Tidsskriftet Tidsskrift for Den norske legeforening

Robot assistance for minimally invasive access and maximally invasive surgery

INVITERT KOMMENTAR

EIRIK KJUS AAHLIN

eirik.kjus.aahlin@unn.no

Eirik Kjus Aahlin PhD, specialist in general surgery and gastrointestinal surgery, senior consultant at the Department of Gastrointestinal Surgery, University Hospital of North Norway, and associate professor at UiT The Arctic University of Norway. He is a board member at the University Hospital of North Norway and the Norwegian Gastro Intestinal Cancer Group, where he is head of the team for oesophageal and gastric cancer.

The author has completed the ICMJE form and declares no conflicts of interest.

The quality of robot-assisted surgery for oesophageal and gastric cancer is satisfactory.

The introduction of robot-assisted systems requires careful oversight. A number of specific complications are associated with robot-assisted surgery, such as the absence of haptic feedback, loss of peripheral vision and delays when converting to open surgery (for example, in cases of severe bleeding). Systematic implementation of robot assistance, with documentation benchmarked against previous internal results as well as national and international standards, is essential. Hauge et al. provide an exemplary demonstration of this approach in a new article in the Journal of the Norwegian Medical Association (1).

The long-term prognosis for oesophageal and gastric cancer has improved significantly, and most patients treated with curative intent achieve lasting remission (2, 3). Endoscopic resection is a function- and organ-preserving option for a small minority of patients, while the vast majority will require organ resection. Resection of the oesophagus, in particular, still carries substantial risk, with serious postoperative complications and long-term functional impairment (4, 5).

Minimally invasive surgery using thoracoscopy and laparoscopy has, in many areas, achieved comparable survival while providing significant benefits such as reduced pain, shorter hospital stays and faster return to normal activity (6). Minimally invasive thoracic access reduces diaphragmatic paresis and, consequently, pulmonary complications. These were previously the most common cause of morbidity and mortality after oesophagectomy (6) and led to lower long-term survival (4).

Robot-assisted minimally invasive resection of the oesophagus and abdomen offers clear advantages compared with open surgery (7), although no definitive benefits have yet been demonstrated compared to other minimally invasive approaches (8).

> ***«Robot-assisted minimally invasive resection of the oesophagus and abdomen offers clear advantages compared with open surgery»***

It is reasonable to assume that minimally invasive surgery of the future will be assisted by robotic systems as well as artificial intelligence. Minimally invasive total meso-oesophageal excision via the abdomen and neck (without entering the pleural cavity) is an experimental technique with high expectations (9). It is so technically challenging that robotic assistance is practically essential.

The study by Hauge et al. is a retrospective review of patients undergoing surgery at Oslo University Hospital between 2018 and 2024. Robot-assisted gastrectomy was introduced in 2018 and robot-assisted oesophagectomy in 2022. A total of 104 patients with oesophageal cancer and 96 with gastric cancer were included in the study. Outcomes were assessed in terms of anastomotic leakage, 90-day mortality and reoperation rates. A 90-day mortality of approximately 3 % represents a good result (10). Anastomotic leakage occurred in 17 % of oesophagectomies and 5 % of gastrectomies. These figures fall within the target values of the Norwegian Registry for Gastrointestinal Surgery (NORGAST) and are in line with international standards (10). A 17 % leakage rate is consistent with international data and represents a currently unresolved surgical challenge when the marginally perfused gastric conduit is used to replace the resected portion of the oesophagus (10).

> ***«The findings indicate that the technology can be implemented in Norwegian hospitals with outcomes comparable to previous reports and international standards»***

Hauge et al.'s findings are particularly timely in light of last year's conclusion by the Decision Forum (a governmental body responsible for approving new diagnostic and treatment methods in Norway) that the evidence base for robotic surgery is limited and that new investments should only be aimed at the largest centres. The findings indicate that the technology can be implemented in Norwegian hospitals with outcomes comparable to previous reports and international standards. Although robot-assisted surgery for oesophageal and gastric cancer has not been shown to improve cancer survival, this type of systematic oversight and quality assurance is a prerequisite for adopting the minimally invasive techniques of the future.

REFERENCES

1. Hauge T, Fasting MH, Johnson E et al. Robotassistert øsofagus- og ventrikkelreseksjon ved Oslo universitetssykehus. Tidsskr Nor Legeforen 2026; 146. doi: 10.4045/tidsskr.25.0681. [CrossRef]

2. Mala T, Abelseth BK, Al-Haidari G et al. Kreft i spiserøret – betydelig bedre overlevelse. Tidsskr Nor Legeforen 2024; 144. doi: 10.4045/tidsskr.24.0547. [PubMed][CrossRef]

3. Kolstad A, Emanuel G, Hjortland GO et al. Long-term trends in the clinical management and outcomes of patients with gastroesophageal cancer in Norway. Acta Oncol 2025; 64: 540–9. [PubMed][CrossRef]

4. Aahlin EK, Olsen F, Uleberg B et al. Major postoperative complications are associated with impaired long-term survival after gastro-esophageal and pancreatic cancer surgery: a complete national cohort study. BMC Surg 2016; 16: 32. [PubMed][CrossRef]

5. Boshier PR, Klevebro F, Savva KV et al. Assessment of Health Related Quality of Life and Digestive Symptoms in Long-term, Disease Free Survivors After Esophagectomy. Ann Surg 2022; 275: e140–7. [PubMed][CrossRef]

6. Fédération de Recherche en Chirurgie (FRENCH) and French Eso-Gastric Tumors (FREGAT) Working Group. Hybrid Minimally Invasive Esophagectomy for Esophageal Cancer. N Engl J Med 2019; 380: 152–62. [PubMed][CrossRef]

7. van der Sluis PC, van der Horst S, May AM et al. Robot-assisted Minimally Invasive Thoracolaparoscopic Esophagectomy Versus Open Transthoracic Esophagectomy for Resectable Esophageal Cancer: A Randomized Controlled Trial. Ann Surg 2019; 269: 621–30. [PubMed][CrossRef]

8. Tagkalos E, van der Sluis PC, Berlth F et al. Robot-assisted minimally invasive thoraco-laparoscopic esophagectomy versus minimally invasive esophagectomy for resectable esophageal adenocarcinoma, a randomized controlled trial (ROBOT-2 trial). BMC Cancer 2021; 21: 1060. [PubMed][CrossRef]

9. Masuda Y, Leong EKF, So JBY et al. A systematic review and meta-analysis of mediastinoscopy-assisted transhiatal esophagectomy (MATHE). Surg Oncol 2024; 53. doi: 10.1016/j.suronc.2024.102042. [PubMed][CrossRef]

10. Hedberg J, Sundbom M, Edholm D et al. Randomized controlled trial of nasogastric tube use after esophagectomy: study protocol for the kinetic trial. Dis Esophagus 2024; 37. doi: 10.1093/dote/doae010. [PubMed][CrossRef]

Publisert: 24 March 2026. Tidsskr Nor Legeforen. DOI: 10.4045/tidsskr.26.0135