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Single-port robotic gastrectomy in gastric cancer: a narrative review on the state of the art and outlook

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Minimally invasive surgery for gastric cancer has progressed from conventional laparoscopy to reduced-port and single-incision techniques, and further to robotic systems that address ergonomic and technical constraints. Reduced-port laparoscopic gastrectomy and single-incision laparoscopic gastrectomy demonstrated feasibility and cosmetic advantages but faced inherent limitations—restricted triangulation, instrument collisions, and unstable visualization—resulting in steep learning curves and selective adoption. Reduced-port robotic platforms, notably Single-Site (Intuitive Surgical)–based reduced-port totally robotic distal gastrectomy, mitigated some limitations and enabled complex tasks, including D2 lymphadenectomy and intracorporeal anastomosis, with acceptable short-term outcomes. The da Vinci Single-Port (SP) system (Intuitive Surgical) represents the latest step in this trajectory, introducing three fully-wristed instruments and a flexible 3-dimensional endoscope through a single multichannel cannula, restoring internal triangulation and reducing collisions. Early clinical experiences from high-volume centers report no or low conversion rates, minimal blood loss, adequate lymph node retrieval, and acceptable morbidity across distal and selected total gastrectomies. Practical considerations for safe adoption include optimized port placement, deliberate scope orientation, and close collaboration with an experienced bedside assistant. Nonetheless, the platform's current lack of integrated robotic staplers and advanced energy or suction devices limits console autonomy; most cases still require an assistant port. Evidence remains confined largely to small series without head-to-head trials against reduced-port multi-arm robotic approaches. Future priorities include SP-dedicated energy and stapling tools, careful expansion to complex procedures, and robust multicenter studies assessing long-term oncologic outcomes. Taken together, the SP platform can be regarded as the present pinnacle of reduced-port gastrectomy and a promising path toward a reproducible, cosmetically favorable, and ergonomically enhanced approach for gastric cancer surgery.
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Key Words: Stomach neoplasms, Gastrectomy, Robotics, Single-port laparoscopy

INTRODUCTION

Surgical treatment inevitably accompanies trauma to uninvolved tissues. In cancer surgery, the paramount objective is achieving maximal oncological radicality while minimizing invasiveness to adjacent structures and maintaining low complication rates [1]. To access the target organ and retrieve the resected specimen, an incision through the abdominal wall is necessary.

During the era of open surgery, the incision size had to

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provide sufficient space not only for removing the resected specimen but also for adequate working space. Typically, the incision was 2–3 times larger than the target organ itself. For optimal surgical performance, an extensive working space was considered essential—"big incision, big surgeon" was common wisdom to ensure patient safety.

However, the advent of minimally invasive surgery fundamentally altered this paradigm [2-4]. Pneumoperitoneum and separate trocars now provide the necessary working space for operators and assistants, meaning incisions need only be as large as the specimen itself [5-9]. While surgeons cannot modify the extraction incision size—which remains constrained by anatomical considerations—they can optimize the size and number of working ports [10-16].

The history of reduced-port gastrectomy represents a systematic optimization of one primary extraction site and a minimized set of auxiliary trocar ports [15]. This technological evolution encompasses 6 distinct developmental stages across 2 major surgical platforms. In laparoscopic surgery, these stages include (1) conventional multiport laparoscopic gastrectomy and (2) reduced-port laparoscopic gastrectomy (RPLG). In robotic surgery, the evolution has progressed through (3) conventional multiport robotic gastrectomy, (4) reduced-port robotic gastrectomy (RPRG) using conventional robotic arms, (5) Single-Site robotic gastrectomy (Intuitive Surgical), and finally (6) da Vinci Single-Port (SP) system robotic gastrectomy (Intuitive Surgical).

This progression reflects the surgical community's continuous effort to minimize patient trauma while preserving oncological safety and surgical precision [3,15,17]. The evolution of minimally invasive gastrectomy is schematically depicted in Fig. 1. Each stage addresses limitations of previous techniques and introduces innovative approaches to improve patient-centered outcomes [13,18-20]. The evolution from conventional multiport approaches to sophisticated single-port systems demonstrates how modern minimally invasive gastric cancer

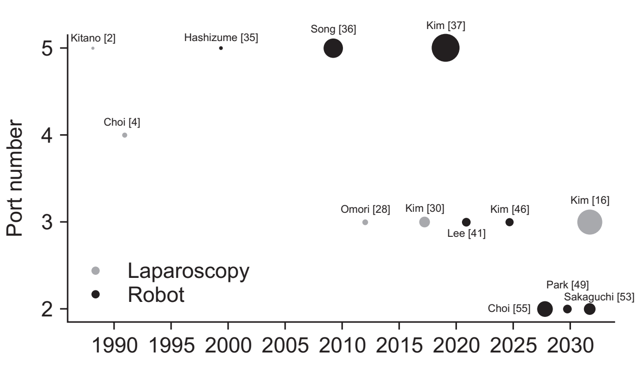

Fig. 1. Chronological trend of port reduction in landmark studies. The circle size corresponds to the number of patients in each study.

surgery continues to advance the fundamental principles of oncological adequacy while reducing parietal trauma, postoperative pain, and visible scarring [21-25]. While this review focuses on the da Vinci SP system in line with the scope of the special issue, it is noted that total gastrectomy has also been reported using a novel single-port robotic platform [26].

A comprehensive literature search was conducted for publications from January 2022 to July 15, 2025 in the PubMed and Embase databases. The search algorithms combined terms related to single-port, robotic surgery, and gastrectomy, specifically: "single-port," "single port," "SP," "robotic," "robotic surgery," "robot-assisted," and "gastrectomy" (including synonyms and equivalent spelling variants) using Boolean operators (AND, OR); for example, ("single-port" OR "single port" OR "SP") AND ("robotic" OR "robotic surgery" OR "robot-assisted") AND ("gastrectomy"). Articles were screened by 2 independent reviewers, and discrepancies were resolved by discussion and consensus.

MAIN TEXT

Evolution of reduced-port laparoscopic gastrectomy

Over the past few decades, surgical management of gastric cancer has undergone remarkable evolution, progressing from traditional open approaches to minimally invasive techniques. Since Kitano et al. [2] first reported laparoscopic gastrectomy in 1994, laparoscopic approaches have gradually replaced open surgery as a standard treatment for gastric cancer. Large-scale randomized controlled trials from Korea, Japan, and China demonstrated comparable oncological safety with superior short-term outcomes, including reduced blood loss, fewer wound complications, and faster recovery [3,5,7-9,27]. Conventional multiport laparoscopic gastrectomy, typically employing 4 to 5 trocars, became widely adopted in East Asia from the 1990s onward, with robust evidence confirming stable triangulation and adequate lymphadenectomy while maintaining comparable long-term survival to open gastrectomy [5,6].

As surgical techniques matured, the first report of RPLG was published [28]. Efforts to further minimize invasiveness led to the development of RPLG [10-12,24,29,30] and single-incision laparoscopic gastrectomy (SILG) [28,31-34]. These approaches sought to decrease surgical trauma and improve cosmetic outcomes beyond what conventional multiport techniques could achieve.

Several comparative studies demonstrated that both RPLG and SILG could achieve operative times, blood loss, and lymph node yields comparable to conventional multiport procedures [12,13,23,33]. Early series also suggested potential advantages in postoperative pain scores and cosmetic satisfaction [21,33]. However, these benefits came with significant technical trade-offs. The reduced number of ports resulted in restricted instrument triangulation, frequent external and internal instrument collisions, and compromised visualization due to crowding of the laparoscope and instruments within a limited working space. The use of straight, rigid laparoscopic instruments further limited surgical dexterity, particularly in narrow operative fields. These ergonomic challenges contributed to a steep learning curve and have limited their widespread adoption [13-15,23].

The progression from multiport to reduced-port laparoscopic techniques clearly demonstrated a trajectory toward less invasive gastric cancer surgery. However, the persistent technical limitations highlighted an unmet clinical need: preserving the cosmetic and patient-centered benefits of reduced-port access while overcoming ergonomic constraints through improved visualization, enhanced instrument maneuverability, and restored triangulation. This need ultimately prompted the exploration of advanced robotic platforms specifically designed for reduced-port surgery.

Evolution of conventional and reduced-port robotic gastrectomy

Robotic gastrectomy was introduced in the early 2000s as a new minimally invasive approach, providing enhanced dexterity, tremor filtration, and stable 3-dimensional (3D) visualization. The first clinical study from Japan demonstrated the technical feasibility of robot-assisted gastrectomy [35]. The first Korean study subsequently reported that multiport robotic systems enabled safe performance of D2 lymphadenectomy and complex reconstructions with acceptable short-term outcomes [36]. A multicenter prospective study from the Korean Robotic Gastrointestinal Surgery Study Group further confirmed that robotic gastrectomy achieved comparable oncologic safety with reduced blood loss and stable surgical performance, although operative times remained longer than with laparoscopy [37]. Other studies have consistently shown that conventional multiport systems such as the da Vinci Si and Xi provide sufficient stability to perform D2 lymphadenectomies and complex reconstructions [17]. In particular, robotic total gastrectomy has the advantages of a stable platform that helps shorten the learning curve compared to laparoscopic approaches [38-40]. Despite these advantages, the requirement for multiple ports and extracorporeal arm collisions limited further reduction of surgical invasiveness.

To minimize the number of incisions, reduced-port or Single-Site robotic platforms were subsequently explored in gastric cancer surgery. In 2018, a Korean clinical study reported reduced-port robotic distal gastrectomy (RPRDG) using the da Vinci Single-Site platform combined with an additional robotic arm [41]. The study demonstrated safety, with no conversions, acceptable operative time, low blood loss, and robust lymph node retrieval. Building on this, a subsequent report of large case numbers of RPRDG compared with conventional laparoscopic approaches showed that RPRDG was associated with significantly less blood loss and comparable or superior lymph node yield, although operative times were somewhat longer [18,42].

Efforts were also made to expand the scope of reduced-port robotic surgery. For example, intracorporeal delta-shaped gastroduodenostomy was successfully performed during RPRDG, overcoming one of the major technical challenges of reduced-port approaches [43,44]. In addition, reduced-port robotic total or proximal gastrectomy incorporating intracorporeal esophagojejunostomy was reported as feasible, demonstrating that even complex reconstructions could be attempted in this setting [19]. Furthermore, a propensity score-matched analysis comparing RPRDG with D2 lymph node dissection and conventional laparoscopic distal gastrectomy in advanced gastric cancer demonstrated that RPRDG achieved significantly less blood loss and greater retrieval of lymph nodes, with comparable complication rates, thereby confirming its feasibility in more advanced disease contexts [45]. Contrary to the RPRG using Single-Site, the first RPRG using a conventional robotic arm was reported in 2020 in Korea [46]. More recently, a novel technique termed trans-umbilical lymphadenectomy using an articulating bipolar vessel-sealing device (TULAB) has been introduced. Unlike Single-Site–based approaches, TULAB utilized an articulating vessel-sealing device for RPRG, aiming to improve surgical ergonomics and facilitate lymph node dissection [47]. Recently, a nationwide study collecting more than 1,000 RPRG, regardless of robotic system, such as conventional robot, Single-Site or SP system, was reported. Compared with matched conventional laparoscopic results, it showed shorter hospital stay, low conversion rate [48]. Collectively, these findings confirmed the technical feasibility of RPRG, but challenges such as limited instrument maneuverability, restricted triangulation, and ergonomic difficulties during lymphadenectomy and reconstruction limited widespread adoption, confining use to selected patients and specialized centers.

The introduction of the da Vinci SP system represented a significant advancement in addressing these limitations. Unlike earlier platforms, the SP system was specifically designed to overcome the challenges of reduced-port approaches, aiming to restore triangulation and reduce instrument collisions through internally articulated instruments and a flexible endoscope [20]. Its introduction marked a pivotal milestone, creating new possibilities for applying advanced robotic capabilities within a truly single-incision paradigm for gastrectomy. Thus, the transition from multiport to Single-Site and finally to SP system represents an ongoing pursuit of less invasive yet precise surgery. Early clinical experiences with SP robotic gastrectomy have demonstrated the feasibility and safety of this system, with encouraging short-term outcomes such as reduced blood loss, rapid recovery, and acceptable complication rates [49-52]. Representative reports of these early experiences are summarized in Table 1.

Current application of the da Vinci Single-Port in gastrectomy

The clinical application of the da Vinci SP system for gastric cancer surgery has been increasingly reported in recent years, and published clinical reports to date are summarized in Table 2. Most of the early clinical experiences have come from Korea and Japan. The first prospective phase I/II trial from Korea evaluated 19 patients undergoing robotic distal gastrectomy using the SP system and reported no conversions, no additional trocar use, and no major complications, thereby confirming safety and feasibility in selected cases [49]. Similarly, an initial Japanese single-center experience with 20 consecutive cases demonstrated no intraoperative conversions, acceptable morbidity, minimal blood loss, and adequate lymph node retrieval, supporting the technical feasibility of this approach during early adoption [50]. In addition, more recent comparative data indicate that the SP platform achieves safety outcomes comparable to those of the Xi system, with potential ergonomic advantages during distal gastrectomy [53].

Beyond distal gastrectomy, hybrid approaches have also emerged. A 23-case series of the minimally invasive laparoscopic and robotic (MILAR) technique (using the SP system) included distal, proximal, and total gastrectomies, showing low blood loss and no ≥grade III complications, and was proposed as a practical bridge during institutional onboarding of SP [51,52]. In China, the first single-port robotic total gastrectomy for advanced gastric cancer demonstrated the

Table 1. Landmark study of reduced port gastrectomy

Study	Year	Country	No. of patients	Platform	Ports	Milestone
Kitano et al. [2]	1994	Japan	1	Lap	5	World's first laparoscopic gastrectomy
Choi et al. [4]	1996	Korea	6	Lap	4	First laparoscopic gastrectomy in Korea
Omori et al. [28]	2011	Japan	7	Lap	3	RPLG
Kim et al. [30]	2015	Korea	30	Lap	3	RPLG in Korea
Kim et al. [16]	2025	Korea	174	Lap	3	RCT of RPLG
Hashizume et al. [35]	2002	Japan	2	Robot	5	First report of RG
Song et al. [36]	2009	Korea	100	Robot	5	RG in Korea
Kim et al. [37]	2016	Korea	223	Robot	5	Prospective study of RG
Lee et al. [41]	2017	Korea	19	Robot	3	RPRG using Single-Site
Kim et al. [46]	2020	Korea	18	Robot	3	RPRG using conventional ports
Choi et al. [55]	2023	Korea	70	Robot	2	Prospective study of RPRG using Single-Site
Park et al. [49]	2023	Korea	19	Robot	2	RPRG using Single-Port
Sakaguchi et al. [53]	2025	Japan	36	Robot	2	Propensity-matched comparison of Single-Port vs. Multi-Port

Lap, laparoscopy; RPLG, reduced-port laparoscopic gastrectomy; RCT, randomized controlled trial; RG, robotic gastrectomy; RPRG, reduced-port robotic gastrectomy.
Single-Site and Single-Port: Intuitive Surgical.

Table 2. Reports of gastrectomy using the Single-Port (SP) system

Study	Year	Country	No. of patients	Ports	Key findings
Cui et al. [54]	2022	China	1	2	First SP robotic total gastrectomy for advanced gastric cancer; D2 lymphadenectomy feasible and safe via minimal incision
Park et al. [49]	2023	Korea	19	2	Phase I/II trial of SP distal gastrectomy; 0% major complications; excellent cosmetic outcome via Pfannenstiel incision
Ito et al. [50]	2025	Japan	20	2	Single-center series showing safe introduction of SP distal gastrectomy with standard lymphadenectomy for stage I/II disease
Yoshikawa et al. [51]	2025	Japan	5	4	Described MILAR hybrid (laparoscopic + SP robotic) distal gastrectomy; auxiliary ports improve traction and overcome single-port limits
Yoshikawa et al. [52]	2025	Japan	23	4	Reported short-term outcomes of MILAR/SP hybrid gastrectomy; minimal blood loss (median 13 mL) and acceptable operative time

MILAR, minimally invasive laparoscopic and robotic.

feasibility of D2 lymphadenectomy with extracorporeal Roux-en-Y reconstruction [54]. In addition, total gastrectomy using a novel single-port robotic platform has been reported [26]. Collectively, these studies indicate that SP robotic gastrectomy is technically feasible across distal and total resections, with promising short-term outcomes when performed in expert centers.

The SP system integrates a flexible 3D endoscope and 3 articulating instruments through a single 25-mm multichannel trocar, minimizing abdominal incisions and enhancing cosmetic and ergonomic outcomes. Its internally elbowed and wristed instruments recreate triangulation within confined spaces, overcoming the instrument crowding and loss of motion typical of single-incision laparoscopy. Early clinical studies have consistently reported minimal intraoperative blood loss and adequate lymph node retrieval, indicating that oncologic safety can be maintained [49-52]. In addition, the single-arm docking architecture reduces external arm collisions, simplifies the operating field, and may shorten docking time [20]. Collectively, these features indicate that the SP system provides an intuitive and comfortable operating environment where previous reduced-port approaches have been technically demanding.

Despite these benefits, several limitations remain. In most procedures, a truly "pure" single-port operation is still uncommon, as an assistant port is often required for stapling or suction. The current SP system lacks integrated staplers and advanced energy devices, limiting full console autonomy. During the initial learning curve, surgeons may encounter intracorporeal collisions and longer operative times until spatial orientation is achieved. Moreover, the existing evidence is confined to small, single-center series; larger comparative studies are warranted to validate its long-term clinical and economic benefits.

RPLG, generally performed with 2 or 3 trocars, has been shown to yield acceptable short-term outcomes [12]. However, the procedure demands considerable technical expertise due to limited instrument maneuverability. SP system preserves the incision economy of RPLG while overcoming these constraints. By enhancing precision and accessibility, SP may extend the reduced-port concept to a broader group of surgeons who are less experienced with advanced laparoscopic maneuvers.

SILG represents another approach to minimize surgical access. Although it has cosmetic advantages, SILG is limited by restricted triangulation and a steep learning curve. SP robotics effectively resolves these limitations, providing a reproducible single-incision platform with enhanced precision and ergonomic stability.

RPRG is the most widely studied reduced-port robotic approach, with large Korean series confirming its safety and oncologic adequacy [18,42,55]. However, multi-arm interference and suboptimal ergonomics remain inherent challenges. The SP system simplifies the operative field and may lower the technical barrier for reduced-port surgery.

Practical surgical tips for beginner surgeons

Adopting the SP system in gastrectomy may present difficulties not only for novice surgeons but also for those who are not familiar with reduced-port surgery. The limited working space and distinctive instrument motion may feel unfamiliar and difficult at first, but a few practical considerations can ease this transition. Sharing these points is not meant as formal instruction, but rather as simple tips that may help surgeons approach the SP system more comfortably and safely during their early experience.

Proper port positioning is important for stable performance in SP gastrectomy. The SP port is usually inserted through an umbilical incision, which is simple and familiar to most surgeons. However, this approach may feel tight when working along the greater curvature because the distance to the target area is short. As an alternative, a Pfannenstiel incision has been introduced [49]. This lower transverse incision offers a wider working angle, better cosmetic results, and may reduce the risk of incisional hernia and postoperative pain. The articulated camera of the SP system now makes this approach feasible, even though earlier robotic platforms could not secure an adequate view through this site. Despite these advantages, the distance can be long when operating on the upper stomach, and visualization may be limited in obese patients. For this reason, the Pfannenstiel approach is best applied in carefully selected patients. The assistant port is also critical. Placement on the left side is helpful for Billroth I reconstruction, whereas a right-sided port is more suitable for Billroth II or esophagojejunostomy, and this adjustment supports safe stapling and reconstruction during the early phase of adoption [49].

One of the most frequent technical challenges for surgeons new to the SP system is intra-abdominal collision among the 3 robotic arms and the endoscope. This is primarily due to their coaxial entry through a single multichannel port. Without deliberate orientation, the instruments may overlap, limiting the range of motion and obscuring the surgical field. To mitigate this, scope positioning plays a key role. The SP system provides 2 scope orientations: an "above mode," with the scope at 12 o'clock angled 0°–30° downward, and a "below mode," with the scope at 6 o'clock angled 0°–30° upward; switching is accomplished by in-case arm rotation. When the endoscope is placed in the above mode, the camera provides a downward view, which is particularly useful for suprapancreatic lymph node dissection and anastomotic reconstruction [50]. Conversely, switching to the below mode reorients the camera upward, allowing improved visualization along the posterior gastric wall and splenic hilum. Alternating between these 2 orientations enables surgeons to adapt to different anatomical planes without redocking. In addition, diagonal alignment of the scope and retractor—such as aligning in a 12–6 or 3–9 orientation—creates more space between instruments. This "cross-configuration" reduces the chance of clashing tips and enhances triangulation. However, in the above mode, sometimes upward traction may be limited because the scope and retractor occupy the same quadrant; therefore, some surgeons add auxiliary upward traction using various organ retractors to re-establish cranial counter-traction or a pseudo-coaxial setup [50]. As a result, instrument movement becomes smoother, ergonomics are improved, and operative efficiency tends to increase once the surgeon becomes accustomed to these adjustments. For visual reference, Supplementary Video summarizing the complete SP distal gastrectomy procedure is provided.

Because the SP system currently lacks dedicated staplers, advanced energy devices, or suction devices, the role of a laparoscopic assistant is indispensable, especially in the early phase of adoption. The assistant is responsible for essential tasks such as liver retraction, suction and irrigation, and the introduction of staplers for transection and reconstruction [49,50]. In addition, advanced energy devices are often manipulated by the assistant to facilitate hemostasis and tissue dissection when required. For hemostasis and fine dissection near critical structures, a double bipolar technique—typically pairing a fenestrated bipolar grasper for traction/low-thermal hemostasis with a Maryland bipolar dissector for precise coagulation–dissection—can minimize instrument exchanges while providing controlled thermal spread; in selected situations, dual Maryland bipolar dissectors may be mounted in both working arms to maximize precision and bipolar control. When dense planes or brisk oozing are encountered, assistant-driven advanced energy devices may be selectively added [1].

Although the SP system provides a robotic clip applier, some surgeons prefer to have the laparoscopic assistant apply clips for vascular and lymphatic control. This preference is often related to cost considerations and the additional time required to exchange robotic arms. In practice, assistants frequently use polymer or metal clips during vessel division and lymphadenectomy. A well-trained assistant who can anticipate these steps and perform clipping efficiently not only ensures hemostatic safety but also helps maintain a smooth surgical flow for the console surgeon.

Early experiences indicate that SP robotic distal gastrectomy is most appropriate for patients with early-stage gastric cancer, relatively low body mass index (BMI), and tumors located in the middle to lower stomach with limited nodal involvement [49,56]. These cases allow surgeons to become familiar with the single-port platform while minimizing intraoperative risk. As proficiency improves, surgeons may gradually extend indications to more challenging cases, such as patients with higher BMI, tumors in the proximal stomach, or procedures requiring more extensive lymph node dissection. Ultimately, total gastrectomy with intracorporeal reconstruction can be attempted after sufficient experience is gained. This stepwise progression mirrors the learning process of multiport robotic and laparoscopic gastrectomy, where distal procedures typically precede proximal or total resections.

Hybrid strategies can also play an important role during the learning phase. The MILAR approach, which combines SP robotic docking with a laparoscopic approach, has been shown to maintain the cosmetic and ergonomic advantages of reduced-port surgery while providing additional flexibility for stapling, retraction, or suction [51,52]. Such approaches are particularly valuable for young surgeons or institutions beginning their SP program, as they help reduce technical hurdles and operative stress while preserving the benefits of a minimally invasive platform.

Meticulous attention to port placement, scope orientation, and efficient collaboration with the assistant are key factors in overcoming the technical constraints of SP gastrectomy. For novice surgeons, gradual adoption beginning with carefully selected patients, and the use of hybrid approaches when appropriate, can facilitate safer implementation. These refinements may help shorten the learning curve and support the broader and safer dissemination of SP robotic surgery for gastric cancer.

FUTURE PERSPECTIVES

The rapid advancement of minimally invasive and robotic technologies has positioned the da Vinci SP system as a potential endpoint in the evolution of reduced-port gastrectomy. It represents the most advanced step so far in gastric cancer surgery with reduced-port access, but several important issues must still be addressed before this platform can be broadly applied and established as a widely adopted standard [50].

Although the SP system provides excellent dexterity and visualization, it still does not include advanced energy devices, staplers, or suction/irrigation tools. Surgeons must therefore depend on assistant ports or conventional laparoscopic devices. This limitation makes it difficult to realize the concept of true single-port surgery and highlights the urgent need for SP-dedicated vessel-sealing devices, staplers, and multifunctional tools. Without such instruments, essential parts of the operation such as lymph node dissection, reconstruction, and other complex tasks cannot fully benefit from the SP platform.

So far, most clinical studies using the SP system have focused on distal gastrectomy [49,50]. Early experiences with total gastrectomy have also been reported, including procedures with D2 dissection and successful extracorporeal Roux-en-Y anastomosis via a 7-cm-long epigastric incision [54]. These pioneering cases indicate that the application of SP robotic surgery can be extended to more complex procedures, although further evidence is still required before broader adoption.

Up to now, most SP gastrectomy studies have focused on short-term feasibility and safety [49-52]. Long-term oncologic outcomes, however, remain largely unknown. As with previous developments in laparoscopic gastric cancer surgery [5,7-9], the real test for SP gastrectomy will be disease-free survival, recurrence patterns, and overall survival. Well-designed multicenter prospective studies with extended follow-up will be essential to confirm the oncologic safety of this approach.

Overall, the future of SP robotic gastrectomy will hinge on 3 key aspects. These include the development of SP-dedicated energy devices and staplers, the safe application to technically demanding procedures such as total gastrectomy, and the accumulation of robust long-term outcome data. Addressing these challenges will be essential in establishing SP robotic gastrectomy as a dependable option for gastric cancer treatment.

CONCLUSION

Minimally invasive surgery for gastric cancer has evolved from conventional laparoscopy to reduced-port and single-incision techniques, and further to robotic systems that address the ergonomic and technical limitations of laparoscopy. Reduced-port robotic approaches, particularly with the da Vinci SP platform, represent the most advanced step in this progression. Early clinical experiences have demonstrated the safety and feasibility of SP gastrectomy with encouraging short-term outcomes and adequate lymph node retrieval. Although current applications remain limited to select patients in specialized centers, ongoing technological refinements and long-term oncological validation will be essential. Taken together, the da Vinci SP system can be regarded as the current state of the art in the evolution of reduced-port gastrectomy and a promising step toward establishing a new paradigm in minimally invasive gastric cancer surgery where 1 or 2 incisions is a standard, and 3 or more incisions is optional, even unnecessary.

SUPPLEMENTARY MATERIALS

Supplementary Video can be found via https://doi.org/10.4174/astr.2026.110.1.26.

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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