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Minimally invasive strategies in rectal neoplasia

Barendse, R.M.

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OUTLINE OF THIS THESIS

Part I: Endoscopic Mucosal Resection and Transanal Endoscopic Microsurgery

The first part of this thesis focuses on piecemeal EMR and TEM as the current standard treatments for large rectal adenomas. In **chapter 1**, we critically review the worldwide literature available at the beginning of this research project (2008), reporting the outcomes of one or both techniques. The results of all studies are summarized to compare the effectiveness and safety of EMR and TEM, which are reflected by recurrence and complication rates. Hereafter, we were interested in the clinical outcomes of Dutch endoscopic and surgical practices. When we started our research project, TEM was a standardized technique performed by a group of dedicated colorectal surgeons, who had all undergone a structured TEM training program. EMR was gradually developed and introduced at that time; structural training was not available. In **chapter 2**, the results of piecemeal EMR and TEM as performed in 8 hospitals in the Netherlands between 2004 and 2008 are described. Although the participating endoscopists and surgeons had variable case-volumes, we could summarize their data to assess and compare the results of EMR and TEM. We gained insight crucial for the start of the randomized TREND study, to which the endoscopists and surgeons described in **chapter 2** would also contribute.

As both EMR and TEM are highly specialized techniques, a learning curve of endoscopists or surgeons starting with these techniques is likely. In many technically complex surgical techniques, the learning curve is researched and reported. Notwithstanding the standardized character of TEM, its learning curve was largely unknown. **Chapter 3** describes the learning curve of TEM as performed by 4 colorectal surgeons from the time they underwent a dedicated TEM training program onwards. We assessed whether the most important pillars of safety and effectiveness, including conversion, complication and recurrence rates, evolved with increasing surgical experience. The understanding of the learning curve, as provided in this chapter, is crucial for quality purposes and the development of guidelines.

While the results of TEM have been extensively reported in previously published literature, we experienced scarcity of evidence on piecemeal EMR for rectal lesions only. Therefore, **chapter 4** describes the clinical outcomes of piecemeal EMR for rectal lesions only, as performed by a dedicated multicentre collaboration with standardized follow-up. The results of this study will facilitate the eventual interpretation of the TREND study results in a wider perspective.

Anorectal dysfunction as a result of the resection of large rectal adenomas has been a concern. Both EMR and TEM may theoretically affect the integrity of the rectal reservoir or anal sphincter complex, with consequent soiling or fecal incontinence. The functional results of TEM have been described in the literature, although the variable methodology and patient cohorts of these studies may confuse clinicians seeking to inform their patients about the possible functional consequences of adenoma resection. In **chapter 5**, the anorectal function of a uniform cohort of patients with rectal adenomas exceeding 30 mm is assessed manometrically before and 6 months after adenoma resection. Patients

undergoing EMR and TEM were both included in this study, and the functional consequences of both techniques are compared.

Part II: Single Port Transanal Surgery

The second part of this thesis focuses on the transanal utilization of single-port devices, originally designed for laparoscopic procedures. This technique is further referred to as Single Port Transanal Surgery (SPTS). The three studies described in this part reflect the time path from proof of concept to initial clinical utilization and comparison with the current standard surgical technique.

The main goal of the study described in **chapter 6** was to assess whether transanal utilization of single-port devices was possible, considering the perioperative features required for safe endoluminal rectal surgery. At that time, multiple disposable single-port devices produced by different manufacturers were available. **Chapter 6** therefore also describes the features of the available ports as experienced by a TEM-expert and eventually leads to the selection of one specific device for rectal surgery.

In **chapter 7**, the initial clinical experience with SPTS is described. This chapter aims to describe the feasibility of this novel technique, and to describe the peroperative features and safety of the procedure. The potential advantages of this technique in comparison with TEM are speculated on, including the potentially greater efficiency associated with some logistic features of the SPTS procedures. This hypothesis has led to the study described in **chapter 8**, in which the efficiency and safety of SPTS and TEM are compared in a case-control design.

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