



Advancements and Challenges in Minimally Invasive General Surgery: A Literature Review

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ABSTRACT

This literature review provides a comprehensive overview of the latest trends and developments in this field. The paper highlights the benefits of minimally invasive surgery (MIS), which has become the gold standard for treating a variety of different surgical conditions.

Keywords: General Surgery, Minimally Invasive Surgical Procedures, Technological Development.

1 INTRODUCTION

This literature review provides a comprehensive overview of the latest trends and developments in this field. The paper highlights the benefits of minimally invasive surgery (MIS), which has become the gold standard for treating a variety of different surgical conditions.

2 METHODOLOGY

This article presents a systematic review of the literature, using the Pubmed, Scielo and Medline databases, with the objective of analyzing the benefits of minimally invasive surgery (MIS). A total of 38 articles that met the inclusion criteria were included and evaluated in terms of methodological quality. The results were grouped by similarity and presented descriptively. The review highlights the importance of MIS, provides up-to-date information on its benefits, and underscores the need for further research and innovation in this area, based on the available scientific literature

3 DISCUSSION

The use of smaller incisions, advanced technology, and specialized tools have led to reduced blood loss, postoperative pain, and shorter hospital stays. However, the article also acknowledges the challenges



faced by surgeons in performing MIS, including the need for specialized training, the use of longer instruments, and the limited visualization provided by endoscopes. Additionally, the article notes that there are still some limitations of MIS, such as the potential for increased false positive rates and the higher cost associated with robotic- assisted surgery. However, the article recognizes the potential of advanced imaging techniques to benefit MIS and the need for continued research to determine the advantages and disadvantages of MIS compared to traditional open surgeries.

4 CONCLUSION

It is concluded that the future of MIS looks bright and surgical training should be reviewed to ensure that surgeons are equipped with the necessary skills and tools to perform these new procedures. This discussion provides valuable insight into the current state of MIS and highlights the need for further research and innovation in this field.



REFERENCES

- Hallowell, P., Dahman, M., Stokes, J., LaPar, D. Midwest Surgical Association Minimally invasive surgery fellowship does not adversely affect general surgery resident case volume: a decade of experience. (n.d.) Recuperado June 26, 2023, de www.sciencedirect.com/science/article/pii/S0002961013000445
- Foley, K., Holly, L., Schwender, J. Minimally Invasive Lumbar Fusion : Spine. (n.d.) Recuperado June 26, 2023, de journals.lww.com
- Schneider, M., Gero, D., Müller, M., Horisberger, K. Inequalities in access to minimally invasive general surgery: a comprehensive nationwide analysis across 20 years. (n.d.) Recuperado June 26, 2023, de link.springer.com/article/10.1007/s00464-020-08123-0
- Henry, J. Minimally invasive thyroid and parathyroid surgery is not a question of length of the incision. (n.d.) Recuperado June 26, 2023, de link.springer.com/article/10.1007/s00423-008-0406-3
- Harrell, A., Heniford, B. www.sciencedirect.com. (n.d.) Recuperado June 26, 2023, de www.sciencedirect.com/science/article/pii/S0002961005004587
- Park, A., Lee, T. Evolution of Minimally Invasive Surgery and Its Impact on Surgical Residency Training. (n.d.) Recuperado June 26, 2023, de link.springer.com/chapter/10.1007/978-3-540-45021-4_2
- Tiang, K. A New Era of Minimally Invasive Surgery: Progress and Development of Major Technical Innovations in General Surgery Over the Last Decade. (n.d.) Recuperado June 26, 2023, de www.thieme-connect.com
- Siu, I., Li, Z., Ng, C. Latest technology in minimally invasive thoracic surgery. (n.d.) Recuperado June 26, 2023, de www.ncbi.nlm.nih.gov/pmc/articles/PMC6381267/
- Hanly, E., Talamini, M. Robotic abdominal surgery. (n.d.) Recuperado June 26, 2023, de www.sciencedirect.com/science/article/pii/S000296100400371X
- Peters, B., Armijo, P., Krause, C., Choudhury, S. Review of emerging surgical robotic technology. (n.d.) Recuperado June 26, 2023, de link.springer.com/article/10.1007/s00464-018-6079-2
- Vitiello, V., Lee, S., Cundy, T. Emerging Robotic Platforms for Minimally Invasive Surgery. (n.d.) Recuperado June 26, 2023, de ieeexplore.ieee.org/abstract/document/6392862/
- Tsui, C., Klein, R., Garabrant, M. Minimally invasive surgery: national trends in adoption and future directions for hospital strategy. (n.d.) Recuperado June 26, 2023, de link.springer.com/article/10.1007/s00464-013-2973-9
- Hamed, O., Gusani, N., Kimchi, E. Minimally Invasive Surgery in Gastrointestinal Cancer: Benefits, Challenges, and Solutions for Underutilization. (n.d.) Recuperado June 26, 2023, de www.ncbi.nlm.nih.gov/pmc/articles/PMC4254473/
- Chiasson, P., Pace, D., Schlachta, C. Minimally invasive surgery training in Canada | SpringerLink. (n.d.) Recuperado June 26, 2023, de link.springer.com/article/10.1007/s00464-002-8818-6



Stassen, H., Dankelman, J., Grimbergen, K. Man-machine aspects of minimally invasive surgery ☆. (n.d.) Recuperado June 26, 2023, de www.sciencedirect.com/science/article/pii/S1367578801000116

Yeh, F., Lin, Y., Ji, Q., Reddick, W. The challenge of mapping the human connectome based on diffusion tractography. (n.d.) Recuperado June 26, 2023, de www.nature.com/articles/s41467-017-01285-x

Virdis, F., Podda, M., Reccia, I., Gallo, G., Khan, M. Laparoscopy and Minimally Invasive Surgery Techniques in Acute Care Surgery. (n.d.) Recuperado June 26, 2023, de link.springer.com/chapter/10.1007/978-3-030-73155-7_19

Nguyen, K., Laurent, A., Dagher, I., Geller, D. Minimally Invasive Liver Resection for Metastatic Colorectal Cancer: A Multi-Institutional, International Report of Safety, Feasibility, and Early Outcomes : Annals of Surgery. (n.d.) Recuperado June 26, 2023, de journals.lww.com

Schmidt, H., Gisbertz, S., Moons, J., Rouvelas, I. Defining benchmarks for transthoracic esophagectomy: a multicenter analysis of total minimally

invasive esophagectomy in low risk patients. (n.d.) Recuperado June 26, 2023, de journals.lww.com

Fuchs-Buder, T., Rosenberg, J. Medical disease and ambulatory surgery, new insights in patient s...: Ingenta Connect. (n.d.) Recuperado June 26, 2023, de www.ingentaconnect.com

Chen, H., Sokoll, L., Udelsman, R. Outpatient minimally invasive parathyroidectomy: A combination of sestamibi-SPECT localization, cervical block anesthesia, and intraoperative parathyroid hormone assay - ScienceDirect. (n.d.) Recuperado June 26, 2023, de www.sciencedirect.com/science/article/pii/S0039606099700565

Himal, H. Minimally invasive (laparoscopic) surgery. (n.d.) Recuperado June 26, 2023, de link.springer.com/article/10.1007/s00464-001-8275-7

Selim, Y., Di Lena, É., Abu-Omar, N., Baig, Z., Verhoeff, K. [HTML][HTML] ... postoperative postdischarge care in patients undergoing lung resection during the COVID-19 pandemic11. Initiating Ethiopia's first minimally invasive surgery (n.d.) Recuperado June 26, 2023, de www.canjsurg.ca/content/65/6_Suppl_2/S33.abstract

Parrish, J., Jenkins, N., Brundage, T. Outpatient minimally invasive lumbar fusion using multimodal analgesic management in the ambulatory surgery setting. (n.d.) Recuperado June 26, 2023, de <http://www.ijssurgery.com/content/14/6/970.abstract>

Giulianotti, P., Coratti, A., Angelini, M., Sbrana, F. Robotics in general surgery: personal experience in a large community hospital. (n.d.) Recuperado June 26, 2023, de jamanetwork.com/journals/jamasurgery/article-abstract/395121

Rahimli, M., Perrakis, A., Gumbs, A., Andric, M. The LiMAX Test as Selection Criteria in Minimally Invasive Liver Surgery. (n.d.) Recuperado June 26, 2023, de www.mdpi.com/2077-0383/11/11/3018

Stefanidis, D., Goldfarb, M., Kercher, K., Hope, W. SAGES guidelines for minimally invasive treatment of adrenal pathology. (n.d.) Recuperado June 26, 2023, de link.springer.com/article/10.1007/s00464-013-3169-z



Gamme, G., Birch, D., Karmali, S. [HTML][HTML] Minimally invasive splenectomy: an update and review. (n.d.) Recuperado June 26, 2023, de www.ncbi.nlm.nih.gov/pmc/articles/PMC3728249/

Lee, J. [HTML][HTML] Anesthesia for ambulatory surgery. (n.d.) Recuperado June 26, 2023, de synapse.koreamed.org/articles/1156714

Mustafa, S., Handren, E., Farmer, D., Ontiveros, E. Original Reports Robotic Curriculum Enhances Minimally Invasive General Surgery Residents' Education. (n.d.) Recuperado June 26, 2023, de www.sciencedirect.com/science/article/pii/S1931720418304598

Unawane, A., Kamyab, A., Patel, M., Flynn, J. Midwest Surgical Association Changing paradigms in minimally invasive surgery training. (n.d.) Recuperado June 26, 2023, de www.sciencedirect.com/science/article/pii/S0002961013000044

Meinzer, A., Alkatout, I., Krebs, T., Bastrup, J. JCM | Free Full-Text | Advances and Trends in Pediatric Minimally Invasive Surgery. (n.d.) Recuperado June 26, 2023, de www.mdpi.com/919598

Van der Meijden, O., Schijven, M. The value of haptic feedback in conventional and robot-assisted minimal invasive surgery and virtual reality training: a current review. (n.d.) Recuperado June 26, 2023, de link.springer.com/article/10.1007/s00464-008-0298-x

Hsieh, P., Koski, T., Sciubba, D., Moller, D. Maximizing the potential of minimally invasive spine surgery in complex spinal disorders in: Neurosurgical Focus Volume 25 Issue 2 (2008) Journals. (n.d.) Recuperado June 26, 2023, de thejns.org

Mack, M. Minimally Invasive and Robotic Surgery. (n.d.) Recuperado June 26, 2023, de jamanetwork.com/journals/jama/article-abstract/193511