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Implementation of a Robotic Emergency General Surgery Program Using the Versius Plus Platform: Initial Experience From the First 30 Consecutive Cases

Giulio Mari, Francesca Roufael, Richard Sassun*, Mauro Santonocito, Stefano M. De Carli, Dario Maggioni

Division of General Surgery, Pio XI Hospital, Desio, Italy

***Corresponding author:**
Richard Sassun MD
Division of General Surgery
Pio XI Hospital
Via Giuseppe Mazzini 1, Desio (MB)
Italy, 20832
Phone: +39 (331) 2049755
E-mail: richardsassun@hotmail.it
ORCID 0000000176494703

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Rezumat

Implementarea unui program de chirurgie robotică de urgență în chirurgia generală utilizând platforma Versius Plus: experiența inițială bazată pe primele 30 de cazuri consecutive

Context: În ciuda adoptării pe scară largă a chirurgiei robotice în chirurgia generală electivă, integrarea acesteia în practica chirurgicală de urgență rămâne limitată din cauza provocărilor organizatorice şi logistice. Acest studiu şi-a propus să descrie implementarea unui program instituțional de chirurgie robotică de urgență utilizând platforma Versius Plus, evaluând fezabilitatea inițială şi rezultatele perioperatorii pe termen scurt.
Metode: Acest studiu observațional retrospectiv a inclus toți pacienții consecutivi care au beneficiat de intervenții chirurgicale abdominale robotice în regim de urgență, în perioada martie – iunie 2026. Obiectivul principal a fost evaluarea fezabilității implementării programului, apreciată prin finalizarea cu succes a procedurii robotice planificate, fără conversie, precum şi prin prezentarea etapelor şi criteriilor de selecție instituțională a pacienților. Obiectivele secundare au inclus evaluarea rezultatelor postoperatorii pe termen scurt.
Rezultate: În perioada de studiu, au fost efectuate 48 de intervenții chirurgicale abdominale de urgență, dintre care 30 de pacienți au îndeplinit criteriile de selecție şi au beneficiat de intervenții chirurgicale abdominale robotice în regim de urgență. Colecistita acută (57%) şi apendicita (33%) au reprezentat cele mai frecvente indicații chirurgicale. Toate intervențiile au fost finalizate cu succes pe cale robotică, fără conversie la laparoscopie sau chirurgie deschisă. Durata medie a intervenției chirurgicale a fost de 58±16 minute, pierderea sanguină estimată a fost de 55 ±15 ml, iar pe parcursul intervențiilor nu au fost înregistrate defecțiuni ale echipamentului robotic. Morbiditatea postoperatorie globală a fost de 20%, fără complicații postoperatorii majore (grad Clavien–Dindo ≥ III), fără reintervenții chirurgicale, iar durata medie de spitalizare postoperatorie a fost de 4,0 ±1,8 zile.
Concluzii: Implementarea unui program structurat de chirurgie robotică de urgență utilizând platforma Versius Plus s-a dovedit fezabilă, cu rezultate postoperatorii pe termen scurt acceptabile la pacienții atent selecționați, în cadrul experienței instituționale inițiale.

Cuvinte cheie: chirurgie de urgență, chirurgie robotică, Versius, chirurgie de urgență i terapie acută, chirurgie generală, chirurgie minim invazivă

Abstract

Background: Despite the widespread adoption of robotic surgery in elective general surgery, its integration into emergency practice remains limited because of organizational and logistical challenges. This study aimed to describe the implementation of an institutional emergency robotic surgery program using the Versius Plus platform evaluating its initial feasibility and short-term perioperative outcomes.

Methods: This retrospective observational study included all consecutive patients who underwent emergency robotic abdominal surgery from March to June 2026. The primary outcome was the feasibility of program implementation, assessed by successful completion of the planned robotic procedure without conversion together with reporting of the institutional selection funnel. Secondary outcomes included short-term postoperative outcomes.

Results: During the study period 48 emergency abdominal procedures were performed and 30 met selection criteria and underwent emergency robotic abdominal surgery. Acute cholecystitis (57%) and appendicitis (33%) were the most common indications. All procedures were successfully completed robotically without conversion to laparoscopy or open surgery. Mean operative time was 58±16 minutes, estimated blood loss was 55±15 mL, and no intraoperative device malfunction occurred. Overall postoperative morbidity was 20%, with no major postoperative complications (Clavien–Dindo grade ≥ III), no reoperations, and a mean postoperative hospital stay of 4.0±1.8 days.

Conclusions: Implementation of a structured emergency robotic surgery program using the Versius Plus platform was feasible with acceptable short-term outcomes in selected patients during the initial institutional experience.

Keywords: emergency surgery, robotic surgery, Versius, acute care surgery, general surgery, minimally invasive surgery

Introduction

Emergency general surgery represents one of the most challenging settings for minimally invasive surgery, requiring prompt decision making, rapid operating room availability, and seamless multidisciplinary coordination. Over the past two decades, laparoscopy has become the standard approach for many urgent abdominal conditions, including acute cholecystitis, acute appendicitis, and selected bowel emergencies, owing to its well established benefits in reducing postoperative pain, morbidity, and length of hospital stay (1,2). In contrast, despite its widespread adoption in elective general surgery, robotic surgery has been integrated into emergency surgical practice at a considerably slower pace. Although an increasing number of studies have demonstrated the safety and feasibility of robotic emergency procedures, its use remains largely confined to selected high volume institutions with dedicated expertise (3-6).

The limited adoption of robotic surgery in emergency settings is attributable not only to technical considerations but, more importantly, to organizational and logistical challenges. Emergency procedures require immediate robotic platform availability, appropriately trained surgeons and operating room personnel, standardized perioperative workflows, and institutional processes capable of integrating robotic technology without delaying urgent patient care. Consequently, successful implementation of emergency robotic surgery depends on institutional readiness as much as on the robotic platform itself. While recent studies have highlighted the feasibility of dedicated robotic acute care surgery programs, reports describing structured implementation strategies remain scarce (7,8).

Recent technological developments may further facilitate the integration of robotic surgery into emergency practice. The Versius Plus platform (CMR Surgical, Cambridge, United Kingdom) features a modular architecture consisting of independent bedside robotic arms that allow conventional laparoscopic trocar positioning and flexible operating room configuration. Unlike traditional multi arm systems, this design minimizes disruption of established laparoscopic workflows, facilitates docking, and enables straightforward conversion to conventional laparoscopy whenever necessary. These characteristics may be particularly advantageous in emergency surgery, where procedural flexibility, operating room efficiency, and rapid adaptation to unexpected intraoperative findings are essential. Recent evidence has

further confirmed the safety and technical feasibility of the Versius platform across abdominal procedures, supporting its broader adoption in minimally invasive surgery (9).

Although several studies have evaluated the perioperative outcomes of robotic emergency surgery, most available evidence consists of retrospective case series or systematic reviews focused primarily on surgical outcomes (3,4,6). Data describing the implementation of structured emergency robotic surgery programs and their early institutional experience remain limited, particularly with modular robotic platforms (7,8).

In March 2026, our institution implemented a structured emergency robotic surgery program using the Versius Plus platform for selected abdominal emergencies. The program was designed to integrate robotic surgery into routine emergency general surgery through standardized patient selection, dedicated multidisciplinary training, predefined operating room workflows, and progressive implementation during daytime and evening operating hours.

The aim of the present study was to describe the implementation of this institutional emergency robotic surgery program and to evaluate its initial feasibility and early perioperative outcomes in the first 30 consecutive patients undergoing emergency robotic abdominal surgery.

Materials and Methods

Study Design

This retrospective observational study analyzed data from a prospectively maintained institutional database including all consecutive patients who underwent emergency robotic abdominal surgery from March to June 2026, following the implementation of the emergency robotic surgery program at Pio XI Hospital (Desio, Italy). The study reports the initial institutional experience after the introduction of the Versius Plus robotic platform (CMR Surgical, Cambridge, United Kingdom) for emergency general surgery.

The emergency robotic surgery program was launched in March 2026 and initially included procedures performed during daytime and evening operating hours (before 8:00 PM), when a fully trained robotic surgical team was consistently available. This phased implementation strategy was adopted to ensure patient safety while progressively integrating robotic technology into routine emergency surgical practice. Emergency surgery was defined as any abdominal procedure required within 24 hours of the surgical decision.

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Pio XI Hospital (R623/26, 15/02/2026). Written informed consent was waived for the retrospective analysis of the prospectively maintained database by the same committee.

Institutional Emergency Robotic Surgery Pathway

Implementation of the emergency robotic surgery program required the development of a standardized institutional pathway involving surgeons, anesthesiologists, scrub nurses, circulating nurses, and operating room personnel (*Fig. 1*). Before clinical implementation, all healthcare professionals participating in emergency robotic procedures completed dedicated training on the Versius Plus platform, including robotic system setup, docking procedures, troubleshooting, and perioperative workflow standardization.

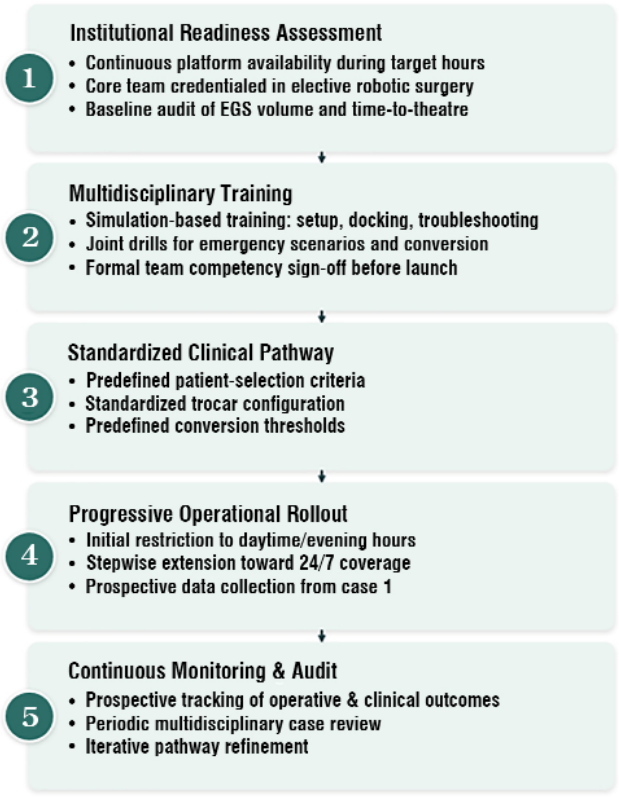


Figure 1. Implementation of the emergency robotic surgery program.

The institutional pathway includes: (1) multidisciplinary team training on the Versius Plus platform; (2) application of explicit inclusion and exclusion criteria by the attending emergency surgeon; (3) verification of platform and team availability before 8:00 PM; (4) standardized laparoscopic trocar configuration adapted to Versius; (5) docking and procedure; (6) predefined conversion criteria if required for safety; and (7) systematic 30-day follow-up. EGS = Emergency general surgery.

Patient Selection

Patient eligibility for robotic surgery was determined by the attending emergency surgeon according to predefined inclusion and exclusion criteria. Inclusion criteria were: adult patient (≥18 years); hemodynamic stability; no anticipated generalized fecal peritonitis; no extensive prior open abdominal surgery expected to preclude safe trocar placement or docking; availability of a Versius Plus platform trained team before 8:00 PM. When these criteria were met, patients underwent a fully robotic procedure using the institutional standardized laparoscopic trocar configuration adapted to the Versius Plus platform.

Surgical Technique

All procedures were performed using the Versius Plus robotic platform by two surgeons experienced in robotic general surgery. Trocar placement followed the standard laparoscopic configuration routinely adopted at our institution for the corresponding procedure. Docking and robotic arm positioning were performed according to the manufacturer's recommendations while preserving the flexibility of conventional laparoscopic access. Conversion to laparoscopy or open surgery was planned and available whenever deemed necessary for patient safety or technical reasons; in the present series no conversions were required.

Data Collection and Study Outcomes

Demographic characteristics, body mass index (BMI), American Society of Anesthesiologists (ASA) physical status classification, surgical indication, and perioperative variables were prospectively collected.

Operative variables included docking time, operative time, estimated blood loss, number of robotic arm clashes, hand motion volume, and conversion to laparoscopy or open surgery. Robotic arm clashes were defined as any physical contact between robotic arms detected by system sensors or observed by the surgical team that required repositioning. Hand motion volume is an automatic console derived metric representing the cumulative three-dimensional volume of hand controller movements during the procedure and was recorded as a descriptive surrogate of surgical activity and performance.

Postoperative outcomes included overall postoperative morbidity, major complications according to the Clavien–Dindo classification, reoperation, readmission, and length of hospital stay. Follow up was systematically performed at 30 days by clinical visit or telephone contact to capture complications, reoperations, and readmissions after discharge.

The primary outcome of the study was the feasibility of implementing a structured emergency robotic surgery program, assessed by successful completion of robotic procedures without conversion within the defined selection pathway, together with reporting of the institutional denominator of eligible emergencies. Secondary outcomes included short-term postoperative outcomes.

Statistical Analysis

Given the descriptive nature of the study, no formal hypothesis testing was performed. Continuous variables are presented as mean ± standard deviation (SD) or median with interquartile range (IQR), as appropriate according to data distribution. Categorical variables are reported as frequencies and percentages. Statistical analyses were performed using R version 4.4.1 (R Foundation for Statistical Computing, Vienna, Austria). This study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations.

Results

Patient Characteristics and Selection Funnel

Between March and June 2026, 48 consecutive emergency abdominal procedures were performed at our institution. Of these, eighteen patients were excluded due to hemodynamic instability (n = 7), generalized fecal peritonitis (n = 4), extensive prior abdominal surgery (n = 3), and platform or team unavailability before 8:00 PM (n = 4). The remaining 30 patients met inclusion criteria and underwent emergency robotic abdominal surgery using the Versius Plus platform. Baseline demographic and clinical characteristics are summarized in *Table 1.*

Table 1. Baseline demographic and clinical characteristics of the study population

Characteristic	Overall (N = 30)
Age, years, median (IQR)	51 (44–60)
Sex, n (%)	
Male	18 (60)
Female	12 (40)
Body mass index, kg/m^2, mean ± SD	24.2 ± 1.6
ASA physical status, n (%)	
I	6 (20)
II	18 (60)
III	6 (20)
Surgical indication, n (%)	
Acute cholecystitis	17 (57)
Acute appendicitis	10 (33)
Right colonic perforation	1 (3)
Incarcerated incisional hernia	2 (7)

Abbreviations: ASA: American Society of Anesthesiologists; BMI: body mass index; IQR: interquartile range; SD: standard deviation.

The median age was 51 years (IQR, 44–60), and 18 patients (60%) were male. Mean BMI was 24.2 ± 1.6 kg/m², while most patients were classified as ASA physical status II (60%).

Acute cholecystitis represented the most frequent indication for surgery (57%), followed by acute appendicitis (33%). Regarding cholecystitis, 6 were mild, 8 were moderate, and 3 were severe according to Tokyo guidelines. Regarding appendicitis, 4 were congested, 3 were suppurated, and 3 were gangrenous. One patient underwent robotic right hemicolectomy for colonic perforation, whereas two patients underwent robotic intraperitoneal onlay mesh (IPOM) Plus repair for incarcerated incisional hernias.

Intraoperative and Organizational Outcomes

All 30 procedures were successfully completed using a fully robotic approach; conversion to laparoscopy or open surgery was not required in any case (*Table 2*). Mean docking time was 10 ± 2.1 minutes. Mean operative time was 58 ± 16 minutes. Estimated blood loss was minimal (55 ± 15 mL). The mean number of robotic arm clashes was 1.4 ± 1.1 per procedure, and mean hand motion volume was 0.021 ± 0.016 m³. These parameters are reported descriptively and may provide reference values for future comparative studies.

No intraoperative device malfunction or technical failure of the robotic platform occurred during the study period.

Postoperative Outcomes

Overall postoperative morbidity was 20.0% (6/30), with all complications being Clavien–Dindo grade I or II (*Table 3*). In particular, anemia requiring transfusion occurred in two patients (one cholecystitis, one right colonic perforation, grade II), urinary tract infection treated with antibiotics in two patients (one cholecystitis, one incarcerated hernia, grade II), ileus managed with nasogastric tube in one patient (after appendicitis, grade I), and one pelvic abscess was treated with antibiotics alone without percutaneous or surgical drainage (one appendicitis, grade II). No reoperations or readmissions were required within 30 days. Systematic 30 day follow up was completed for all patients. The mean postoperative length of hospital stay was 4.0 ± 1.8 days. Collectively, these findings demonstrate that implementation of the institutional emergency robotic surgery pathway was associated with favorable short term perioperative outcomes during the initial experience.

Table 2. Intraoperative and organizational outcomes

Variable	Overall (N = 30)
Docking time, min, mean ± SD	10 ± 2.1
Operative time, min, mean ± SD	58 ± 16
Estimated blood loss, mL, mean ± SD	55 ± 15
Robotic arm clashes, n, mean ± SD	1.4 ± 1.1
Hand-motion volume, m³, mean ± SD	0.021 ± 0.016
Conversion to laparoscopy/open surgery, n (%)	0 (0%)

Abbreviations: SD: standard deviation; OR: operating room. Robotic arm clashes defined as physical contact between arms requiring repositioning. Hand-motion volume is a console-derived metric of cumulative hand controller movement volume.

Discussion

The present study demonstrates that the implementation of a structured emergency robotic surgery program is feasible with acceptable short term outcomes in carefully selected patients undergoing emergency abdominal surgery. During our initial institutional experience, all procedures were successfully completed using a fully robotic approach without conversion to laparoscopy or open surgery, no major postoperative complications or reoperations occurred, and favorable short term perioperative outcomes were achieved. Beyond these encouraging clinical results, the principal finding of this study is that successful integration of robotic technology into emergency general surgery depends primarily on institutional organization, standardized clinical pathways, dedicated multidisciplinary training, and progressive implementation rather than on the robotic platform itself.

Although robotic surgery has become an established component of elective abdominal surgery, its implementation in emergency settings has progressed considerably more slowly (9,10). Current evidence indicates that robotic emergency surgery is technically feasible and associated with acceptable perioperative outcomes in carefully selected patients; however, its adoption remains largely confined to specialized centers, and robust comparative evidence is still lacking (3-6). Consequently, the principal challenge facing emergency robotic surgery is no longer demon-

Table 3. Postoperative outcomes

Outcome	Overall (N = 30)
Length of hospital stay, days, mean ± SD	4.0 ± 1.8
Overall postoperative complications, n (%)	6 (20)
Anemia requiring transfusion (CD grade II)	2 (7)
Urinary tract infection (CD grade II)	2 (7)
Ileus requiring nasogastric tube (CD grade I)	1 (3)
Abscess treated with antibiotics only (CD grade II)	1 (3)
Major complications (Clavien–Dindo grade ≥ III), n (%)	0 (0)
Reoperation within 30 days, n (%)	0 (0)
Readmission within 30 days, n (%)	0 (0)

Abbreviations: SD, standard deviation; CD, Clavien–Dindo.

strating technical feasibility but rather identifying reproducible organizational models and training capable of integrating robotic technology into routine emergency surgical care without compromising efficiency, safety, or timely access to treatment (11).

Our findings reinforce the concept that implementation itself represents one of the major determinants of successful emergency robotic surgery (12). Unlike elective procedures, emergency operations require immediate operating room availability, coordinated multidisciplinary teamwork, trained nursing staff, and surgeons familiar with robotic technology under time sensitive conditions. Recently, Piqueras et al. described the successful implementation of a structured robotic acute care surgery program based on progressive institutional integration, standardized operating room protocols, and dedicated multidisciplinary training (7). Similarly, Zangbar et al. emphasized that sustainable emergency robotic surgery requires institutional commitment, structured credentialing pathways, workflow redesign, and continuous team education rather than simply increasing access to robotic technology (8). Our experience closely reflects these principles and supports the concept that standardized implementation pathways may enable the safe integration of robotic surgery into routine emergency clinical practice within defined operating hours.

Our findings are consistent with the growing body of evidence supporting the safety and feasibility of robotic emergency surgery, even in complex scenarios (13). More broadly, the systematic reviews by Ibrahim et al. and Morais et al. concluded that robot assisted emergency general surgery is technically feasible and safe across a wide spectrum of emergency abdominal procedures, while emphasizing that the available evidence remains limited by retrospective study designs, heterogeneous patient populations, and the lack of high quality prospective comparative studies (4,6). Focusing specifically on acute cholecystitis, the recent systematic review and meta analysis by Jamal et al. demonstrated lower conversion rates with robotic surgery while maintaining perioperative outcomes comparable with conventional laparoscopy (14). Likewise, Shen et al. reported that incorporation of robotic cholecystectomy into an acute care surgery practice model was feasible and associated with fewer conversions to open surgery without compromising postoperative safety (5). Our findings build upon the existing evidence by demonstrating that favorable perioperative outcomes can be achieved within the framework of a structured institutional implementation pathway using a modular robotic platform.

Importantly, the present program operated exclusively before 8:00 PM. Therefore, the results cannot be extrapolated to a continuous 24/7 robotic emergency service. The organizational indicators reported support the practicality of a daytime and evening model but leave open the question of overnight feasibility.

From a practical perspective, our experience suggests that emergency robotic surgery should not be viewed simply as an extension of elective robotic practice but rather as the result of a carefully designed institutional process. Appropriate patient selection, multidisciplinary team training, standardized operating room logistics, and progressive implementation appear to represent the essential prerequisites for establishing sustainable emergency robotic surgery programs. As robotic platforms become increasingly available, future research should focus not only on expanding surgical indications but also on optimizing implementation strategies, evaluating learning curves, and assessing organizational efficiency and cost effectiveness to facilitate broader adoption of robotic emergency surgery.

Several limitations should be acknowledged. First, this study represents the initial experience of a single institution and includes a relatively small cohort of carefully selected patients, limiting the generalizability of our findings. Selection bias is inherent in the applied inclusion criteria and is acknowledged. Second, the absence of a contemporary laparoscopic control group precludes direct comparison of perioperative outcomes between surgical approaches. Third, follow up was limited to 30 days and therefore does not allow assessment of long term clinical outcomes. In addition, the relatively small sample size prevented meaningful subgroup analyses. Finally, although this study demonstrates the feasibility of implementing an emergency robotic surgery program, it was not designed to evaluate the learning curve associated with program development or to perform a formal cost effectiveness analysis. Moreover, because the program functioned only before 8:00 PM, conclusions cannot be extended to a 24/7 service model.

Conclusions

The implementation of a structured emergency robotic surgery program using the Versius Plus platform was feasible with acceptable short term outcomes in selected patients during our initial institutional experience. Successful integration of robotic surgery into emergency general surgery depended primarily on standardized institutional pathways, dedicated multidisciplinary training, and progressive implementation rather than on technological innovation alone. These findings provide a practical organizational framework

for institutions seeking to establish daytime and evening emergency robotic surgery programs. Larger multicenter prospective studies are warranted to validate these findings and to define the long term clinical, organizational, and economic impact of emergency robotic surgery, including the feasibility of continuous 24/7 coverage.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. Arnold M, Elhage S, Schiffern L, Lauren Paton B, Ross SW, Matthews BD, et al. Use of minimally invasive surgery in emergency general surgery procedures. Surg Endosc. 2020;34(5):2258-2265.
2. Brucchi F, Sassun R, Lauricella S, Cirocchi R, Parati G, Dionigi G, et al. Robotic vs. laparoscopic TAPP: a systematic review and meta-analysis of randomized controlled trials on short-term outcomes. Hernia. 2025;30(1):36.
3. Petropoulou T, Evangelou K, Polydorou A. Robotic-Assisted Surgery in Emergency General Surgery: A Prospective, Single-Center, Case Series. Cureus. 2025; 17(10):e93650.
4. Ibrahim Y, Rahman MA, Pickering O, Cole K, Pucher PH. Current evidence and reported experiences for robot-assisted emergency general surgery: systematic review. J Robot Surg. 2025;19(1):534.
5. Shen A, Barmparas G, Melo N, Chung R, Burch M, Bhatti U, Margulies DR, Wang A. Incorporating Robotic Cholecystectomy in an Acute Care Surgery Practice Model is Feasible. Am Surg. 2024;90(10):2457-2462.
6. Morais MC, de Carvalho LDS, Nogueira R, Kasakewitch JPG, Perim V, Neves V, Faleiro M, Lima DL, Smith VL. Safety and feasibility of robotic surgery in acute care setting: a systematic review. J Robot Surg. 2025;19(1):454.
7. Piqueras A, Díez A, Marrano E, Protti GP, Samsó RH, Martín-Izquierdo I, et al. Results of the structured implementation of a robotic acute care surgery program. J Robot Surg. 2026;20(1):406.
8. Zangbar B, Vetri R, Mehta R, et al. How to Build a 24/7 Robotic Acute Care Surgery Program. Curr Trauma Rep. 2025;11:15.
9. Li X, Liu Y, Chen G. Safety and feasibility of the Versius robotic surgical system for colorectal resection: proportional meta-analysis of single-arm studies. J Robot Surg. 2026;20(1):358.
10. Ferrari D, Violante T, Novelli M, Sassun R, Sileo A, Larson DW. Robotic Surgery in Emergency Colorectal Procedures: Analysis of Outcomes and Future Trends. J Am Coll Surg. 2025 Jul 23. Online ahead of print.
11. de'Angelis N, Khan J, Marchegiani F, Bianchi G, Aisoni F, Alberti D, et al. Robotic surgery in emergency setting: 2021 WSES position paper. World J Emerg Surg. 2022;17(1):4.
12. Brucchi F, De Troyer A, Gori A, Dionigi G, Vanderstraeten E, Mottrie A, et al. Structured Training in Robotic Abdominal Wall Surgery: A Systematic Review of Educational Models, Methodologies, Existing Gaps and Unmet Needs. J Abdom Wall Surg. 2025; 4:15190.
13. Sassun R, Sileo A, Ng JC, Mari G, Behm KT, Shawki SF, et al. Diverticular disease complicated by colovesical and colovaginal fistulas: not so complex robotically. Surg Endosc. 2025;39(6):3941-3946.
14. Jamal Z, Talal MA, Saeed J, Siddiqui A, Haider MI, Zafar K, et al. Is robotic surgery ready for emergency cholecystectomy? A systematic review and meta-analysis of robotic versus laparoscopic approach in acute cholecystitis. J Robot Surg. 2026;20(1):166.