

Uniportal robotic-assisted thoracic surgery for anatomical lung resections: initial experience and technical feasibility

Mehlika İşcan¹, Ömer Yavuz¹

Thoracic Surgery Department, Basakşehir Çam ve Sakura City Hospital, İstanbul, Türkiye

KEY WORDS

anatomic lung resection, minimally-invasive surgery, robotic surgery, uniportal robotic-assisted thoracic surgery

ABSTRACT

INTRODUCTION Uniportal robotic-assisted thoracic surgery (URATS) combines the precision of robotic systems with the minimal invasiveness of single-incision surgery. However, its widespread adoption is currently limited by technical challenges regarding external robotic arm collision and setup complexity.

AIM We aimed to evaluate the feasibility, safety, and early adaptation of URATS using a standardized “vertical parallel” docking strategy during our initial experience.

MATERIALS AND METHODS Data from the first 12 consecutive patients undergoing URATS anatomical lung resections were retrospectively analyzed. A strict vertical parallel docking configuration was employed, stacking the robotic arms linearly within the incision to prevent collision. The early learning trends were assessed using trend analysis of docking and console times.

RESULTS The cohort included 7 lobectomies, 4 segmentectomies, and 1 pneumonectomy. All procedures were successfully completed without conversion to thoracotomy or multiportal RATS. Median total operative time was 211 minutes (range, 122–368 min). A rapid standardization of the setup phase was observed, with median docking time stabilizing at 5 minutes (range, 4–7 min). Correlation analysis demonstrated rapid adaptation to the setup process within the initial cases (Spearman $\rho = -0.92$; $P < 0.001$). Console times fluctuated according to patient-specific complexity (eg, obesity, adhesions) rather than case sequence. No major intraoperative complications occurred.

CONCLUSIONS URATS is a safe and feasible technique for complex anatomical resections, including pneumonectomy, even during the initial experience. The adoption of a vertical parallel docking strategy may shorten the initial adaptation phase by preventing robotic arm collisions, thereby making the procedure more reproducible.

INTRODUCTION The concept of uniportal surgery has revolutionized thoracic procedures by minimizing surgical trauma to a single intercostal space, thereby reducing postoperative pain and paresthesia.^{1,2} While uniportal video-assisted thoracic surgery (UVATS) is widely adopted, it presents significant ergonomic challenges, including limited instrument maneuverability and the fulcrum effect, particularly in complex anatomical resections.³⁻⁵

Robotic technology offers solutions to these ergonomic limitations through 3-dimensional (3D), high-definition visualization and wristed instruments. However, standard robotic platforms typically require multiple ports, potentially

contradicting the notion of the uniportal approach being the least invasive option. Recently, uniportal robotic-assisted thoracic surgery (URATS) has emerged as a novel technique that integrates the precision of the robotic system with the single-incision approach.^{6,7}

Despite its potential, widespread adoption of URATS is currently limited by technical concerns regarding the collision of robotic arms within a narrow incision and the perceived complexity of the docking process. The primary challenge is not to establish its superiority over other techniques, but rather prove its technical feasibility, safety during the early adaptation period, and setup standardization.⁸ Therefore, defining a reproducible

Correspondence to:

Mehlika İşcan, MD, Thoracic Surgery Department, Basakşehir Çam ve Sakura City Hospital, Başakşehir Olimpiyat Bulvarı Yolu, 34480 İstanbul, Türkiye, phone: +90 543 660 93 34, email: mehlikaiscan@gmail.com

Received: February 26, 2026.

Revision accepted: March 20, 2026.

Published online: March 27, 2026.

Wideochir Inne Tech Maloinwazyjne.

2026; 21 (1): 63-70

doi:10.20452/wiitm.2026.18021

Copyright by the Author(s), 2026

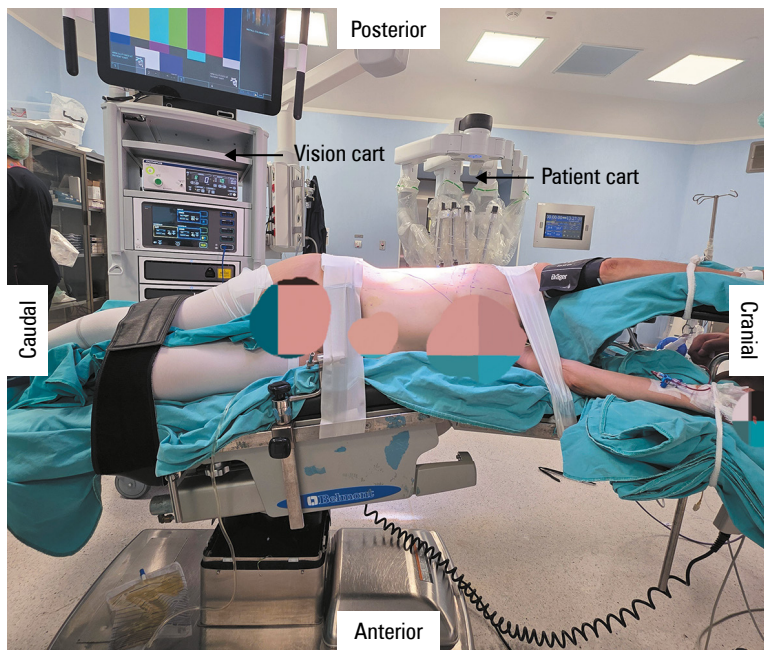


FIGURE 1 Intraoperative positioning and operating room setup, with the patient in the lateral decubitus position. Both the patient cart and the vision cart are positioned on the posterior side of the patient. The anterior side is reserved for the bedside assistant (not pictured) to manage the uniportal approach.

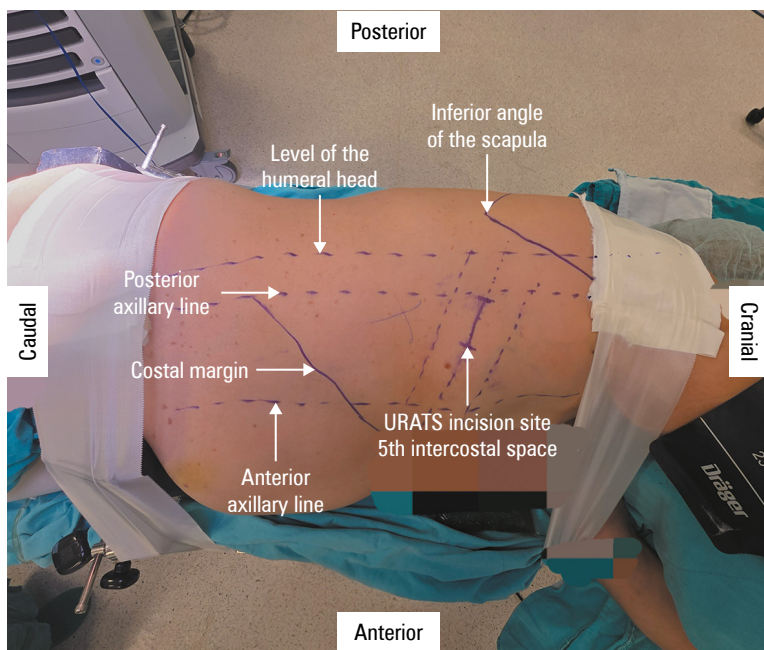


FIGURE 2 Preoperative planning showing key anatomical landmarks, with the inferior angle of the scapula, axillary lines, and costal margin marked. During URATS, the incision is made in the fifth intercostal space, anterior to the posterior axillary line.

Abbreviations: URATS, uniportal robotic-assisted thoracic surgery

docking strategy is essential to prevent external arm collision, facilitate early adaptation, and ensure procedural safety during the transition from multiportal to uniportal RATS.

AIM The aim of this study was to present technical details and early outcomes of our first 12 consecutive URATS anatomical lung resections.

We specifically aimed to describe our “vertical parallel” arm docking configuration designed to prevent instrument collision, analyze the rapid improvement in setup times as a marker of early adaptation, and demonstrate safety and feasibility of this technique in a mixed cohort of malignant and benign pathologies.

MATERIALS AND METHODS Study design and patient selection This retrospective study was conducted in a tertiary referral center. Data from the first 12 consecutive patients who underwent URATS anatomical lung resections between September 2024 and September 2025 were analyzed.

Patients with early-stage non-small-cell lung cancer (NSCLC) or benign inflammatory diseases (eg, bronchiectasis) requiring anatomic resection (lobectomy, segmentectomy, or pneumonectomy) were enrolled in the study. Individuals with chest wall invasion and those requiring sleeve resections were excluded.

Preoperative assessment All patients underwent thorough preoperative evaluation, including pulmonary function tests, contrast-enhanced computed tomography (CT) of the thorax, and positron emission tomography/CT for suspected malignancies.

Surgeon experience All procedures were performed by a single console surgeon (MI) who had completed the European Society of Thoracic Surgeons Robotic Academy fellowship. Prior to initiating this URATS series, the surgeon routinely performed multiportal RATS and UVATS for anatomical lung resections. This background in both multiportal robotic console operation and single-incision spatial dynamics facilitated the transition to the URATS approach.

Data collection and definitions Patient demographics, comorbidities, and operative metrics were retrospectively analyzed. Comorbidities and preoperative physical condition were evaluated using the Charlson Comorbidity Index and the American Society of Anesthesiologists classification, respectively. Operative times were strictly defined as follows: docking time (from positioning the robotic patient cart over the operating table to the completion of arm setup and targeting, ready for console work), console time (from the surgeon initiating console work to robotic instrument withdrawal), and total operative time (from skin incision to final skin closure). Conversion was defined as the necessity to add an additional working port (conversion to multiportal VATS or RATS) or proceeding to open thoracotomy. Severe adhesions were intraoperatively defined as dense, vascularized pleural adhesions requiring extensive sharp dissection before proceeding with resection. Patient-specific complex cases were defined as those involving extended



FIGURE 3 Manual hand assignment settings on the surgeon console touchpad; **A** – left-sided setup, with arms 1, 2, and 3 docked. Arm 2 is assigned to the left hand (L), and arm 1 to the right hand (R). Arm 4 (undocked) is also assigned to R to complete the circuit; **B** – right-sided setup, with arms 2, 3, and 4 docked. Arm 3 is assigned to L, and arm 4 to R. Arm 1 (undocked) is assigned to L.

resections (eg, pneumonectomy), high body mass index (BMI; >30 kg/m²), or severe adhesions.

Surgical technique Anesthesia, positioning, and incision All procedures were performed under general anesthesia with double-lumen endotracheal intubation for single-lung ventilation. The patients were placed in the standard lateral decubitus position. The robotic platform and monitor were positioned at the patient’s back, while the bedside surgeon stood anteriorly (FIGURE 1). A single 4-cm incision was made without rib spreading. A wound protector was inserted to maximize working space. No carbon dioxide (CO₂) insufflation was utilized.

Intercostal space selection Since robotic staplers were not available, we routinely utilized the fifth intercostal space (ICS; FIGURE 2), which provides optimal angulation for manual stapler insertion.

Generally, the seventh ICS is reserved for robotic stapler use, with the exception of middle lobectomies, where the sixth ICS is preferred, even with manual staplers, to achieve better angulation toward the fissure and hilum.

Docking strategy Vertical parallel configuration We utilized the da Vinci Xi surgical system (Intuitive Surgical, Sunnyvale, California, United States). The patient cart approached from the dorsal side. The target laser was aligned with the posterior corner of the incision, parallel to the spine. To prevent external collision, we employed a vertical parallel docking configuration, where the robotic arms were aligned linearly rather than being crossed (Video 1).

Arm selection, arrangement, and alignment Three robotic arms were used. For the left-sided resections, arms 1, 2, and 3 were deployed. Arm 3 (posterior) held the camera, while arms 1 and 2 served as working ports. For the right-sided resections, arms 2, 3, and 4 were utilized, with arm 2 serving as the camera port.

The arms were docked perpendicular to the patient in a specific vertical stack within the incision. The top (cranial) arm held the camera (eg, arm 3 for the left side), with the 30° down-looking scope. The middle arm served as the left-hand instrument arm (eg, arm 2) for the Cadere / fenestrated bipolar forceps, and was positioned closely against the upper lip (cranial aspect) of the incision. The bottom (caudal) arm served as the right-hand instrument arm (eg, arm 1) for the Maryland Bipolar forceps, and was positioned closely against the lower lip (caudal aspect) of the incision.

All arms were deployed in the FLEX position. On the robotic arms, the word “FLEX” is printed as a physical alignment marker. The priority was to ensure that the setup joint of each arm was centered anywhere along these printed letters (F, L, E, or X) to maximize the range of motion, rather than requiring alignment with 1 specific letter.

Console setup Manual orientation Since the da Vinci Xi system does not automatically recognize the uniportal geometry, hand assignments were set manually to ensure intuitive control (FIGURE 3). The left-sided resections (arms 1, 2, and 3) were carried out as shown in FIGURE 3A. Arm 1 was assigned to the right hand, and arm 2 to the left hand. The undocked arm 4 was assigned to the right hand to satisfy the system’s logic. The right-sided resections (arms 2, 3, and 4) were performed as demonstrated in FIGURE 3B. Arm 3 was assigned to the left hand, and arm 4 to the right hand. The undocked arm 1 was assigned to the left hand.

The unused fourth arm had to be assigned to the remaining available orientation to satisfy the system’s logic. It was set in the “Ready” mode, even though it remained undocked.

TABLE 1 Demographic and clinical characteristics of the study patients (n = 12)

Characteristic		Value
Age, y		65.5 (46–76)
Sex	Men	8 (66.7)
	Women	4 (33.3)
BMI, kg/m ²		26.8 (19.8–31.8)
Current smoker		8 (66.7)
FEV1, %		104 (74–132)
ASA class	II	7 (58.3)
	III	5 (41.7)
Charlson Comorbidity Index, points		6 (0–9)
Comorbidities	Cardiovascular disease	8 (66.7)
	Hypertension	6 (50)
	Ischemic heart disease	3 (25)
	Peripheral vascular disease	2 (16.7)
	Pulmonary disease	6 (50)
	Chronic obstructive pulmonary disease	3 (25)
	Bronchiectasis	3 (25)
	Metabolic disorders	4 (33.3)
	Diabetes mellitus	4 (33.3)
	Hyperlipidemia	2 (16.7)
	Chronic kidney disease	1 (8.3)
	Cerebrovascular disease	1 (8.3)
Diagnosis	Non–small-cell lung cancer	10 (83.3)
	Benign disease (bronchiectasis)	2 (16.7)
Tumor location	Right side	8 (66.7)
	Left side	4 (33.3)

Data are presented as number (percentage) or median (range).

Abbreviations: ASA, American Society of Anesthesiologists; BMI, body mass index; FEV1, forced expiratory volume in 1 second

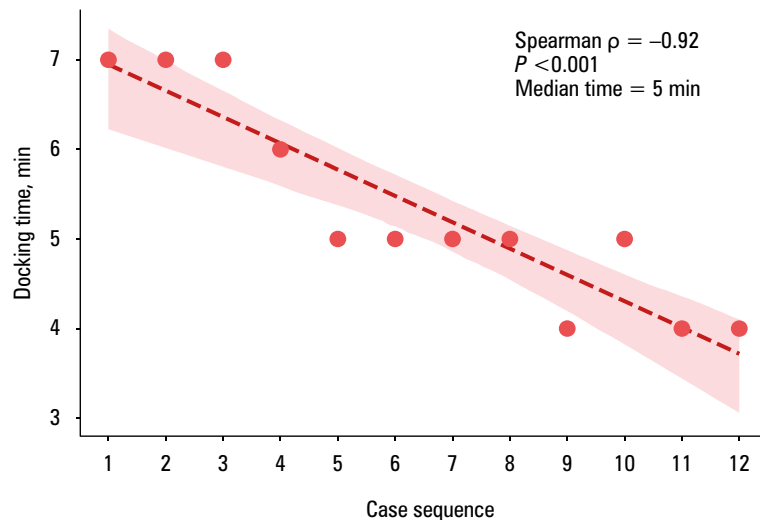


FIGURE 4 Early learning trends for uniportal robotic-assisted thoracic surgery docking time, with the scatter plot demonstrating a reduction in setup time across the case sequence. The rapid descent to a median of 5 minutes reflects the efficiency and early adaptation to the standardized vertical parallel arm configuration.

The “steering wheel” maneuver Unlike in multiportal RATS, independent arm movements are restricted in URATS. To overcome this, the surgeon must adopt an en bloc movement strategy.

Similar to turning a steering wheel, all 3 arms are moved synchronously in the desired direction. This technique maintains the parallel relationship and allows for 360° access, enabling dissection even directly underneath the wound protector, without depending on the assistant. The clinical utility of this maneuver is demonstrated in *Video 2*, which showcases left lower lobe superior segmentectomy (S6) requiring extensive adhesiolysis and extreme angulation.

Instrumentation and bedside assistance Bedside assistant The assistant introduced a long, curved-tip suction (typically used for subxiphoid VATS) through the widest gap available, strictly positioned below the camera and above the right-hand instrument to avoid collisions. This specific instrument length prevented conflict with the robotic arms.

Stapling Vascular and bronchial divisions were performed using manual staplers. Curved-tip staplers were preferred for vascular structures to ensure safe passage under robotic vision. The stapler was typically introduced through the gap between the working arms. However, in the cases where the working space or angulation was insufficient, we employed a dynamic strategy: the most caudal arm (eg, arm 1 holding the Maryland Bipolar forceps) was temporarily undocked and retracted. This allowed for the manual stapler to be inserted from the most inferior aspect of the incision. Notably, in standard fully robotic setups, this caudal position corresponds to the designated assignment for the robotic stapler arm.

Statistical analysis All analyses were performed using SPSS Statistics software for Windows, version 26.0 (IBM Corp., Armonk, New York, United States). Distributional assumptions were evaluated using the Shapiro–Wilk test and visual inspection (Q–Q plots). Given the small sample size (n = 12), nonparametric summaries and tests were prioritized. Continuous variables were reported as medians (with ranges), and categorical variables as frequencies and percentages.

Early learning trends were explored using the Spearman rank correlation (ρ) between chronological case order and specific operative time components (docking and console times), visualized with scatter plots and exploratory visual trendlines. To assess the impact of patient-specific factors, console times were compared between complex cases (BMI >30 kg/m², severe adhesions, or cases requiring extended resections), and standard cases using the Mann–Whitney test (exact *P* values were used due to the small sample size). The results are interpreted as exploratory. A 2-sided *P* value below 0.05 was considered significant.

Ethics The study was approved by the Ethics Committee of the Başakşehir Çam ve Sakura City Hospital (KAEK/24.12.2025.397). All participants provided written informed consent.

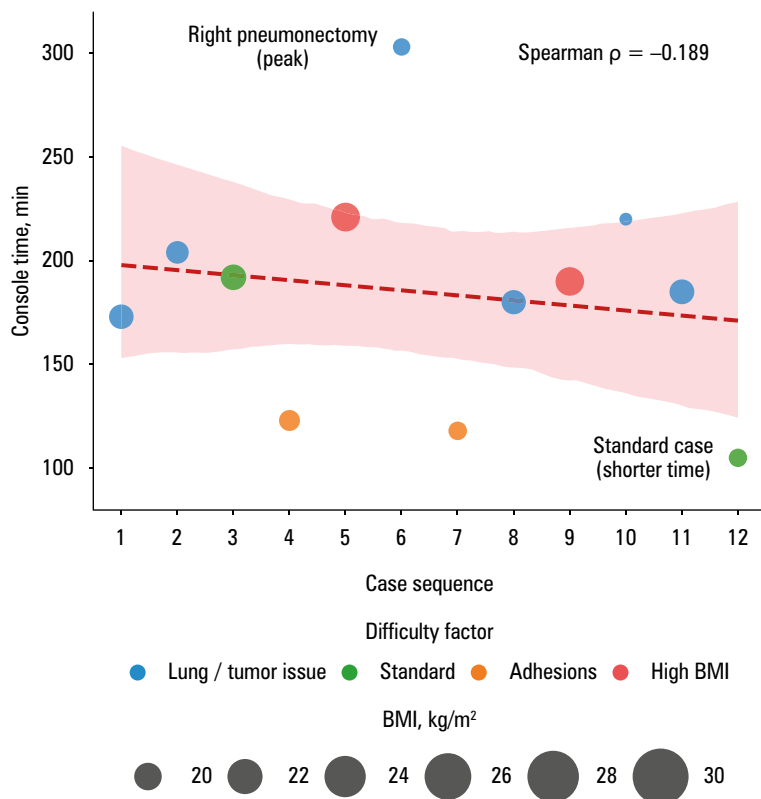


FIGURE 5 Operative complexity map illustrating patient-specific factors in relation to the console time, with the scatter plot showing that variability in operative duration occurred independently of the case sequence. Markers are coded by primary difficulty factors (eg, adhesions, high BMI, lung/tumor issue), with marker size proportional to BMI. Notable peaks correspond to complex cases, such as right pneumonectomy (case 6), and high-BMI patients, while standard cases tend to require shorter console times, reflecting a steady technical workflow.

Abbreviations: see TABLE 1

RESULTS Patient characteristics A total of 12 consecutive patients underwent URATS anatomical lung resection during the study period. Median patient age was 65.5 years (range, 46–76 y), and the cohort was predominantly male (66.7%). The indications for surgery were NSCLC in 10 patients (83.3%) and bronchiectasis in 2 participants (16.7%). Among the NSCLC cases, adenocarcinoma was the most common histological subtype (n = 6). The cohort demonstrated adequate preoperative pulmonary reserve, with median forced expiratory volume in 1 second of 104% and diffusing capacity of the lungs for carbon monoxide of 78.5%. Detailed demographic and clinical characteristics are summarized in TABLE 1.

Perioperative outcomes and safety All procedures were successfully completed using the URATS approach. There were no conversions to multiportal RATS, thoracotomy, or conventional VATS. The surgical procedures included 7 lobectomies (58.3%), 4 segmentectomies (33.3%), and 1 pneumonectomy (8.3%). Intraoperative safety was maintained with median blood loss of 20 ml (range, 0–200 ml), and no patient required blood transfusion.

Operative times and early learning trends Median total operative time was 211 minutes (range, 122–368 min). The hallmark of our initial experience was the rapid standardization of the setup phase using the vertical parallel arm configuration. By aligning the robotic arms vertically, parallel to each other through a single incision, external collisions were minimized effectively. Median docking time was 5 minutes (range, 4–7 min). Trend analysis showed a strong negative correlation between case sequence and docking time (Spearman $\rho = -0.92$; $P < 0.001$), indicating rapid adaptation to the setup process within the first few cases (FIGURE 4).

In contrast, console time (median, 187.5 min [range, 105–303 min]) did not demonstrate a monotonic decrease over the 12 cases (Spearman $\rho = -0.189$; $P = 0.556$). However, as illustrated in the operative complexity map (FIGURE 5), this variable fluctuated according to individual patient characteristics rather than technical adaptation. The longest console time (303 min) corresponded to right pneumonectomy complicated by an emphysematous noncollapsing lung. Similarly, secondary peaks were observed in the patients with high BMI ($>30 \text{ kg/m}^2$) or severe adhesions. There was no difference in median console times between these complex cases (n = 5) and standard cases (n = 7; $P = 0.46$). Standard lobectomies in the individuals without obesity and without severe adhesions were completed in approximately 100 minutes, indicating an efficient workflow and technical feasibility with standard anatomy.

Pathological and postoperative outcomes Pathological evaluation showed median tumor size of 3.4 cm (range, 1.1–7.5 cm). Complete resection (R0) was achieved in all oncological cases (n = 10), where a median of 17.5 lymph nodes (range, 4–30) was harvested from a median of 6 stations (range, 4–8), aligning with established oncological principles (TABLE 2).

Postoperative recovery The postoperative recovery course is detailed in FIGURE 6. Median duration of chest drainage was 1.5 days (range, 1–3 d), and median length of hospital stay was 2 days (range, 1–3 d). The majority of patients were discharged within 48 hours of surgery. No 30-day mortality occurred. No major complications requiring surgical or procedural re-intervention were observed, including bleeding requiring re-exploration, bronchopleural fistula, or acute respiratory failure necessitating invasive ventilatory support.

DISCUSSION Our initial experience with URATS for anatomical lung resections demonstrates feasibility and safety of this technique, even in a diverse cohort with complex cases, such as pneumonectomy. While recent studies have validated the perioperative outcomes of URATS in comparison with both UVATS and multiportal RATS, the primary focus of this study was to evaluate the technical standardization of the procedure

TABLE 2 Perioperative and pathological outcomes

Variable		Value
Surgical procedure	Lobectomy	7 (58.3)
	Segmentectomy	4 (33.3)
	Pneumonectomy	1 (8.3)
Operative time, min	Docking time	5 (4–7)
	Console time	187.5 (105–303)
	Total operative time	211 (122–368)
Intraoperative blood loss, ml		20 (0–200)
Conversion		0
Pathological evaluation	Tumor size, cm ^a	3.4 (1.1–7.5)
	Dissected lymph nodes ^a	17.5 (4–30)
	Lymph node stations ^a	6 (4–8)
	R0 resection rate ^a	10 (100)
Postoperative course	Chest drainage duration, d	1.5 (1–3)
	Length of hospital stay, d	2 (1–3)
	30-day mortality	0

Data are presented as number (percentage) or median (range).

a Calculated for oncological patients (n = 10)

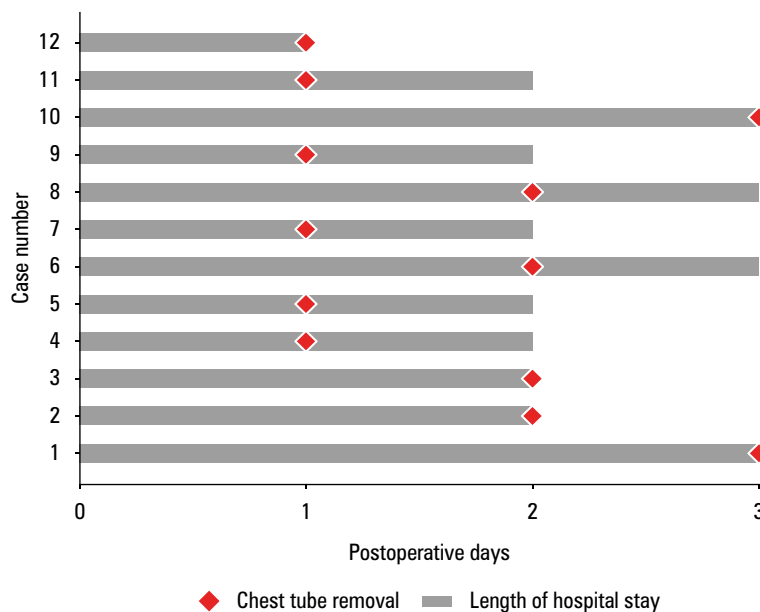


FIGURE 6 Swimmer plot detailing the postoperative recovery course for each patient (n = 12). The graph illustrates a streamlined recovery, with the majority of chest tubes removed by day 1 or 2, allowing for early discharge (≤ 48 h) in most cases.

during the implementation phase.^{7,9} Our findings indicate that a strict vertical parallel docking strategy may facilitate a rapid improvement in setup efficiency, with a relatively quick reduction in docking times within the first 12 cases.

A critical aspect of transitioning to URATS is managing the geometry of the robotic arms to prevent external collision. In this series, we utilized a specific vertical parallel configuration, stacking the camera and instrument arms linearly within the incision. Our analysis showed a strong negative correlation between case sequence and docking time ($\rho = -0.92$), with median setup time

stabilizing at 5 minutes. This aligns with the observations of Gonzalez-Rivas et al,⁶ who emphasized that maintaining a fixed spatial relationship between the arms is essential for collision-free manipulation. To further overcome the limitations of the single-port geometry, we adopted the steering wheel maneuver described in our technique. By moving the robotic arms synchronously en bloc, we were able to maintain the parallel alignment while accessing extreme angles, as demonstrated in our segmentectomy cases. The absence of conversion to multiportal RATS or thoracotomy in our series suggests that this standardized setup may provide sufficient range of motion for anatomical dissection without the need for additional ports.

Regarding early learning trends, our data showed a distinction between the setup phase and the operative phase. While docking times decreased steadily, the console times remained variable. As illustrated in the operative complexity map, prolonged operative times appeared to be related to objective patient-specific factors, specifically higher BMI and severe adhesions, rather than case sequence. This observation is consistent with the finding of Ning et al,¹⁰ who reported that once the docking technique was standardized, the operative duration in URATS was primarily dictated by pathological conditions (eg, adhesions, fissure status). Notably, 33.3% of our cases were segmentectomies. The successful completion of these complex parenchymal-sparing procedures, along with pneumonectomy, supports the conclusion of Manolache et al⁷ that the robotic platform provides adequate exposure for central hilar dissections even through a single incision.

Another distinct feature of our series was the performance of all procedures under atmospheric pressure, without the use of CO₂ insufflation. While most robotic platforms rely on capnotherax to expand working space, our experience suggests that the rigid chest wall created by the wound protector provides sufficient room for dissection, mimicking the familiar environment of UVATS. This approach, combined with the routine use of manual staplers by the bedside assistant, provides a resource-efficient alternative. While robotic staplers ensure autonomy, our findings corroborate a report by Chen et al¹¹ suggesting that manual instrumentation can be safely integrated into the robotic workflow with appropriate assistant training, provided that specific port placement strategies (eg, utilizing the fifth or sixth ICS) are employed to optimize angulation.¹¹

The safety profile observed in this initial cohort, characterized by negligible blood loss and no major intraoperative complications, is comparable to larger URATS series.^{12,13} Furthermore, the postoperative recovery trajectory, with median length of hospital stay of 2 days, aligns with the established benefits of minimally-invasive thoracic surgery. These early outcomes suggest that the transition to URATS can be achieved safely when a structured docking protocol is strictly followed.

For surgeons and institutions already established in the UVATS approach, the clinical rationale for transitioning to URATS is to maintain the familiar single-incision strategy while gaining superior 3D visualization and articulating precision of a robotic platform. To achieve this transition using current technology, it is important to acknowledge that the da Vinci Xi system is inherently designed for multiportal procedures. A newer generation of purpose-built robotic platforms, such as the da Vinci SP system, is specifically designed for uniportal access, and represents the future of single-incision robotics. However, the da Vinci SP system is not universally available, and its widespread adoption in thoracic surgery has been limited by a lack of robust, articulating robotic staplers necessary for thick pulmonary vessels. Consequently, adapting the globally accessible da Vinci Xi platform for the URATS serves as a versatile alternative. Unlike the da Vinci SP system, the Xi platform can readily accommodate standard thick-tissue robotic staplers. Furthermore, as demonstrated in our series, this approach also offers flexibility to safely use standard, more economical manual endoscopic staplers, introduced by the bedside assistant. This stapling versatility allows centers to offer single-incision robotic surgery using their existing hardware and resources, acting as a practical bridge until dedicated single-port platforms become universally adopted.

As surgical education progressively shifts to online platforms, concerns regarding the reliability of available content have emerged. Indeed, a recent study by Yalçın et al¹⁴ evaluating the educational value of robotic-assisted thoracoscopic lobectomy videos demonstrated that the quality of such resources on online platforms is often heterogeneous and suboptimal. This underscores the necessity for rigorously standardized, peer-reviewed technical reports—such as the vertical parallel docking strategy described herein—to guide surgeons safely during their initial experience.

Limitations This study is limited by its retrospective design and a small sample size. Furthermore, the cohort was highly heterogeneous, comprising 3 different types of anatomical resections (lobectomy, segmentectomy, and pneumonectomy). While the docking phase was uniform across the procedures, this heterogeneity limited our ability to uniformly evaluate console time trends. Due to the single-center design of the study, the results reflect institutional proficiency in uniportal surgery and may not be immediately generalizable. Future prospective studies with larger cohorts are needed to further validate our technical observations and long-term outcomes.

CONCLUSIONS In conclusion, URATS is a safe and feasible technique for anatomical lung resections, capable of addressing complex anatomical scenarios, such as pneumonectomy and

segmentectomy, even during the initial experience. The principal contribution of this study is the validation of a standardized vertical parallel docking configuration, which, when combined with the en bloc/steering wheel maneuver strategy, effectively neutralizes the risk of external arm collision—the most significant barrier to URATS adoption. Furthermore, our experience demonstrates that the integration of manual staplers and elimination of CO₂ insufflation create a technically viable and resource-efficient workflow. These technical refinements transform URATS from a challenging novelty into a reproducible and accessible standard for minimally-invasive thoracic surgery.

ARTICLE INFORMATION

VIDEO The video files are available online at <https://dx.doi.org/10.20452/witm.2026.18021>.

ACKNOWLEDGMENTS None.

FUNDING None.

CONTRIBUTION STATEMENT Concept and design: Mİ. Data collection: Mİ and ÖY. Analysis and interpretation: Mİ. Writing the original draft: Mİ. Writing, review, and editing: Mİ and ÖY. All authors read and approved the final version of the manuscript.

CONFLICT OF INTEREST None declared.

AI STATEMENT Artificial intelligence was not used in the preparation of this manuscript.

OPEN ACCESS This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License ([CC BY-NC-SA 4.0](https://creativecommons.org/licenses/by-nc-sa/4.0/)), allowing third parties to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material, provided the original work is properly cited, distributed under the same license, and used for noncommercial purposes only.

HOW TO CITE İşcan M, Yavuz Ö. Uniportal robotic-assisted thoracic surgery for anatomical lung resections: initial experience and technical feasibility. *Wideochir Inne Tech Maloinwazyjne*. 2026; 21: 63-70. doi:10.20452/witm.2026.18021

JOURNAL INFORMATION

Videosurgery and Other Miniinvasive Techniques is an official journal of the Videosurgery Foundation.

REFERENCES

- 1 Gonzalez-Rivas D, Paradela M, Fernandez R, et al. Uniportal video-assisted thoracoscopic lobectomy: two years of experience. *Ann Thorac Surg*. 2013; 95: 426-432. [↗](#)
- 2 Qin SL, Huang JB, Yang YL, Xian L. Uniportal versus three-port video-assisted thoracoscopic surgery for spontaneous pneumothorax: a meta-analysis. *J Thorac Dis*. 2015; 7: 2274-2287. [↗](#)
- 3 Li Z, Ng CS. Future of uniportal video-assisted thoracoscopic surgery—emerging technology. *Ann Cardiothorac Surg*. 2016; 5: 127-132. [↗](#)
- 4 Ng CS, Wong RH, Lau RW, Yim AP. Minimizing chest wall trauma in single-port video-assisted thoracic surgery. *J Thorac Cardiovasc Surg*. 2014; 147: 1095-1096. [↗](#)
- 5 Trevis J, Chilvers N, Freystaetter K, Dunning J. Surgeon-powered robotics in thoracic surgery; an era of surgical innovation and its benefits for the patient and beyond. *Front Surg*. 2020; 7: 589-565. [↗](#)
- 6 Gonzalez-Rivas D, Manolache V, Bosinceanu ML, et al. Uniportal pure robotic-assisted thoracic surgery—technical aspects, tips and tricks. *Ann Transl Med*. 2023; 11: 362. [↗](#)
- 7 Manolache V, Motas N, Bosinceanu ML, et al. Comparison of uniportal robotic-assisted thoracic surgery pulmonary anatomic resections with multiport robotic-assisted thoracic surgery: a multicenter study of the European experience. *Ann Cardiothorac Surg*. 2023; 12: 102-109. [↗](#)
- 8 Kaneda H, Nakano T, Utsumi T, Murakawa T. Feasibility and safety of uniportal robotic-assisted thoracoscopic surgery in initial series of anatomical pulmonary resections under learning curve. *Gen Thorac Cardiovasc Surg*. 2025; 73: 52-57. [↗](#)
- 9 Paradela M, Garcia-Perez A, Fernandez-Prado R, et al. Uniportal robotic versus thoracoscopic assisted surgery: a propensity score-matched analysis of the initial 100 cases. *Ann Cardiothorac Surg*. 2023; 12: 23-33. [↗](#)
- 10 Ning Y, Chen Z, Zhang W, et al. Short-term outcomes of uniportal robotic-assisted thoracic surgery anatomic pulmonary resections:

experience of Shanghai Pulmonary Hospital. *Ann Cardiothorac Surg.* 2023; 12: 117-125. [↗](#)

11 Chen J, Gao Y, Yang Y, et al. Comparison of perioperative outcomes between hybrid uniportal robotic-assisted and uniportal video-assisted thoracoscopic surgery – a propensity score matching analysis. *Ann Thorac Med.* 2025; 20: 125-133. [↗](#)

12 Mercadante E, Martucci N, De Luca G, et al. Early experience with uniportal robotic thoracic surgery lobectomy. *Front Surg.* 2022; 9: 1005860. [↗](#)

13 Stamenovic D, Schiller P, Karampinis I, et al. Uniportal robotic assisted surgery for anatomical lung resection – first German experience. *Int J Med Robot.* 2023; 19: e2580. [↗](#)

14 Yalçın NC, Güler A, Özkaya M. Assessment of the educational value of robotic-assisted thoracoscopic pulmonary lobectomy videos. *Wideochir Inne Tech Maloinwazyjne.* 2025; 20: 456-463. [↗](#)