Quality assessment, assurance and improvement through clinical auditing

The colorectal cancer case

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CHAPTER 1

General introduction and outline thesis
Health is considered one of the most valuable virtues for a person and for society. Together with an ever-increasing proportion of the gross domestic product spend on healthcare (currently more than 10%), it is not surprising that quality of care is a hot topic of debate. All healthcare professionals are considered to be intrinsically motivated to provide the best care for each patient and to have a profound idea of what good healthcare processes and outcomes would be. However, for a long time, it could not be objectively demonstrated if the desired healthcare goals were really reached or how healthcare professionals performed according to their peers.

Nowadays, guideline adherence is still often used as a surrogate indicator to determine whether the right quality of care was delivered. However, guideline development is a difficult process and the quality of guidelines highly depend on the methodological quality, scientific input, and actuality. Variability of guideline adherence, but also of clinical practice and outcomes, has been extensively demonstrated. This possibly indicates underlying differences in quality of care and therefore improvement potential, but perhaps also knowledge gaps that might initiate new research and necessity to update guidelines. Among others, these considerations have led to a societal demand for the presence of a reliable quality assessment and assurance system in healthcare, and this demand is likely to keep on growing.

**Audit and Feedback**

Audit and Feedback is considered a promising tool for quality assessment, assurance, and to facilitate improvements. In an audit, performance data is systemically and uniformly collected and feedback is given to healthcare providers. The most important performance measures are summarized in so-called structure, process and outcome indicators. The indicators are risk adjusted for the most important factors defining patient case load. Factors included in the risk adjustment model are based on a combination of statistical tests and experts’ consensus. All feedbacked data is accompanied by a benchmark, usually consisting of the average of all participants in that registry. This information provides a rough idea of own performance and is supposed to encourage further investigation and the incitement of improvement initiatives.

**Colorectal cancer**

The call for quality assessment, assurance and improvement is also present in the care of colorectal cancer (CRC) patients, one of the most predominant cancers in Western countries and a major health burden. In the Netherlands, around 15,000 patients are diagnosed with CRC annually, with around 5000 deaths per year. Peak incidence is seen among individuals between 55-85 years old, but recently the rising incidence under young adults has been brought to the attention.

In the majority of the cases, CRC develops slowly, starting as a benign precursor lesion (i.e. adenomatous or serrated polyps) that can have a dwell time of multiple years. Polyps are usually present without any clinical signs. However, also CRC may be present in the absence of symptoms...
or produce only very subtle symptoms for a considerable amount of time. This allows the cancer to grow largely unnoticed into higher tumor stages, which is accompanied by a worse prognosis.

In 2014, a nationwide Fecal Immunochemical Test (FIT)-based CRC screening program was implemented in the Netherlands. The primary aim of this screening program was to detect CRC at an earlier stage, and in addition, ideally, also to detect its precursor lesions. Early CRC detection (and consequently treatment) and removing precursors lesions have been shown to reduce mortality and incidence of CRC.

Polyps, and nowadays also some early invasive lesions, are generally treated by endoscopic resection. If the endoscopist judges that a benign or early invasive lesion cannot be completely and/or safely removed endoscopically, alternative treatment options are considered. This treatment usually consists of surgery, which is also the cornerstone of CRC treatment. Surgery for CRC can be complemented by (neo)adjuvant therapies such as radiotherapy or chemotherapy.

In 2009, a nationwide audit registry for the surgical treatment of CRC was initiated by healthcare professionals, the Dutch Surgical Colorectal Audit (DSCA). The name was changed into the Dutch ColoRectal Audit (DCRA) in 2017, because the board and registry became multidisciplinary. This registry was initiated to provide reliable information to the surgeons about the (hospital) quality of care of resections for primary CRC up to 30 days after surgery. In addition, carefully selected performance indicators on hospital level were made publicly available to meet the societal demand for transparency on quality of care.
OUTLINE OF THIS THESIS

In the past decade, numerous quality initiatives were undertaken to improve the quality of CRC care, including the implementation of (nationwide) audits. The studies in this thesis aim to contribute to the assessment and further improvement of the quality of CRC care.

PART I Quality of diagnosis and treatment of benign precursor lesions of CRC

The first part of this thesis focuses on the quality of care of CRC precursor lesions. Performing a high-quality colonoscopy is crucial for the prevention of CRC, and several well-defined and validated quality measures have been developed over the past years. In Chapter 2, we describe the organization and implementation of an audit registry for colonoscopies including the most important quality measures. The registry was designed in such a way that automated extraction of these quality parameters from the core endoscopy reporting systems was possible, preventing any additional registration burden for colonoscopists.

The nationwide introduction of the FIT-based screening program led to an impressive increase in the detection of precursor lesions and early invasive (T1) cancers. This also led to an increased detection rate of precursors lesions that were considered inappropriate for endoscopic removal by the endoscopist. Although endoscopic resection techniques for this type of lesions have advanced in the past decade, surgery is still frequently performed. As individuals with precursor lesions are often asymptomatic and these lesions might still have a long dwell-time to cancer, if ever, one might argue that balancing the potential benefits and harms of the treatment is even more important. In chapter 3, we present an overview of the reasons for referral to the surgeon and postoperative outcomes of lesions that are diagnosed as benign at histopathological examination of the resection specimen. Results from this study can be compared with the results from chapter 4, in which we performed a systematic review of postoperative adverse outcomes of surgery for benign lesions.

PART II Referral of CRC for surgery

In the second part of this thesis, referral and waiting times for CRC surgery are addressed. With the introduction of the nationwide FIT-based screening program, not only an increasing number of precursor lesions, but also more CRCs are detected. In Chapter 5 we present the impact of the screening program on surgery for CRC in terms of volume and waiting times.

In addition, as centralization of more complex CRC surgery is encouraged, interhospital referral should also take place. The extent of interhospital referral in the Netherlands, the characteristics of referred patients, and which consequences those referrals have on waiting times for surgery, are described in chapter 6.
PART III Quality assessment, assurance and improvement of surgical CRC treatment

In the final part of this thesis we assess the quality and the effect of improvements of CRC treatment. The implementation of the nationwide CRC screening program led to the introduction of a ‘new type’ of patient undergoing surgery for CRC. Among others, screening patients are most likely to be asymptomatic, and are supposed to be diagnosed with a lower cancer-stage than would have been the case otherwise. In Chapter 7, the characteristics and postoperative outcomes of patients with screen-detected CRC are compared with patients with non-screen-detected CRC. In addition, we evaluated if the existing risk-adjustment model, which is already being used for hospital comparison, would level out any potential differences found between patients with screen-detected and non-screen-detected cancer.

Besides organizational advancements to reduce the societal burden of CRC, such as screening, also technical advancements in CRC treatment have been made. For example, surgery for CRC is increasingly performed laparoscopically, and in our country this technique has been introduced successfully and relatively fast with structured training programs. Research showed that laparoscopic surgery has multiple advantages over open surgery, such as less postoperative short-term adverse events, faster postoperative recovery, and in the long-term most likely also a lower risk on a small bowel obstruction and incisional hernia.\textsuperscript{20-22} However, with the use of laparoscopic surgery quickly increasing, and the selection of patients with CRC considered eligible for laparoscopic surgery expanding, concerns grew about the possible detrimental effects of conversion, and caution was advised in selecting patients eligible for laparoscopic surgery.\textsuperscript{23 24} In Chapter 8 we report on the development of laparoscopic surgery, conversion and its outcomes compared to open surgery.

Although multiple studies with audit data demonstrate improvements in CRC treatment, overall improvement does not necessarily mean that all patient subgroups equally benefit from these advancements. In addition, critics argue that audits and transparency of indicators could incite risk averse behavior, and that improvements demonstrated by audit registries could be partially be explained by that phenomenon. In chapter 9, a comprehensive overview of the outcomes of subgroups of patients undergoing surgery for CRC is provided. In addition, signs of risk averse behavior are investigated to roughly get an idea of the risk of exclusion of high-risk patients by auditing.

In chapter 10, we summarize our main conclusions. In chapter 11, the future perspectives of quality assessment, assurance and improvement through clinical auditing are discussed.
REFERENCES


