

review

Organ sparing for rectum and quality of surgery for preventing local recurrences

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The progress in the management of rectal cancer in the last 100 years has been phenomenal. From the days of Myles abdominal perineal resection at the beginning of the 20th century we have progressed to being able to manage most rectal cancers without the need for a permanent colostomy and from a surgical procedure associated with 40% local recurrence to one with less than 5%. Adjuvant modalities with radiotherapy and chemotherapy have similarly proven useful in advanced disease to improve not only local control but also survival. In the manuscript the particular attention is paid to two aspects: 1) the surgical technique that is so critical in improving survival by improved local control and 2) looking at anal-preserving surgeries for advanced and low rectal cancers. It is concluded that a properly done procedure using the TME approach supported by preop radiation for advanced lesions will result in excellent local control and function in over 90% of low rectal cancers.

Key words: rectal neoplasms - surgery; neoplasms recurrence, local prevention and control

The progress in the management of rectal cancer in the last 100 years has been phenomenal. From the days of Myles abdominal perineal resection at the beginning of the 20th century we have progressed to being able to manage most rectal cancers without the need for a permanent colostomy and from a surgical procedure associated with 40% local recurrence to one with less than 5%. Adjuvant modalities with radiotherapy and chemo-

therapy have similarly proven useful in advanced disease to improve not only local control but also survival.

In my presentation I wish to particularly look at two aspects: 1) the surgical technique that is so critical in improving survival by improved local control and 2) looking at anal-preserving surgeries for advanced and low rectal cancers.

In the last 20 years, there have been a number of prospective studies that have identified the surgeon as a prognostic factor in rectal cancer outcome. This implies that surgical techniques are critical in providing local control than the biology of the disease. Philips published the first of these in the early 1980's.

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In the prospective data base of the UK Large Bowel Project, over 1000 procedures were analyzed. For the 20 surgeons who had done greater than 30 patients and as many as 100 patients, the local recurrence varied between 5 % and 20 %. There was no difference between the local recurrence whether it was done by the resident working for the consultant or by the consultant. In another prospective data base published from Edinburgh which looked at 13 surgeons who had treated 645 rectal cancer patients, they noticed not only a major difference in postoperative morbidity, curative resection and leak rate but they also saw the local recurrence vary between 0 and 21 % as well. Ten-year survival varied between 20 % and 63 %. The Swedish Rectal Trial has also been analyzed and it has been shown that similarly in the 11 surgeons who had done greater than 25 procedures, in other words, experienced surgeons, for a total of 464 patients, the percent of abdominal perineal rate changed varied between 40 % and 80 % and the 3-year local recurrence varied between 0 and 41 %. The analysis showed that local recurrence was lower in the patients who had surgery at the university hospitals and the death was lower in specialists who had been practicing for more than 10 years. Finally, in the rectal cancer study in Germany, Hermanek has shown that local recurrence was different according to the departments the surgery was performed in. It also varied by the surgeon and was affected by low volume. There seems to be no question that in fact the surgeon is the prognostic factor in this disease in terms of local recurrence and function. What is encouraging is that local recurrence significantly influences survival. If in fact we could identify what makes the difference, then the appropriate techniques can be taught.

It is no wonder that results are so variable if we look at the standards of surgery for this disease if we look at the quality control of the NSABP R-01 Study with adjuvant treatments.

The only requirements were that the tumor must be completely resected, margins tumor free, mesentery should be removed with the specimen, and the levators should be transected at the pelvis wall when possible. With our knowledge today of good rectal cancer surgery, this is a totally inadequate measure of what constitutes a proper rectal operation.

In the early 80's we became interested in local recurrence of rectal cancer and took advantage of our prospective Cancer Registry to see if the quality of surgery made a difference as determined by the pathology and surgical record. Using this data base in a retrospective manner the only things we could determine were whether the specimen was removed intact, whether the tumor was transected during the procedure, and whether there was a 2.5 cm distal margin. Using these basic criteria we identified a difference in outcome in two groups of patients. In Stage I and Stage IV patients there was no difference in the quality of surgery and the ultimate outcome. However, in Stage II and III patients there was a significant difference. In the Stage II patients the local recurrence for the adequate surgical group was 7 % as compared to 50 % in the inadequate group despite the fact that the latter had a higher rate of postoperative radiotherapy. In Stage III patients the local recurrence was 18 % for the adequate group as compared to 64 % for the inadequate group. The survival was also improved in the former group. Similarly, patients who had the inadequate resection had radiotherapy more often. In other words, radiotherapy did not make up the difference for poor quality surgery. A number of other retrospective studies identify this. The most recent one being from Edmonton AB, our sister city, which looked at patients who had perforation of the rectum during the procedure as a marker of poor surgery. In those patients who had intact specimens, local recurrence was 17 % as compared to those who had perforated specimens at 54 %. There was also a significant

drop of survival by 25 % in the latter group of patients. We also see now that reports being published using total mesorectal excision which identify in over 1800 patients only 8.6 % local recurrence. This is dramatically different from the standard studies from years past of rates of 40 %.

In 1987, our own division adopted the mesorectal TME approach as described by Bill Heald. We compared our results over the last 8 years to the results of general surgeons and colorectal surgeons from 1992. Our hypothesis was that a properly procedure using the oncology principles is the most and probably the only significant determinant for maximizing local control and function. This should be reflected in the degree of training as measured by the Board-certified general surgeon, Board-certified colorectal surgeon, or an oncology surgeon. Once again we used our Cancer Registry and identified all rectal cancers done in our region of about 1 million people, and compared it to our own surgical oncology practice. There were a total of about 70 resections done in that time and the median follow-up was 2.5 to 3 years. The use of radiotherapy was significantly different in the 3 groups with the general surgeon and the colorectal surgeon using it mostly postop as compared to the oncology surgeon who used it almost exclusively preop. Secondly, the use of abdominal perineal resection was very much less for the oncology surgeon who had a sphincter-saving rate of 94 % as compared to 50 % and 60 % for the general surgeon and the colorectal surgeon. Analyzing this further, it showed that very few sphincter-saving procedures were done with tumors between 0 to 5 cm in the non-oncology surgeons as compared to 60 % for the surgical oncologist. Only two thirds of the time was the sphincter saved for a lesion between 5 and 10 cm for general surgeons and colorectal surgeons as compared to 100 % for surgical oncologists.

Finally, the local recurrence was 33 % for general surgeons, 6 % for colorectal and 0 %

for surgical oncologists. This study shows that one can obtain superior local control and preserve function in most patients with rectal cancer using appropriately applied oncology principles. This study, unlike many others, also identifies training as more important than volume. We now see that in one other retrospective study reported from Edmonton, colorectal surgeons did better than non colorectal surgeons in terms of local control and survival. As well, more volume for colorectal and non-colorectal surgeons was associated with a decreased local recurrence. We also see around the world that the training approach by Bill Heald for teaching TME to Swedish and Norwegian surgeons decreased local recurrence of rectal cancer surgery from 40% to 10%. This is the most definitive proof that the proper technique is teachable and reproducible in surgeons who have an interest in rectal cancer.

What was unexpected in our study was to see how common abdominal perineal resection is still being performed for rectal cancers as compared to our group of patients. Our experience documented that even in more advanced rectal cancer sphincter-sparing procedures were possible and safe. Using preoperative radiotherapy in particular and also employing the colo-anal anastomosis an excellent functional result is possible without risking local recurrence in low rectal cancer.

We still see in the 1993 edition of a colorectal surgery text by Stanley Goldberg that the abdominal perineal resection as the 'gold' standard for this disease. In fact, the data today refutes this approach. There is no embryological anatomic, oncologic or clinical data to support this approach. Rectal cancer does not spread through lymph nodes that traverse the levators. In order to have a perineal recurrence an abdominal perineal resection is a prerequisite. Modern series show no difference in local recurrence in rectal cancer whether the anus has been preserved or removed. Heald has recently published that

in 85 curative, consecutive anterior rectal cancer resections below 5 cm in which sphincter-saving surgery was performed local recurrence was 1 % at 6 years follow-up. In detailed pathologic studies, we see that distal spread, even in advanced cancer is contained within 15 mm of distal bowel and lymph node spread in advanced cancer is contained in 2.5 cm. The majority of patient's tumor, both in the rectal wall and the lymph nodes, is contained within 1 cm.

There are now a number of studies identifying that coloanal anastomosis, particularly with a 5 cm J-pouch, give excellent long-term function with continence of 91 %. Even a straight anastomosis, which is technically easier to do gives a 70 % perfect result at 3 years. Age is not a contraindication to this approach. In one study of 40 patients the only difference in results was a higher constipation rate in patients over 75. In those patients with advanced cancers, radiotherapy can downstage the lesion to allow a coloanal or low rectal anastomosis be performed. In the two studies reported on the conversion of

patients needing abdominal perineal to sphincter-saving procedure with the use of preop radiotherapy, approximately 70 % could be salvaged by radiotherapy. Local failure was about 10 % with a 70 % to 80 % excellent sphincter function.

It is apparent that the literature now identifies that surgical techniques are available that reduce local recurrence even without radiotherapy to less than 5 % in T1-2 lesions and in T3, T4 lesions, radiotherapy can downstage the lesion so that sphincter-saving procedures may be performed. We also see that the mesorectum in the majority of cancers contains all local regional disease and distal spread is usually less than 1 cm allowing one to do coloanal anastomosis in low lesions. The abdominal perineal resection should, therefore, be relegated only to patients with involvement of the anal sphincter or levators.

In conclusion, a properly done procedure using the TME approach supported by preop radiation for advanced lesions will result in excellent local control and function in over 90 % of low rectal cancers.