Seminars in Colon and Rectal Surgery 30 (2019) 51–52

Contents lists available at ScienceDirect

Seminars in Colon and Rectal Surgery

journal homepage: www.elsevier.com/locate/yscrs

Introduction

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The management of rectal cancer is undergoing tremendous and rapid advances that are truly altering the way we think about and ultimately treat this disease. Just 15 years ago, patients with rectal cancer were staged with transrectal ultrasound and depending upon the T and N staging were given just two treatment options. Patients with T3, T4 or N+ disease were treated with neoadjuvant long-course chemoradiation followed by open total mesorectal excision (TME) and patients with T1, T2 disease were treated with open TME only. Adjuvant chemotherapy was then left to the end of the treatment journey. It was all very simple and straightforward. However, this treatment paradigm has many shortcomings. First, many patients were either over or under treated and risking exposure to unnecessary toxicity. All three modalities of treatment carry specific and significant side effects or complications that have significant impact on patients and their quality of life. Second, this regimen delayed systemic therapy for up to 6 months from the time of diagnosis in patients with advanced disease. Therefore, significant strides have been made in improving local control of the disease but there has been no improvement in disease-free survival. Third, we have found that as many as 20% of patient had no residual tumor remaining at the time of surgery. This has raised questions regarding the need for surgery at all. Finally, options for surgical resection have multiplied. Open TME appears to remain the gold standard but the acceptance of minimally invasive techniques such as laparoscopy, robotics and transanal techniques are increasing. Everything from pre-treatment staging, neoadjuvant chemoradiation regimens, surgical techniques, timing of systemic chemotherapy and non-operative management have been studied in order to improve the care of patients with rectal cancer.

The staging of rectal cancer has evolved beyond T and N stage with the widespread adoption of magnetic resonance image (MRI) staging. Because of MRI, we now know that not all T3 tumors need neoadjuvant therapy and understand the importance of circumferential mesorectal margin in influencing the neoadjuvant regimen, surgical approach and ultimate cancer specific outcomes. MRI provides a more extensive perspective regarding the location and extent of disease than was previously possible. Therefore, it has allowed for the development of more patient specific care plans. These concepts will be addressed in the manuscript Rectal Cancer Staging.

The definitive treatment of rectal cancer has traditionally required trimodal therapy – radiation therapy, surgery, and systemic chemotherapy. Historically, the sequence of events was radiation therapy, surgery and finally systemic chemotherapy. Several issues have led to studies examining the most appropriate timing and sequence of the three treatment modalities. Several of these issues include influences on tumor response to therapy such as extended interval between radiation therapy and surgery, the impact of systemic chemotherapy in the neoadjuvant setting and attempts to improvement disease free survival by administering systemic chemotherapy earlier in the treatment course. This has led to the concept of using systemic chemotherapy in the neoadjuvant setting sequentially before or after radiation therapy, and this has become known as total neoadjuvant therapy. Early data suggests this use of total neoadjuvant therapy provides an increase rate of complete pathologic response. This increase in complete pathologic response (cPR) and our increasing understanding of the natural history of cPR have led to the study of non-operative management. The history and evolution of these ideas are presented in the sections The History of Neoadjuvant Therapy, Total neoadjuvant therapy, and Non-operative therapy.

Despite all of the advances in radiation and chemotherapy, the surgical management of rectal cancer remains the most important modality of its treatment. The importance of a complete resection of the rectum and mesorectum within the appropriate fascial plans to achieve adequate circumferential and distal margins is paramount. This can be very challenging in the best of circumstances and the complexities of rectal cancer surgery had migrated to minimally invasive approaches. Minimally invasive surgery has many clear short-term benefits but the data regarding oncologic results for rectal cancer are less clear. Therefore, a complete understanding of the data is necessary in order to provide patients the most effective care. The surgical management of rectal cancer will be discussed in the sections: The technical aspects of rectal cancer surgery and Proctectomy for rectal cancer – What is the data for open, laparoscopic, and robotics?

Finally, this issue will also address topics that present complex challenges to physicians and patients. Locally recurrent rectal cancer occurs in less than 10% of patients treated with neoadjuvant therapy and TME. However, when it occurs less than half of these patients are eligible for curative attempts at resection. Therefore, it is important to understand the indications for resection, and the curative and palliative treatment options. Lastly, the increased survival times associated with current chemotherapy regimens have greatly impacted the management of the primary tumor in these patients. Historically, median survival was such that little thought outside of fecal diversion was given to the primary rectal tumor in the setting of noncurative metastatic disease. As survival has been prolonged, it is becoming

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https://doi.org/10.1053/j.scrs.2019.04.001

more apparent that specific attention must be given to primary tumors. The section of Management of stage IV rectal cancer – How to incorporate radiation therapy, chemotherapy and surgery will address how to best management the primary rectal tumor while preserving the improvements in median survival achieved with systemic therapy.

As you can see rectal cancer is a complex multidisciplinary disease. This issue attempts to address the major components and their evolutions in the care of these patients. This is a really exciting time in treatment of rectal cancer so we hope that everyone enjoys this issue. We would also like to thank the authors and we appreciate their time and expertise that went into each section.