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Review

Rectal cancer surgery: A brief history

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ABSTRACT

In the last 250 years, the treatment of rectal cancer has changed dramatically. Once considered an incurable disease, combined modality therapy has improved mortality from 100% to less than 4% for locally advanced rectal cancer. This dramatic reduction paralleled surgical techniques based on a growing understanding of anatomy and disease pathology. In order to understand modern treatment, it is necessary to recognize the achievements of preceding surgeons.

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Introduction

"Colorectal surgery, as a specialty, parallels the development of surgery in general" [1]

Rectal cancer has been a recognized pathology for millennia. Yet, it was considered incurable up until the eighteenth century, when techniques to remove the rectum were developed and utilized. With innovations in anesthesia, asepsis, and blood transfusion, rectal resection became more radical and aggressive. Pioneers have left their marks with revolutionizing techniques that decreased local recurrence and increased survival. To understand combined modality therapy, it is essential to recognize the achievements of our predecessors in order to further advance the treatment of rectal cancer.

Literature search

A literature search of Ovid, Cochrane database, Pubmed, and Google Scholar was used to identify studies and review articles regarding the history of rectal cancer surgery. The following key words were used for the search: "abdominoperineal resection", "APR", "colorectal cancer", "total mesorectal excision", "posterior proctectomy", "anterior resection", "autonomic nerve preservation", "William Ernest Miles", "William Heald", "Paul Kraske", "Alan Parks". Articles were also identified using the "related articles" function in Pubmed.

Antiquity

Ailments of the rectum have been recognized and treated for several millennia. The ancient Egyptians and Greeks developed techniques for hemorrhoids and fistulae-in-ano. Both the Ebers and Beatty Medical Papyri detail rectal procedures, as well as more than 40 different rectal medications. The fifth century Greek historian Herodotus commented on the vast body of rectal knowledge while studying at the Library of Alexandria [1]. Though recognized, rectal cancer was considered incurable.

Eighteenth and nineteenth century

Origins of rectal cancer resections

It was not until the eighteenth century when Giovanni Morgagni first proposed resection of the rectum that treating rectal cancer was considered. In 1739, Jean Faget of France is credited with the first attempted rectal resection. Thinking he was merely draining an ischio-rectal abscess, Faget found a perforated rectal cancer [1–3]. Resecting the rectum, the patient was left with an "uncontrollable sacral anus" [1] that was difficult to control. Ultimately, the patient did not survive. In 1776, Henry Pillore of Rouen, France performed the first colostomy on an adult for an "annular, scirrhous carcinoma that had completely obstructed the lumen of the rectum." [2] This patient, too, did not survive.

First "success" with rectal excision

Jacques LisFranc performed the first successful excision of a rectal tumor in 1826 [1]. Within seven years, LisFranc performed nine more perineal or posterior resections – five were considered successful. Only operating on palpable lesions, LisFranc's technique was quite primitive, without anesthesia or hemostasis. Asking the patient to bear down, LisFranc would evert the rectum, dissect below the peritoneal reflection and amputate a few inches of rectum [1,2].

Even though LisFranc could resect the rectum, early results were quite poor. Sepsis was common. The patients experienced tremendous pain and often would not survive secondary to hemorrhage. If the patient did survive, success was measured by having the patient leave the hospital – as the patient would surely die from recurrent disease [7].

Advances with anesthesia and asepsis

The introduction of anesthesia and asepsis led to different operations that had not been previously possible. Theodor Billroth excised 45 rectums from 1860 to 1872 in a similar fashion to LisFranc. A year later, Aristide Verneuil modified LisFranc's perineal resection and removed the coccyx to allow for better exposure and more radical excision. In 1874, Kocher closed the anus to reduce spillage and infection. Then, performing a sacrectomy, he would resect the rectum and anastamose the colon to the anus [1,3].

During this era, Paul Kraske (Image 1) was developing his own technique of removing the rectum perineally. After a colostomy was performed, he would incise from the center of the sacrum to the anus. The left side of the coccyx and sacrum were disarticulated and detached (Image 2), freeing the rectum from its attachments. The rectum was divided at least "half an inch" on either side of the tumor and removed in a similar manner to Kocher's technique. Kraske presented his technique to the Congress of the German Society of Surgery in 1885. It was received with great eagerness and quickly adopted [1,4].

Image 1. Professor Paul Kraske [4].

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