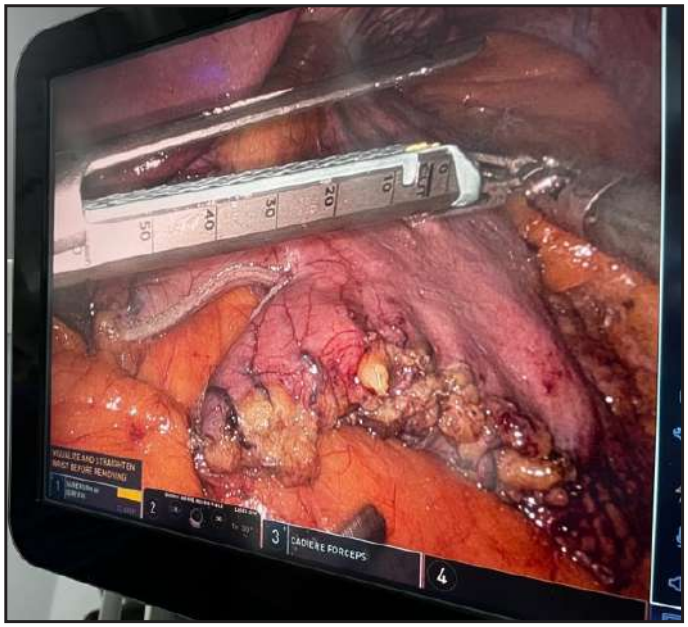
In addition, the advanced robotic platform provides 3D vision, state-of-the-art vessel sealing devices, and other high-end instruments. One of the latest innovations is the robotic tissue stapler, which incorporates Artificial Intelligence (AI) for highly accurate tissue sealing, minimising bleeding and reducing complications.

Case Study

A 40-year-old male experienced progressive weight gain during and after the COVID-19 period, eventually entering a vicious cycle of super morbid obesity. He weighed 180 kg, with a Body Mass Index (BMI) of 56, and presented with type 2 diabetes, hypertension, back pain limiting physical activity, and shortness of breath on minimal exertion. That was when he consulted for bariatric surgery at Medanta - Gurugram to help address these problems.

Following thorough evaluation and preoperative optimisation, he underwent robot-assisted bariatric surgery in January 2025. The procedure was performed safely using the Da Vinci Xi robotic platform along with SureForm robotic staplers, and was completed in under two hours. The patient experienced minimal postoperative pain, had an uneventful recovery, and was discharged on the postoperative Day 2 despite multiple comorbidities.

Robotic platform in use



Robotic tissue stapling with dry tissues and minimal bleeding

At his two-month follow-up visit, the patient had already lost 25 kg, achieved remission of diabetes, and discontinued all diabetes medications. He was exercising for nearly an hour daily and reported significant improvement in his quality of life.

Conclusion

Robotic technology has proven to be a valuable tool in the surgical management of super morbid obesity, particularly in patients with multiple comorbidities and difficult abdominal wall anatomy. The robotic platform enhances surgical precision, ergonomics, and intraoperative control, resulting in favourable perioperative outcomes, reduced postoperative morbidity, and improved long-term metabolic parameters. This case highlights the effectiveness of a multidisciplinary, technology-enabled approach in managing complex obesity.

Dr. Vikas Singhal

Associate Director - GI Surgery, GI Oncology and Bariatric Surgery

Medanta - Gurugram

From Retrograde to Antegrade

A Strategic CTO Success Story

Successful percutaneous coronary intervention (PCI) for chronic total occlusions (CTOs) has been associated with a reduced need for coronary artery bypass grafting (CABG), improved left ventricular function, and better long-term survival. With the advancement of hardware's and multiple algorithmic approached to CTO, success rates for CTO recanalisation have increased from 60% to 90% over the past decade.

Case Study

A 61-year-old male with a past history of inferior wall myocardial infarction (IWMI) over 15 years ago presented with a recent anterior myocardial infarction (MI). ECG showed QS complexes in the anterior leads and small q waves in leads II, III, and aVF.

Coronary angiography was done which revealed an 80% calcific stenosis in the proximal Left Anterior Descending (LAD), 80% stenosis in the obtuse marginal (OM) branch, and a dominant right coronary artery (RCA) with a 100% CTO involving a long segment. Retrograde filling of the RCA was noted via AV groove collaterals (CC2) from the left circumflex artery (LCx). Percutaneous coronary intervention to the LAD and OM was performed in Stage I, and the patient was taken for Stage II RCA CTO intervention.

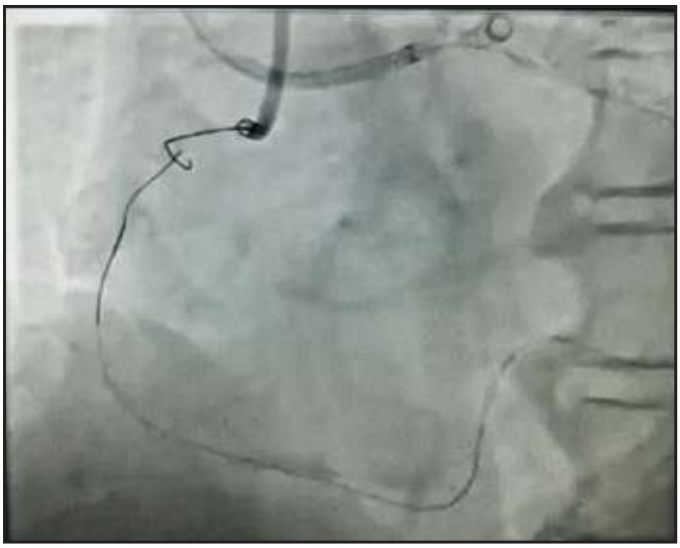
An upfront retrograde approach was taken due to good collateral filling from the LCx to the RCA.

Retrograde filling of RCA via AV groove collaterals (CC2) from LCx - favourable anatomy for retrograde approach

The AV groove collateral was tracked using a Caravel 150 microcatheter and a Sion wire. The Sion wire was then exchanged for a Suoh-3 at the corkscrew bends, an ideal wire for such anatomy with a tip load of 0.3g, which successfully crossed the collateral, as confirmed by a tip injection.

Successful crossing of AV groove collateral using Suoh-3 wire and Caravel microcatheter - tip injection confirms proper positioning

Retrograde wire advancement in the RCA CTO was attempted using a Gladius EX, which nearly reached the proximal cap; however, the distal tip was not in-plane.

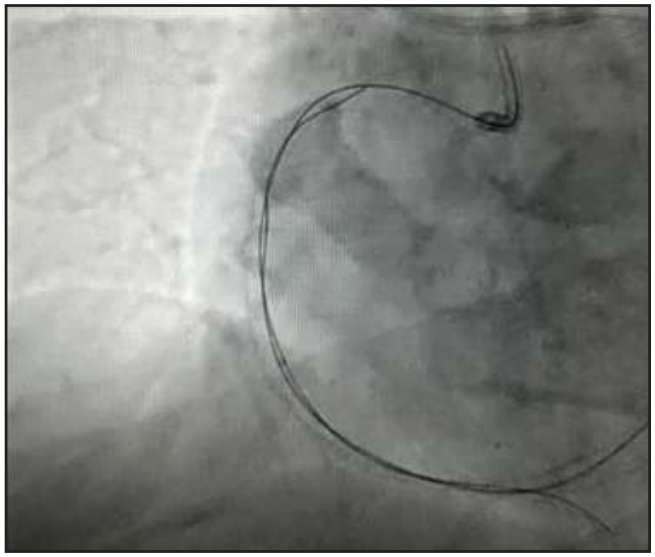


Retrograde wire (Gladius EX) nearing the proximal cap of RCA CTO but tip alignment not ideal - limiting success via retrograde

During antegrade wiring, the guide catheter tended to back out, so the stiff Conquest Pro 9 wire was advanced deeper into the CTO segment. A reattempt with a Gaia-2 wire achieved some advancement within the arterial architecture, but balloon advancement failed which was necessary for reverse CART.

As a result, antegrade wire crossing was reattempted using the retrograde gear as a landmark, with the steerable and directional Gaia-3 wire. The antegrade Gaia-2 wire successfully crossed into the PLV, and partial balloon advancement was achieved with deeper wire positioning and slight deep throttling of the guide.

Finally, a Nick Nano 0.85 microcatheter successfully crossed the CTO on the antegrade wire.



Antegrade microcatheter (Nick Nano 0.85) successfully crossing CTO after landmark-guided wiring using retrograde hardware as reference

After a confirmatory contrast shot, the retrograde wire was withdrawn, and stenting was completed via the antegrade system, yielding a good final result with TIMI 3 flow.

Final angiographic result showing well-deployed stent with TIMI 3 flow in RCA post-successful antegrade CTO revascularisation

The procedure was successful, and the post-operative period remained uneventful.

Conclusion

This case demonstrates an attempted retrograde approach owing to the presence of favourable interventional collaterals. However, the retrograde wire could not successfully cross the CTO lesion. After multiple attempts, the antegrade wire ultimately crossed the CTO using the retrograde gear as a landmark - an established technique contributing to retrograde success.

Dr. Pravin K Goel
Director - Cardiology
Medanta - Lucknow

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Welcome Onboard

Dr. Pravin Saxena
Senior Director - Cardiac Anaesthesia
Medanta - Gurugram

Dr. Saxena is a Cardiac Anaesthesiologist with over 20 years of experience in both paediatric and adult cardiac anaesthesia. He specialises in managing complex neonatal cases, ultrasound-guided paediatric invasive line placement, and administering anaesthesia outside the OT, including in interventional cardiology and radiology.

Dr. Sushma Bala
Consultant - Nephrology and Kidney Transplant Medicine
Medanta - Ranchi

Dr. Sushma Bala is a nephrologist with expertise in chronic kidney disease, acute kidney injury, kidney transplant care, kidney biopsy, and extracorporeal therapies. She is also experienced in developing dialysis protocols and optimising transplant outcomes through a multidisciplinary approach.

Dr. Priya Jha
Consultant - Anaesthesia
Medanta - Patna

Dr. Jha is an anaesthesiologist with expertise in general, paediatric, obstetric, and neuroanaesthesia. She is proficient in managing critically ill patients and skilled in labour analgesia, patient-controlled analgesia (PCA), ultrasound-guided regional blocks, and advanced life support.

Dr. Aditi
Consultant - Radiology
Medanta - Ranchi

Dr. Aditi is a Radiologist with expertise in women's imaging and diagnostic modalities such as general ultrasound, CT, MRI, mammography, and fluoroscopy procedures.

Dr. Jaya Pandey
Consultant - Neonatology
Medanta - Lucknow

Dr. Pandey specialises in neonatology with expertise in managing critically ill newborns, including premature and extremely low birth weight infants. She is skilled in neonatal resuscitation, advanced ventilation, functional echocardiography (POCUS), and high-risk newborn follow-up, with a strong focus on developmentally supportive care and lactation support.

Dr. Nandita Kujur
Associate Consultant - Neurosurgery
Medanta - Ranchi

Dr. Kujur is Jharkhand's first female and first endovascular neurosurgeon, with expertise in both endovascular and conventional neurosurgical procedures. She specialises in minimally invasive neurovascular interventions.

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Dr. Indu Kiran

Associate Consultant - Neurology

Medanta - Patna

Dr. Kiran is a neurologist with expertise in diagnosing and managing disorders of the brain, spine, nerves, and muscles. She is experienced in providing comprehensive care for a wide range of neurological conditions.

Dr. Rahul Sharma

Associate Consultant - Paediatric Nephrology

Medanta - Gurugram

Dr. Sharma specialises in paediatric nephrology with expertise in acute and critical care nephrology, chronic kidney disease, and paediatric kidney transplantation.

Dr. Nelesh Aggarwal

Associate Consultant - Radiation Oncology

Medanta - Lucknow

Dr. Aggarwal specialises in precision radiotherapy with expertise in SRS, SRT, SBRT, IGRT, VMAT, DIBH, IMRT, 3D-CRT, and palliative radiotherapy. He focuses on delivering effective cancer treatment while minimising side effects.

Dr. Suman Prakash

Associate Consultant - Cardiology

Medanta - Patna

Dr. Prakash is an interventional cardiologist with expertise in coronary angioplasty, pacemaker and device implantation, structural heart interventions, and non-invasive diagnostics like stress and contrast echocardiography

Dr. Navneet Saurav

Associate Consultant - Urology

Medanta - Lucknow

Dr. Saurav is a urologist specialising in endo-urology, renal transplantation, andrology, and robotic urological surgery, with expertise in stone disease, prostate surgery, male infertility, and minimally invasive procedures.

Dr. Himanshu Gupta

Associate Consultant - Gastroenterology

Medanta - Lucknow

Dr. Gupta specialises in hepatology and gastroenterology with expertise in liver disease management, gastrointestinal disorders, and advanced diagnostic and therapeutic endoscopy.

Dr. Anjali Sachan

Associate Consultant - Medical Oncology

Medanta - Lucknow

Dr. Sachan is a medical oncologist with expertise in chemotherapy, targeted therapy, immunotherapy, and the comprehensive management of solid and haematologic cancers.

Dr. Abhinav Pande

Associate Consultant - Interventional Cardiology

Medanta - Lucknow

Dr. Pande specialises in interventional and preventive cardiology, with expertise in coronary angioplasty, pacemaker implantation, and other cardiac device procedures.

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Dr. Shivani Kanwal
Associate Consultant - Nephrology
Medanta - Gurugram

Dr. Kanwal specialises in nephrology with expertise in kidney transplantation, glomerular diseases, dialysis therapies, and interventional nephrology. She is skilled in kidney biopsies, tunneled catheter insertions, and peritoneal dialysis

Dr. Junaid Iqbal
Attending Consultant - Emergency and Trauma Care
Medanta - Ranchi

Dr. Iqbal is an Emergency and Trauma Care specialist with expertise in acute care, trauma resuscitation, and the management of life-threatening emergencies. He is proficient in rapid clinical assessment and the stabilisation of critically ill patients.

Dr. Aniket Sinha
Attending Consultant - Internal Medicine
Medanta - Ranchi

Dr. Aniket Sinha is a physician with expertise in diabetes, cardio-respiratory care, critical care, and emergency medicine. He also specialises in managing multi-system conditions, including renal, liver, autoimmune, and neurological disorders, and has additional training in 2D echocardiography.

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Golf Course Road
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Medanta Helpline: 88 0000 1068

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