

# Aspects on Minimally Invasive Surgery for Rectal Tumours

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Avhandlingen baseras på följande delarbeten

- I. Kvarnström, A, Swartling, T, Kurlberg, G, Bengtsson, J-P, Bengtsson, A. **Pro-inflammatory Cytokine Release in Rectal Surgery: Comparison between Laparoscopic and Open Surgical Techniques.** *Archivum Immunologiae et Therapiae Experimentalis* 2013; Aug 8.
- II. Kvarnström, A, Sokolov, A, Swartling, T, Kurlberg, G, Mollnes, T.E., Bengtsson, A. **Alternative pathway activation of complement in laparoscopic and open rectal surgery.** *Scandinavian Journal of Immunology* 2012 Jul; 76(1): 49-53.
- III. Swartling, T Kvarnström, A, Bengtsson, A, Kurlberg, G. **Inflammatory response to transanal endoscopic microsurgery for tumours of the rectum.** *Manuscript.*
- IV. Swartling, T, Kålebo, P, Derwinger, K, Gustavsson, B, Kurlberg, G. **Stage and size using magnetic resonance imaging and endosonography in neoadjuvantly-treated rectal cancer.** *World Journal of Gastroenterology* 2013 Jun 7; 19(21): 3263-71.
- V. Swartling, T, Kodeda, K, Derwinger, K, Kurlberg, G. **A population-based study of transanal endoscopic microsurgery and salvage total mesorectal excision as treatments for early rectal cancer.** *Manuscript.*



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## ABSTRACT

**Background** Transanal endoscopic microsurgery (TEM) and laparoscopic rectal resection are minimally invasive methods of surgery for rectal tumours. One aim of this thesis was to analyse the inflammatory response after minimally invasive surgery compared with open resection. Other aims were to investigate patient selection using magnetic resonance imaging (MRI) and endorectal ultrasound (ERUS) and to investigate the outcome of TEM for rectal cancer.

**Methods** Inflammatory mediators were measured using enzyme-linked immunosorbent assays (ELISA) in patients undergoing TEM, laparoscopic or open resection. Assessments of tumours using MRI and ERUS were compared with histopathology. Registry data from TEM procedures and salvage resection for rectal cancer were analysed. Low-risk tumours were defined as tumour stage T1, submucosal invasion Sm1-2, <3 cm, without adverse features, and these were separately analysed for outcome.

**Results** The increases of interleukin-6 and C-reactive protein were less pronounced after TEM and laparoscopic resection than after open resection. The staging accuracy using MRI was increased from 0.65 to 0.83 by combining lymph node assessment using MRI with bowel wall assessment using ERUS. There were no local recurrences after TEM for low-risk tumours.

**Conclusions** The inflammatory response after TEM and laparoscopic resection was limited compared with open resection. The staging accuracy was increased by a combined use of MRI and ERUS. The population-based oncological outcome of TEM for low-risk tumours was excellent.

**Keywords:** minimally invasive surgery, rectal neoplasm, inflammatory response, MRI, endosonography, transanal endoscopic microsurgery, TEM, rectal tumour, rectal cancer, local recurrence, outcome rectal cancer.

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