EE746

Utilization and patient characteristics of Robotic-assisted Colorectal Surgery in Germany: a claims data analysis

Joana Pestana, PhD[1], Christian Jacob, PhD[2], Janina Röhrkaste, MSc[2], Kathrin Gerchow, MPH[2], James Lavin, BSc[3]
[1]Intuitive Surgical Deutschland GmbH, Freiburg, Germany, [2]Cencora, Hannover, Germany, [3]Intuitive Surgical, Aubonne, Switzerland

BACKGROUND

Colorectal cancer is the third most common worldwide, and in Germany accounted for 54,610 new colorectal cancer cases and 22,670 related deaths in 2022.[1]

Surgical intervention remains a fundamental component of treatment.

Type of surgery is often dictated by the tumor's location and severity. Common surgeries include sigmoid colectomy, right and left hemicolectomy, and rectal resection.

The global adoption of Robotic-assisted surgery (RAS) is increasing, driven by technological advancements and a growing body of evidence supporting its benefits over laparoscopic and open techniques.[2]

OBJECTIVES

1) Investigate the **utilization of RAS** compared to LAP and open techniques for colorectal cancer in Germany.

2) Evaluate demographic and clinical variations among different surgical techniques, including open, laparoscopic, and robotic-assisted surgery, as well as among various procedures such as sigmoid colectomy, right/left hemicolectomy, and rectal resection.

METHODS

Data Source: *InGef* research database, the representative sample for scientific purposes encompassing 4.4 million people, which covers approx. **4.7% of the German population.**

Eligible and comparable population:

Patients who underwent a rectal or colon resection surgery for cancer

Retrospective cohort

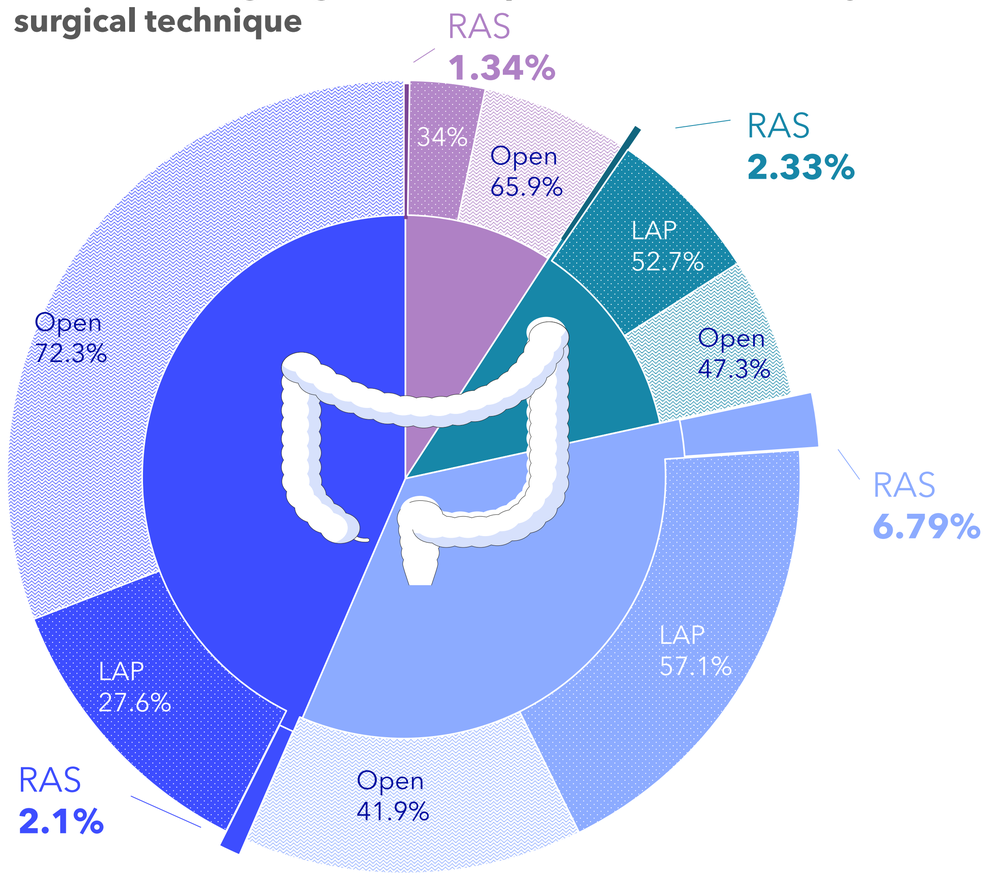
2015 -2023

ingef

Exclusion of patients with:

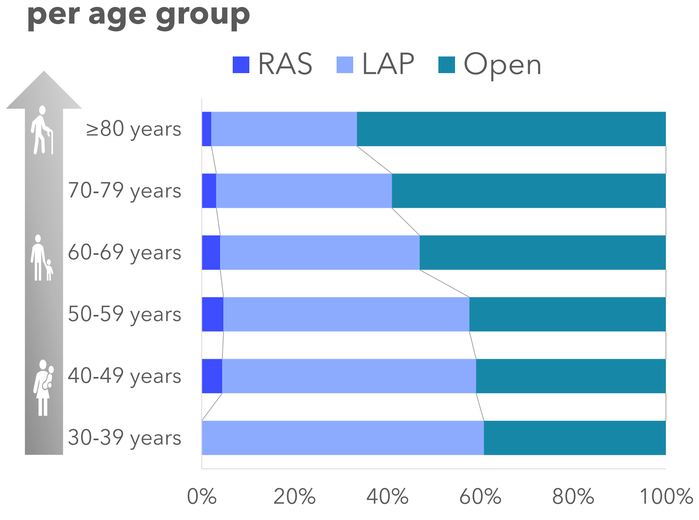
- Any other primary tumors.
- less than one year observability before and after surgery.
- Patients with "combined open-laparoscopic", "peranal" and "conversions".

Patients undergoing colorectal procedure stratified by surgical technique

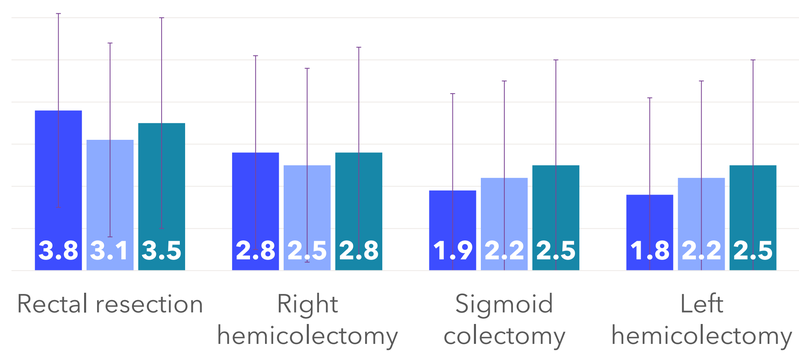


Proportion of procedures stratified by surgical technique

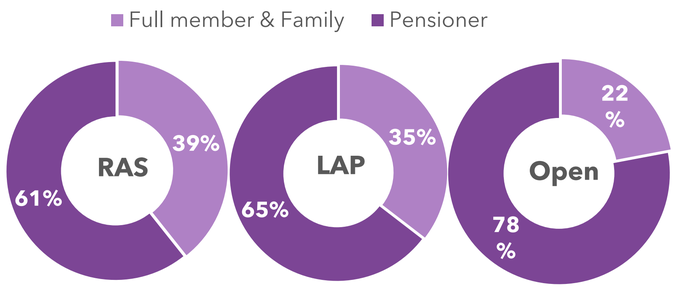
per age group



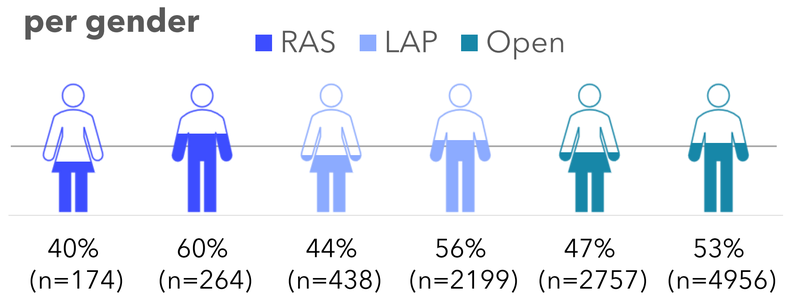
per CCI scores



per insurance status

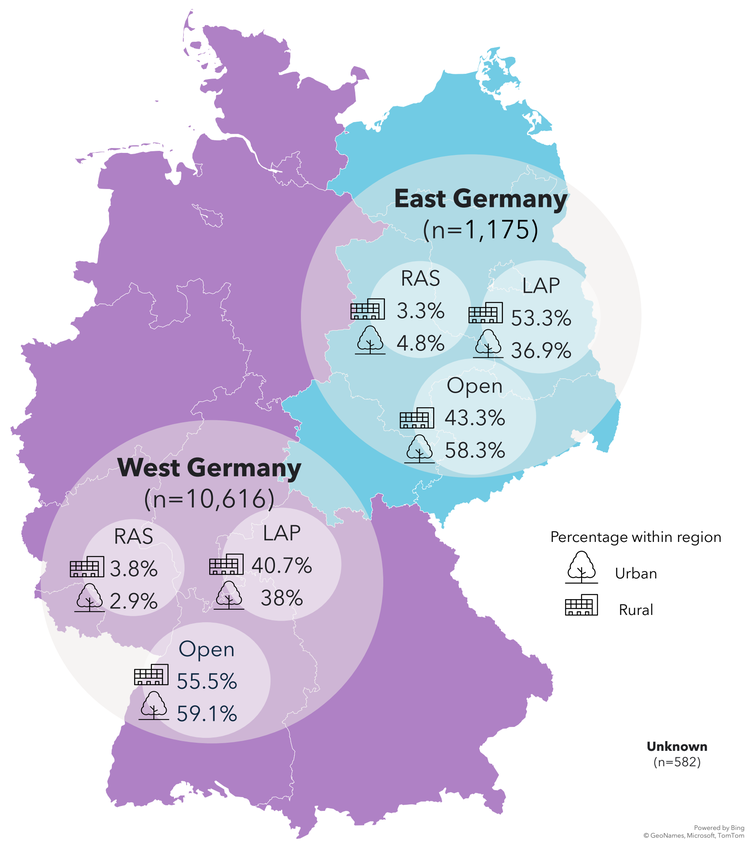


per gender



Most colorectal procedures were performed in West-Urban areas (65%), followed by West-Rural regions (21%).

Urban areas show a higher proportion LAP and RAS (45%) compared to rural areas (41%), indicating better access to minimally invasive techniques. In West Germany, the proportion of RAS is higher in urban settings (3.8%), whereas in East Germany, urban areas show a lower adoption of RAS (3.3%).



RESULTS

From 2016 to 2022, the database had 12,373 patients identified that met the inclusion criteria. In total, 1,504 patients with sigmoid colectomy, 5,280 right and 1,121 left hemicolectomy, and 4,077 rectal resection were identified.

RAS was most frequently used for rectal resections (6.8%), followed by sigmoid colectomy (2.3%), right hemicolectomy (2.1%), and left hemicolectomy (1.3%).

RAS patients were **younger** than those undergoing open surgery, predominantly **male** and more likely a **full insurance member.**

Patients who underwent rectal resection and right hemicolectomy using minimally invasive techniques (RAS or LAP) had higher mean Charlson Comorbidity Index (CCI) scores compared to those treated with open surgery. For sigmoid and left hemicolectomy, patients undergoing RAS—minimally invasive surgery—had fewer average comorbidities than those who received LAP or open procedures.

CONCLUSIONS

RAS use in Germany is modest but increasing, especially for rectal cancer, and is mainly applied in younger, healthier patients, likely due to risk stratification and technology access. Further research is needed to compare outcomes, and its effectiveness. To enable fair **comparisons**, this study shows that differences in **patient characteristics across surgical techniques must be adjusted for**.

References:
(1) Ronckers, Cécile, et al. "Krebs in Deutschland für 2019/2020." (2023).
(2) Khajeh E, Aminizadeh E, Dooghaie Moghadam A, Nikbakhsh R, Goncalves G, Carvalho C, et al. Outcomes of Robot-Assisted Surgery in Rectal Cancer Compared with Open and Laparoscopic Surgery. Cancers. 2023;15(3).
(3) Andersohn, F., & Walker, J. (2021). Institute for Applied Health Research Berlin (InGef) Database. *Databases for Pharmacoepidemiological Research*, 125-129.