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Original article

Kraske's posterior approach to the mid rectum; does it still have a place in the surgeon's armentarium?

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SUMMARY

Between 1983 and 2006, 24 patients with rectal lesions were treated by Kraske's posterior approach at the 4th department of surgery of Evangelismos Hospital and Athens Medical Center. Ten were male and 14 female. Their age ranged from 36-81 years (M: 61,2 years). The pathology of the treated lesions included: 5 villous adenomas,6 tubular adenomas, 5 tubulovillous adenomas,1 benign stenosis,1rectovaginal fistula and 6 adenocarcinomas of the rectum. One patient died from massive pulmonary embolism, the first postoperative day after a defunctional colostomy for a proctocutaneous fistula.The postoperative complications included 2 proctocutaneous fistulas, 1 wound infection and minor incontinence in one patient which recovered spontantaneously. The postoperative follow up period varied from 6 to 60 months (M: 37,8 months). Only one recurrence was observed in a patient who had an infiltrative adenocarcinoma. It is concluded that Kraske's procedure is easy to perform and it is suitable for elderly patients who cannot tolerate a major operation or for cases where complete excision of a benign lesion and in carefully selected cases of a malignant lesion, cannot be safely performed endoscopically or transanally.

Key Words: Kraske's procedure, posterior rectal approach, rectal lesion, rectal surgery.

The posterior transacral approach to the rectum, was originally described by Paul Kraske and it allows exposure of the mid rectum after removal of the coccyx and a portion of the left sacral wing. After cadaveric experimentation Kraske performed the operation on a female patient with carcinoma of the rectum on the 10th of December 1884 and he presented it to the 14th Congress of German Surgeons. In his paper which was entitled "Zur exstirpation hochsitzender meastdarmkrebse" Kraske described his technique as a surgical approach to the treatment of rectal carcinoma.[1,2] This operation soon became popular in Germany and Austria, although in the United States it never gained great popularity. Since then various modifications of the original technique have been used by surgeons like Billroth, Heinecke and Mason.[3-5] In 1908 when Miles described the abdominoperineal resection of the rectum for carcinoma, Kraske's procedure was abandoned due to its complications although the sphincters were preserved.[6]

Recently, several studies have demonstrated that certain tumors of the rectum may be adequately treated with local excision. Furthermore for patients with medical comorbidity local excision is a treatment of choice since the morbidity and mortality rate is low. This operation also offers also an alternative approach for mid rectal lesions that cannot be treated transanaly. The purpose of this retrospective study was to analyze the indications, the complications and the results of the Kraske's posterior approach to the rectum.

MATERIALS AND METHODS

A retrospective review was performed to analyze the files of 24 patients with mid rectal lesions who have been operated on by the authors with the Kraske procedure at "Evangelismos" Hospital and Athens Medical Center between 1992 – 2004. Ten (42%) patients were male and fourteen (58%) were female. Their age varied between 36-81 years old (mean age 61,2 years).

The diagnosis of the lesion was established by rectoscopy with colonoscopy and biopsy for patients with rectal

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tumors. All patients with malignancy underwent upper and lower abdominal CT scans. Five patients with T1NoMo adenocarcinoma also underwent an endoluminal sonography of the rectum in order to decide the feasibility of the surgical treatment by the Kraske's posterior approach.

Five (21%) patients had villous adenoma, 6 (25%) patients had tubular adenoma, 5 (21%) had tubulovillous adenoma, 1 (4%) had benign ischemic stenosis of the mid rectum, 1 (4%) had rectovaginal fistula and 6 (25%) had adenocarcinoma (one with infiltrating adenocarcinoma T2NoMo and five with adenocarcinoma T1NoMo). In 9 (37,5%) patients the lesion was located on the anterior rectal wall, in 10 (42%) on the posterior wall, in 4 (16,5%) on the lateral wall of the rectum and in one (4%) patient the lesion was annular. This last patient had a benign ischemic rectal stricture extending for a distance of 1.5-2.0 cm length. The distance of the lesions from the dented line ranged between 6.0- 10.0 cm.

The post operative follow up period ranged from 2 to 15 years (mean follow up period: 9, 5 years). The follow up protocol included physical examination, sigmoidoscopy, C/T scan in cases of malignancy and record of the observed complications and complaints.

All patients underwent complete preoperative bowel preparation with 3-days oral clear liquids and mechanical preparation – oral cathartics and enemas the day before the operation. Prophylactic antibiotics were also prescribed and included oral metronidazole 500 mgr x 3 per os and neomycin 1gr x 3 per os the day before the operation.

A modification of the transanal approach of Kraske was performed. The patient was placed in the prone jackknife position with the chest and pelvis supported and the abdomen free. The skin was incised in the midline from the level of the lower part of the sacrum to 2-3cm from the anus. The coccyx was dissected free by dividing the muscular and ligamentus attachments to the sides of the coccyx and the whole length of the anococcygeal raphe was incised. The coccyx was removed (fig. 1). The levator ani muscles and the Waldeyer's fascia were divided in the midline exposing the posterior rectal wall. The lesion was located by palpation and the posterior rectal wall was incised longitudinally (fig. 2, 3). The lesion was excised with macroscopically disease free margins of about 1cm distance from the lesion. In all cases the patient underwent full thickness excision of the lesion. The wall defect created by the excision of the tumor was approximated transversely with a double layer of running 3-0 vicryl suture. In one case where the patient had a benign rectal stenosis, the rectum was completely mobilized by dissecting it free from the vagina and the stenosis was excised. The two rectal stumps were anastomosed end to end. In the case of the female patient who developed a rectovaginal fistula 9cm from the dentate line, after a lower anterior resection of the rectum and a left colostomy, the orifice of the fistula was localized, the rectum was mobilized and the fistulous tract excised. The defect was closed in layers. The Waldeyer's fascia was approximated using a running 3-0 vicryl suture. The levator muscles were closed vertically in layers using the same type of absorbable sutures. After meticulous hemostasis, the wound was irrigated with normal saline and 10% solution of povidone iodine. A subcutaneous closed suction drain was placed in the lower part of the wound and the subcutaneous space and skin were closed in layers.

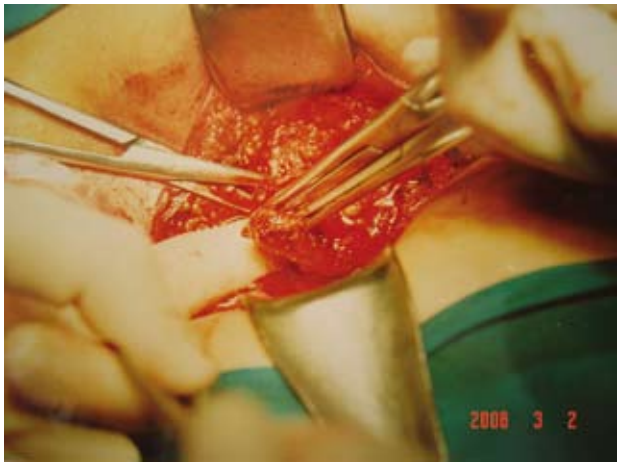

Figure 1. Kraske's procedure. The coccyx is dissected free and excised.

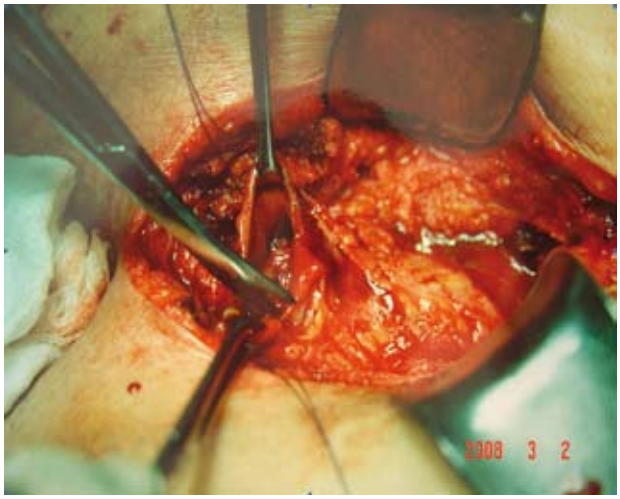

Figure 2. Kraske's procedure. The posterior wall of the mid-rectum is opened longitudinally.

Figure 3. Kraske's procedure. The mid-rectum is opened and an adenoma is protruding from the anterior rectal wall.

The operative time ranged from 75 to 120 minutes (mean operative time: 87,5 minutes). The patients remained on IV fluids and nil by mouth for 4-5 days. The drain was removed the fifth to eighth postoperative day when the discharge was practically nil.

RESULTS

The postoperative hospital stay period ranged from 7 to 48 days (mean: 14,2 days). The operative mortality was 1/24 (4,8%). This patient underwent a defunctional colostomy for treatment of a proctocutaneous fistula the 10th postoperative day and died one day after from a massive pulmonary embolism.

The overall morbidity including all complications was 13%. The observed complications included 2 (8,7%) proctocutaneous fistulas which were treated by defunctional colostomy, 1 (4%) wound infection without fistula which was treated conservatively and 1 (4%) patient developed minor incontinence mostly for gas which recovered completely without any further treatment over the next three months.

During the follow up period the only observed recurrence was in the group of patients treated for malignancy and included a patient who had an invasive adenocarcinoma in whom the lesion recurred ten months after the original operation. He was treated by abdominal perineal resection and died from metastatic disease of the liver eight months after the last procedure. In the remaining group of 22 patients no recurrence of the disease was recorded.

DISCUSSION

In the past the results of the treatment of mid rectal tumors by the Kraske's procedure were disappointing due to the development of local complications such as proctocutaneous fistulas, wound infection, stricture and incontinence.[2,3] These resulted in the limited use of the Kraske's procedure which is confirmed by the small number of patients included in the various articles published in the medical literature. However the series of Wilson and Gordon[4] as well as of Jorgensen and Ottsen[7] present encouraging results.

The operative mortality in all series is practically zero.[4,8-13] The operative mortality of the present series of 4,8% is due to the death of one patient from massive pulmonary embolism after a defunctioning colostomy for the treatment of proctocutaneous fistula. The development of proctocutaneous fistulas varies from 0% to 27% (table 1). In 50%-75% of the cases they were healed spontaneously, while in 25%-50% of them a colostomy was needed which was restored after the fistula had healed. In our series two out of twenty three (8,7%) developed proctocutaneous fistula which was treated by defunction colostomy.

When Kraske's procedure is performed for malignancy the recurrence rate ranges from 0%-25%.[14-16] In the cases

Table 1. Results of Kraske's procedure for rectal lesions

Author	Year	No. PATIENTS	POST-OPERATIVE MORTALITY	FISTULA DEVELOPMENT	RECURRENCE
Wilson S.E. et al	1969	20	0	4 (20%)	1(5%)
Arnand J.P. et al	1978	11	0	3 (27,3%)	0 (0%)
Christiansen J.	1980	17	0	2 (11,7%)	2 (11,8%)
Sweenney W.B. et al	1991	11	0	0 (0%)	1 (9%)
Harvey E. et al	2003	30	0	1(3%)	1 (3%)
Terkivatan T. et al	2004	57	0	5 (9%)	2 (3,5%)
Onaitis M. et al	2006	22	0	4 (17%)	2 (8,3%)
Present serie	2007	24	1 (4,8%)	2 (12%)	1 (4,3%)

of malignancy, the depth of the invasion (T1NoMo) appears to be the most important factor of possible recurrence. This is investigated pre-operatively by CT scan imaging of the pelvis and abdomen as well as by endorectal coil MRI or endoluminal ultrasound scan which will show not only the T stage but also the possible nodal involvement of the disease. Therefore according to recent studies the incidence of local recurrence for T1 stage ranges between 0%-5%, for T2 stage 10%-20% and for T3 stage of lesion 24%-50% without nodal metastatic involvement.[4,6] The disease free margin of the resected lesions remains a crucial factor for recurrence. For any T stage with nodal involvement the treatment of choice remains the total mesorectal excision (abdominoperineal or low anterior resection).

Besides these established criteria for the local excision of the malignant lesion by Kraske's approach in selected cases such as extensive co-morbid disease, informed patient decision about the undesirability of a colostomy (which was the case in one patient from our series), the posterior approach can be used for treatment even in T3 lesions knowing that this kind of excision is an oncological compromise.

An alternative approach to mid rectal lesion is the York – Mason posterior transphincteric operation in which the anal sphincter is completely divided and the rectum is split vertically.[17,18] It shows an excellent view to the lumen of the mid rectum but it has the disadvantage of potential dysfunction of the sphincter mechanism postoperatively and also the development of fecal fistula.[18]

The transanal endoscopic microsurgery is now an established approach to remove rectal sessile polyps.[19] For a few medical centers it is a choice which can obviate the need for more radical operation such as Kraske's procedure.[12] Although this technique is appealing for removal of rectal lesions which are not accessible for excision per anum, it is handicapped by its complex and expensive instruments. It requires special training in order to obtain the necessary skills which are difficult to maintain due to the limited number of candidates for this technique.

The Kraske's posterior approach is a viable option and its success is largely dependent on its indications. It should be considered in benign mid rectal lesions as in adenomatus polyps, leiomyomas, endometriosis, benign strictures, localized rectal hemangiomas, rectovaginal and rectoprostatic fistulas as well as in pre malignant lesions (villous adenomas, recurrent dysplasias in endoscopic polypectomy site) which cannot be excised transanally.[20,21]

Finally it may be used as an alternative in the management of selected malignant lesions as in rectal carcinomaT1,N0,M0, carcinoid tumor or adenocarcinoma in high risk patients and in carefully selected cases with meticulous histologic evaluation of the margins of excision. Preoperative bowel preparation is of vital importance, as is delayed oral feeding despite the rapid restoration of normal bowel function, the use of broad spectrum antibiotics and the removal of the closed system drains on the 5th-7th postoperative day. Based on our experience this procedure should continue to be a part of the surgeon's armentarium.

REFERENCES

1. Corman LM. Classic Articles in Colonic and Rectal Surgery. Dis Col & rect 1984; 27:499-503.
2. Hargrove WC, Gertner HM, Fitts WT Jr. The Kraske operation for carcinoma of the rectum. Surg Gynecol Obstet 1979; 148:931-933.
3. Lockhart-Mummery HE: Cancer of the rectum in: Monographs on Neoplastic Disease P. 206, Edited by Dukes CE London and Edinburgh 1960, E& S. Livingstone Ltd.
4. Wilson SE, Gordon HE: Excision of rectal lesions by the Kraske approach. Am J Surg 1969; 118:213-217.
5. Brien PH. Kraske's posterior approach to the rectum. Surg Gynecol Obstet 1976; 413-414.
6. Localio SA, Eng K. Sphincter saving operations for cancer of the rectum. N Eng J Med 1979; 300:1028-1030.
7. Jorgensen SJ, Ottsen M. Posterior rectotomy for villous tumors of the rectum. Acta Chir Scand 1975; 141:680-682.
8. Christiansen J. Excision of mid rectal lesions by the Kraske sacral approach Br J Surg 1980; 67: 651-652.
9. Sweenne WB, Deshmukh N. Modified Kraske approach for disease of the mid rectum. Am J Gastroent 1991; 86:75-78.
10. Arnaud JP, Eloy MR, Clendinnen G, et al. The posterior approach for villous tumors of the rectum. Am J Surg 1978; 136:273-275.
11. Terkivatan T, den Hoed PT, Langer JFM, et al. The place of the posterior surgical approach for lesions of the rectum. Dig Surg 2005; 22: 86-90.
12. Onaitis M, Ludwig K, Peree-Tamayo A, et al. The Kraske Procedure: A Critical analysis of a Surgical approach for mid rectal lesions. J Surg Onc 2006; 94:194-202.
13. Harvey E, Young M, Flanigan T, et al. Complications are increased with the need for an abdominal assisted Kraske procedure. The American Surgeon 2004; 70:193-197.
14. Mason AY. Malignant tumors of the rectum. Local excision. Clin Gastroenterol 1975; 4:582-593.
15. Morson BC, Bussey HJR, Samoorian S. Policy of local excision for early cancer of the colorectum. Gut 1977; 18:1045-1050.
16. Bouvet M, Milas M, Giaco GG, et al. Predictors of recurrence after local excision and postoperative chemoradiation therapy of adenocarcinoma of the rectum. Am Surg Oncol 1999; 6:26-32.

17. Mason AY. Transsphincteric approach to rectal lesion. Surg Ann 1977; 6:171-194.
18. Thompson BW, Tucker WE. Transsphincteric approach to lesion of the rectum. South Med J 1987; 80:41-43.
19. Buess G, Kip J, Muller K, Ibald R, et al. Clinical results of transanal endoscopic microsurgery. Surg Endosc 1988; 2:245-250.
20. Gordon PH, Niratrongs S. Principles and practice of surgery for the colon, rectum and anus, 1st Edition, Quality Medical Publishing INC, 1992, p.432.
21. Minsky BP, Enker WE, Cohen AM, et al. Clinicopathologic features in rectal cancer treated by local excision and post-operative radiation therapy. Radiat Med 1995; 13:235-241.