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marshmallow

surgical MARVELS

Dr. Mahesh D. Patel
G.I, Lung & Thoracic Onco Robotic Surgeon

surgical MARVELS

FROM THE CEO'S DESK

There are moments in the life of a hospital when medicine transcends science and becomes art.

We, at Zydus, have a long legacy of adapting emerging technology and converting it into practical solutions. Empowered by the vision and freedom entrusted to us by our chairman, Shri Pankajbhai Patel, our teams have been able to explore, innovate, and push boundaries - a belief that continues to inspire everything we do. And from this harmony, the concept of Surgical Marvels was born.

Surgical Marvels is more than a compilation of rare and complex procedures. It is about what it means to walk into an operating theater knowing that the next few hours could alter the course of a life. It is about the weight of responsibility, the discipline of preparation, and the conviction that drives a surgeon to take on the near-impossible, not once, but time and again.

This belief lies at the core of who we are. This book captures those moments.

At the heart of this collection is Dr. Mahesh D. Patel, whose decade-long association with Zydus Hospitals has left an indelible mark on our institution and the lives of countless patients. But more than surgeries, this book is about what it takes to attempt them. Through its pages, we witness some of Dr. Patel's most extraordinary work in GI, lung and thoracic oncology surgeries ever performed; landmark moments that stand at the very edge of what has been claimed to be technically possible. His commanding presence in the operating room, shapes not only the course of the procedure, but anchors everyone around him in a shared sense of purpose.

Having known Dr. Patel for many years now, what continues to amaze me is not just his consistency, grit, and humility, but also his enviable ability to meet complexity with composure. His journey is a reflection of the ethos we hold dear at Zydus: a relentless pursuit of better, not just for today, but for every tomorrow we hope to build.

This is the first volume in what we hope will become a long-standing series that captures the depth, discipline, and human impact of advanced surgery. It offers a rare window into some of the most demanding operations performed at our institution, and the stories behind them.

I hope Surgical Marvels lights that fire in you as it has in us, to believe in the future of surgical science, and in the humanity that sustains it.

I invite you to read, reflect, and be inspired.

Dr. Sajan Nair
Chief Executive Officer
Zydus Hospitals

> ***Self-sacrifice? But it is precisely the self that cannot and must not be sacrificed. It is the unsacrificed self that we must respect in man above all.***
>
> ***— The Fountainhead, Ayn Rand***

Dr. Mahesh D. Patel

GI, Lung & Thoracic Onco Robotic Surgeon

A Brief Bio

Dr. Mahesh D. Patel, the first physician in a family of entrepreneurs, carved out a path that was entirely his own. During his MBBS years, he discovered a deep fascination for surgery and initially wanted to become a cardiothoracic surgeon. However, as his master's progressed, he found himself drawn to the complex interdependence of the gastrointestinal tract, lungs, and thoracic cavity, a dynamic that piqued his interest. That fascination quickly transformed itself into a calling. After completing his master's in surgery, he sought advanced specialisation in GI, lung, and oncological surgery, honing his expertise in India before travelling to Germany, Korea, and the United States for further training. His travels overseas were never purely for leisure. Whether attending a fellowship or an international conference, his travels took him places but he never lost sight of base. There have been instances when he travelled to Australia to give a lecture, only to board the very next flight home.

For over a decade, Dr. Mahesh has been an invaluable member of the Zydus family. His repertoire spans the full arc of complex GI and thoracic malignancy care; having successfully performed thousands of complex and rare cancer surgeries, including several firsts in India. Through the years, he has managed to preserve the same hunger for knowledge and curiosity alive that marked his early days, thrusting his career to new frontiers. It is a privilege to have his expertise and vision as part of our shared journey.

Outside the operating theater, Dr. Mahesh is passionately dedicated to causes close to his heart. Since his college days, he has cared for injured and abandoned strays, often welcoming several into his home. His home has sheltered close to a dozen rescued dogs and cats in the past. On his days off, he frequently performs complex surgeries for animals in distress, at no cost, often at the request of veterinary clinics dealing with challenging cases. Despite his many achievements, Dr. Mahesh remains grounded. He still drives the same old car. For him, his career was never about money or status. For him, medicine is about passion, discipline, the thrill of problem-solving, the lives he saves, and the unshakable integrity that guides every decision he makes.

His guiding philosophy is simple: Find what you love, do it well, and never lose sight of why you began.

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CASE STORIES

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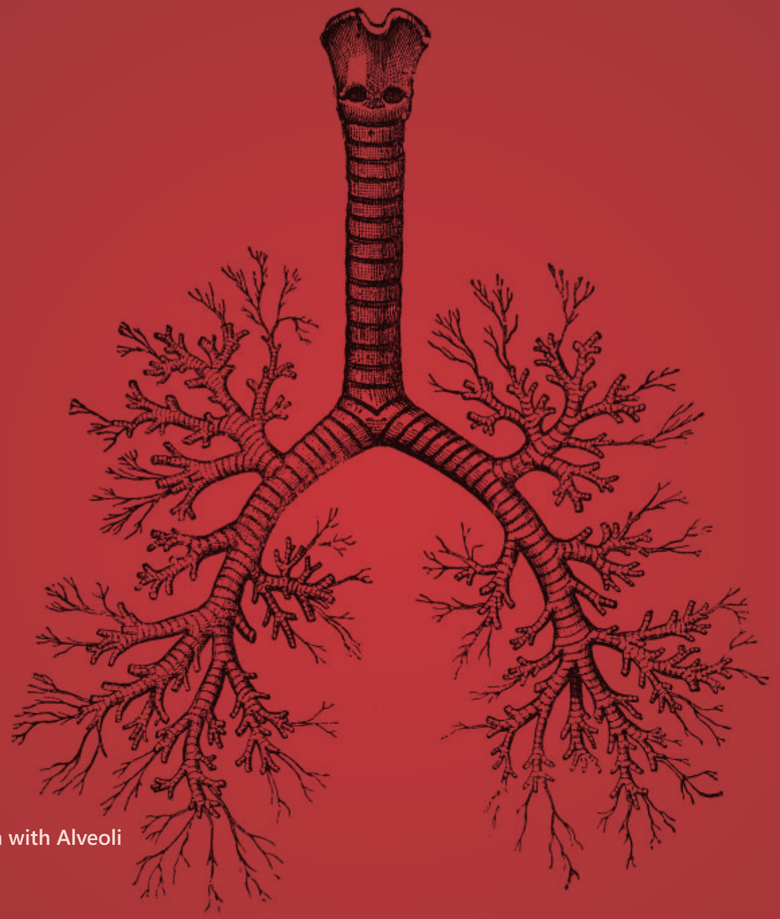

Trachea with Alveoli

PNEUMA

BREATH OF LIFE

India's first robotic tracheal tumour surgery with ECMO saves a young woman

We go through our days unaware of the silent rhythm that sustains us, the thin column of air slipping through the trachea, slowly filling our lungs. Breathing is a reflex we often take for granted. Symptoms like shortness of breath, lingering cough, heaviness in chest - are all easily written off as mere fatigue or stress.

Such was the case of a young woman, Neeta (name changed). She was presented to the Emergency Department with increasing difficulty in breathing. For her, the sensation crept up slowly as she could feel tightness in her chest, which was followed by shorter breaths until she faced incredible difficulty in breathing. She was rushed to the emergency department of a nearby hospital. The doctors found a tumour lodged deep within her trachea, the airway that connects the mouth to the lungs. It was growing from within the tracheal lumen, narrowing the airway from the inside out, with the possibility of closing off her airway entirely.

Operating on them typically requires cutting open the chest (open sternotomy), resecting the trachea where the tumour is lodged, and sewing it back together, all while keeping the patient breathing through a tube placed in the very airway being operated on. The process is invasive, high-risk, complex, and often has extended hospital stays and protracted recovery. In addition, the breathing tube would obstruct access to the tumour, adding to the complexity.

Weighing in the risks, Dr. Mahesh D. Patel, Sr. GI, Lung, and Thoracic Onco-surgeon at Zydus Cancer Hospital, chose a different and less invasive route. He decided to attempt something no one in India had attempted, and which had been documented only a handful of times globally: a robotic tracheal resection using ECMO support.

ECMO, or Extracorporeal Membrane Oxygenation, is a technology that was more commonly associated with ICUs. During the COVID-19 pandemic, ECMO was a life-saving measure to oxygenate the blood outside the body. By taking over the work of the heart and lungs, it bypassed them entirely. With ECMO, Dr. Patel saw an opportunity to eliminate the need for an endotracheal tube altogether. Having performed India's first tracheal resection thoracoscopically, he knew that suturing the trachea with the tube in-situ complicates surgical access and visualization. But with ECMO taking over the work of the heart and lungs, he would have full access to the trachea without the need for a breathing tube. The question now was not if, but how well it could be done.

It was a high-stakes strategy. ECMO isn't standard for surgical support, especially not in airway surgeries. The risks could include excessive bleeding and other technical complications. But since the potential reward was enormous, and after thorough evaluation, the call was taken to put her on ECMO before surgery. It provided Dr. Patel with a pristine view of the surgical field, and allowed him to delicately resect the mass and reconstruct the trachea.

Blood thinners were carefully managed to avoid clotting in the circuit. Intra-operatively, the patient was successfully weaned off ECMO. Free from the trauma of an open sternotomy, she was discharged within a week, and she remains cancer-free. This was arguably the first time in India when robotic tracheal resection was done under ECMO. He has also carried out India's first tracheal resection under ECMO in a patient with benign strictures which was also a success.

Four years later, the woman is still doing well.

This stands as proof that progress in medicine is often forged by those willing to imagine a better way- and then make it real.

Alveolar Sacs

A human being breathes around 25,000 times a day and permanent brain damage or death can occur in as little as 4 minutes if a person is deprived of oxygen.

The lungs contain approximately 2,400 kilometres of airways and 300 to 500 million air sacs (alveoli) by which an average person breathes in around 11,000 liters of air every day.

MASS OF CONFUSION

Uncovering the mystery behind a misdiagnosed stage 4 cancer

At the peak of his career, Rajesh (name changed), a senior professional in a reputed organisation, had every reason to feel accomplished, and years of hard work had brought him professional stability and respect. But life, as it often does, had other plans.

Rajesh was diagnosed with esophageal cancer. The word 'cancer' has a way of unmaking a person's reality. He underwent chemotherapy and radiotherapy followed by surgery to remove the tumour. Post-surgery, he was supposedly in remission until one day, almost after a year, he complained of severe back pain. The doctor had asked him to undergo a CT, an MRI, and a PET scan, thinking the cancer might've come back. Sadly, he was right, as the reports suggested that he had stage 4 metastatic cancer.

Life hit a new low. Things started turning south as it was seen that he had developed multiple lesions in his vertebral bones and on multiple enlarged lymph nodes in his mediastinum (chest). This finding shook his life. Convinced that his time was limited, he stepped away from his job to spend time surrounded by his loved ones

He was put on palliative chemotherapy and radiotherapy for the same. Soon after, Rajesh developed a trachea-neo gastric tube fistula, a potentially serious complication where an abnormal connection forms between the trachea (windpipe) and a nasogastric tube, forming a direct invasion of the tumour from one structure to the other. This can lead to aspiration of stomach contents into the lungs, causing pneumonia or other respiratory issues. To avoid any further added complications, stenting was planned.

Given Dr. Mahesh Patel's flawless track record of breezing through the toughest cases, Rajesh was referred to him for stenting. However when Rajesh's scans showed the fistula to be peculiar in shape, it piqued doctor's instincts. Though all his reports came back positive for stage 4 cancer, which aligned with the diagnosis made by several reputed hospitals, Dr. Patel wasn't ready to accept the situation at face value. He insisted on re-checking Rajesh's original biopsy reports, PET scans and tissue blocs from Rajesh's past surgeries. What came to light was appalling and could potentially change the entire diagnosis around. One of his lymph nodes, tested positive for tuberculosis (TB). This opened the Pandora's box.

Though TB is a serious diagnosis in its own right, it was welcome news compared to the nightmarish diagnosis of cancer. TB is well known as a diagnostic chameleon and can resemble malignancy. Metastatic cancer and spinal TB (Pott's disease) are commonly diagnosed lesions in the spine. He had already endured 12 rounds of palliative chemotherapy and radiotherapy, and there was only so much Rajesh could take.

Dr. Patel, pondered on two questions: where can TB originate in the vertebra, and how is it any different from cancer when it comes to the bones. He went back to the basics and got a fresh review of the PET CT scan and MRIs to trace back where the process could have started in Rajesh's body.

Compared to cancer, its insidious enemy, which infiltrates the bones, spinal TB infection originates in the intervertebral disc space between the bones. This revelation uncovered the truths hidden in plain sight and completely altered the course of his story.

Dr. Patel deduced that the chemotherapy had not worked because it wasn't cancer, and the radiation was merely suppressing TB. After extensively rummaging through his past medical data, Dr. Patel arrived at the diagnosis that had eluded so many before him. Further cementing this, the radiologists concurred that the process had indeed started in the intervertebral disc space, and Rajesh was finally started on TB medications.

As expected, with time, he started getting better as slowly his strength returned and with it, the life he thought he had lost. The lesions in the bone and the lymph nodes also disappeared. After comprehensive treatment, he slowly resumed his daily activities.

It's been nearly a decade since that terrifying diagnosis. And Rajesh, who had once accepted his fate, is now living a healthy life.

In medicine, it's easy to follow protocol. Harder still is to find the courage to question what everyone else has accepted as the truth. Sometimes, that's exactly what can save a life. This case is proof of that.

What sets a great doctor apart is not just skill, but instinct. Dr. Patel chose to scrutinize the evidence anew and his ability to see beyond the obvious uncovered the truth that changed everything for his patient.

STAGE 4 CANCER TO A NEW LIFE

The amalgamation of strategic planning and expertise proves transformative for a patient

At 44, life usually feels like it's finally falling into place. With most people easing into the prime of their lives with steady careers and secure finances, it's an age when life feels more certain, more settled. It's when people start building on what they've already created.

But for Aniket (name changed), life, as he had come to know it, came to a standstill when he was diagnosed with a neuroendocrine tumour (NET) Grade 2 in the periampullary region. By the time it was detected, the cancer was already at stage 4, as it had spread to both lobes of his liver. A diagnosis like this is never easy.

Unlike in the past, its incidence in the younger and middle-aged population has skyrocketed, bringing looming uncertainties about the future.

Because NETs often lack clear symptoms, they are frequently diagnosed late or by chance. Once diagnosed, the mainstay of treatment is surgery, and aggressive surgeries can often lead to recovery. In addition, LAR and DOTA therapy are also possible treatment options.

Aniket was already undergoing chemotherapy, as surgery was not an option due to the advanced stage of his condition. He developed obstructive jaundice, which required repeated stent placements. Unfortunately, the stents frequently became blocked, leading to cholangitis, recurrent hospitalisations, and interruptions in his chemotherapy.

After one such episode, he consulted Dr. Mahesh D. Patel, and after a thorough evaluation, Dr. Patel presented a radical, high-risk surgery that could potentially change the trajectory of his life.

The plan was as bold as it was daunting. Dr. Patel proposed that the procedure would involve resecting approximately 70% of his liver, 50% of his pancreas, and removing all associated lymph nodes.

As anticipated, Aniket postponed the surgery out of fear and concern over possible complications. However, another episode of cholangitis within a few months led him to reconsider.

Three months after the initial consultation, Aniket agreed to proceed with surgery.

The risks were significant, and the margin for error was slim. If successful, this could be Aniket's only chance at cure.

Aniket underwent right extended hepatectomy, where almost 70% of his liver was removed, and radiofrequency ablation (RFA), in which electric current is used to heat a tumour until it is destroyed, was used for two lesions in the left lobe of the liver. Around 50% of his pancreas was also completely removed using Whipple's procedure, along with extensive mesenteric lymph node dissection. Dr. Mahesh pushed the limits of what's possible with this surgery. He knew the margin of error was very low, as even the slightest deviation could be fatal.

The surgery was a success and lasted 18 hours without a break.

However, postoperatively, he faced a few complications like liver dysfunction, for which he was hospitalized for a few weeks. With 70% of his liver gone, the remaining 30% of his liver struggled to meet the demands of his body, and his platelet counts plummeted.

He remained in the hospital for 40 days under intensive monitoring and treatment. Slowly, the tides began to turn. The liver adapted, and so did his body. And the man who had once been locked in a cycle of temporary fixes began recovering, for good.

Today, he is completely disease-free, living a full and healthy life.

Nine years have passed. The man who once entered the hospital holding the hand of his 8-year-old son with an uncertain future now walks the path of life with his 18-year-old by his side.

The patient's liver had 30 lesions that were mostly confined to the right side, and 9 of his lymph nodes were positive for cancer. The complexity of this case demanded an extreme step, and as anticipated, it turned out to be in Aniket's favor.

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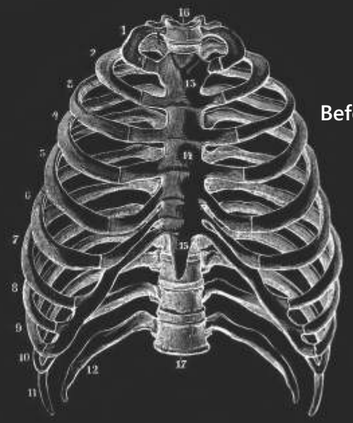

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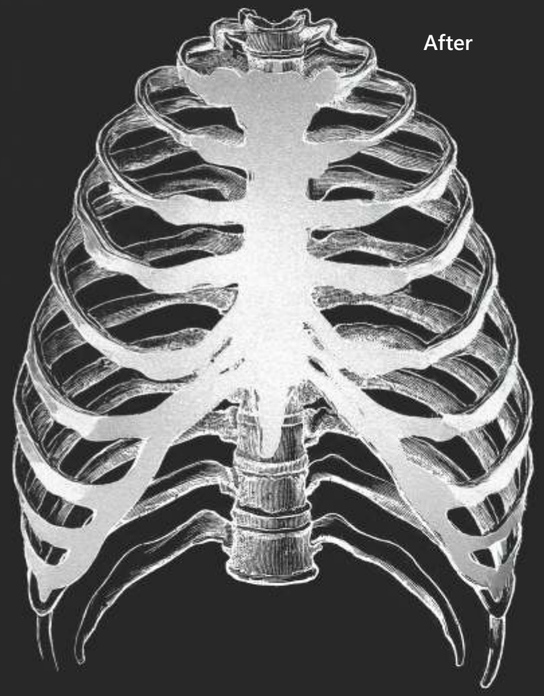

After

SUPERGIRL

A NEW SHIELD FOR A BRAVE HEART

India's first 3D-printed sternal implant

Medical breakthroughs often begin as bold ideas. True progress is often driven from the few who dare to imagine and do the impossible.

In the human body, the sternum (breastbone) serves as the keystone of the skeleton. It protects the heart, blood vessels, and lungs, forming a protective barrier for some of the body's most vital structures. Any surgery aiming for its removal have always been challenging, more so in pediatric patients. Such was the case of a young 13-year-old girl who was battling an aggressive cancer that had metastasized to her sternum.

Her family consulted with Dr. Mahesh D Patel, at Zydus Cancer Hospital. Her imaging results confirmed that the entire sternum that was involved, had to be removed.

Traditionally, in such cases, muscle flaps or titanium surgical meshes are used. But an innovative plan of creating an exact replica of the sternum to be removed using titanium via a 3D printed model was ideated. There were very few cases done in the world, and the models created were very complex and heavy. So Dr. Patel planned to create an indigenous design which was lighter in weight, durable and gave the perfect cosmesis.

As this had never been attempted in India, this procedure came with its own complex set of anatomical, reconstructive and mechanical challenges.

Pre-operative planning and designing the implant played a crucial role in the success of this surgery. The sternum is a critical load-bearing structure so titanium was chosen for its high biocompatibility, corrosion resistance, favorable strength-to-weight ratio, and its incredible ability to integrate with surrounding tissues. Titanium is also compatible with MRIs. Though post-op, patients are required to carry a certificate as proof of surgery while traveling, to avoid being unnecessarily inconvenienced at metal detectors during security checks. Synthetic meshes or autologous flaps are often used in such reconstructive procedures but they do not offer the same structural fidelity or cosmesis in full sternum replacement. Although 3D-printed materials are widely used in medical procedures, they had never before been utilized to such an extent in sternum reconstruction. Dr. Patel closely coordinated with the medical devices company to design the implant using 3D modeling based on her CT imaging. It was shaped to mimic the natural contour of the sternum and designed with precise alignment, allowing sufficient margins for screws and other intra-operative adjustments such as bone trimming, if required. Dr. Patel made sure that it included critical design parameters like a smoother inner lining to avoid sticking to any cardiac structures or major vessels and that the anterior surface had a crisscross lattice to encourage tissue adherence and future integration. He also added predefined sites for surgical screws that would be placed during the procedure to anchor the implant to the adjacent ribs.

The entire design and fabrication process involved multiple rounds of iteration and took approximately 4-6 weeks. During the procedure, the implant was successfully placed and the surgery was a success. The patient was discharged within a few days. This was reportedly the first instance in India where an artificial 3D printed titanium sternum was implanted in a patient. A landmark case, it demonstrated the integration of personalized implant design and set a new benchmark in chest wall reconstruction. A year later, in a similar case, the final construct was further refined and was made to weigh less than 200 grams, significantly lighter than the implant used in the earlier case. This weight reduction was done based on the insights from the previous case, and was done so without compromising its mechanical strength.

After the sternectomy, a portion of her superior vena cava was also removed. The implant was fixed onto the remaining rib structures using screws that were placed at the pre-mapped locations.

Dr. Patel along with his reconstructive team led by Dr. Raghuvir Solanki and Dr. Jatin Bhojani (Sr. Reconstructive Surgeons), used a soft-tissue flap to ensure a tension-free closure and favourable aesthetic outcomes. The surgery was successful, she had an uneventful postoperative recovery, and was discharged without complications. During her follow-ups, her imaging reports also confirmed that the implant had been properly positioned and there was no local recurrence. While it was based on an earlier precedent set by the same team, the technical refinements in implant weight, anatomical conformity, and surgical planning established a reproducible protocol. By uniting personalized implant design, advanced imaging, and thorough surgical planning, Dr. Patel and his team showed how imagination, engineering, and surgical mastery can help even the most vulnerable patients across age groups. It has since set the path for future complex chest wall reconstructions in India.

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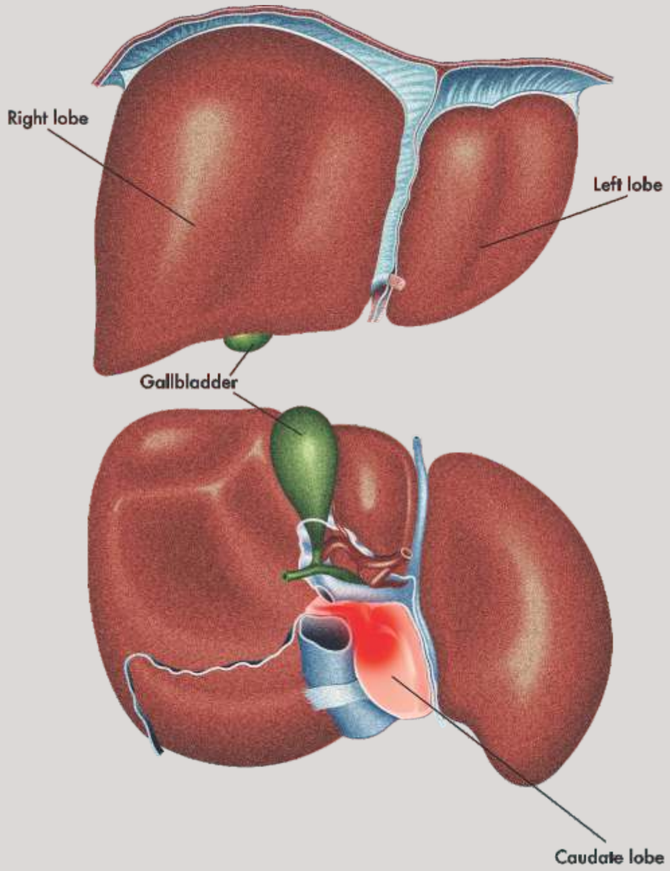

FINGER OF THE LIVER

CAUDATE LOBE TUMOUR REMOVAL: A MILESTONE

Robotic resection of a segment 1 hepatocellular carcinoma: Nation's first

The liver is anatomically divided into 8 segments. Segment 1, also known as the caudate lobe, is the most elusive and treacherous to navigate surgically, and still remains one of the most anatomically and technically challenging areas.

Segment 1, the caudate lobe, stands apart: a solitary finger of liver tissue tucked deep against the spine, cupped around the inferior vena cava (IVC) and crowned by the hepatic veins. Unlike other hepatic segments, Segment 1 is functionally distinct as it receives vascular inflow from both the right and left portal vein and hepatic artery branches, and demonstrates independent venous drainage directly into the IVC via short, delicate hepatic veins. These unique characteristics render surgical resection particularly difficult, with a high risk of uncontrollable bleeding and vascular injury. Consequently, segment 1 tumours are rarely approached laparoscopically, and almost never robotically. In this landmark case, a 75-year-old patient from Rajasthan had been diagnosed with a 9 cm hepatocellular carcinoma (HCC) localized to Segment 1. HCC is the most common primary malignancy of the liver and is closely associated with chronic liver injury and cirrhosis. While this patient's liver was non-cirrhotic, his age carried its own physiological challenges that required a strategic, minimally invasive approach to reduce any chances of peri-operative morbidity.

Traditionally, caudate lobe resections are performed via open surgery, given the segment's proximity to the IVC, hepatic veins, and retrohepatic ligamentous attachments. However, Dr. Patel opted for a robotic approach - exactly what was needed in the tight corridor between the IVC, the hepatic veins, and the ligamentous attachments anchoring the caudate lobe. This way he also avoided placing a large upper abdominal incision, reducing blood loss, and shortening post-operative recovery.

This marked the first instance of a robotic resection of a caudate lobe HCC in India. Robotic surgery offers critical advantages in hepatobiliary procedures, including superior 3D magnified visualization and enhanced instrument articulation. These features are particularly advantageous in such confined operative fields, where precision and stability are paramount. The risk of torrential hemorrhage from injury to the IVC, short hepatic veins, or portal venous branches needed meticulous preoperative planning by the surgical team.

During the procedure, robotic ports were strategically positioned to provide better triangulation and reach. The caudate lobe was mobilized with careful dissection around the IVC, which preserved the critical vascular structures in the region. The segmental inflow was controlled, and the parenchymal transection was performed using advanced bipolar energy and harmonic devices. The tumour was resected in toto without any intra-operative complications or, blood transfusion or the need for conversion to open surgery.

Just five days post-surgery, the patient, who might have otherwise faced weeks of recovery after open surgery, had an uneventful recovery and was discharged in a few days. This was crucial considering the patient's advanced age and the probable complications that could have delayed his recovery. Histopathology confirmed the diagnosis of HCC with clear resection margins, and surveillance imaging during follow-up demonstrated no evidence of recurrence.

Dr. Patel, through this case, established a critical precedent for utilizing robotic surgery in complex segmental liver resections. It furthers the idea that with appropriate case selection and institutional expertise, robotic platforms can safely expand the scope of minimally invasive liver surgery, even in anatomically challenging regions such as Segment 1.

Beyond its novelty, the case highlights the potential to improve outcomes in elderly or high-risk patients by minimizing operative trauma, reducing hospital stay, and enhancing recovery. Even the most secluded corners of the liver can be treated with finesse. With very few countries in which such surgeries have been successfully done, this case still remains the landmark case in robotic HPB surgeries in India.

1.5 liters of blood, accounting for about 25% of the total cardiac output, flows through the liver every minute.

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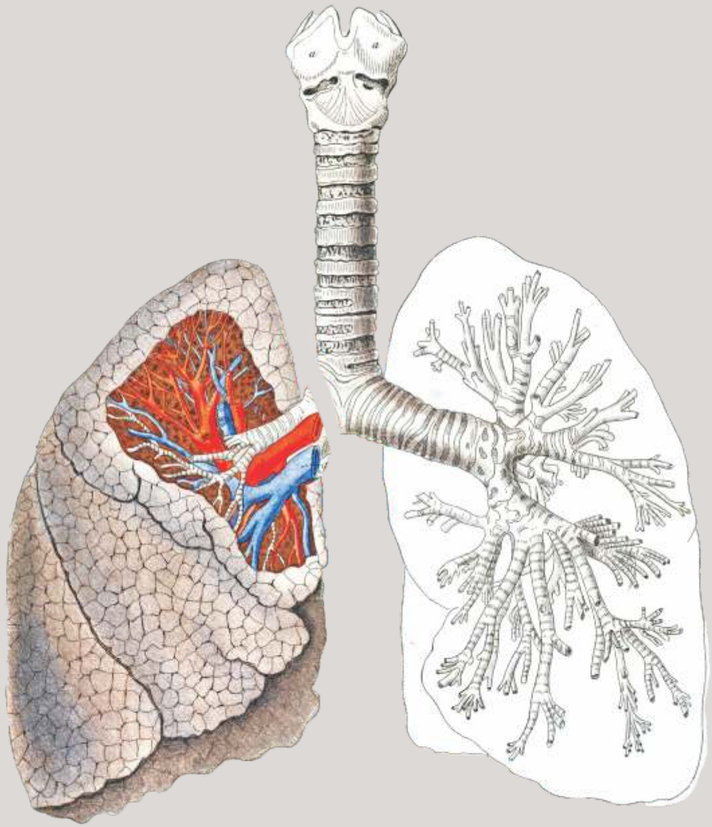


LIFE IN A GASP

A TALE OF SPLIT TRACHEA

Man rams into a truck, splitting his trachea into two

A vegetable vendor from Ahmedabad was driving on his usual route back home from Rajkot in the wee hours of a Sunday morning. Accompanying him were two passengers who were asleep in the back. Momentarily, he lost control of the steering wheel which spiraled out, rear-ending his small pick-up vehicle into a truck. The impact forced the back of the truck into the driver's seat, causing a massive lung injury. He was rushed to a nearby hospital for primary care and was later transferred to Zydus Hospitals, where a full body CT scan revealed extensive injuries: a tracheal injury, three rib fractures, a broken nose, a scapular fracture, and three deep muscle cuts. “We have always treated chest injuries with rib fractures as an emergency. Only during the surgery did we discover that his bronchus was split into two", said Dr. Mahesh D. Patel.

The patient's right bronchus (tubes connecting the windpipe to the lungs) split, and his right lung detached from the trachea.

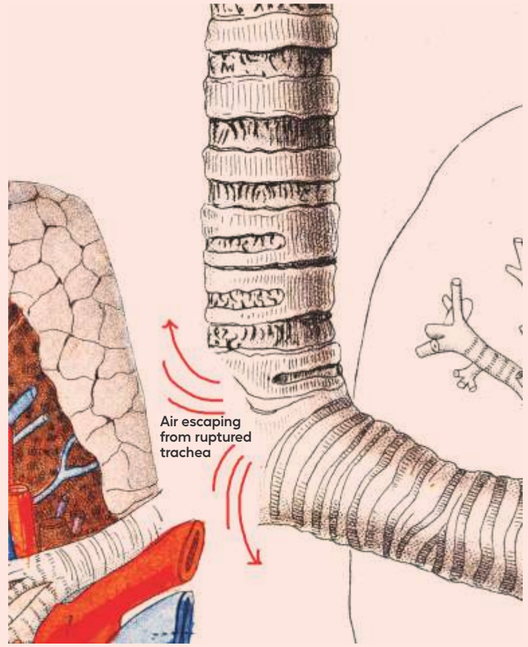
Even before the bronchial tear was addressed, the patient had developed a tension pneumothorax. With every breath, air kept leaking into the chest cavity but could not escape, creating a one-way valve effect. The pressure within his chest began to rise rapidly, compressing the heart and the major blood vessels. “Had an intercostal drain (ICD) not been inserted immediately before reaching Zydus, the mounting pressure could have stopped his heart within minutes,” explained Dr. Patel. The ICD was the very first life-saving step as it released the trapped air, stabilized circulation, and bought the crucial time needed for definitive surgery.

Lungs are naturally light, but once the airflow to the right lung was interrupted after the bronchus was severed, blood gushed into his lungs, making it heavier and pulling it down due to its now-gained weight. This created a breeding ground for secondary infections. As the right lung comprises 60% of the total lung volume, the damage became increasingly difficult to reverse with each passing minute.

Dr. Patel immediately operated and mobilized the organ to suture both parts of his bronchus shut, preventing any infection or secondary complications.

Quick thinking, prompt action, and the surgeons’ extensive experience become crucial in such time-sensitive cases. Dr. Patel has successfully managed more than 600 rib fixations in trauma patients.

The 6-hour surgery was successful, and positive improvements were seen within just 3 days. He was off external support systems within a week and discharged after 10 days, and the patient is doing well.



Chest trauma accounts for nearly a quarter of all trauma-related deaths.

The 'Fallen lung sign' is seen in less than 1% of thoracic trauma patients, and carries an immediate mortality of 85%, making it one of the most severe trauma of all thoracic injuries. Nearly 80% of patients succumb on the spot, and among those who are fortunate enough to reach the hospital in time, 30% do not survive.

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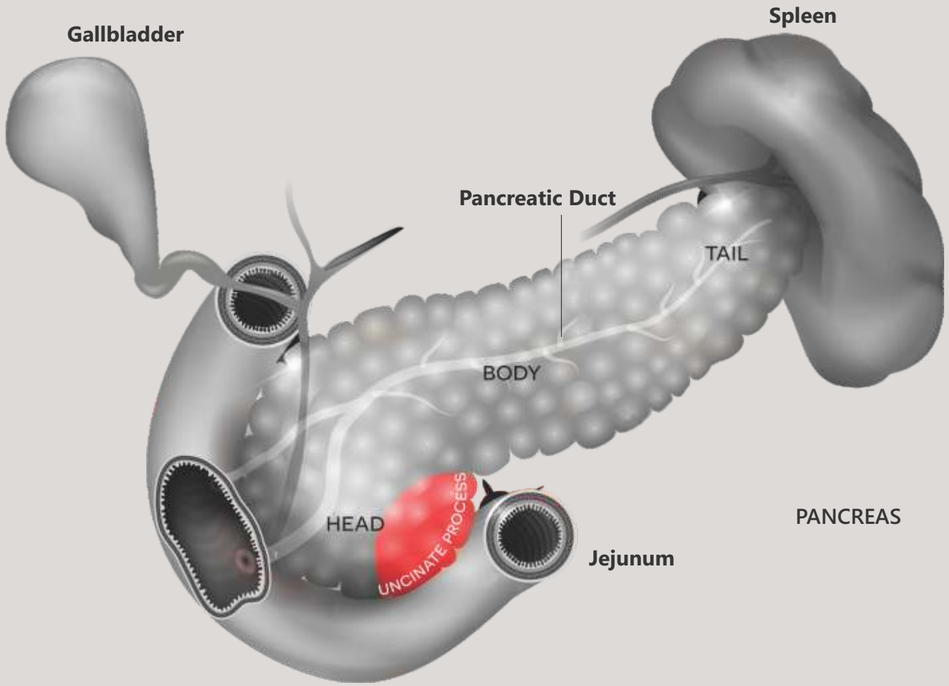

SHAKTI

ROBOTIC ENUCLEATION OF INSULINOMA

Resecting neuroendocrine tumours in the uncinate process of the pancreas

Insulinoma is a rare type of pancreatic neuroendocrine tumour (NET) that secretes insulin independent of the body's glucose levels. Normally, insulin is released in response to rising blood sugar. But in insulinoma, this regulation is lost, resulting in episodes of hypoglycemia (dangerously low blood sugar), even when the body doesn't need more insulin.

At only fifteen days postpartum, the joy of new motherhood was overshadowed by a growing fear, as Anita (name changed) suffered from repeated episodes of hypoglycemia, often bordering on near-comatose states. She had a high body mass index (BMI) but paradoxically, her insulin levels were persistently low. After a detailed evaluation, she was diagnosed with insulinoma and was referred to Dr. Mahesh D. Patel, as she was experiencing dangerous drops in blood glucose levels.

Despite low insulin readings, her blood glucose levels continued to plummet, leading to diagnostic confusion. Further imaging revealed a 2 cm lesion in the uncinate process of the pancreas, a location notoriously difficult to access surgically because of its anatomical proximity to major vessels such as the superior mesenteric artery and vein, which supply blood to vital organs including the small intestine.

Surgical intervention was essential. The patient had become dependent on continuous glucose infusion to prevent hypoglycemia and lived with constant anxiety, especially regarding her ability to care for her newborn. A traditional open surgery would have entailed significant risks and might have required a Whipple's procedure (pancreaticoduodenectomy), a highly invasive operation with a long recovery period and potential complications. However, in this case, the multi-disciplinary team opted for a technically complex yet organ-preserving alternative : robotic enucleation.

Enucleation involves meticulous removal of just the tumour, sparing the surrounding pancreatic tissue. However, when the tumour is embedded in the head or uncinate process of the pancreas, areas deeply integrated with vital vascular structures, the risk of intraoperative bleeding, pancreatic duct injury, and postoperative leakage increases substantially. Only a few such procedures have been reported in literature, and even fewer in the uncinate process, due to these challenges.

The surgery lasted six hours. The tumour lay perilously close to the major vessels, demanding precise dissection with minimal margin for error. The robotic platform enhanced the dexterity and control in this tight, anatomically complex region. Dr. Patel's years of experience with robotic techniques were crucial in ensuring that the procedure was completed successfully without the need to convert to open surgery, or even a major vascular compromise. This marked the first time that such a procedure had ever been performed in India.

By the very next day, the patient no longer required glucose drips. All symptoms of hypoglycemia had disappeared. Her insulin regulation was normal. Within just 48 hours, she could walk on her own, and the largest post-surgical scar measured only 2 cm. Her recovery was smooth, and she was discharged soon after, able to return home to her baby. Gradually, she resumed her daily activities without the looming fear of sudden glucose crashes.

This case points to not just the diagnostic intricacies of insulinomas, especially with their atypical biochemical profiles, but also focuses on the technical demands of such highly complex surgery in postpartum patients with high BMI. Robotic enucleation, though under-reported in such contexts, is a great option with less morbidity and a highly effective alternative to conventional open surgery. Navigating such complex cases requires experienced surgical teams, advanced technology, and interdisciplinary collaboration in achieving optimal patient outcomes, even in such rare and high-risk scenarios.

Only between 1 and 3 people in every million develop an insulinoma every year. Although rare, insulinoma is the most common type of functioning pancreatic NET. Five common types of functional pancreatic NETs include Insulinomas, Glucagonomas, VIPomas, Somatostatinomas, and Gastrinomas.

Legendary Apple Inc., co-founder Steve Jobs, passed away at the age of 56 after battling pancreatic NET, and Dag Kittlaus, creator of 'Siri', was later diagnosed with the very same form of cancer.

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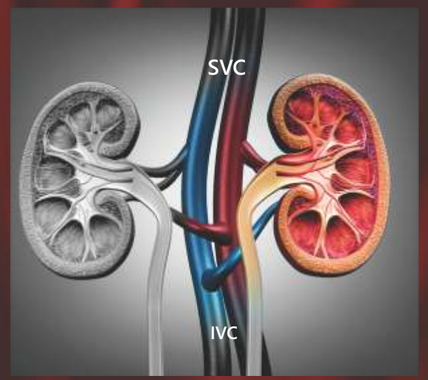

MYSTIQUE

LET THE BLOOD FIND ITS WAY

Resecting the IVC without reconstruction through collateral circulation

The inferior vena cava (IVC) is the largest and most vital vein in the human body, responsible for transporting deoxygenated blood from the lower limbs, pelvis, and abdominal organs to the heart. Anatomically located along the right side of the vertebral column, the IVC originates at the junction of the left and right common iliac veins and ascends to the right atrium of the heart. Given its central role in maintaining venous return and its proximity to organs like the liver, pancreas and kidneys, tumours involving the IVC present extraordinary clinical challenges. These cases are rare, high-risk, and demand a deep understanding of vascular anatomy and the body's compensatory systems. One such case of a young girl stands out, who, in her late teens was diagnosed with a rare and aggressive form of cancer, extra-renal renal cell carcinoma (RCC) that had adhered to the entire length of her IVC and invaded the right kidney. She consulted Dr. Mahesh D Patel, Sr. GI, Lung, Thoracic Onco-surgeon, who then operated and decided to surgically resect the tumour, along with the right kidney and the IVC. Extra-renal RCC is a sporadic tumor which can occur at any age during adulthood, with no specific ethnic predilection. Unlike classic RCC, extra-renal presentations are extremely rare and may arise from ectopic renal tissue or present as metastatic lesions that mimic primary renal neoplasms. The involvement of the IVC in this case made it significantly more complex. tumours that extend into the IVC often do so through direct invasion or through tumour thrombus formation. These cases are uncommon and usually seen in advanced stages of kidney cancer, making her scenario exceptionally rare, both due to her age and the tumour's anatomical spread. Such cases typically involve resecting the tumour along with the involved segment of the IVC, followed by immediate reconstruction of the vein using synthetic grafts or autologous veins. The rationale behind IVC reconstruction is to maintain the primary route for venous return. However, these reconstructions are not without risks. Synthetic grafts, while lifesaving, are prone to thrombosis (clot formation), infection, and in some cases, complete occlusion. The IVC was involved but not occluded making this a difficult scenario. These complications can severely impact long-term outcomes, particularly in young patients. Drawing on his extensive experience in complex vascular surgeries, Dr. Mahesh D. Patel opted to remove the IVC entirely, along with the patient's right kidney. What made the situation even more delicate was that the venous drainage of the left kidney was also sacrificed during surgery, while its arterial supply remained intact. This meant the burden of venous return now had to be entirely managed by the body's secondary, or collateral, venous pathways. Such a decision was only possible because of Dr. Patel's previous surgeries and the confidence in the body's ability to reroute blood through alternative channels. The key to this body's adaptation lies in 'the retroperitoneum', the anatomical space behind the peritoneal cavity that houses various organs and critical vascular structures. Within this space exists a network of collateral veins, including the azygos and hemiazygos veins, which connect the IVC to the superior vena cava (SVC), and the vertebral venous plexus. These vessels are typically small and underutilised in healthy individuals but can become functionally significant when the IVC is obstructed or removed. Over time, these channels can expand (a phenomenon known as vascular remodeling) and effectively take over the job of the IVC. This compensatory capacity is an extraordinary feature of human physiology. In cases of slow-growing tumours, like the one in this patient, collateral pathways may have already been partially developed by the time of surgery.

The retroperitoneal collaterals, in particular, form a crucial bridge between the lower body and the heart, connecting with the superior vena cava through the azygos system. These channels can sustain adequate venous return if the transition is gradual and the patient is otherwise healthy, as it was in her case.

The decision to avoid IVC reconstruction, therefore, was not taken lightly. It was based on a careful preoperative assessment of the collateral circulation and the patient's physiological condition. The surgery itself spanned eight hours. By choosing to resect the IVC without reconstruction, Dr. Patel effectively eliminated the risk of prosthetic graft thrombosis, which could have been life-threatening. "Surgical courage lies not just in performing the technically possible, but in knowing when to trust the body's own resilience. Sometimes the best reconstruction is none at all", he said. **This surgery marked Dr. Patel's twelfth IVC resection.** While such cases remain infrequent worldwide, Dr. Patel's accumulated experience allows him to make confident, nuanced decisions that may depart from conventional guidelines but offer better outcomes for the individual. The surgery was a success, and she recovered really well. After spending a week in the hospital, she went home with a smile on her face. It has been six years since her surgery, and she is disease-free and doing well. For surgeons, this case highlights that innovation often lies not in adding complexity but in daring to simplify.

NAVIGATING THE UNCHARTED

One of India's rarest resections involving the IVC and the abdominal aorta

Neuroendocrine tumours (NETs) are a heterogeneous group of neoplasms that originate from neuroendocrine cells, known for their ability to produce and secrete bioactive substances such as serotonin. While many NETs follow an indolent, and a relatively slow-growing course, certain subtypes of these can demonstrate locally aggressive behaviour and invade adjacent organs and vascular structures, further complicating the patient's situation.

One such challenging case was that of a 50-year-old man from Madhya Pradesh, a former hockey player, who until his diagnosis, was in a relatively healthy condition with no known comorbidities. The diagnosis of a low-grade NET that involved his right kidney, inferior vena cava (IVC), and the fact that it had started encroaching upon his abdominal aorta, was deeply concerning.

Faced with this rare and high-risk presentation, the patient was referred to Dr. Mahesh D. Patel at Zydus Cancer Hospital. Known across the surgical oncology community for his ability to take on anatomically complex and high-stake cases, he was the natural choice for a surgery of this magnitude.

Upon thorough evaluation of the NET's vascular and visceral involvement, the multi-disciplinary tumour board concluded that the best and possibly the only curative approach would be an extensive, radical surgical resection.

It involved operating on the body's largest vein, the IVC. It courses through the abdomen, ferrying deoxygenated blood from the lower body back to the heart's right atrium. Removing a single major vascular structure can lead to significant complications; but removing both the IVC and a segment of the abdominal aorta, multiplies the risks exponentially.

The 12 hours of surgery required an en bloc resection of the right kidney, IVC, and involved segment of the abdominal aorta. A vascular reconstruction of the aorta accounted for 12 cm, which was performed using a PTFE (polytetrafluoroethylene) graft by the vascular surgery team led by Dr. Krunal Gohil. Just within a centimeter of the incision, lay the left renal artery : now the only blood vessel supplying the patient's solitary remaining kidney. Any inadvertent trauma here would have been catastrophic. So it had to be minutely monitored so as to not cut that artery. Notably, the IVC was not reconstructed.

NETs of this nature often secrete serotonin and other vasoactive substances that trigger a fibrotic response in the surrounding tissue. This fibrosis creates a puckering effect that distorts normal anatomical planes and causes dense adherence to the surrounding tissues. Surgical dissection in such fields is notoriously difficult and increases the risk of hemorrhage and inadvertent organ or vascular injury, if not performed with extreme precaution. Post-operatively, the patient was advised strict bed-rest during the initial recovery period and was gradually mobilised under supervision. Despite the complexity of the procedure and the post-operative challenges, he recovered well and was discharged within 15 days.

At one-year follow-up, he remains disease-free with no signs of recurrence.

"Radical resections involving major vessels carry inherent risks," Dr. Patel acknowledges, "but in carefully selected patients, they offer the best, and sometimes the only chance of patient's long-term survival."

This case stands out as one of the rarest and most technically demanding NET resections ever performed in India.

With measured precision, strategic clarity, and calm decision-making, Dr. Mahesh navigated one of the most challenging surgical landscapes. His ability to deliver high-stake care with such finesse continues to raise the bar for complex oncologic surgery in the country.

Average blood flow velocity at rest is about 0.3 m/sec in the aorta and only 1 mm/sec in the capillaries, i.e. approximately 5 Liters of blood passes through the aorta every minute. This can increase significantly to over 35 Liters / min in elite athletes during exercise.

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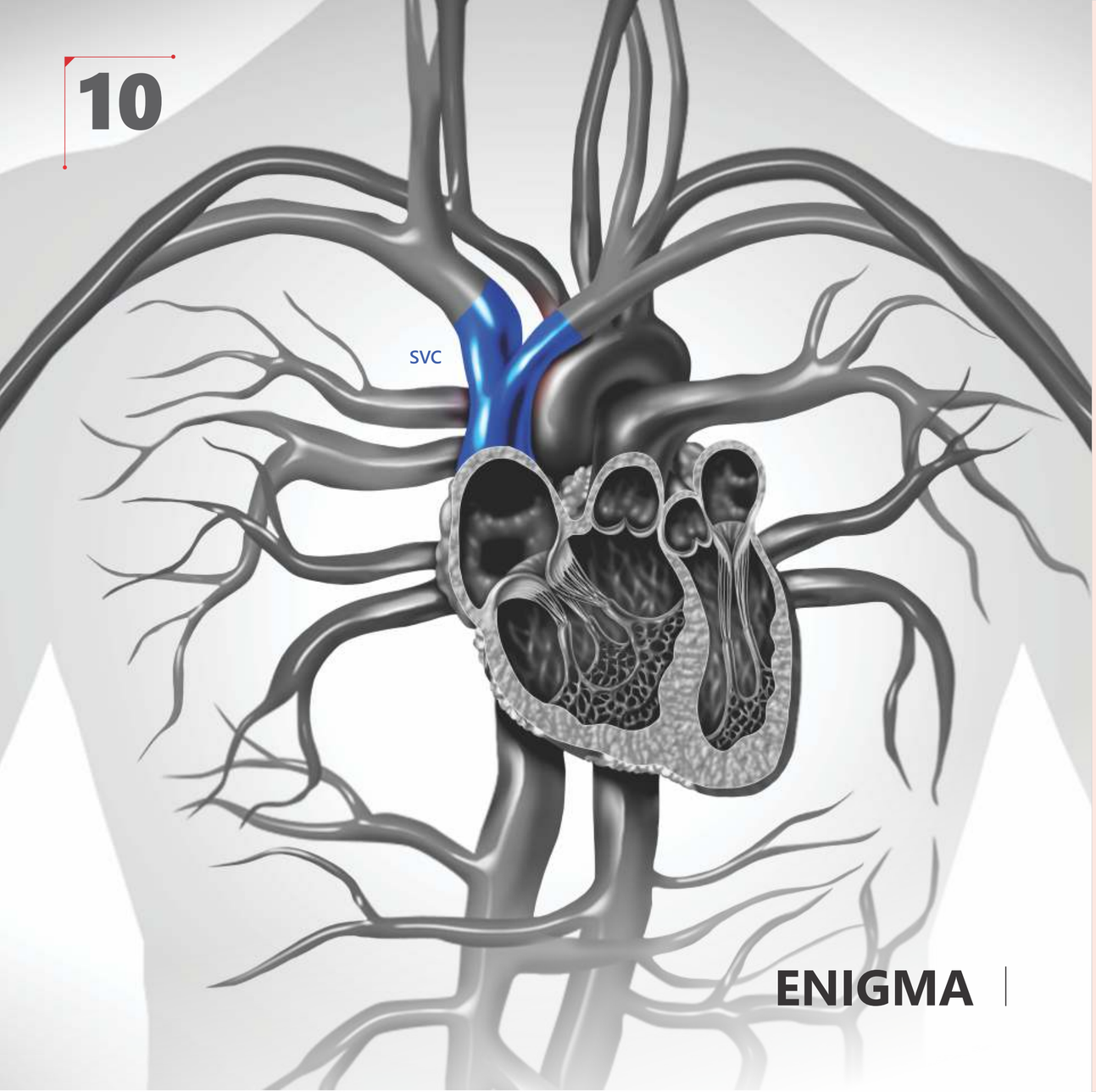

ENIGMA

LIVING WITHOUT THE SVC

Managing SVC resection and chest wall reconstruction in invasive thymoma

The superior vena cava (SVC) serves as a vital conduit in the intricate design of the human body. Being one of the body's largest veins, it is responsible for returning deoxygenated blood from the upper half of the body (head, neck, arms, and chest) back to the heart. Any disruption to this vessel can be critical. Any compromise can have significant physiological consequences such as swelling of the face and upper limbs, cerebral congestion, and elevated venous pressure. For this reason, the SVC is rarely sacrificed during surgery unless absolutely necessary.

One such case was that of a 75-year-old woman who arrived at Zydus Cancer Hospital with a rapidly enlarging anterior chest wall tumour. The mass was visibly protruding, intensely painful, and had begun to significantly affect her breathing and daily function. Imaging revealed that the tumour had invaded the sternal bone and encased the SVC. In most such cases, palliative care of radiation may be the first approach. However, she was not a candidate for radiotherapy due to the extent of bone involvement and the risk of further deterioration. As her tumour continued to grow, surgical resection became the only viable and curative option.

She was referred to Dr. Mahesh D. Patel, a name known for taking on anatomically and surgically complex cases. He assessed her situation and after a detailed evaluation and tumour board discussion, a surgical plan was drawn. Resecting the tumour was of utmost importance, including the involved area of her sternum and the SVC. The sternum would be reconstructed using a titanium mesh, but notably, the SVC would not be reconstructed.

The tumour was excised in its entirety along with the diseased sternal bone, and a titanium mesh was inserted which would provide chest wall stability. The SVC was also removed intra-operatively along with bilateral brachiocephalic veins.

Surgery went on for over 10 hours. Given the anticipated hemodynamic impact, the patient was closely monitored post-operatively for signs of impaired venous return. The body initiated compensatory mechanisms through the development of collateral venous pathways, easing the pressure on alternative venous pathways that allowed the edema to gradually resolve.

However, the case became extremely complex as she was also diagnosed with myasthenia gravis (MG) after she began experiencing episodes of extreme fatigue, difficulty in chewing and swallowing, and weakness in her limbs.

MG is a rare chronic auto-immune neuromuscular disorder in which antibodies disrupt communication between nerves and muscles, leading to fluctuating muscle weakness. It is known to have an association with thymic tumours, and in her case, histopathology confirmed a B2 thymoma, a subtype more commonly linked with auto-immune manifestations. While the surgery had already removed the primary tumour, the onset of MG required immunosuppressive therapy and close monitoring.

Though her recovery slowed, her progress was constant. Despite a protracted post-operative course, the patient's recovery trajectory remained steadily positive.

This case is a profound example of the human body's remarkable ability to adapt. Even in the absence of a vessel as vital as the SVC, the body found a way to re-route and survive. Such stories remind us that medicine, at its best, does not overpower nature but works in harmony with it.

Dr. Mahesh D. Patel is a rare blend of surgical skill and clinical acumen. In this case, his ability to balance risk with opportunity, to trust physiology without overstepping its limits, and to act decisively when others may have hesitated, was pivotal.

The first case report in the world of total SVC resection without reconstruction was published in June 2025. This patient had been treated in April, 2024 at Zydus Cancer Hospital.

Throughout his career, Dr. Patel has managed some of the most complex thoracic procedures, having resected more than a dozen inferior vena cavas (IVCs) and a few SVCs.

Dr. Patel continues to take on seemingly impossible cases and push the boundaries of thoracic surgery.

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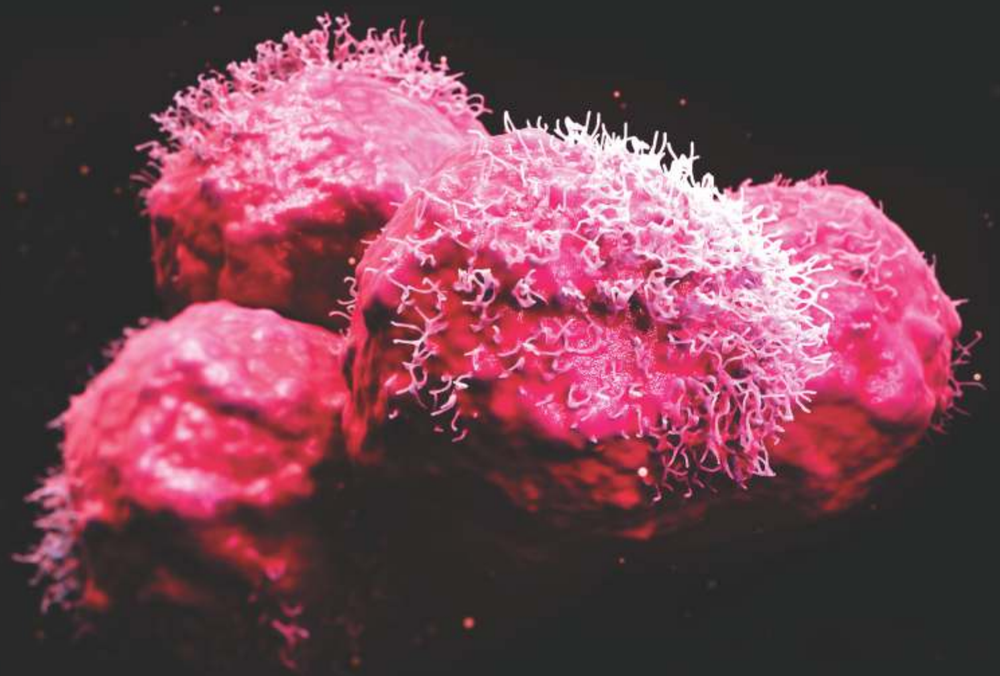

Tumour Cells in their Micro Environment

GOLIATH

A BATTLE WITHIN

Managing a colossal metastatic GIST through precision surgery

Gastrointestinal stromal tumours (GISTs) were originally believed to have originated from the mesenchymal cells of the gastrointestinal tract. By 1998, it was discovered that GISTs originate from the interstitial cells of Cajal. In the later years, research indicated that these cells are characterized by mutations in the c-KIT gene, making them CD117 positive. This 'gain of function' mutation is responsible for activating the growth of these tumours. Although GISTs are considered rare, they can behave aggressively, with 10-30% progressing to malignancy, metastatically spreading frequently in the liver and the peritoneum. Most GISTs are discovered incidentally so the true prevalence remains largely unknown.

Incidentally, 30-year-old woman and a mother to one child, was diagnosed with a GIST, that had primarily originated in the stomach and had metastasized to her liver, where it grew within the right lobe of the liver, eventually measuring to nearly 30 cm in diameter. The normal weight of the liver is 1.5 kg. The sheer size and weight of this massive tumour caused significant abdominal distention and protruded the belly region. It filled her abdomen, pushed against her organs, and made everyday tasks like walking, playing with her son, and even breathing an ordeal.

Chemotherapy and radiotherapy are usually ineffective against GISTs and most of these tumours that have been resected are usually no more than 5 cm in diameter. A type of targeted cancer drug used for GIST is called a tyrosine kinase inhibitor (TKI). These TKIs block tyrosine kinases that help to send growth signals in cells, so blocking them stops the cell from growing and dividing. TKIs particularly imatinib, with sunitinib and regorafenib are subsequent options. Surgical resection remains the only curative modality.

She had been treated with imatinib for a prolonged period but she had no response to the treatment. Due to the increasing tumour size, she had begun experiencing significant impairment in her daily activities. She was referred to Dr. Mahesh D. Patel for further evaluation and management.

The gold standard of treatment for GISTs is surgical resection, however it is usually recommended for GISTs that are less than 5 cm in size. As it is unconventional to find tumours that have grown to exceptionally large sizes and are unresectable then neoadjuvant imatinib is given daily. Metastases are very common and can be seen in the liver as was in her case, where massive extent of hepatic involvement was observed. The only surgical option was a right hepatectomy combined with gastric resection.

Though she was counseled regarding the potential complications as the surgery entailed removing more than 50% of her liver tissue and the stomach tumour, she opted to proceed with surgery in view of her deteriorating quality of life.

It was a high-risk surgery. The operation posed several technical challenges as the sheer size of the tumour had distorted the hepatic anatomy, and was closely abutting major vascular structures, making identification of safe resection planes and achieving negative margins were tricky. Drawing from his years of experience in handling complex cases, Dr. Patel was confident.

The tumour, weighing a whopping 6 kg, more than the weight of newborn babies, was completely removed and intra-operative navigation ensured the preservation of adequate remnant liver function.

This case also contributes to the growing body of evidence that with experienced surgical expertise, even highly advanced tumours, once considered unmanageable, can be approached with a curative intent. Dr. Patel's role was central in giving a young mother another chance at life. From palliative treatment, she progressed to a curative outcome after surgery. In a gist, this endeavour also added to the collective understanding of how complex GISTs can be approached and treated.

Histopathological examination confirmed complete resection with negative margins. Post-operatively, her recovery was smooth, and before long, she returned to her daily life, once again able to take care of her child and watch her son grow, a future that only months earlier had seemed impossibly out of reach.

It's been five years since her surgery.

GISTs which are >10 cm in size are usually reduced before being operated on surgically. Her tumour had unfortunately grown to a massive 30 cm. To surgically remove such a massive tumour successfully was a colossal achievement.

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A Clump of Blood Vessels

PROMETHEUS

AT THE EDGE OF POSSIBILITY

Surgical management of a colossal hepatic hemangioma consuming 70% of the liver

Hepatic hemangiomas are the most common benign tumours of the liver. They are vascular malformations, composed of clusters of blood vessels. In most individuals, hemangiomas remain small, asymptomatic, and are often discovered incidentally during imaging. Yet, in rare cases, these lesions can grow to enormous sizes, causing severe symptoms and can even lead to life-threatening complications such as cardiac failure or catastrophic intra-abdominal bleeding.

Such was the case of a middle-aged woman who was referred to Dr. Mahesh D. Patel, GI, Lung and Thoracic Onco-surgeon at Zydus Cancer Hospital, by one of his seniors. When she consulted him, she was facing excruciating abdominal pain and a sense of heaviness. Imaging revealed an unusually large hepatic hemangioma measuring approximately 30 cm in diameter. The mass had consumed almost 70% of her liver, compressing adjacent structures and leaving only segments 6 and 7 unaffected. While hepatic hemangiomas exceeding 5 cm are classified as 'giant,' the largest surgically treated lesion described in the published literature has been 25 cm. Its sheer size not only explained her debilitating symptoms but also carried the looming risk of rupture that could cause massive internal hemorrhage or even a circulatory overload.

After thorough evaluation, Dr. Mahesh was of the opinion that surgical removal of the mass was the only viable option. The challenge, however, was formidable. Most of her liver tissue was replaced by the hemangioma, and the tumour was only millimeters away from vital vascular and biliary structures that needed to be preserved. The margin of error was virtually non-existent. Only a handful of giant hemangiomas have been surgically treated worldwide, and none of this magnitude has ever been reported before.

Any misstep could have resulted in massive bleeding or loss of the already limited liver remnant. Over the course of the surgery, Dr. Patel excised the entire liver affected by the hemangioma.

Only segments 6 and 7 were preserved, leaving the patient with just enough functioning parenchyma to sustain hepatic function. Hemostasis was also a critical concern throughout the procedure. Given the vascular nature of hemangiomas, uncontrolled intra-operative hemorrhage could have been fatal. Despite the enormous scale of the tumour, the 8-hour surgery concluded successfully.

Over time, her liver function stabilized and she returned to a normal life. Seven years after the surgery, she remains in good health, with no recurrence or complications.

Hepatic hemangiomas occur in up to 20% of the population, and the majority remain clinically non-invasive. Only a small fraction enlarge to the point of causing symptoms or necessitating surgical removal. For patients with massive hemangiomas, surgery remains the definitive treatment, though it carries significant risks. In addition to extraordinary technical demands of such procedures there lies an importance of timely intervention, careful surgical planning, and long-term follow-up.

In Greek mythology, Prometheus' liver symbolized endurance through perpetual regeneration.

In modern medicine, this endurance was tested by a colossal 30 cm hepatic hemangioma that consumed nearly 70% of the liver. Transforming myth into reality, this case proved that even when nearly consumed, the liver can still regenerate completely.

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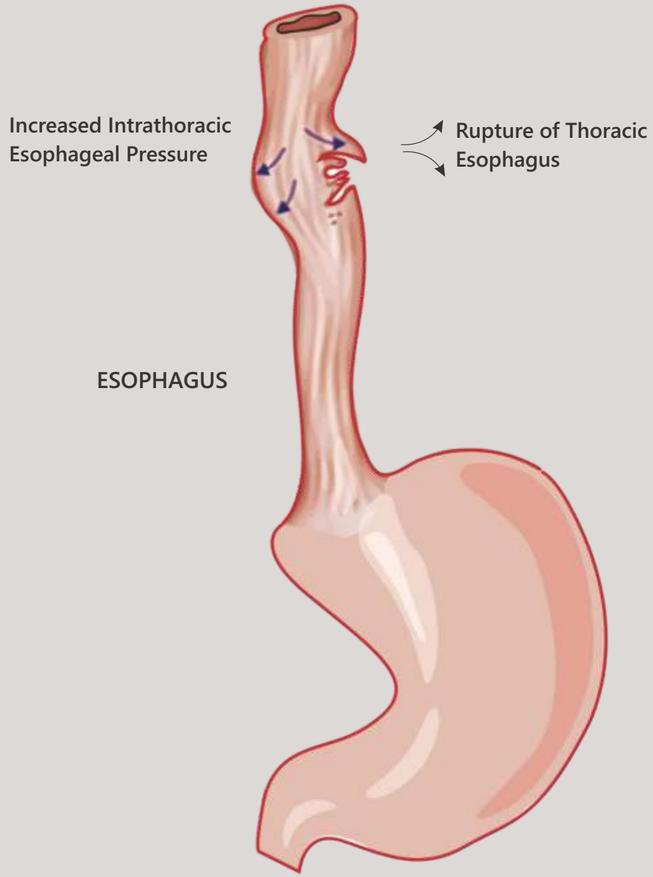

HIROSHIMA

ATLAS OF THE CHEST

Robotic surgery for Boerhaave syndrome

Spontaneous rupture of the esophagus or Boerhaave syndrome is a rare and catastrophic condition, characterized by a full-thickness (transmural) perforation of the esophageal wall. It typically occurs by a sudden rise in the intraluminal pressure against a closed glottis. First described by Herman Boerhaave in 1724, it continues to be one of the most lethal gastrointestinal emergencies, with mortality rate exceeding 90% when left untreated. Even with timely intervention, prognosis remains poor, particularly when diagnosis is delayed.

A young boy from Bhuj suddenly began experiencing intense episodes of vomiting. The severity and force of the vomiting were tremendous. Within minutes, his chest filled with unbearable pain as what had torn inside was not just muscle or tissue, but the very wall of his esophagus. He developed repetitive, violent episodes of vomiting and this sudden pressure led to a full-thickness tear in the lower third section of his esophagus. The esophageal tear was >10 cm long and it was located proximally to the gastroesophageal junction, the most frequently affected area owing to its inherent structural vulnerability as it has a higher density of neurovascular structures and a relative paucity of longitudinal muscle fibres. Longitudinal tears in this region typically measure up to 3-8 cm.

To address this leak, an esophageal stent was inserted; however, it failed to contain the leak and the food particles continued to leak into the thoracic cavity. This led to progressive mediastinitis and evolving sepsis. Oral contrast imaging showed extravasation into the thoracic compartment that confirmed the ongoing leakage.

Boerhaave syndrome is notoriously difficult to diagnose early, as its clinical manifestations are heterogeneous and may overlap with more common thoracic conditions such as myocardial infarction, pulmonary embolism, or perforated peptic ulcer. Classical findings such as Mackler's triad (vomiting, chest pain, subcutaneous emphysema) are present in less than 50% of the cases. Consequently, delays in diagnosis are common and prognostically significant.

Optimal management requires surgical intervention within the first 6-8 hours, with survival rates approaching 75% when treatment initiated within 12-24 hours. Beyond this window, the risk of severe mediastinitis, empyema, acute respiratory distress syndrome (ARDS), and septic shock increases substantially.

He consulted Dr. Mahesh D. Patel to whom the case came after 48 hours of onset. Wasting no more time, he performed surgery that very night. Intra-operatively, extensive necrosis of the esophageal wall was seen, and there was significant sloughing that meant Dr. Patel had to resect a major segment of the esophagus. The mediastinum and lungs were also inflamed and encased in fibrinous tissue, which then had to be debrided. Dead and infected tissues were removed, and the esophagus was reconstructed in two layers to restore the continuity. The entire surgery was done robotically to enhance the visualization and precision in navigating the inflamed thoracic cavity. Surgery lasted 9 hours.

Post-operatively, the patient recovered well and came out of sepsis. He was soon able to ingest food orally. When he finally went home, he had just four tiny scars, each no bigger than a fingernail.

Because of Dr. Patel's extensive experience in robotic cancer surgeries, his expertise could be adapted to manage a rare benign case. Had this surgery been done conventionally, it would have required a large scar extending from the front to the back of the chest and completely opening the thoracic cavity, which could have carried significant long-term morbidity.

The key challenge lay in performing such a complex repair through a minimally invasive route. It was successfully accomplished in the least morbid method possible, ensuring long-term functional benefits.

Boerhaave syndrome, though rare, is associated with formidable mortality, demands high clinical suspicion and timely intervention.

Very few successful cases of Boerhaave syndrome managed through robotic surgery have been reported worldwide, and none so far from India, making this case a notable contribution to the field.

Like Atlas condemned to carry the heavens, a burden fell upon a young boy that no human should face. A gaping 10-cm-long esophageal rupture spilled gastric contents into his thorax.

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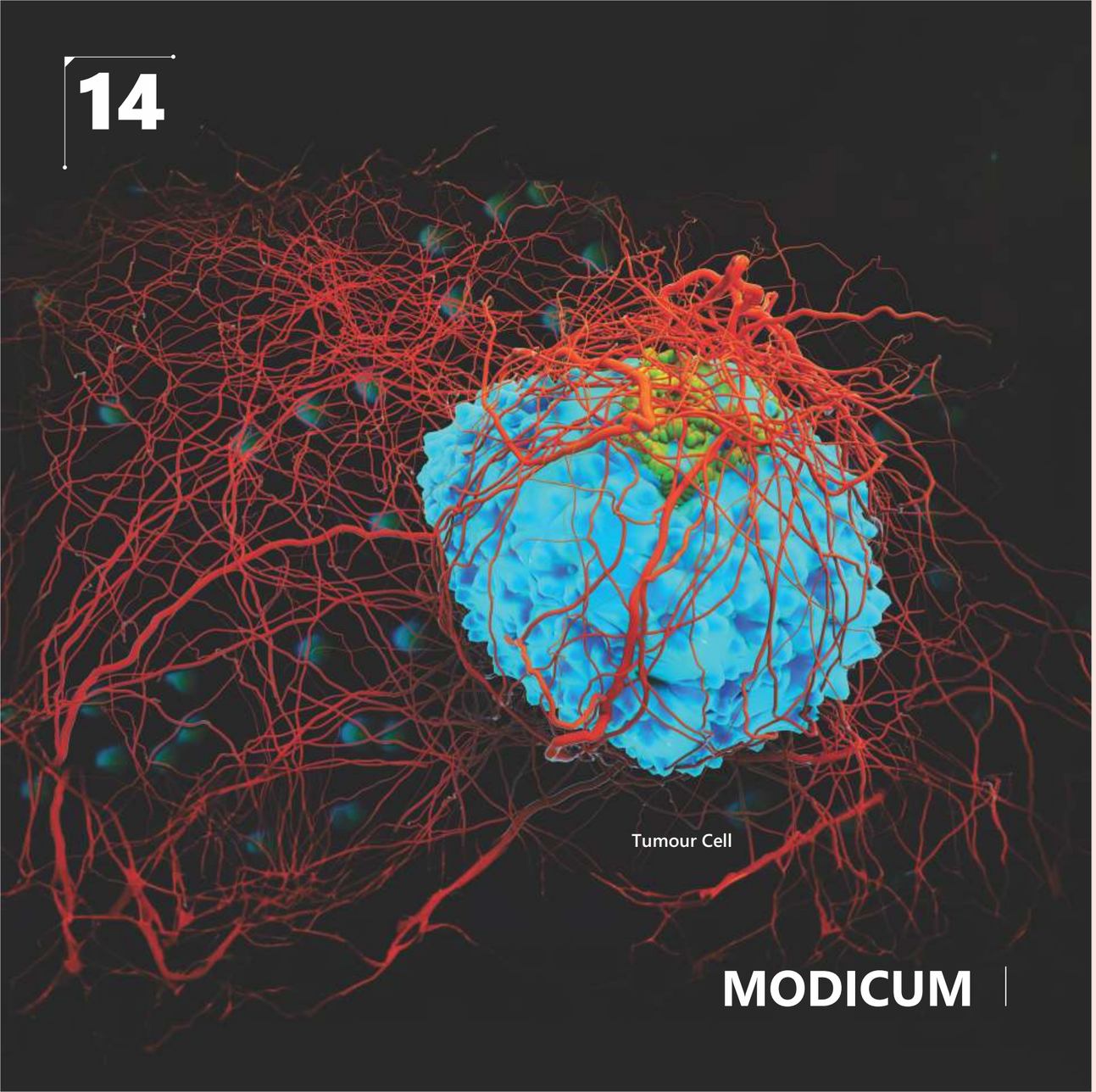

MODICUM

LESS IS ENOUGH

Lung-sparing bronchoplasty for a pediatric bronchial neuroendocrine tumour

Neuroendocrine tumours (NETs) of the lung are rare entities, especially when they arise in the bronchus of young patients. Unlike the more common adult lung cancers, these tumours are often indolent but can cause serious problems by blocking airways and damaging lung function over time. In children and adults, their diagnosis often comes as a shock, not only because of the rarity but also because of the potential impact on growth, development, and long-term respiratory health.

Such was the case of a 14-year-old boy from Rajkot, who found himself at the center of an unusual medical journey. His tumour was discovered incidentally, but he had been experiencing persistent coughing and episodes of blood in his sputum that were dismissed as minor infections earlier. Further scans revealed an NET, nestled within the bronchus of his left lung. Given his age and the location of the tumour, the stakes were high. Removing the entire lung at his age was not an option and the only viable option was to find a way to preserve his lung to ensure a normal quality of life ahead.

The family traveled to Ahmedabad to consult Dr. Mahesh D. Patel, an experienced GI, Lung, and Thoracic Onco-surgeon at Zydus Cancer Hospital. Dr. Patel recognised both the rarity and the gravity of the case. The boy was among the youngest patients he had seen with a bronchial NET. The lesion was identified as localised but obstructive, and surgical excision was deemed necessary. Lung-sparing surgeries such as bronchoplasty are particularly valuable in younger patients to preserve respiratory reserve and ensure normal development. It is a highly specialized procedure where only the diseased segment of the bronchus is excised, and the healthy ends are rejoined. Unlike conventional lung resection using lobectomy or pneumonectomy, which sacrifices large portions of lung tissue, bronchoplasty allows the patient to continue breathing as naturally as before. In young patients, such lung-sparing techniques are invaluable, as they ensure the lungs continue to develop and function at near-normal capacity.

The complexity of this surgery, however, cannot be understated. Bronchoplasty requires precise identification of tumour margins, immaculate suturing of delicate bronchial tissue, and rigorously controlling the bleeding and ventilation throughout the procedure. In this boy's case, two challenges were particularly significant. First, precise localization of the tumour margins was necessary to achieve complete excision without sacrificing any additional bronchial tissue. Second, because the surgery involved operating so close to the vital airway structures, maintaining adequate oxygenation during the procedure was critical.

Though technically challenging in his age group, the boy was placed on single-lung ventilation during surgery. It involved temporarily deflating one lung while the other continued to function, providing the surgeon a clear operative field without compromising the patient's oxygen supply.

The surgery lasted seven hours. The tumour-bearing bronchial segment was removed while preserving the majority of the left lung. The bronchial ends were re-anastomosed with fine sutures, ensuring airtight closure and restoration of airway integrity. Throughout the procedure, careful hemostasis was maintained, and intra-operative monitoring showed stable respiratory parameters throughout.

The post-operative course was remarkably smooth. Despite the magnitude of the procedure, his recovery was smooth. This procedure was done robotically which meant smaller scars, faster healing, and an early return to routine activities. Histopathological analysis confirmed complete excision of the NET with negative margins.

Owing to Dr. Patel's extensive expertise in complex lung surgeries, he made sure that there were no complications post-op as the delicate nature of airway reconstruction bears the risk of intra-operative bleeding, post-operative airway stenosis or even anastomotic failure.

NETs of the bronchus may be rare in children, but when they appear, they present formidable challenges. This case shows the importance of early diagnosis and the value of lung-sparing surgical techniques.

This is a rare case observed in the pediatric patient group. In addition, we have extensive experience performing bronchoplasties robotically in adults as well.

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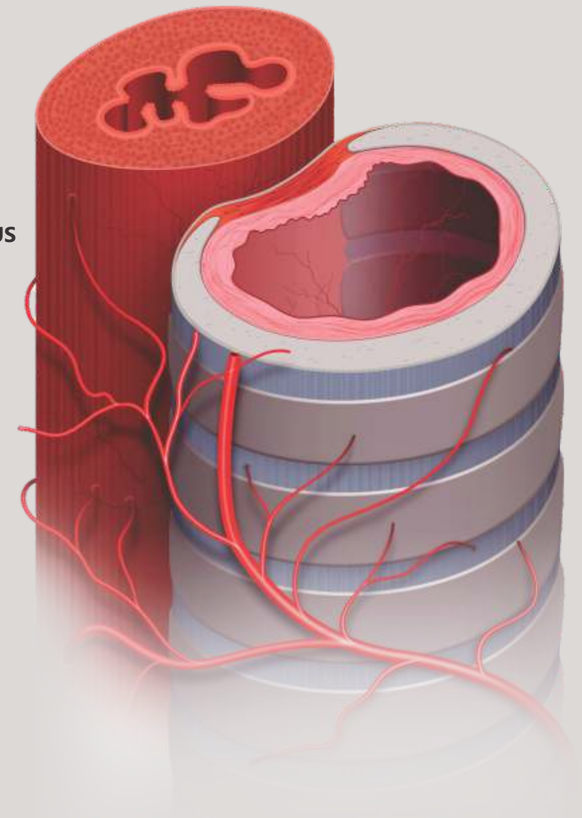

PHOENIX

CLOSING THE GAP

Minimally invasive repair of chronic tracheoesophageal fistula and a maximally invasive repair of a post-operative tracheo-neogastric fistula

A fistula is an abnormal communication between two distinct structures. While some are surgical complications, most arise as a consequence of infection, chronic inflammation, or trauma. Chronic fistulas are notorious for their voracious propensity to recur and can profoundly impact a patient's quality of life.

One such case was of a 35-year-old male who struggled with a decade-long history of a tracheoesophageal fistula after an episode of TB, refractory to multiple prior surgical interventions. His life was further complicated by a grave diagnosis of stage III gallbladder carcinoma, for which he underwent surgery. These recurrent morbidities had eventually taken a toll on him and he was suffering from recurrent lung infections. Traditionally, such cases are managed through open thoracotomy, which carries substantial morbidity, requires a prolonged recovery period, and poses a high risk of recurrence.

By the time he arrived at Zydus, he was weary and frustrated as two of his previous surgeries had failed. He was then referred to Dr. Mahesh D. Patel as he sought a less invasive option. Considering the patient's condition and wish to undergo only a minimally invasive procedure, Dr. Patel faced a dilemma. He had to chose between giving him a better quality of life, albeit with risk of further deterioration or counsel him to live with discomfort after winning the battle against gallbladder cancer.

The procedure was carried out using a thoracoscopic approach to minimize any surgical trauma. Four small thoracic ports were placed that gave access to the surgical area. The fistula was then delineated and stapler was used to divide both the structures and an intercostal muscle flap was created to keep them separated. The surgery was a success. His post-op phase was uneventful and he recovered with minimal pain. It has been 4 years since, and he remains disease and cancer-free to date.

From an academic perspective, this case teaches us important lessons. First, recurrent fistulas, even after multiple failed operations can still be treated if innovative techniques are applied. Second, though minimally invasive approaches are technically demanding, they can be crucial in complex redo cases, offering patients reduced morbidity and faster recovery.

In some cases of fistula, they occur as a result of prior surgery as was seen in another patient who was just 55 years old when he was diagnosed with esophageal cancer. For this, he underwent an esophagectomy where the diseased esophagus was removed and replaced by a stomach tube. Post-op, he developed a fistula, which was 5 cm in length, between the neogastric tube and his trachea. This had serious consequences, as he could neither breathe nor eat on his own and required a tracheostomy tube for breathing and a jejunostomy tube for feeding. He was also referred to Dr. Patel, who performed a sternotomy where his entire thorax was opened through the sternum. His trachea and neo-esophagus were separated and sutured. To keep the fistula from not forming in the future, an omental flap from the stomach was inserted between both the structures to separate them. An omental flap is an autologous omental tissue. The omentum is a highly vascular and rich in immunologically active cells, and it was fashioned into a pedicled flap and interposed between the trachea and neo-esophagus. This barrier would ensure a mechanical separation and promote angiogenesis and enhance healing due to its immunologic properties. Both trachea and the neo-esophagus were then reconstructed and they were closed to prevent any leakage. The surgery was a success and lasted ten hours. Over the course of three to four months, both the tracheostomy tube and the jejunostomy tube were removed and he could breathe and eat on his own.

After more than three years of follow-up, the patient remains cancer-free and free from any further recurrences of fistula or infections. These cases underscore not only Dr. Mahesh D. Patel's surgical mastery but also the remarkable resilience of the human body when guided by expert hands.

Post-operative tracheo-esophageal fistulas are a surgeon's nightmare. There is a paucity of recommended guidelines for their management, making it extremely challenging to pursue these cases.

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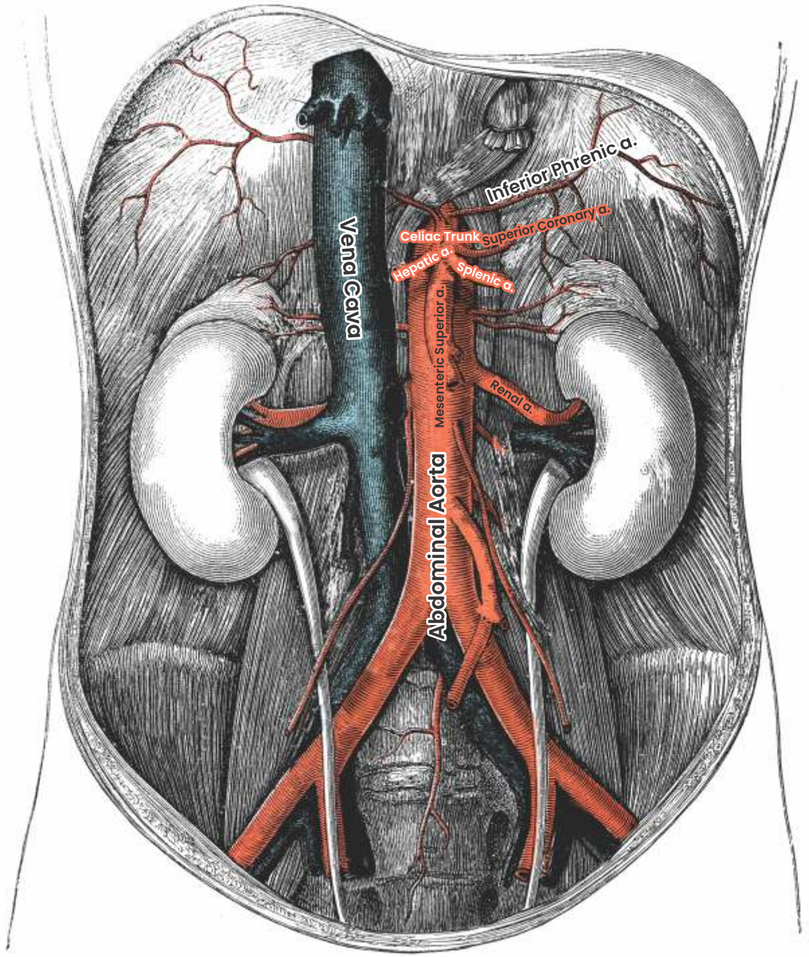


GARDEN OF EDEN

IN PURSUIT OF EXCELLENCE

Rarest surgery for pancreatic cancer (Modified *Apple*by's procedure)

Pancreatic cancer remains one of the most aggressive malignancies of the gastrointestinal tract with a 5-year survival rate that seldom exceeds 10%. Moreover, tumours that arise in the body or tail of the pancreas are frequently diagnosed at a locally advanced stage. Cases involving the celiac axis, which is the core arterial supply of the liver, stomach and spleen, have been traditionally marked as inoperable. Only a select few tertiary centers worldwide have attempted the modified Appleby procedure, and in India, documented cases are exceedingly rare.

A 70-year-old man with pancreatic cancer (T4) was referred to Dr. Mahesh D. Patel. The patient was obese with long-standing type 2 diabetes mellitus. On evaluation, Dr. Patel suggested two management pathways: palliative care or radical surgery. After counseling him on the probable operative risks, he still chose to go forward with surgery. He underwent chemotherapy and radiotherapy for 4 months before surgery.

The complications were multi-fold. Normally, the celiac axis divides into the hepatic artery, left gastric artery and the splenic artery. The gastroduodenal artery (GDA) is a branch of the hepatic artery. The superior mesenteric artery (SMA) is the main blood supply to the intestines, but it also has collaterals with the GDA and can provide blood to the liver and stomach via collaterals, if the celiac axis is compromised. Excision of this axis imperils perfusion to the liver, stomach, and residual pancreas, with a tangible risk of post-operative hepatic failure and stomach necrosis.

The surgery went on for 9 hours. In the modified Appleby procedure, the patient's celiac artery was resected along with the common hepatic, splenic, and the left gastric artery to achieve a complete, margin-negative (R0) resection.

The patient's post-operative trajectory was remarkably smooth. A series of liver function tests confirmed preserved hepatic inflow, and gastric mucosa remained well perfused.

Such is the elegance of human physiology that it harbors pre-existing arterial channels that are capable of compensating for lost inflow. As was seen in this case, the flow to the liver and the other vital organs could be maintained by a channel of collateral circulation through the anastomotic pathways between the superior mesenteric artery and the gastroduodenal artery via the anterior and posterior pancreaticoduodenal pathways. Saving the gastroduodenal artery is important to ensure blood supply to the liver through the collateral pancreaticoduodenal arcades. Intra-operative Doppler assessment was performed to confirm adequate hepatopetal flow through SMA-derived collaterals.

For pancreatic body cancers considered inoperable, the average survival is usually less than a year. In this case, however, despite the significantly higher surgical risk, the procedure was successful. It has now been three years since the operation, and the patient remains disease-free, enjoying an excellent quality of life with no signs of recurrence.

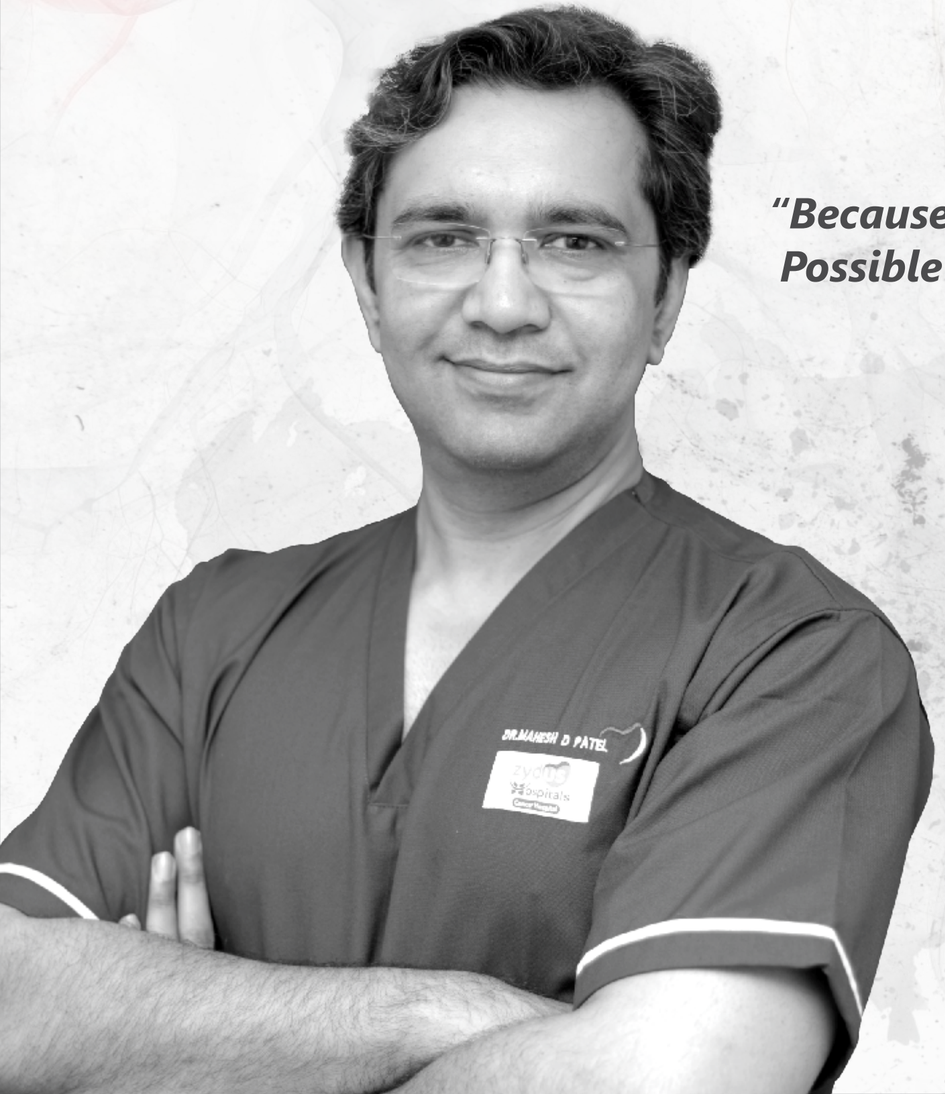
This case reflects his virtuosity in operative techniques and the intellectual audacity required to push the frontiers of surgical oncology for the better.

As this final case draws the narrative to a close, it gathers within it the spirit of all that has marked my career.

Each patient, each challenge, has always been a chance to learn, to refine, and to reach a little further. We have highlighted the entire spectrum of difficult and minimally-invasive surgeries for managing cancer and its surgical complications.

In this field, the journey of learning never truly ends; progress is born from the willingness to adapt, grow, and keep moving forward.

- Dr. Mahesh D. Patel



*"Because No Marvel is Possible **Alone**"*

Words often fall short when it comes to expressing gratitude, but I wish to sincerely thank all those without whom Surgical Marvels would not have been possible.

First and foremost, my gratitude goes to Zydus Hospital. Without this institution, I doubt such complex, pioneering, and pivotal surgeries could have been achieved, whether in India or elsewhere in the world. The hospital's world-class infrastructure gave me the confidence to initiate and successfully perform these challenging procedures.

A special thanks to Dr. Sajan Nair, our CEO and a true visionary, for giving me the platform to showcase these landmark achievements. I am also deeply grateful to the management for their belief in me and my work.

My journey with this hospital has been a long and fulfilling one.

The team that stands behind me is vast, and it would be impossible to name everyone without leaving someone out. Yet, I must acknowledge the team from Anesthesia, Medical Oncology, Radiation Oncology, Pathology, Critical Care, Medicine, Radiology, Plastic Surgery, Vascular Surgery, CVTS, Nursing Department, OT Staff and all my peers who have stood like a rock of support throughout. I am equally grateful to the doctors who referred their patients and to the patients themselves, who parked their trust in me.

I extend my heartfelt appreciation to Ms. Neelanjana Bhattacharyya, for penning down each case so articulately, and to Ms. Kavita Sadana, for editing them with such clarity and precision.

And to the readers and medical aspirants, for investing your time in exploring this compilation of cases. These stories are no longer mine alone once they reach your hands. Hope this inspires you to continue pursuing your purpose and calling, and may you contribute your best to advancing science to better the patient's quality of life.

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