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Here is a collection of abstracts of published papers related to Robotic surgery in the journal *Mini-invasive Surgery* (www.misjournal.net) from Jan 2019 to present, including paper types, titles, full-text links, DOI, abstracts and keywords, which are more convenient for you by clicking the titles in Table of Contents/entering keywords in look-up function to quickly search papers you want to read. We hope this collection is a good assistant for you. Your recommendation of this collection to your friends or colleagues is highly appreciated. If you have any questions in using this collection, please feel free to contact our editorial office.

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Robotic surgery

1. Review

Navigation, mixed reality, and robotics in endoscopic spine surgery

[HTML](#) [PDF](#)

Cite this article: Derman PB, Satin AM. Navigation, mixed reality, and robotics in endoscopic spine surgery. *Mini-invasive Surg* 2022;6:8.

<http://dx.doi.org/10.20517/2574-1225.2021.111>

Abstract

Endoscopic spine surgery (ESS) is an ultra-minimally invasive technique through which spinal pathology can be addressed via sub-centimeter incisions with negligible soft tissue disruption. However, concerns exist regarding the steep learning curve, operative time, and radiation exposure to the surgical team. The use of intraoperative navigation, mixed reality, and robotics in the setting of ESS is currently being explored, and the early evidence suggests that such technologies may help mitigate these issues. The application of these technologies in ESS as well as the associated literature is reviewed herein.

2. Original Article

Trifecta results in Retzius-sparing robotic radical prostatectomy: results of a high-volume center

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Cite this article: Olivero A, Dell' Oglia P, Ambrosini F, Secco S, Barbieri M, Palagonia E, Napoli G, Strada E, Petralia G, Di Trapani D, Buratto C, Martiriggiano M, Galfano A, Bocciardi AM. Trifecta results in Retzius-sparing robotic radical prostatectomy: results of a high-volume center. *Mini-invasive Surg* 2022;6:6.

<http://dx.doi.org/10.20517/2574-1225.2021.117>

Abstract

Aim: We aimed to evaluate trifecta outcomes after Retzius-sparing robot-assisted radical prostatectomy (rs-RARP).

Methods: We evaluated 1488 patients who had undergone rs-RARP at our institution from 2011 to 2019. All patients filled out questionnaires for functional outcomes before surgery, and only patients with baseline continence and IIEF-5 scores of > 16 were included. Biochemical recurrence (BCR) was defined as two consecutive prostatic specific antigen levels of > 0.2 ng/mL after rs-RARP. Postoperative continence was defined as the use of no pads. Potency was defined as the ability to achieve erections for sexual intercourse, with or without phosphodiesterase-5 (PDE-5) inhibitors. A multivariable logistic regression model was performed to identify predictors of trifecta outcome.

Results: In total, 1240 patients were included in the analysis. During the 24-month follow-up time, 149 patients (11.9%) harbored BCR. Urinary continence was observed in 981 patients (79.5%), while 171 (13.8%) still used a safety pad daily after 24 months. Sexual potency was reported in 643 patients (51.9%), of whom 379 (30.6%) had spontaneous erections and 264 (21.3%) used a PDE-5 inhibitor. Overall, the trifecta outcome was reached by 42.1% of the study's population. The trifecta outcome was easily reached by younger patients and patients who underwent a full nerve-sparing (NS) prostatectomy. In the multivariable model, age [odds ratio (OR) = 0.89; 95% confidence interval (CI): 0.84-0.90; $P < 0.01$] and type of NS surgery [partial NS (OR = 3.34; 95%CI: 1.01-11; $P = 0.04$) full NS (OR = 4.57; 95%CI: 1.86-12; $P < 0.01$)] resulted as independent predictors.

Conclusion: rs-RARP is associated with optimal trifecta outcome rate. Age and NS technique are independent predictors of trifecta outcomes.

3. Review

Minimally invasive surgery for gallbladder cancer at an expert center

[HTML](#) [PDF](#)

Cite this article: Lee JS, Han HS, Yoon YS, Cho JY, Lee HW, Lee B, Kim M, Jo Y. Minimally invasive surgery for gallbladder cancer at an expert center. *Mini-invasive Surg* 2021;5:57. <http://dx.doi.org/10.20517/2574-1225.2021.139>

Abstract

In this article, we reviewed the techniques and outcomes of minimally invasive surgery for gallbladder cancer performed at an expert center. The techniques of laparoscopic extended cholecystectomy with the short- and long-term outcomes at our center were described. The short- and long-term survival outcomes of laparoscopic extended cholecystectomy are comparable to open surgery. Laparoscopic surgery is a safe, effective alternative for open surgery in the treatment of gallbladder cancer. The benefits of robotic surgery should be proven with further research.

4. Perspective

Has robotic prostatectomy determined the fall of the laparoscopic approach?

[HTML](#) [PDF](#)

Cite this article: Hayes J, Vasdev N, Dasgupta P. Has robotic prostatectomy determined the fall of the laparoscopic approach?. *Mini-invasive Surg* 2021;5:56. <http://dx.doi.org/10.20517/2574-1225.2021.126>

Abstract

Robotic-assisted laparoscopic prostatectomy (RALP) has revolutionised the surgical management of localised prostate cancer in the modern era. The surgeon is provided with greater precision, more versatile dexterity and an immersive three-dimensional visual field. The impressive hardware facilitates, for example, the dissection of the peri-prostatic fascia, whilst preserving the neurovascular bundle, or the suturing of the vesico-urethral anastomosis. Prior to RALP, laparoscopic radical prostatectomy (LRP) represented the first venture into the minimally invasive world. Associated with more cumbersome ergonomics, LRP has a significant learning curve compared with the

robotic approach. There has been a paucity, until recently, of high-quality literature comparing outcomes between the two operations, including the attainment of the Pentafecta of survivorship: biochemical recurrence-free, continence, potency, no postoperative complications and negative surgical margins.

5. Review

Current status on robotic assisted myomectomy

[HTML](#) [PDF](#)

Cite this article: Kiss I, Svobodova P, Karasek L, Svoboda B. Current status on robotic assisted myomectomy. *Mini-invasive Surg* 2021;5:55.

<http://dx.doi.org/10.20517/2574-1225.2021.70>

Abstract

Uterine leiomyomas are common benign solid tumors of the uterus. While the presence of fibroids is rarely life threatening, they are associated with symptoms affecting quality of life and fertility. Myomectomy is a standard fertility-sparing surgery which should be considered for women suffering from fibroid-related symptoms who do not desire hysterectomy or any alternative treatment option. While open surgery is thought to be reserved for large and numerous myomas, mini-invasive methods as laparoscopy and robot-assisted surgery have evolved in the hands of experienced surgeons to also deal with these more complex cases. Robotic myomectomy has its advantages in lower blood loss, fewer complications, and shorter hospital stay over open surgery, whereas the comparison outcomes with laparoscopic myomectomy are still uncertain. Advantages of the wristed instruments, three-dimensional vision along with the incorporation of correct surgical techniques could emphasize the benefits of the robotic assisted approach in large and numerous myoma cases. Careful and detailed assessment should precede the surgery to recognize risks and steps to reduce operation time, which tends to be the most presented drawback of robotic myomectomy. As the tendency of robot-assisted

surgeries is growing, many authors share their experience or publish comparison studies with other surgical methods. Our article describes the current status concerning robotic myomectomy, reviewing publications from the past five years (2016-2021).

6. Technical Note

Single-port robotic radical cystectomy with ileal conduit urinary diversion: technique and review of the early outcomes in literature

[HTML](#) [PDF](#)

Cite this article: Chen G, Crivellaro S. Single-port robotic radical cystectomy with ileal conduit urinary diversion: technique and review of the early outcomes in literature. *Mini-invasive Surg* 2021;5:54.

<http://dx.doi.org/10.20517/2574-1225.2021.69>

Abstract

The introduction of the da Vinci single port (SP) surgical system (Intuitive Surgical, Sunnyvale, CA, USA) has meant a necessary evolution in the surgical techniques used to perform various Urologic surgeries, such as robotic-assisted radical cystectomy (RARC). In this paper, we describe a step-by-step technique for RARC with intracorporeal ileal conduit urinary diversion using the SP system at our institution and summarize early outcomes in the literature. The surgery was performed utilizing the standard institutional approach for radical cystectomy for the multiport robot, modified for the SP where appropriate. A total of 3 articles were found that included early patient outcomes after SP RARC. Including our institution, a total of 21 patients were included in the final analysis. The average patient age was 68 years old, 16 of the 21 patients were male, 13 of the patients had intracorporeal urinary diversions, the average operative time was 366 min with an average estimated blood loss of 185. The average length of stay was 5.4 days. Among these patients, there were three 30-day complications noted and five 90-day complications, all of which were Clavian II or

lower. We conclude that RARC utilizing the SP approach is both feasible and offers several theoretical advantages over the open and multiport approaches, but further study is necessary before advocating for widespread adoption of this modality.

7. Perspective

Minimally invasive liver resection in Japan: is the robot necessary?

[HTML](#) [PDF](#)

Cite this article: Ishizawa T, Hasegawa K. Minimally invasive liver resection in Japan: is the robot necessary?. *Mini-invasive Surg* 2021;5:52.

<http://dx.doi.org/10.20517/2574-1225.2021.81>

Abstract

Robot-assisted hepatectomy (RAH) is rarely indicated in Japan because of the lack of reimbursement from the national health insurance system. Instead, laparoscopic hepatectomy has been approved for all hepatectomy procedures except resections requiring biliary reconstruction. An obvious advantage of RAH over laparoscopic hepatectomy is the fact that surgeons can use multi-articulated surgical devices, which may facilitate resection of superior/posterior hepatic regions, hilar dissection, biliary reconstruction, and hepatic segmentation by fluorescence imaging. With the accumulation of evidence supporting the use of robotic surgical devices in particular situations of hepatectomy, RAH will become more commonly indicated in Japan under the existing nationwide reporting system and board certification systems to assure surgical safety.

8. Review

Hybrid coronary revascularization: the Emory experience

[HTML](#) [PDF](#)

Cite this article: Pusca SV, Halkos ME. Hybrid coronary revascularization: the Emory experience. *Mini-invasive Surg* 2021;5:51.

<http://dx.doi.org/10.20517/2574-1225.2021.45>

Abstract

This article reviews the Emory University Experience with hybrid coronary revascularization and identifies key factors essential for the success of this relatively new and evolving strategy for the treatment of coronary artery disease. Key decisional and technical factors were identified. In addition, careful patient selection, stepwise progression in learning the different aspects of the procedure, and close collaboration between cardiac surgery-interventional cardiology are key factors for success.

9. Editorial

The future of robotic radical prostatectomy driven by artificial intelligence

[HTML](#) [PDF](#)

Cite this article: Checcucci E, Porpiglia F. The future of robotic radical prostatectomy driven by artificial intelligence. *Mini-invasive Surg* 2021;5:49.

<http://dx.doi.org/10.20517/2574-1225.2021.98>

10. Systematic Review

Functional and oncological outcomes with male nerve sparing robotic assisted radical cystectomy

[HTML](#) [PDF](#)

Cite this article: Thinagaran JKR, Maqboul F, Dovey Z, Wiklund P. Functional and oncological outcomes with male nerve sparing robotic assisted radical cystectomy. *Mini-invasive Surg* 2021;5:46. <http://dx.doi.org/10.20517/2574-1225.2021.53>

Abstract

Aim: In keeping with the ethos of surgical oncology, male nerve sparing (NS) robotic assisted radical cystectomy (RARC) aims to maximise functional outcomes without sacrificing oncological outcomes. This review details the surgical technique of male

NS RARC as well as discussing strategies that may be employed in tandem with surgery to improve post-operative recovery and longer-term quality of life.

Methods: An OVID/EMBASE database search was done with key words of robotic, cystectomy, male and nerve sparing. Publications with no description of post-operative functional outcome were excluded. A total number of 25 relevant publications were selected investigating male NS RARC, assessing functional outcomes along with other surgical standard indicators.

Results: Most series contained small numbers of patients with largely retrospective data and the associated bias of selection. Mean follow up of 27.06 months (range 2.8-58 months) was noted overall. Study design, technique, definitions and measurements of continence and erectile function are heterogeneous across series. With a mean follow up of 27.06 months (range 2.8-58 months), a post-operative satisfactory erectile function of 54.32% (range 9%-100%) and satisfactory day time continence of 90% (range 54.5%-100%) and night time continence of 80.55% (range 46.7%-88%) was found with a mean positive surgical margin rate of only 1.8% (range 0%-6.4%).

Conclusion: Male NS RARC for appropriately selected patients will offer good functional outcomes. Results from the series reviewed suggest the technique is both feasible and safe, without compromising longer term oncological results.

11. Review

The contemporary status of robotic intracorporeal neobladder

[HTML](#) [PDF](#)

Cite this article: Maqboul F, Thinagaran JKR, Dovey Z, Wiklund P. The contemporary status of robotic intracorporeal neobladder. *Mini-invasive Surg* 2021;5:44. <http://dx.doi.org/10.20517/2574-1225.2021.54>

Abstract

Robotic intracorporeal neobladder (RIN) is increasingly the modality of choice for

intracorporeal urinary diversion in high-volume Robotic Urology centers. This article details the modern technique of RIN, explains specific tips and tricks to facilitate timely operative progression as well as weighs the outcomes from recently published series. An OVID/EMBASE database search was done using keywords: robotic, cystectomy, intracorporeal neobladder, orthotopic, and intracorporeal urinary diversion. The inclusion criteria were original studies on Robot-Assisted Radical Cystectomy (RARC) with RIN series, available in full text in English, published over the last ten years with a specific analysis of oncological and functional outcomes. Pooled data analysis of the 10 studies included shows 80% of patients had organ-confined disease ($\leq pT2$), 1.86% of patients had positive surgical margin, median lymph node yield of 23 nodes (IQR = 7.5), and cancer-specific survival rate of 78% (range 72%-100%) over a mean follow up of 27.43 months (range 13-37 months). Functionally, the median day continence rate is 81.5%, night continence rate is 61%, and rate of return to spontaneous sexual activity is 33.5%. This compares favorably with outcomes of The International Robotic Cystectomy Consortium - Extracorporeal Urinary Diversion data and data from open radical cystectomy (ORC) neobladder series with long term follow up. High-volume robotic centers have successfully introduced programs for RARC, with RIN demonstrating its safety and feasibility. Their results suggest potential to improve perioperative and functional outcomes over ORC. Moreover, under mentorship, surgeons can learn the technique of RARC and RIN without these outcomes being significantly affected.

12. Technical Note

Technique of robotic first rib resection for thoracic outlet syndrome

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Cite this article: Gharagozloo F, Atiquzzaman N, Meyer M, Werden S. Technique of robotic first rib resection for thoracic outlet syndrome. *Mini-invasive Surg* 2021;5:39.

<http://dx.doi.org/10.20517/2574-1225.2021.74>

Abstract

Conventionally, resection of the first rib has been performed by the transaxillary and supraclavicular approaches. These approaches are hampered by poor visualization and exposure of the operative field, neurovascular complications, and less than optimal surgical outcomes. The Robotic Surgical System allows for high-definition, magnified, three-dimensional visualization of the operative field and is associated with accurate instrument maneuverability in a confined space. Importantly, the robotic transthoracic technique facilitates the disarticulation of the costo-sternal joint, which appears to be the most critical determinant of surgical success. Robotic first rib resection has been associated with the best-reported outcomes in patients with both Neurogenic and Venous (Paget Schroetter Syndrome) Thoracic Outlet Syndrome (TOS). This paper outlines the technique of robotic first rib resection with disarticulation of the costo-sternal joint for patients with TOS.

13. Technical Note

Retroperitoneal approach for robot-assisted partial nephrectomy: a step-by-step description of surgical technique

[HTML](#) [PDF](#) [Video](#)

Cite this article: Bianchi A, Cianflone F, Migliorini F, Cerruto MA, Tafuri A, Antonelli A. Retroperitoneal approach for robot-assisted partial nephrectomy: a step-by-step description of surgical technique. *Mini-invasive Surg* 2021;5:37. <http://dx.doi.org/10.20517/2574-1225.2021.64>

Abstract

In the last decades, minimally invasive partial nephrectomy (PN) has gained traction and, as of today, robot-assisted laparoscopic PN (RAPN) is increasingly being performed; this procedure might be performed with a transperitoneal or retroperitoneal (rRAPN) approach. However, rRAPN is less standardized in the literature. Therefore, we describe our rRAPN technique using a da Vinci Xi Surgical

System and four robotic arms. First, with the patient placed in full flank position, the camera port is placed at the level of the Petit' s triangle apex. Retroperitoneal space is created by turning the index finger in a 180 ° movement through this port. After, the two first 8 mm robotic ports are blindly placed with the surgeon' s index finger guide, 8 cm far from the first port, respectively along the anterior and posterior axillary line; 3-5 cm caudally to the last one, a 12 mm AirSeal® assistant port is placed in the same manner. To create space for the last 8 mm robotic port, the peritoneum is reflected medially and downward off of the transversus abdominis muscle laparoscopically. Only then, the last port is placed under direct vision 8 cm ventral and about 2 cm cephalad from the port on the anterior axillary line. The robotic ports placement will result in a caudally convex arc. This technique, due to the extensive use of the surgeon index, implies fast access to the retroperitoneum, protects the underlying anatomical structures from damage, and, due to the trocar positioning along an arc, lowers the arm conflict risk.

14. Systematic Review

Surgical and functional outcomes after robot-assisted radical cystectomy in female patients: a systematic review of the literature

[HTML](#) [PDF](#)

Cite this article: Ornaghi PI, Tafuri A, Orlando R, Panunzio A, Moschini M, Afferi L, Lonati C, Cerruto MA, Antonelli A. Surgical and functional outcomes after robot-assisted radical cystectomy in female patients: a systematic review of the literature. *Mini-invasive Surg* 2021;5:42.

<http://dx.doi.org/10.20517/2574-1225.2021.50>

Abstract

Aim: We aimed to review and summarize recent data on surgical and functional outcomes in women undergoing robot-assisted radical cystectomy (RARC) and urinary diversion (UD) for bladder cancer, compared with male and open

counterparts.

Methods: A systematic review of English-language articles published in the last 15 years was performed on PubMed/Medline database according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement. Outcomes of interest included peri- and post-operative surgical outcomes [operative time (OT), estimated blood loss (EBL), hospital stay (LOS), complications, and readmission], pathological outcomes [pT stage, lymph node (LN) yield, positive surgical margins (PSMs), and positive LN (pN+)], and functional outcomes [daytime and nighttime continence, sexual activity, need for clean intermittent catheterization (CIC), and quality of life (QoL) evaluation].

Results: Overall, eight studies were selected collecting data from 229 female patients undergoing RARC. The median OT was 418 min (range 311-562 min) and the median EBL was 380 mL (range 100-1160 mL). OT and EBL were not significantly different comparing males and females, whereas the robotic approach was found to be significantly related with longer OT and lower EBL compared to the open procedure. The median LOS was 9.8 days (range 6.5-21 days); no significant differences in LOS were found between open RC (ORC) and RARC in female patients, as well as between RARC in women and men. The mean incidence of 30-day complications after RARC in women was 32.9%, with 12% of high-grade complications, while the 30- and 90-day readmission rates were 20.8%, and 28%, respectively. Complications and readmission comparing RARC and ORC in female patients appear to be overlapping. The mean rate of PSMs was 2.5% and the mean rate of pN+ was 12.7%; both these outcomes were similar in RARC compared with ORC. The mean number of retrieved LN was 20.6 (range 11.3-35.5). The LN yield resulted significantly influenced by the robotic approach [median 27 (range 19-41)] compared to the open one [20.5 (range 13-28)]. After 12 months, the rate of women with daytime and nighttime continence was 66.7%-90.9% and 66.7%-86.4%, respectively, while that of sexually active women ranged 66.7%-72.7%. The need for CIC ranged 12.5%-27.2%. Administering the EORTC-QLQ-C30 questionnaire after RARC and intracorporeal

neobladder, the global health status/QoL and physical and emotional functioning items improved significantly over time.

Conclusion: RARC and UD in female patients is a feasible procedure with surgical outcomes overlapping with those in the male patient population. Postoperative functional outcomes on continence, sexual function, and QoL are still poorly investigated, although results inherent in the nerve-sparing approach appear promising.

15. Original Article

Retrospective study assessing the learning curve and the accuracy of minimally invasive robot-assisted pedicle screw placement during the first 41 robot-assisted spinal fusion surgeries

[HTML](#) [PDF](#)

Cite this article: Maalouly J, Sarkar M, Choi J. Retrospective study assessing the learning curve and the accuracy of minimally invasive robot-assisted pedicle screw placement during the first 41 robot-assisted spinal fusion surgeries. *Mini-invasive Surg* 2021;5:35. <http://dx.doi.org/10.20517/2574-1225.2021.57>

Abstract

Aim: The purpose of this study was to assess the learning curve and the accuracy of robot-assisted pedicle screw placement in the first 41 cases.

Methods: This retrospective study investigated the first 41 patients undergoing spinal fusion, whereby 250 pedicle screws were inserted with robotic assistance in a private hospital by a single surgeon. The pedicle screw accuracy was evaluated by computed tomography scan by an orthopedic surgeon according to the Gertzbein and Robbins classification. Planning time and screw placement time were noted. In addition, data about any screw malposition, a return to the operating theatre, and intraoperative repositioning were collected. The data were analyzed with Microsoft Excel.

Results: The results show a high degree of accuracy (98%) of pedicle screw

placement with a minimally invasive robot-assisted spinal fusion with no screw malposition requiring a return to the operating theatre. The learning curve improved with time, reaching a plateau at around 25 cases.

Conclusion: This study shows a high degree of accuracy of pedicle screw placement with the robot and it shows a surgeon's improved experience with the robot with time. Further comparative studies are needed to better assess the robot's accuracy and its future in spine surgery.

16. Opinion

Robotic-assisted approach for complex inguinal hernias

[HTML](#) [PDF](#)

Cite this article: Malcher F, Lima DL, Lima RNCL, Sreeramoju P. Robotic-assisted approach for complex inguinal hernias. *Mini-invasive Surg* 2021;5:31. <http://dx.doi.org/10.20517/2574-1225.2021.48>

Abstract

Laparoscopic inguinal hernia repair was introduced in the early nineties as a minimally invasive alternative to the classic Lichtenstein repair. Over the decades, minimally invasive approaches have demonstrated both postoperative benefits and easy replicability. Robotic inguinal hernia repair has been shown as a safe alternative to laparoscopic repair. Furthermore, due to technical difficulties, complex inguinal hernia repairs (scrotal hernias, incarcerated hernias, recurrent hernias, mesh removal, and previous pelvic surgery) are a relative contraindication for laparoscopic repairs. In this article, we highlight the advantages of the robotic approach for complex cases of inguinal hernia.

17. Technical Note

Management of hernial orifices in robotic inguinal hernia repair

[HTML](#) [PDF](#)

Cite this article: Baur J, Ramser M, Dietz UA. Management of hernial orifices in robotic inguinal hernia repair. *Mini-invasive Surg* 2021;5:27.

<http://dx.doi.org/10.20517/2574-1225.2021.28>

Abstract

The development of a postoperative seroma after endoscopic transabdominal (TAPP) or extraperitoneal (TEP) groin repair is a frequent problem. Although seromas are usually only mildly symptomatic, the swelling that develops postoperatively often causes patients to feel insecure and worried. In the literature some technical approaches to reduce the incidence of postoperative seroma are described. This technical note deals with the authors' approach in the management of large medial and lateral hernial orifices during robotic r-TAPP procedures using DaVinci Xi technology with the aim of seroma prophylaxis.

18. Review

Oncologic outcomes in robot-assisted radical cystectomy: Where do we stand in 2021?

[HTML](#) [PDF](#)

Cite this article: Miller BL, Pachorek M, Sam AP, Yuh B, Lau CS. Oncologic outcomes in robot-assisted radical cystectomy: Where do we stand in 2021?.

Mini-invasive Surg 2021;5:24. <http://dx.doi.org/10.20517/2574-1225.2021.25>

Abstract

Robot-assisted radical cystectomy is an alternative to the standard open surgical approach and has been increasingly used to surgically treat bladder cancer. Data on oncologic outcomes for the robotic approach have matured, and now intermediate and long-term oncologic outcomes are available. This review focuses on oncologic outcomes of the robotic approach with a focus on recent data and high-quality studies. Based on the current literature available, there are no consistent differences between

the robotic and open approaches with respect to positive margin rates, lymph node yields, recurrence patterns, or recurrence free, cancer-specific, and overall survival. If oncologic surgical principles are adhered to, excellent oncologic outcomes are achievable with the robotic approach.

19. Technical Note

Ergonomics in robotic surgery: patients' safety and protection during complex procedures

[HTML](#) [PDF](#)

Cite this article: Stefan SS, Ahmad Y, Khan JS. Ergonomics in robotic surgery: patients' safety and protection during complex procedures. *Mini-invasive Surg* 2021;5:23. <http://dx.doi.org/10.20517/2574-1225.2021.24>

Abstract

Specific injuries due to poor positioning seen in robotic pelvic surgery include slips, compartment syndrome, facial oedema, injuries on pressure points, and accidental injuries caused by the robotic arms. The use of the vacuum bean-bag positioner, L-bar against the patient's face, and inflated gloves for hand support are simple and effective techniques and should be included in the standard operating policies for robotic surgery. We recommend use of the "L" shaped safety bar against the patient's face to ensure protection against accidental injuries caused by the robotic arms. The anti-slip bean-bag mattress is efficient to prevent slipping; it conforms to the shape of the body for stable positioning and allows extremities to lie in a natural position. Protection of pressure points of hands and elbows can be done with inflated medical gloves placed in the patient's hands. Surgeons, anaesthetists and theatre teams are together responsible for ensuring that safety measures are in place to reduce the risk of these complications.

20. Technical Note

Robotic Ivor Lewis esophagectomy

[HTML](#) [PDF](#)

Cite this article: Ackerman JM, Luketich JD, Sarkaria IS. Robotic Ivor Lewis esophagectomy. *Mini-invasive Surg* 2021;5:14.

<http://dx.doi.org/10.20517/2574-1225.2021.02>

Abstract

The addition of robotic-assistance is the latest evolution of minimally invasive esophageal resection and reconstruction. Despite the improved visualization, the addition of wristed instrumentation, and improved ergonomics, there remains a significant learning curve for complex procedures like esophagectomy. In experienced, high-volume centers, robotic-assisted minimally invasive esophagectomy (RAMIE) has demonstrated outcomes equivalent to traditional laparoscopic and thoracoscopic minimally invasive esophagectomy. Herein, the RAMIE procedure is described in detail in key steps. This approach has been established as safe and effective for esophagectomy.

21. Editorial

Robotic surgery: is it really different from laparoscopy? a critical view from a robotic pioneer

[HTML](#) [PDF](#)

Cite this article: Gagner M. Robotic surgery: is it really different from laparoscopy? a critical view from a robotic pioneer. *Mini-invasive Surg* 2021;5:12.

<http://dx.doi.org/10.20517/2574-1225.2021.23>

22. Original Article

Comparative analysis of perioperative outcomes between robot-assisted partial nephrectomy and open partial nephrectomy: a propensity-matched study

[HTML](#) [PDF](#)

Cite this article: Sawada A, Kobayashi T, Takahashi T, Kono J, Masui K, Sato T, Sano T, Goto T, Akamatsu S, Ogawa O. Comparative analysis of perioperative outcomes between robot-assisted partial nephrectomy and open partial nephrectomy: a propensity-matched study. *Mini-invasive Surg* 2021;5:6.
<http://dx.doi.org/10.20517/2574-1225.2020.100>

Abstract

Aim: Partial nephrectomy is the standard treatment for small renal tumors; however, it remains unclear which surgical approach from among robot-assisted partial nephrectomy (RAPN) and open partial nephrectomy (OPN) is superior. This study aimed to compare perioperative outcomes of RAPN and OPN performed at a single institution after adjusting for preoperative patient and tumor characteristics using propensity score matching (PSM).

Methods: In this retrospective cohort study, patients who underwent RAPN or OPN for a renal mass of cT1-2 N0 M0 between 2005 and 2020 at our institution were recruited. The study outcomes were perioperative outcomes, complications, and pathological and functional outcomes. PSM was used to account for baseline covariates.

Results: Overall, 131 RAPN and 71 OPN cases were extracted; in addition, 58 cases of RAPN and OPN were selected via PSM. RAPN was superior to OPN in terms of estimated blood loss (10 g vs. 160 g, $P < 0.001$), ischemia time (23 min vs. 34 min, $P < 0.001$), and hospital duration (7 days vs. 12 days, $P < 0.001$). There were no significant differences in the incidence of perioperative complications or in the rate of positive surgical margins (both $P > 0.05$). With respect to functional outcomes, the rates of preservation of renal function at both 1 day and 3 months postoperatively were higher with RAPN than with OPN (85.3% vs. 69.1% and 93.3% vs. 85.6% respectively, both $P < 0.001$).

Conclusion: In selected cases, RAPN with warm ischemia appears to preserve renal function equally well or better compared to OPN with cold ischemia.

23. Review

Conventional and robotic transanal minimally invasive surgery for rectal neoplasia

[HTML](#) [PDF](#)

Cite this article: Jahansouz C, Arsoniadis EG, Sands DR. Conventional and robotic transanal minimally invasive surgery for rectal neoplasia. *Mini-invasive Surg* 2021;5:1. <http://dx.doi.org/10.20517/2574-1225.2020.82>

Abstract

The treatment of rectal cancer is evolving at a rapid pace in parallel with advancements in surgical technique. One such advancement is the application of the laparoscopic platform to the transanal approach, coined transanal minimally invasive surgery (TAMIS). TAMIS overcomes many of the shortcomings of the traditional transanal approach to the local resection of rectal neoplasia, offering greater visualization and access to the middle and upper rectum with improved oncologic outcomes. Following the introduction of conventional TAMIS, the robotic platform was introduced and applied in analogous fashion. Over the past decade, data have accumulated enabling the comparison of the two approaches most notably with regard to patient morbidity, mortality, and oncologic outcomes. This review discusses the most recently available outcomes regarding conventional and robotic TAMIS and provides a comparison of the two platforms in the treatment of rectal neoplasia. While randomized controlled trials comparing the two platforms are lacking, important differences have been identified. Conventional TAMIS is the more cost-effective approach while advancements in the robotic platform allow the surgeon to be seated and ergonomically optimized, allowing greater visualization and ease of suturing. Differences in oncologic outcomes between the two platforms have not been identified. Head-to-head randomized controlled trials are required to determine if any differences in functional or oncologic outcomes exist.

24. Review

Robotic liver surgery: literature review and current evidence

[HTML](#) [PDF](#)

Cite this article: Ruzzenente A, Alaimo L, Conci S, Bagante F, Campagnaro T, Pedrazzani C, Guglielmi A. Robotic liver surgery: literature review and current evidence. *Mini-invasive Surg* 2020;4:91.

<http://dx.doi.org/10.20517/2574-1225.2020.90>

Abstract

In the field of minimally invasive surgery, robotic surgery (RS) was introduced to overcome drawbacks in laparoscopic surgery. However, its clinical application in hepatobiliary surgery is not yet standardized. This review analyzed the results of RS to clarify the benefits of robotic liver surgery in comparison with standard laparoscopy. Among 112 publications found in the literature, the 72 most relevant were selected and the following data were extracted: patients characteristics, operative procedures, histopathology, short-term and long-term outcomes, and costs. Twenty-nine articles on robotic liver resections, published in the last five years (2015-2020) and including 1831 patients, were analyzed. Twenty-five comparative studies between robotic and laparoscopic surgery were evaluated to underline the differences in operative outcomes. Eventually, 4 sub-group analyses were conducted on hepatocellular carcinoma, gallbladder cancer, hilar cholangiocarcinoma, and colorectal liver metastases. Almost all the authors reported data on safety, feasibility and oncologic effectiveness of RS reaching comparable results with laparoscopy. However, even if robotic surgery showed longer operative time and higher costs, in selected cases it allowed to increase the rate of minimally invasive approach when compared with laparoscopy. Thus, both open and minimally invasive surgery should be provided in a modern hepatobiliary center, including the robotic approach particularly to complex cases, otherwise very demanding by laparoscopy. In conclusion, different techniques should be tailored to each patient, choosing the

minimally invasive approach when possible, enhancing patients' recovery after surgery, especially in cirrhotic livers and in the context of liver transplantation. Although many centers experienced robotic liver surgery, more and larger studies are necessary to define its real benefits relative to laparoscopy, in order to standardize patient selection criteria and techniques.

25. Editorial

Searching for a better definition of robotic surgery: is it really different from laparoscopy?

[HTML](#) [PDF](#)

Cite this article: Gumbs AA, De Simone B, Chouillard E. Searching for a better definition of robotic surgery: is it really different from laparoscopy?. *Mini-invasive Surg* 2020;4:90. <http://dx.doi.org/10.20517/2574-1225.2020.110>

26. Review

Robotic or laparoscopic surgery for rectal cancer - which is the best answer? A comprehensive review of oncological outcomes

[HTML](#) [PDF](#)

Cite this article: Ghuman A, Kavalukas S, Wexner SD. Robotic or laparoscopic surgery for rectal cancer - which is the best answer? A comprehensive review of oncological outcomes. *Mini-invasive Surg* 2020;4:84. <http://dx.doi.org/10.20517/2574-1225.2020.88>

Abstract

Treatment of rectal cancer is ever evolving with the introduction of newer surgical technologies and multimodal treatment approach. The literature evaluating the various surgical treatment options with regards to operative and nonoperative outcomes is abundant. This is a comprehensive review focused on oncological outcomes of rectal cancer resection performed robotically or laparoscopically. Based on the current

literature available, there is no significant difference in total mesorectal excision completeness, lymph node harvest, positive circumferential resection margin, or proximal resection margin between robotic and laparoscopic approaches for rectal resection. Selection of surgical approach should not be based on pathological outcomes as they are equivalent.

27. Technical Note

Robotic Heller myotomy

[HTML](#) [PDF](#)

Cite this article: Sollie ZW, Jiwani AZ, Wei B. Robotic Heller myotomy. *Mini-invasive Surg* 2020;4:80. <http://dx.doi.org/10.20517/2574-1225.2020.81>

Abstract

Achalasia is a neurodegenerative disorder of the esophagus of unknown etiology, which affects motility, causing symptoms such as progressive dysphagia with liquids then solids, heartburn, regurgitation, odynophagia, weight loss, nocturnal cough, and chest pain. Evaluation will show a characteristic “bird’s beak” appearance on barium esophagram and diagnosis is confirmed with esophageal manometry. Durable relief from the symptoms of achalasia can be achieved with pneumatic dilation, per-oral endoscopic myotomy, or surgical myotomy. Laparoscopic Heller myotomy with Dor (or Toupet) fundoplication for many years had been considered the gold standard for therapy. Since its development in 2001, the robotic Heller myotomy (RHM) has gained increasing popularity. Studies have shown equivalent efficacy of relieving achalasia symptoms but decreased incidence of esophageal perforation with RHM. The higher cost of RHM remains the largest barrier. Our objective was to provide a brief review of the current literature related to RHM and provide a detailed description of how to perform the procedure.

28. Original Surgery

Robotic surgery of gallbladder cancer

[HTML](#) [PDF](#)

Cite this article: Belli A, Patrone R, Albino V, Leongito M, Piccirillo M, Granata V, Pasta G, Palaia R, Izzo F. Robotic surgery of gallbladder cancer. *Mini-invasive Surg* 2020;4:77. <http://dx.doi.org/10.20517/2574-1225.2020.70>

Abstract

Aim: The aim of this study was to describe our technique for the surgical treatment of clinically suspected or incidentally diagnosed gallbladder cancer (GBC) and to report the outcomes of our experience.

Methods: This is a retrospective observational study including consecutive patients operated by a robotic approach for the surgical treatment of clinically suspected or incidentally diagnosed GBC (with the intent of radical re-resection after index cholecystectomy) performed between January 2017 and December 2019. Clinical outcomes and technical details related to the robotic approach were analyzed.

Results: During the study period, 8 patients underwent robotic radical cholecystectomy with lymphadenectomy and atypical resection of segments IVb-V. No conversion or major complications occurred intraoperatively. All patients underwent a radical resection. There were one Clavien-Dindo grade II and one grade IIIb complication. Median hospital stay was 6 days (range 5-11). At a median follow-up of 17.5 months (range 29.3-7.3), all patients are alive and free from disease except one who had peritoneal recurrence and underwent chemotherapy. No trocar site recurrence was observed.

Conclusion: The present study describes a standardized step-by-step robotic technique for the surgical treatment of GBC and demonstrates the feasibility and safety of the robotic approach. More data and multicentre series are needed to confirm our results

and to assess the oncologic outcomes of the robotic approach.

29. Original Article

Parenchymal transection in robotic liver resection: results of 70 resections using the Vessel Sealer

[HTML](#) [PDF](#)

Cite this article: Nota CL, Molenaar IQ, te Riele WW, van Santvoort HC, Rinkes IHMB, Hagendoorn J. Parenchymal transection in robotic liver resection: results of 70 resections using the Vessel Sealer. *Mini-invasive Surg* 2020;4:74. <http://dx.doi.org/10.20517/2574-1225.2020.57>

Abstract

Aim: There is no standard technique for transection of the hepatic parenchyma during robotic liver resection. The aim of this study was to describe the outcomes of robotic liver resections using the Vessel Sealer for parenchymal transection.

Methods: This is a post hoc analysis of a prospective database. All consecutive patients who underwent robotic liver resection in the Regional Academic Cancer Centre, Utrecht, Netherlands, between August 2015 and January 2019 were included.

Results: A total of 70 robotic liver resections were performed, including 60 minor resections (86%) and ten hemihepatectomies (14%). Five procedures (7%) were converted. Mean parenchymal transection time was 43 ± 26 min. Median blood loss was 150 mL (interquartile range 40-300). Ten patients (14%) suffered from a major complication, and three patients (4%) had bile leakage postoperatively. One patient died from post-hepatectomy liver failure.

Conclusion: Based on the results of this series, consisting of 60 minor liver resections and 10 hemihepatectomies, we conclude that the use of the Vessel Sealer during the parenchymal transection in liver resection is feasible and safe.

30. Review

Robotic pancreaticoduodenectomy and splenopancreatectomy: technical aspects and

review of literature

[HTML](#) [PDF](#)

Cite this article: Tschuor C, Nagarkatti SS, Salibi PN, Vrochides D, Martinie JB.

Robotic pancreaticoduodenectomy and splenopancreatectomy: technical aspects and review of literature. *Mini-invasive Surg* 2020;4:72.

<http://dx.doi.org/10.20517/2574-1225.2020.39>

Abstract

Robotic pancreatic surgery provides several advantages. Since the first report of a robotic-assisted distal pancreatectomy in 2001, total pancreatectomies, pancreatic tumor enucleations, pancreaticoduodenectomy, central pancreatectomy and Appleby procedures have been performed, indicating a promising future. The aim of this article is to describe our experience of robotic pancreatic surgery including technical aspects for pancreaticoduodenectomy and distal pancreatectomy. The current literature on feasibility, safety and early postoperative outcomes will be discussed.

31. Review

Robotic vs. laparoscopic major hepatectomy

[HTML](#) [PDF](#)

Cite this article: Ziogas IA, Tohme S, Geller DA. Robotic vs. laparoscopic major hepatectomy. *Mini-invasive Surg* 2020;4:69.

<http://dx.doi.org/10.20517/2574-1225.2020.63>

Abstract

The introduction of laparoscopic technology and surgical robots in hepatobiliary surgery in the 1990s and 2000s, respectively, has dramatically revolutionized the field. Even though laparoscopic and robotic major hepatectomy was slower to adopt compared to minimally-invasive minor hepatectomy, the number of major hepatectomies performed with both approaches worldwide has significantly increased

and is still rising. Despite the few comparative studies between laparoscopic and robotic major hepatectomy, most studies are focused on describing the procedures or reporting the outcomes of each method, either separately, or mixed with minor hepatectomies. Based on the available data, the direct comparison between the two techniques has shown that when robotic major hepatectomy is performed by experienced hepatobiliary surgeons in high-volume centers, it can lead to similar operating times, estimated blood loss, hospital length of stay, complication and mortality rates compared to its laparoscopic counterpart. The likelihood of achieving a margin-negative resection in cancer patients, as well as long-term disease-free and overall-survival are comparable between the groups. However, broader adoption of the robotic approach might be a hurdle in low-volume centers due to the high fixed capital and annual maintenance cost of the surgical robot.

32. Review

The technique of robotic anatomic pulmonary segmentectomy II: left sided segments

[HTML](#) [PDF](#)

Cite this article: Gharagozloo F, Meyer M. The technique of robotic anatomic pulmonary segmentectomy II: left sided segments. *Mini-invasive Surg* 2020;4:68.

<http://dx.doi.org/10.20517/2574-1225.2020.60>

Abstract

Anatomic pulmonary segmentectomy and mediastinal nodal dissection has been advocated in patients with smaller tumors or patients with limited pulmonary reserve. The overall 5-year survival and the lung cancer-specific 5-year survival following anatomic segmentectomy have been shown to be equivalent to that of lobectomy. Robotic surgical systems have the advantage of magnified, high-definition three-dimensional visualization and greater instrument maneuverability in a minimally invasive platform. These robotic systems can facilitate the dissection of the bronchovascular structures and replicate the technique of segmentectomy by

thoracotomy. Greater experience with the robotic platform has resulted in a reproducible anatomic segmentectomy technique. This is a companion paper to The Technique of Robotic Anatomic Segmentectomy I: Right Sided Segments. This paper outlines the technique of anatomic pulmonary segmentectomy for the left lung: Left Upper Lobe (LUL) Anterior Segment (S3), LUL Apicoposterior Segment (S1 + S2), LUL Lingulectomy (S4, S5), Left Lower Lobe (LLL) Superior Segmentectomy (S6), and LLL Basal Segmentectomy (S7-S10).

33. Review

The technique of robotic anatomic pulmonary segmentectomy I: right sided segments

[HTML](#) [PDF](#)

Cite this article: Gharagozloo F, Meyer M. The technique of robotic anatomic pulmonary segmentectomy I: right sided segments. *Mini-invasive Surg* 2020;4:66.

<http://dx.doi.org/10.20517/2574-1225.2020.53>

Abstract

Anatomic pulmonary segmentectomy and mediastinal nodal dissection have been advocated in patients with smaller tumors or patients with limited pulmonary reserve. The overall five-year survival and lung cancer-specific five-year survival following anatomic segmentectomy have been shown to be equivalent to lobectomy. Robotic surgical systems have the advantage of magnified high-definition three-dimensional visualization and greater instrument maneuverability in a minimally invasive platform. Robotics can facilitate the dissection of the broncho-vascular structures and replicate the technique of segmentectomy by thoracotomy. Greater experience with the robotic platform has resulted in a reproducible technique. The Technique of Robotic Anatomic Segmentectomy Part I outlines a stepwise approach to robotic segmentectomy of S1, S2, S3, S4, S5, S6, and S7-S10 of the right lung. The Technique of Robotic Anatomic Segmentectomy Part II outlines a stepwise approach to robotic segmentectomy to the left lung.

34. Review

Robotic or laparoscopic surgery for rectal cancer - which is the best answer? a comprehensive review of non-oncological outcomes and learning curve

[HTML](#) [PDF](#)

Cite this article: Kavalukas SL, Ghuman A, Sharp SP, Wexner SD. Robotic or laparoscopic surgery for rectal cancer - which is the best answer? a comprehensive review of non-oncological outcomes and learning curve. *Mini-invasive Surg* 2020;4:61. <http://dx.doi.org/10.20517/2574-1225.2020.71>

Abstract

Much effort has been spent evaluating the difference between robotic and laparoscopic surgery platforms for rectal cancer. There is a plethora of literature comparing outcomes for intraoperative events, postoperative complications, long term outcomes, cost, and learning curve. The data are conclusive regarding the higher cost of robotic surgery compared to laparoscopic surgery. This article is a comprehensive review of the available literature regarding intraoperative and postoperative outcomes. For practically all parameters evaluated, there are no significant differences between the two platforms. The ultimate decision on whether to perform robotic vs. laparoscopic surgery should be based on surgeon preference and familiarity with equipment, as well as local resources.

35. Review

Technique of robotic lobectomy III: control of major vascular injury, the 5 “P”s

[HTML](#) [PDF](#)

Cite this article: Gharagozloo F, Meyer M. Technique of robotic lobectomy III: control of major vascular injury, the 5 “P” ’ s. *Mini-invasive Surg* 2020;4:57. <http://dx.doi.org/10.20517/2574-1225.2020.44>

Abstract

Robotic Lobectomy has been evolving over the past decade and has been shown to be an oncologically efficacious procedure. Although robotic lobectomy is performed more frequently in centers around the world, it accounts for a small percentage of all lobectomies. One of the major causes of reluctance to adopt robotic lobectomy and segmentectomy procedures by surgeons is the fear of bleeding complications, as well as the lack of a standardized reproducible approach to these potentially catastrophic events. This paper outlines a proven strategy for control of bleeding complications during robotic lobectomy and segmentectomy procedures: the 5 “P”s of Prevention, Preparedness, Poise, Pressure, and Proximal Control.

36. Review

The technique of robotic lobectomy II: left sided lobes

[HTML](#) [PDF](#)

Cite this article: Gharagozloo F, Meyer M. The technique of robotic lobectomy II: left sided lobes. *Mini-invasive Surg* 2020;4:56.

<http://dx.doi.org/10.20517/2574-1225.2020.43>

Abstract

Robotic lobectomy has been evolving over the past decade and has been shown to be an oncologically efficacious procedure. The Technique of Robotic Lobectomy I outlined the stepwise approach to robotic lobectomy of the right upper, right middle and right lower lobes. This paper outlines the stepwise technical approach to robotic lobectomy of the left upper and lower lobes. The accompanying paper, Technique of Robotic Lobectomy III: Control of Bleeding Complications, outlines a methodical technical approach for the control of catastrophic bleeding complications.

37. Review

The technique of robotic lobectomy I: right-sided lobes

[HTML](#) [PDF](#)

Cite this article: Gharagozloo F, Meyer M. The technique of robotic lobectomy I: right-sided lobes. *Mini-invasive Surg* 2020;4:55.

<http://dx.doi.org/10.20517/2574-1225.2020.42>

Abstract

Robotic Lobectomy has been evolving over the past decade and is an oncologically efficacious procedure. Although robotic lobectomy is performed more frequently around the world, it accounts for a small percentage of all lobectomies. The major determinants for the lower level of adoption of the robotic lobectomy procedure are 1. The lack of concise step by step procedure outlines for the surgeons who are transitioning from either open or video-assisted thoracic surgical procedures to robotics, or 2. A strategy for control of catastrophic bleeding during the robotic lobectomy procedure. The Technique of Robotic Lobectomy Part I outlines a stepwise approach to robotic lobectomy for the right upper, middle, and lower lobes. Part II outlines a stepwise approach to robotic lobectomy for left upper, and lower lobes. Part III outlines a methodical technical approach for the control of catastrophic bleeding complications.

38. Original Article

Robot-assisted spleen preserving distal pancreatectomy (RA-SPDP): a single center experience

[HTML](#) [PDF](#)

Cite this article: Kauffmann EF, Napoli N, Menonna F, Genovese V, Cacace C, Gianfaldoni C, Vistoli F, Amorese G, Boggi U. Robot-assisted spleen preserving distal pancreatectomy (RA-SPDP): a single center experience. *Mini-invasive Surg* 2020;4:54. <http://dx.doi.org/10.20517/2574-1225.2020.46>

Abstract

Aim: To define the outcome of robot-assisted spleen preserving distal pancreatectomy (RA-SPDP) in a high-volume center.

Methods: A retrospective analysis of a prospectively maintained database was performed to identify RA-SPDP performed at our Center between April 2008 to October 2017.

Results: During the study period, RA-SPDP was attempted in 54 patients. The spleen was preserved, always along with the splenic vessels (Kimura procedure), in 52 patients (96.3%). There were no conversions to open or laparoscopic surgery. Mean operative time was 260 min (231.3-360.0). Grade B post-operative pancreatic fistula (POPF) occurred in 19 patients (35.2%). There were no grade C POPF. Two patients required repeat surgery because of postoperative bleeding and splenic infarction, respectively. There were no post-operative deaths at 90 days. Excluding one patient with known diagnosis of metastasis from renal cell carcinoma, malignancy was eventually identified in 7 of 53 patients (13.2%).

Conclusion: In the hands of dedicated pancreatic surgeons, robotic assistance results in a high rate of spleen preservation with good clinical outcomes. Despite careful preoperative selection, several patients can be found to have a malignant tumor. Taken altogether these results suggest that patients requiring these procedures should be preferentially referred to specialized centers.

39. Review

Robotic esophagectomy: how I do it?

[HTML](#) [PDF](#)

Cite this article: Khaitan PG, Lazar JF, Margolis M, Henderson HR, Watson TJ.

Robotic esophagectomy: how I do it?. *Mini-invasive Surg* 2020;4:51.

<http://dx.doi.org/10.20517/2574-1225.2020.34>

Abstract

Compared to the open approach, minimally invasive esophagectomy (MIE) offers several advantages including smaller incisions with decreased pain, improved cosmesis, and earlier return of the patient to baseline function. Robotic-assisted minimally invasive esophagectomy (RAMIE) builds on standard MIE by offering three-dimensional visualization, better instrument articulation, tremor filtration, and superior ergonomics, all of which facilitate technical precision and surgeon comfort. An evolving literature demonstrates that when performed by experienced surgeons, RAMIE leads to improved perioperative outcomes with long-term oncologic equivalency to open approaches, and may offer advantages compared to traditional MIE. This review focuses on the key steps of performing 3-field McKeown, 2-field Ivor Lewis, and transhiatal robotic esophagectomies, data regarding the short- and long-term outcomes, and a brief overview of upcoming trials comparing RAMIE with MIE.

40. Review

Robotic esophagectomy: the evolution of open esophagectomy to current techniques and a review of the literature

[HTML](#) [PDF](#)

Cite this article: Hasson RM, Fay KA, Phillips JD, Millington TM, Finley DJ.

Robotic esophagectomy: the evolution of open esophagectomy to current techniques and a review of the literature. *Mini-invasive Surg* 2020;4:46.

<http://dx.doi.org/10.20517/2574-1225.2020.10>

Abstract

Esophageal cancer persists as one of the most common causes of cancer-related death and 5-year survival remains poor at 20%. Surgical resection is the gold standard for treatment and cure, and the development of minimally invasive surgery has increased the popularity of robotic-assisted minimally-invasive esophagectomy. The benefits described include less morbidity and greater patient satisfaction compared to open

techniques. Nevertheless, institution capabilities and surgeon experience are strong determinants of whether a robotic program will be adopted for oncologic esophageal care. Thus, we review the available literature regarding the history of esophagectomy, evolution to minimally invasive approaches, the introduction of robotic-assisted esophagectomy including its respective outcomes in comparison to open and minimally invasive approaches, and future directions.

41. Review

Trends in the evolution to robot-assisted minimally invasive thoracoscopic esophagectomy

[HTML](#) [PDF](#)

Cite this article: Liu J, Motoyama S, Sato Y, Wakita A, Kawakita Y, Nagaki Y, Fujita H, Imai K, Minamiya Y. Trends in the evolution to robot-assisted minimally invasive thoracoscopic esophagectomy. *Mini-invasive Surg* 2020;4:44.

<http://dx.doi.org/10.20517/2574-1225.2020.20>

Abstract

Much effort has been made to improve outcomes and/or minimize the invasiveness of esophagectomy for thoracic esophageal cancer. This has led to the evolution from open esophagectomy to thoracoscopic minimally invasive esophagectomy (MIE), and from MIE to robot-assisted minimally invasive esophagectomy (RAMIE). RAMIE is being applied clinically to overcome the limitations of MIE. In this article, we review the trends in the evolution from thoracoscopic MIE to RAMIE. It has now been demonstrated that RAMIE is both safe and feasible, and may decrease morbidity and mortality rates associated with esophagectomy and improve oncological outcomes. On the other hand, there are still many problems that need to be solved.

42. Systematic Review

Robot-assisted minimally invasive esophagectomy: systematic review on surgical and

oncological outcomes

[HTML](#) [PDF](#)

Cite this article: Bongiolatti S, Farronato A, Di Marino M, Anecchiarico M, Coratti F, Cianchi F, Coratti A, Voltolini L. Robot-assisted minimally invasive esophagectomy: systematic review on surgical and oncological outcomes. *Mini-invasive Surg* 2020;4:41. <http://dx.doi.org/10.20517/2574-1225.2020.28>

Abstract

Aim: Esophagectomy is associated with several post-operative complications (50%-70%) due to surgical trauma. Minimally invasive techniques have therefore been applied to decrease mortality and morbidity. Robot-assisted minimally-invasive esophagectomy (RAMIE) was developed to overcome the drawbacks of the thoraco-laparoscopic approach. The objective of this systematic review is to report some recent experiences and to compare RAMIE with other approaches to esophagectomy, focusing on technical and oncological aspects.

Methods: Pubmed, Embase and Scopus databases were searched for “robot-assisted esophagectomy”, “minimally invasive esophagectomy” and “robotic esophagectomy” in January 2020. The study was focused on original papers on totally endoscopic RAMIE in the English language. No statistical procedures (meta-analysis) were performed.

Results: Three hundred and twenty studies were identified across the database and after screening and reviewing, 14 were included for final analysis. The overall 90-day post-operative mortality after trans-thoracic esophagectomy ranged from 0% to 9% and did not differ between approaches. Post-operative complications ranged between 24% and 60.9%: respiratory (6.25% to 65%), cardiac (0.8% to 32%), anastomotic leak (3.1% and 37.5%) and vocal cord palsy (9.1%-35%) were the most frequent. The evidence for long-term outcomes is weak, with no significant differences in overall survival, disease-free survival and recurrence identified in comparison with other approaches. The selected papers showed that RAMIE had comparable outcomes

between the open and thoraco-laparoscopic approaches within a multimodal treatment pathway.

Conclusion: RAMIE also seems to be associated with better lymph node dissection, nerve sparing and quality of life, but larger studies are needed to obtain more evidence.

43. Review

Robotic thymectomy for myasthenia gravis

[HTML](#) [PDF](#)

Cite this article: Mammana M, Comacchio GM, Dell' Amore A, Faccioli E, De Franceschi E, Rossi S, Rea F. Robotic thymectomy for myasthenia gravis. *Mini-invasive Surg* 2020;4:37. <http://dx.doi.org/10.20517/2574-1225.2020.24>

Abstract

Thymectomy is an effective treatment option for the management of myasthenia gravis, as demonstrated by a recent multicenter randomized clinical trial. Complete removal of all thymic tissue, including ectopic foci, increases the chance of achieving a remission or a substantial improvement of the disease; therefore, extended transsternal thymectomy was long considered the procedure of choice. Over the years, several minimally invasive approaches have been proposed, with the aim to reduce perioperative morbidity and to improve aesthetics; however, concerns exist that through such approaches, it may not be possible to achieve a complete resection. Robotic thymectomy seems to overcome many of the limitations associated with other minimally invasive approaches. The available evidence suggests that robotic thymectomy for myasthenia gravis is a safe procedure, and that long-term neurological outcomes are satisfactory.

44. Review

MIS AI - artificial intelligence application in minimally invasive surgery

[HTML](#) [PDF](#)

Cite this article: Nawrat Z. MIS AI - artificial intelligence application in minimally invasive surgery. *Mini-invasive Surg* 2020;4:28.

<http://dx.doi.org/10.20517/2574-1225.2020.08>

Abstract

This chapter is devoted towards analyzing the progress and barriers to the development of artificial intelligence (AI) and medical robotics in minimally-invasive surgery. The less invasive the surgical intervention and the further the surgeon is from the operating table, the greater the roles of decision support systems (AI) and performance of specific tasks (by medical robots).

45. Original Article

Robotic lateral heller myotomy without fundoplication for achalasia

[HTML](#) [PDF](#)

Cite this article: Gharagozloo F, Atituzzman N, Atiquzzman B. Robotic lateral heller myotomy without fundoplication for achalasia. *Mini-invasive Surg* 2020;4:22.

<http://dx.doi.org/10.20517/2574-1225.2019.61>

Abstract

Aim: Laparoscopic anterior esophageal myotomy with a Dor anterior fundoplication is the most commonly performed surgical myotomy procedure. A lateral esophageal myotomy without an antireflux procedure performed through a left thoracotomy has been associated with the lowest rate of postoperative gastroesophageal reflux and the highest rate for relief of dysphagia. The surgical robot allows for the lateral myotomy procedure to be performed by laparoscopy rather than thoracotomy. We studied our experience with Robotic Lateral Heller Myotomy Without Fundoplication (RLHM) for achalasia.

Methods: A retrospective review was conducted of the patients with achalasia who underwent RLHM. All patients completed a subjective dysphagia score questionnaire, received an Eckardt Score, and underwent manometry and pH testing preoperatively, as well as at 6 and 12 months following the myotomy procedure.

Results: Forty-eight patients underwent RLHM. The median operating room time was 85 min (range 60-132 min). There was no conversion to a laparotomy. Median hospitalization was 2 days (range 2-3 days). There were no mucosal perforations, complications, or deaths. Following RLHM, the Lower Esophageal pressure decreased from 35 mmHg (range 18-120 mmHg) to 13.2 mmHg (range 9.8-16.6 mmHg) ($P < 0.0001$). The length of the Lower Esophageal high-pressure zone decreased from 5.5 cm (range 4-9 cm) to 2.2 cm (range 1.5-2.8 cm) ($P < 0.0001$). Two patients (2/48) (4.2%) had pathologic gastroesophageal reflux. The median acid exposure in all patients was 0.4% (range 0%-17.8%), and the median Demeester score was 7.5 (range 2-125). The Eckardt score decreased from 6.3 ± 1.8 to 0.8 ± 1.8 at 1 month ($P < 0.0001$), and 0.8 ± 1.1 at 12 months ($P < 0.0001$).

Conclusion: RLHM is associated with excellent relief of dysphagia and a low incidence of new gastroesophageal reflux.

46. Review

Robotic transanal surgery: perspectives for application

[HTML](#) [PDF](#)

Cite this article: Genova P, Memeo R, Brunetti F. Robotic transanal surgery: perspectives for application. *Mini-invasive Surg* 2020;4:20.

<http://dx.doi.org/10.20517/2574-1225.2019.47>

Abstract

Transanal minimally invasive surgery (TAMIS) is a surgical technique which allows

the local excision of rectal benign tumors and early stage cancers measuring up to 4 cm and lying within 6-8 cm from the anal verge. It is performed by means of a disposable transanal platform and conventional laparoscopic instruments, proving to be effective and easily available. Hence, TAMIS soon became a valid alternative to other transanal resective procedures, especially transanal endoscopic microsurgery, and rapidly spread. Moreover, soon after its introduction, TAMIS started to be performed also using robotic technologies, but no clear advantages were found to date. This review is intended to provide a general overview on TAMIS, with a special focus on its association with robotic systems and the perspectives of this approach.

47. **Review**

Robotic versus open and video-assisted thoracoscopic surgery approaches for lobectomy

[HTML](#) [PDF](#)

Cite this article: Montagne F, Bottet B, Sarsam M, Mbadinga F, Chaari Z, Rinieri P, Melki J, Peillon C, Baste JM. Robotic versus open and video-assisted thoracoscopic surgery approaches for lobectomy. *Mini-invasive Surg* 2020;4:17. <http://dx.doi.org/10.20517/2574-1225.2019.74>

Abstract

More and more data are available on the benefits of minimally invasive thoracic surgery compared to open thoracic surgery in the curative treatment of early-stage non-small cell lung cancer. However, results are conflicting, especially when video-assisted thoracoscopic surgery (VATS) is compared to robotic-assisted thoracoscopic surgery (RATS) for lobectomy. Our goal is to report the main results of recent systematic reviews and meta-analyses comparing RATS, VATS, and open surgery for lobectomy. Using PubMed database, we selected systematic reviews and meta-analyses, which compared the short-term outcomes of patients treated by RATS, VATS, or open surgery for lobectomy. In all but one of the systematic reviews,

robotic lobectomy allowed similar short-term outcomes as VATS lobectomy and better short-term outcomes than open surgery. One meta-analysis by O' Sullivan et al. found that robotic lobectomy was associated with fewer adverse events ($P < 0.00001$) and lower 30-day mortality ($P = 0.001$), compared to VATS lobectomy. Robotic lobectomy could be a valid alternative to VATS and open lobectomy. Short-term outcomes do not appear to be different between VATS and RATS cohorts, except in one recent meta-analysis, which reported the superiority of RATS compared to VATS. Without cost analysis and randomized controlled trials with long-term outcomes, no strong conclusions can be drawn.

48. Original Article

Robotic selective thoracic sympathectomy for hyperhidrosis

[HTML](#) [PDF](#)

Cite this article: Gharagozloo F. Robotic selective thoracic sympathectomy for hyperhidrosis. *Mini-invasive Surg* 2020;4:14.

<http://dx.doi.org/10.20517/2574-1225.2019.55>

Abstract

Aim: Thoracic sympathectomy is indicated in patients with upper extremity hyperhidrosis. The success of dorsal thoracic sympathectomy is judged by the rates of relief of hyperhidrosis, recurrence, and compensatory hyperhidrosis. We studied robotic selective sympathectomy (RSS) directed at the division of the preganglionic and postganglionic rami without interruption of the sympathetic chain.

Methods: During RSS, the preganglionic and postganglionic sympathetic fibers and communicating rami to intercostal nerves 2, 3, and 4 are divided. The sympathetic chain is left intact.

Results: Forty-seven patients underwent RSS. RSS was performed in a staged fashion with the more symptomatic side first, followed by the contralateral side after at least four weeks. Mean operative time was 67 ± 13 min for unilateral RSS. There was no

conversion to thoracotomy. The mean increase in ipsilateral palmar temperature was 1.2 ± 0.3 °C. Median hospital stay was three days (range 1-4 days). Complications included transient heart block after sympathectomy on the second side in 1/47 (2%) and transient partial Horner's syndrome which resolved in two weeks in 1/47 (2%). There was no permanent Horner's syndrome. Relief of hyperhidrosis was seen in 98% of patients. At a mean follow up of 28 ± 6 months, 46/47 (98%) patients were free of sustained compensatory hyperhidrosis.

Conclusion: RSS is associated with excellent relief of hyperhidrosis and the lowest reported rate of compensatory hyperhidrosis.

49. Review

Nodal upstaging robotic lobectomy for non-small cell lung cancer

[HTML](#) [PDF](#)

Cite this article: Zirafa CC, Romano G, Nesti A, Davini F, Melfi F. Nodal upstaging robotic lobectomy for non-small cell lung cancer. *Mini-invasive Surg* 2020;4:13. <http://dx.doi.org/10.20517/2574-1225.2019.35>

Abstract

Nodal upstaging takes place when unsuspected lymph node metastases are detected by pathological evaluation, after surgical treatment for non-small cell lung cancer. In early stages non-small cell lung cancer, nodal upstaging amounts to 4.8%-24.6%, depending on several factors, such as accuracy of preoperative staging, localisation and size of tumour and number of lymph nodes removed. Nodal upstaging is considered a surrogate of the completeness of thoracic oncologic surgery; for this reason, various studies focus on the evaluation of its rate in the different surgical approaches used to treat lung cancer. In this analysis, a high percentage of upstaging is observed in robotic surgery, having similar values to open surgery results, usually considered the gold standard in terms of oncologic radicality. In fact, thanks to its features, robotic surgery allows carrying out a thorough lymphadenectomy in the most

comfortable manner, ensuring an excellent vision and manoeuvrability of the instruments even in the most remote areas of the thorax. According to these results, robotic surgery constitutes a safe and radical surgical option, showing encouraging results on the efficacy of lymphadenectomy and, consequently, on its the long-term outcomes.

50. Original Article

Robotic vs. traditional stapler use in robotic portal anatomic lung resection

[HTML](#) [PDF](#)

Cite this article: Phillips JD, Fay KA, Hasson RM, Millington TM, Finley DJ. Robotic vs. traditional stapler use in robotic portal anatomic lung resection. *Mini-invasive Surg* 2020;4:12. <http://dx.doi.org/10.20517/2574-1225.2020.02>

Abstract

Aim: Currently, there is a paucity of data comparing robotic to traditional video-assisted thoracic surgery stapling devices and the effects on perioperative outcomes during robotic anatomic lung resection. We sought to investigate our institutional experience with patients undergoing robotic anatomic lung resection stratified by the type of stapler used over a contemporary period.

Methods: We performed a retrospective review of a prospectively maintained thoracic surgery database and evaluated all patients who underwent robotic anatomic lung resection between January 2015 and December 2018. Patients were grouped based on the type of stapler used during surgery and preoperative characteristics and intraoperative and postoperative outcomes were compared.

Results: In total, 634 lung resections occurred during the study period. Of those, 236 met inclusion criteria, and 49 cases (20.8%) fully utilized the robotic stapler. We found no clinically significant difference in preoperative or intraoperative characteristics between groups, except operative time was longer in the robot stapler group. This was likely related to surgeon learning curve. There were no differences

between groups in postoperative outcomes or complications.

Conclusion: We found equivalent rates of complications, prolonged air leak, and chest tube duration between the two groups. Based on our data, we recommend that surgeons use the stapling device with which they are most confident.

51. Review

Robotic lobectomy costs and quality of life

[HTML](#) [PDF](#)

Cite this article: Nishimura JM, Goodwin M, Kneuert P, Moffatt-Bruce S, Merritt RE, D' Souza DM. Robotic lobectomy costs and quality of life. *Mini-invasive Surg* 2020;4:11. <http://dx.doi.org/10.20517/2574-1225.2019.48>

Abstract

The surgical approach for lobectomy has changed over time with recent data demonstrating that the majority are performed using a minimally invasive approach. While the use of the robotic platform for pulmonary resection has been shown to have acceptable clinical outcomes, cost and quality of life need to be considered when starting a robotic lobectomy program. In this review, we evaluate the literature on cost of robotic lobectomy and quality of life. The results suggest that early experience in a robotic lobectomy program may be associated with relatively higher index hospital costs when compared to video-assisted thoracoscopic surgery; however, with increased experience and volume, the difference may no longer be of significance. When compared with thoracotomy, the cost is comparable if not less costly and may even be profitable for the hospital. Quality of life appears to be acceptable in the early experience of robotic lobectomy.

52. Original Article

Thoracic surgery by minimally invasion robot-assisted in children: “experience and current status”

[HTML](#) [PDF](#)

Cite this article: Navarrete-Arellano M. Thoracic surgery by minimally invasion robot-assisted in children: “ experience and current status ” . *Mini-invasive Surg* 2020;4:9. <http://dx.doi.org/10.20517/2574-1225.2019.70>

Abstract

Aim: We report our experience in minimally invasive thoracic robot-assisted surgery in children, and a current analysis is carried out on this topic.

Methods: Observational, prospective, and longitudinal studies were performed for children with thoracic pathology treated with robotic surgery, from March 2015 to April 2019. We used the “da Vinci surgical system” (Intuitive Surgical, Inc., Sunnyvale, CA. USA). Registered variables included demographic data, diagnosis, surgery, total time, time of console surgery, bleeding, hemotransfusions, conversions, complications, postoperative (PO) stay, and follow-up. Measures of central tendency were used. Research Ethics Committee of Hospital approved the study. We conducted a detailed non-systematic review of previous publications of children undergoing thoracic robotic surgery.

Results: We treated 11 children, with average age of 5.7 years and weight of 21.3 kg. Diagnosis were: congenital cystic adenomatoid malformation, intralobar sequestration, diaphragmatic paralysis, diaphragmatic eventration, mediastinal teratoma, Ewing’s tumor of the fourth left rib, and pulmonary tuberculosis. Surgeries performed were: four lobectomies, four diaphragmatic plications, two tumor resections, and a case of pleural and lung biopsies. The average of console surgery time was 166.45 min, PO stay was 3.6 days, and follow-up was 24.7 months. Conversions and PO complications were 9.1%, and there were no intraoperative complications and mortality. Currently, the number of children treated with thoracic robot-assisted surgery has barely reached 100 cases.

Conclusion: Our results are encouraging, although our experience is limited to a few cases. Robotic surgery for the treatment of thoracic pathology is feasible and safe, and

has advantages. To date, very few patients have been treated, and few pediatric surgeons worldwide have applied thoracic robotic surgery in children.

53. Review

Pain management following robotic thoracic surgery

[HTML](#) [PDF](#)

Cite this article: Gharagozloo F. Pain management following robotic thoracic surgery.

Mini-invasive Surg 2020;4:8. <http://dx.doi.org/10.20517/2574-1225.2019.62>

Abstract

For robotic thoracic surgical patients, minimizing pulmonary complications is the key to decreasing morbidity. Once the pain is controlled, the morbidity associated with thoracic surgery is decreased. Consequently, control of pain is the core requirement in robotic thoracic surgical patients. Appropriate pain control depends on a multifaceted program that is based on an understanding of the pathophysiology of pain. A multifaceted pain control program after robotic surgery needs to address local and systemic pain pathways. This review outlines such a multifaceted program with the use of subpleural catheters for prolonged ambulatory infusion of local anesthetic for 10 days, nonsteroidal anti-inflammatory agents, and measured use of narcotic analgesics.

54. Review

Milestones in robotic colorectal surgery development: an historical overview

[HTML](#) [PDF](#)

Cite this article: Genova P, Pantuso G, Abdalla S, Memeo R, Gaiani F, Gavriilidis P, de' Angelis N. Milestones in robotic colorectal surgery development: an historical overview. *Mini-invasive Surg* 2020;4:2.

<http://dx.doi.org/10.20517/2574-1225.2019.30>

Abstract

The present article is a historical review intended to trace the most important phases in the development of robotic surgical technology, with a special focus on colorectal surgery. The initial section considers the origin and some etymological aspects of the word “robot”. Then, a historical overview traces the development of robotic technology in industry and its implementation within the operating theatres. Finally, the first publications concerning robot-assisted colon and rectal surgery are reported together with a brief state of the art about this issue.

55. Review

Long-term survival of robotic lobectomy for non-small cell lung cancer: a literature review

[HTML](#) [PDF](#)

Cite this article: Ricciardi S, Davini F, Zirafa CC, Romano G, Melfi FMA. Long-term survival of robotic lobectomy for non-small cell lung cancer: a literature review. *Mini-invasive Surg* 2020;4:1. <http://dx.doi.org/10.20517/2574-1225.2019.50>

Abstract

Even though robotic-assisted surgery is increasingly used for resection of non-small cell lung cancer (NSCLC), data on long-term oncologic outcomes of robotic surgery are still not well defined. The primary endpoint of this review is to analyse the long-term results of robotic lobectomy in NSCLC patients. A systematic research was performed using the PubMed database. Articles published from January 2008 to January 2019 were included. We excluded studies that did not provide results for the long-term outcomes of robotic lobectomy, studies that had fewer than 50 cases and ones that focused on results of sub-lobar resections. Therefore, ten eligible studies were included in this analysis. In total, 2873 patients, with a mean age ranging between 66 and 68 years, who underwent robotic lobectomy for NSCLC, were analysed. Most patients (81%) had early-stage disease. The five-year overall survival

for stage I disease fluctuated between 77% and 100%. The five-year disease-free survival was reported to be near 73%. We can conclude that robotic assisted lobectomy is an effective minimally-invasive procedure for lung resection. The current literature shows that robotic lobectomy is associated with long-term survival and lasting disease-free survival, equivalent to those reached by video-assisted thoracic surgery and open approach.

56. Original Article

Robotic-assisted abdominoperineal resection: technique, feasibility, and short-term outcomes

[HTML](#) [PDF](#)

Cite this article: Abdalla S, Valverde A, Fléjou JF, Goasguen N, Oberlin O, Lupinacci RM. Robotic-assisted abdominoperineal resection: technique, feasibility, and short-term outcomes. *Mini-invasive Surg* 2019;3:39.

<http://dx.doi.org/10.20517/2574-1225.2019.38>

Abstract

Aim: The use of robotic-assisted laparoscopy seems fully adapted to pelvic surgery. However, few studies focus on robotic-assisted abdominoperineal resection (RAAPR). The aim of this study was to assess the feasibility, short-term postoperative outcomes, and pathological results of RAAPR. In addition, we provide a detailed description of the operative procedure and a brief review of the current literature.

Methods: Between January 2013 and April 2018, we performed a total of 428 robotic surgeries, including 294 colorectal resections (68.7%). Data were prospectively collected and included demographics, intraoperative findings, postoperative outcomes, and pathological data. For this study, we included the first 20 consecutive RAAPRs performed with the four-arm da Vinci Si surgical system (Intuitive Surgical Inc., Sunnyvale, CA, USA).

Results: Twenty patients (nine men) with a mean age of 68 years and a mean BMI of

24.5 ± 5.0 kg/m² underwent RAAPR for low rectal adenocarcinoma (80%) or squamous cell carcinoma of the anal canal. Sixteen (80%) patients underwent preoperative pelvic radiotherapy and eight (40%) had a history of previous abdominal surgery. Mean operative duration was 218 ± 52 min. There was no conversion to open surgery. Mortality, reoperation, and morbidity rate were 5%, 25%, and 60%, respectively. Three (15%) patients presented perineal complications. Mean length of hospital stay was 20 days. Three (15%) patients had pT4 tumor. Mesorectal excision was considered complete in 90%. On average, 16.5 ± 7.2 lymph nodes were retrieved. Conclusion: RAAPR is feasible, with acceptable pathologic and short-term outcomes. The current literature does not demonstrate significant differences between robotic and laparoscopic APR. Indeed, we cannot justify its use in routine on the basis on the available evidence.

57. Review

Minimally invasive right colectomy - from conventional laparoscopic resection to robotic-assisted surgery: a narrative review

[HTML](#) [PDF](#)

Cite this article: Moroni P, Payá-Llorente C, Lauka L, Reitano E, Memeo R, Gavriilidis P, Brunetti F, Martínez-Pérez A. Minimally invasive right colectomy - from conventional laparoscopic resection to robotic-assisted surgery: a narrative review. *Mini-invasive Surg* 2019;3:36. <http://dx.doi.org/10.20517/2574-1225.2019.34>

Abstract

Robotic-assisted abdominal surgery was introduced with the aim of overcoming the drawbacks of the conventional laparoscopic approach. The present narrative review focuses on the comparison between laparoscopic and robotic-assisted approaches for right colectomy (RC) regarding short- and long-term outcomes, costs, and learning curve. The main technical aspects related to the use of robotic assistance for this specific procedure are further discussed. Minimally invasive RC is considered

technically challenging due to the particularities of the right and middle colic vascular anatomy. Robotic RC is not yet widespread due to its high cost and longer operating time. However, its use may result in advantages regarding short-term clinical outcomes, and it facilitates the acquisition of basic surgical skills by speeding up the learning curve of minimally invasive colorectal surgery.

58. Original Article

Robotic bronchial sleeve resections: technical details and early results

[HTML](#) [PDF](#)

Cite this article: Durand M. Robotic bronchial sleeve resections: technical details and early results. *Mini-invasive Surg* 2019;3:35.

<http://dx.doi.org/10.20517/2574-1225.2019.31>

Abstract

Aim: We report our four-arm robotic bronchial sleeve anatomical lung resection technique and its early results.

Methods: We retrospectively collected all the four-arm robotic sleeve anatomical lung resections we performed in our institution from February 2014 to August 2019. We reported the results as a series of cases.

Results: During that period, 582 robotic procedures were performed by a single surgeon, of which 486 were major anatomical lung resections. From this group, 10 patients (2%) underwent bronchial sleeve resections. All patients were treated on the right lung. Neither conversion nor major events occurred during surgery. The first bronchial sleeve was performed for Patient 219. The mean length of procedure was 164 (\pm 43) min. One patient died during hospitalization due to a non-related complication (gastric massive bleeding). Three patients had no complications. Six had minor complications (Clavien Dindo Grade 2) resulting in prolonged length of stay. The mean length of stay was 10 (\pm 5.7) days. No bronchial fistula occurred. All resection margins were R0.

Conclusion: Four-arm robotic bronchial sleeve is a feasible and safe procedure. Telemanipulation surgery offers excellent technical conditions to ensure a hand-sewed anastomosis and R0 resection. The technical principle and dissection are the same as those of open surgery. Patient selection and mastering of the telemanipulation device are mandatory to perform these complex and rare procedures.

59. Systematic Review

Robotic synchronous treatment of colorectal cancer and liver metastasis: state of the art

[HTML](#) [PDF](#)

Cite this article: Sammarco A, de ' Angelis N, Testini M, Memeo R. Robotic synchronous treatment of colorectal cancer and liver metastasis: state of the art. *Mini-invasive Surg* 2019;3:31. <http://dx.doi.org/10.20517/2574-1225.2019.33>

Abstract

Aim: To analyze the series in literature of pure robotic surgery.

Methods: A complete review of the literature was performed to identify papers with data concerning robotic synchronous treatment of colorectal liver metastases.

Results: Three papers demonstrate the feasibility of this kind of synchronous treatment.

Conclusion: Robotic synchronous treatment of primary tumor and colorectal liver metastasis is feasible and safe.

60. Review

Robotic total mesorectal excision: state of the art

[HTML](#) [PDF](#)

Cite this article: Sebastián-Tomás JC, Santarrufina-Martínez S, Navarro-Martínez S, González-Guardiola P, Martínez-López E, Payá-Llorente C, García-Granero E,

Martínez-Pérez A. Robotic total mesorectal excision: state of the art. *Mini-invasive Surg* 2019;3:30. <http://dx.doi.org/10.20517/2574-1225.2019.29>

Abstract

Minimally-invasive conventional up-to-down laparoscopic approach is a widespread alternative for rectal cancer resection. Its potential benefits towards open surgery have been shown to rely, however, at secondary clinical outcomes, and its oncological non-inferiority compared with the traditional open approach has not been demonstrated yet. In this scenario, robotic-assisted minimally-invasive rectal resection has gained increasing popularity and promising expectancies. This narrative review aims to assemble the most updated evidence available and to discuss the future perspectives and challenges for this emergent surgical tool. The main benefit over conventional laparoscopy appears to be a reduction of conversion rates to open surgery, whereas the oncologic and functional outcomes seem similar than the other alternatives. Increased costs are the main limitation of the widespread of robotic technology. Low quality of the current evidence is remarkable.

61. Review

Robotic surgery for gastric cancer

[HTML](#) [PDF](#)

Cite this article: Makuuchi R, Kamiya S, Tanizawa Y, Bando E, Terashima M. Robotic surgery for gastric cancer. *Mini-invasive Surg* 2019;3:11. <http://dx.doi.org/10.20517/2574-1225.2019.03>

Abstract

The number of robotic gastrectomy (RG) cases is increasing, especially in East Asia. The da Vinci Surgical System for RG allows surgeons to perform meticulous procedures using articulated devices and provides potential advantages over laparoscopic gastrectomy (LG). Meta-analyses including a large number of

retrospective studies comparing RG and LG revealed only a limited advantage for RG over LG, such as lower blood loss, and the obvious disadvantage of longer operation times and higher medical cost. Specifically, a multicenter, prospective, single-arm study performed in Japan showed favorable short-term outcomes of RG over LG, while a non-randomized controlled trial in Korea showed similar postoperative complication rates for RG and LG, although the medical costs were significantly higher in RG. A well-designed randomized controlled trial is thus necessary to establish robust evidence comparing the two surgeries. In addition, further development of surgical robotics is expected for RG to be accepted more widely.