SPHINCTER RECONSTRUCTION FOLLOWING ABDOMINOPERINEAL RESECTION WITH THE USAGE OF PUDENDAL NERVE ANASTOMOSIS

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INTRODUCTION

Abdomino-perineal resection (APPR) is usually carried out for rectal carcinomas close to the anal canal. A permanent stoma is created in this operation. Permanent abdominal stoma is a significant morbidity. A neo-anus following APR has recently been reconstructed with an electrically stimulated neo-sphincter with the aim of creating a sphincter of sufficient strength. The clinical results, however, have so far been rather disappointing. Other natural anal functions and a greater sphincteric strength may be needed to achieve fecal continence. The primary concept of our procedure is to reconstruct the normal functions of the external anal sphincter with regard to: (1) voluntary contraction and relaxation in accordance with defecation, (2) tonic activity at rest, and (3) the receptor mechanism to sense the need to defecate, which is made possible by pudendal nerve anastomosis. Both animal studies and simulated operations on human cadavers led us to our first trial in 1997, in which the operative procedure and postoperative course have been previously reported. In that paper, we reported the pudendal nerve anastomosis technique to be both clinically feasible and physiologically effective in achieving adequate anal functions.

SURGICAL PROCEDURE

The procedure was not staged. That is, the reconstruction was done on the same day of rectal resection. After constructing a colonic S-pouch measuring 35 mm in length with a conduit measuring 35 mm in length immediately after a conventional abdominoperineal resection of the rectum with ligation and transection of the inferior mesenteric artery at its origin, total mesorectal excision, and lateral lymph node dissections, the patient was placed in a prone jack-knife position. After a long, curved skin incision from the anus via the buttocks to the back of the right thigh near the knee, the lower part of the gluteus maximus muscle (lower GMM) was mobilized and the inferior gluteal nerve to the lower GMM was transected at the branching point. The central end of the transected pudendal nerve was microsurgically anastomosed to the distal end of the transected inferior gluteal nerve ton the lower GMM by the technique of epineural anastomosis. After totally resecting the sacrotuberous ligament to reduce the compression of the supplying vessels and to obtain a good mobilization of the pudendal nerve, the lower GMM was transposed and wrapped in a counterclockwise fashion around the conduit of the colonic S-pouch, which was pulled down to the perineal wound and sutured circumferentially to the skin of the perineum. The distal end of the transposed muscle was stitched at the sacral bone. A diverting ileostomy was constructed (Fig 1). This procedure was similar to that of the first case except for the resection of the sacrotuberous ligament and the construction of the S-pouch. This operation was approved by the Ethical Committee of Jichi Medical School Hospital.

OUR PRESENT RESULTS

We have carried out the new method of anal reconstruction in 12 rectal cancer patients. In seven patients, diverting ileostomy was closed, and were suitable for evaluation. Three were waiting for ileostomy closure. The other two were not suitable for evaluation for various reasons. All the 5 patients showed voluntary contraction of the neo-anus and could defecate without irrigation. Three patients were able to distinguish gas from stool. Three had minor incontinence while 2 had major incontinence. Mean resting pressure and mean squeezing pressure were lower than normal, but the mean length of the anal canal was normal.

DISCUSSION AND CONCLUSIONS

Although the results were not entirely satisfactory, our method of reconstructing anal sphincter may have a possibility to improve the quality of life in patients who need to have abdominoperineal excision.

Although all previous methods of neo-sphincters have been made to achieve sufficient sphincteric strength, this characteristic is only one of several anal sphincteric functions, and the clinical outcomes of these procedures have overall been unsatisfactory. In some cases in which the postoperative defecatory status was estimated to be good, daily irritation was reported to be essential. In other words, the powerful neo-sphincter blocked the fecal flow during squeezing and also during evacuation in a manner similar to that of outlet obstruction syndrome. We considered the functional problems after anal reconstruction to originate from the loss of coordination between contraction and relaxation of the neo-sphincter and also from a deterioration in the ability to sense the need to defecate. To achieve these functions, we designed a new procedure of anal reconstruction with pudendal nerve anastomosis, as the pudendal nerve controls the external anal sphincter function. Sensory receptors to sense the distension are said to lie in the rectal wall or pelvic musculature or both, which is primarily composed of the puborectal muscle and the external anal sphincter muscles. These muscles are innervated by the S2 to S4 nerves or the pudendal nerve. Although the neo-sphincter had a tonic electric activity at rest, the neo-anal pressure was low. It was difficult to decide how tight to wrap the transposed muscle around the colon at the initial operation because the muscle tends to at designed for patients with carcinoma of the lower rectum who need to undergo an abdominoperineal resection and would as a result lose their anus. However, we would not advise this rophy because of the temporary denervation. This procedure was originally procedure for patients with limited life expectancy or who have adverse prognostic indicators in their cancer.

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