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Brief Correspondence

Current Expectations and Opinions on Single-port Robotic Surgery: A Survey Among European Experts by the SPARC Collaborative Group

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Abstract

Single-port (SP) robotic surgery is a relatively new technology that is expected to become available on the European market within a year. We investigated the current expectations of robotic surgery experts and opinion leaders practicing in Europe. A 17-item online questionnaire was sent to 120 participants identified as “experts” on the basis of their general contributions to the field of robotic surgery. Overall, 90 responses were registered, with a response rate of 75%. Italy (30%), France (15%), and the UK (12%) provided the most participants, who worked mainly in academic—either public (60%) or private (20%)—hospitals. Most respondents (79%) had no previous experience with “single site” surgery, and attendance at scientific meetings (79%) and perusal of the literature (65%) were the sources of SP knowledge most frequently reported. The perceived advantages of SP robotic surgery included lower invasiveness (61%), easier access to the retroperitoneal or extraperitoneal space (53%), better cosmetic results (44%), and lower postoperative pain (44%). The most “appealing” SP procedures were retroperitoneal partial nephrectomy via an anterior approach (43%) and transvesical simple prostatectomy (43%). Within the limitations of this type of analysis, our findings suggest high interest and a positive attitude towards SP technology overall.

Patient summary: Technology for single-port (SP) robotic surgery, in which just one skin incision is made in the abdomen to perform the operation, will soon be available in Europe. We conducted a survey on SP surgery among European experts in urological robotic surgery. The results show that there is high interest in and a positive attitude to SP surgery. The SP approach could result in better cosmetic results and lower postoperative pain for patients.

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The da Vinci Single Port (SP) platform (Intuitive Surgical, Sunnyvale, CA, USA) represents one of the latest technological innovations in robotic urological surgery [1]. Currently approved for clinical use in the USA, South Korea, and Japan, the SP platform is expected to become available on the European market very soon. Since its initial clinical use [2], a growing body of evidence has shown promising outcomes with this approach [3], leading to increasing popularity and widespread adoption.

The introduction of the SP system has raised interest in the urology community and generated discussion about the advantages and disadvantages of this technology. We conducted a survey to assess the potential impact of SP robotic surgery in Europe, with questions to capture interest, attitudes, expectations, and potential concerns among European experts in the field.

A 17-item anonymous online survey [4] was realized using a specialized web platform (Typeform S.L., Barcelona, Spain). The questionnaire covered several domains, including baseline characteristics, hospital setting, surgeon background (previous experience with single-site surgery using multiport robots, knowledge about SP), opinions on acquiring and adopting the SP, perspectives on potential advantages and pitfalls of implementation, preferred indications/procedures, and patient perspectives. The survey questions are listed in [Supplementary Table 1](#). An invitation to participate in the survey was sent via e-mail

to 120 individuals identified as “experts” on the basis of their general contributions to the field of robotic surgery ([Supplementary Table 2](#)). After 1 month, responses were collected and a descriptive analysis was conducted. No incentive was given to the survey responders.

Overall, 90 responses were registered, with a response rate of 75%. The median age of responders was 50.5 years (interquartile range 45–57.75) and the majority were male (91%). Italy (30%), France (15%), and the UK (12%) provided the most participants ([Fig. 1](#)), who worked mainly in academic public (60%) hospitals. A da Vinci X/Xi platform was available in almost all centers (95%), and 24% and 11% also had Hugo and Versius systems, respectively. The median number of robotic procedures performed yearly at their institutions was 400 (interquartile range 220–560). Most respondents (79%) had no previous experience with “single site” surgery, and attendance at scientific meetings (79%) and the literature (65%) were the sources of SP knowledge most frequently identified. Across all the responders, 68% stated their hospital should acquire an SP platform, and 74% would be very/somewhat likely to use the platform, if available. Most surgeons (59%) foresee using SP for “selected” cases, while 23% think it is too early to say and 18% would use the platform for all robotic cases.

The advantages of SP robotic surgery perceived include lower invasiveness (61%), easier access to the retroperitoneal or extraperitoneal space (53%), better cosmetic

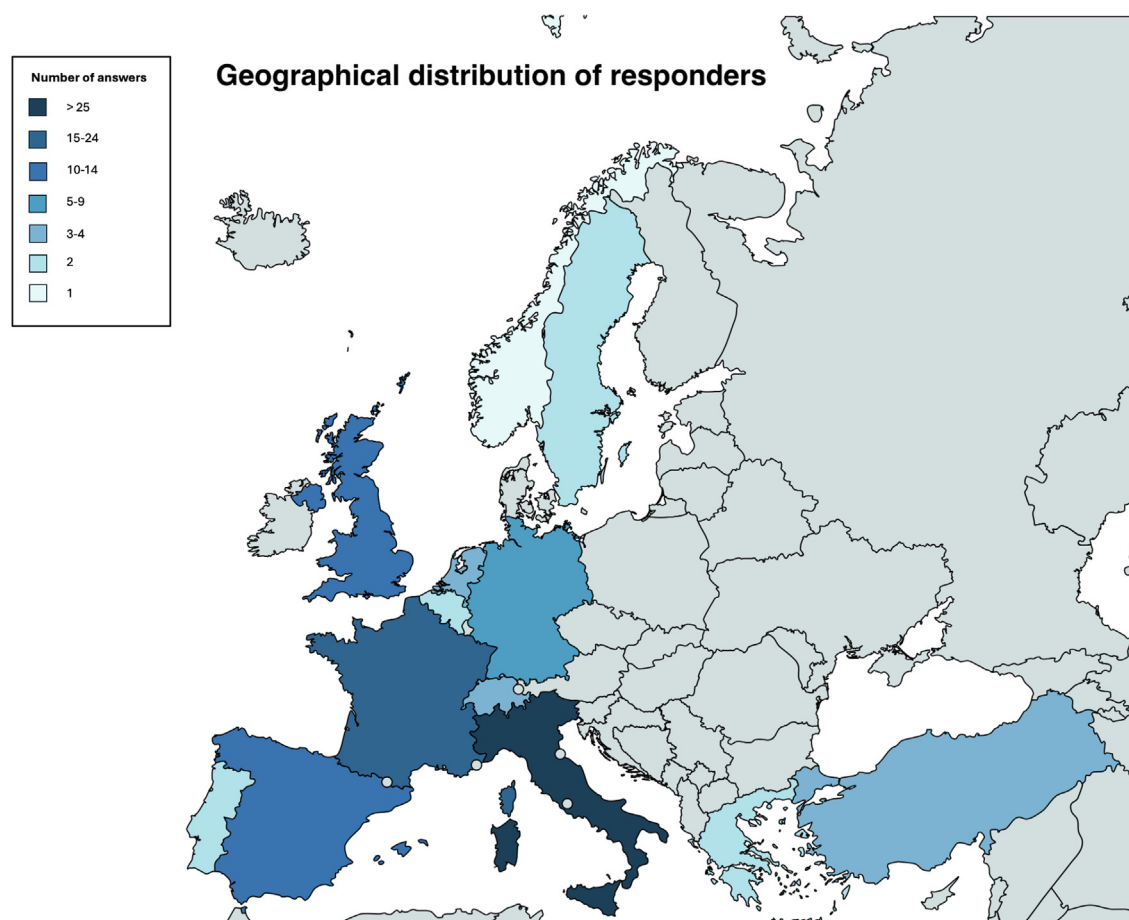


Fig. 1 – Geographical distribution of the survey responders.

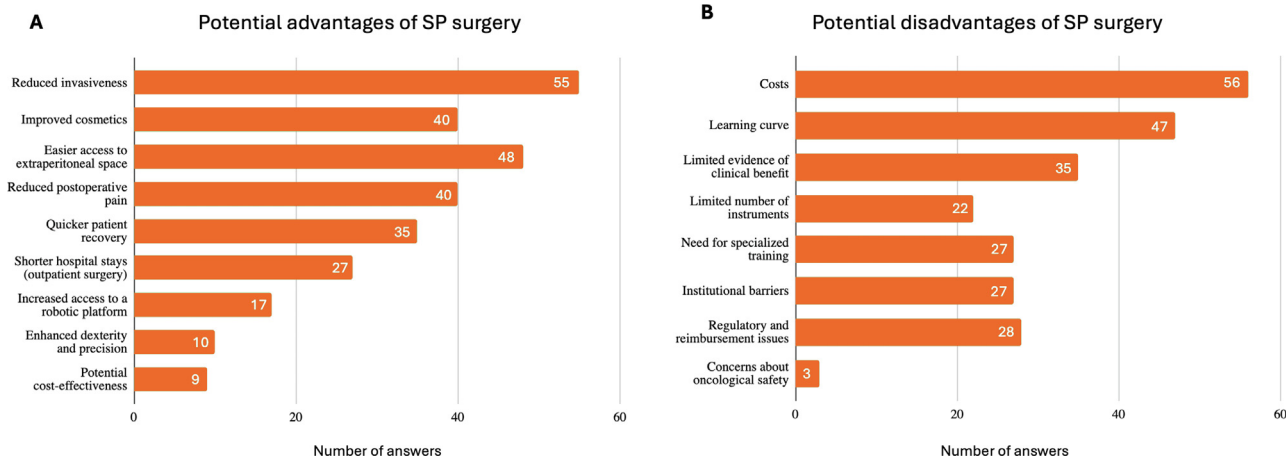


Fig. 2 – Primary advantages and disadvantages of single-port robotic surgery.

results (44%), and lower postoperative pain (44%; Fig. 2A). Potential challenges in implementing SP robotic surgery foreseen include costs (62%) and the learning curve (52%; Fig. 2B).

The most “appealing” SP procedures were retroperitoneal partial nephrectomy via an anterior approach (43%) and transvesical simple prostatectomy (43%), followed by pyeloplasty via any approach (41%) and extraperitoneal radical prostatectomy (40%). Most experts believe that patients will be highly enthusiastic (40%) about introduction of the SP platform, with the most “appealing” advantages from a patient perspective identified as better cosmetic results (61%) and lower postoperative pain (51%).

The survey results depict a scenario in which European surgeons are awaiting market availability of the SP platform with anticipation of an opportunity to assess and adopt this innovative tool. These opinions of European experts align with messages conveyed in the literature regarding potential advantages in terms of invasiveness, length of stay, cosmetic results, and postoperative pain [5,6]. In a comparison between inpatient and outpatient care, a significant association between operative time, narcotic use, and hospitalization time was observed for SP surgery [7]. Adoption of SP surgery has the potential to address these aspects and achieve advantages to ultimately enhance health care value in terms of lower postoperative morbidity, length of hospital stay, and associated costs. It is yet to be confirmed if these variables apply to European patients, who are mainly treated in universal health care systems with longer hospital stays and minimal opioid use. Indeed, similar results have been previously reported for a multiport platform [8,9]. Therefore, assessment of whether the suggested clinical benefits justify the platform costs, a concern expressed by most respondents, is essential. There are limited cost-effectiveness analyses on the adoption of SP surgery. In the only study available, Lenfant et al. [10] showed that implementation of SP technology for radical prostatectomy resulted in higher overall surgical care costs in comparison to multiport surgery. The likely explanation is that the lower costs associated with hospitalization, which is shorter

after SP surgery, are offset by its higher surgical consumable costs. A minimum requirement to justify the adoption of SP surgery may be safe implementation of SP procedures without compromising surgical outcomes previously achieved with multiport robotic surgery. Successful establishment of protocols for outpatient surgery, coupled with better postoperative pain management and cosmetic results, could play a pivotal role in shifting the paradigm towards SP surgery.

Interestingly, a progressive increase in adoption of the Hugo platform is evident from this snapshot, which may provide a basis for an intriguing comparison with the SP surgical system once both are available in the hands of experienced surgeons [11]. From a technical standpoint, according to the responders’ opinions, the most appealing aspect of SP surgery is rediscovery of the extraperitoneal space, as the SP platform overcomes multiport limitations related to this approach [12]. While extraperitoneal procedures can certainly be performed using a multiport robot, it is undeniable that the SP platform will facilitate wider adoption of procedures that avoid the peritoneal cavity. Survey participants reported that retroperitoneal partial nephrectomy via an anterior approach [13] and transvesical simple or extraperitoneal radical prostatectomy are the most appealing of the procedures possible with the SP platform. Interest in the anterior approach for renal surgery may be attributed to its flexibility, as it provides access to the entire urinary tract in an extraperitoneal fashion, along with the technical efficacy that requires minimal tissue dissection to reach the renal hilum.

Even though there is a specific learning curve for SP surgery, one study demonstrated that the curve is relatively short for a surgeon already experienced in robotic surgery [14]. An analysis of the SP workload also demonstrated no significant differences in mental, physical, and temporal demands in comparison to traditional multiport procedures [15].

Our study has limitations inherent to its design that may introduce selection bias and hinder the generalizability of the results. Surgeons who opted to participate may hold dif-

ferent opinions or experiences in comparison to those who chose not to respond. Furthermore, the survey provides a snapshot at a specific point in time, and attitudes to SP surgery may evolve over time. In addition, the limited geographic representation may not fully encompass the diversity of perspectives across all European countries.

Within the limitations of this type of analysis, our findings suggest high interest in and a positive attitude to the SP technology overall. Several advantages are expected from the surgeon and patient perspectives, but concerns remain about potential pitfalls, such as the cost and the learning curve. Among possible procedures, those requiring extraperitoneal access allowed by the SP platform are the most attractive.

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Study concept and design: Autorino, Ditonno, Licari.

Acquisition of data: Ditonno, Licari, Franco, Bologna.

Analysis and interpretation of data: Ditonno, Bologna, Soputro, Ramos.

Drafting of the manuscript: Ditonno.

Critical revision of the manuscript for important intellectual content: Nelson, Ahmed, Badani, Antonelli, Stifelman.

Statistical analysis: Ditonno, Manfredi.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.euro.2024.01.007>.

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