

The results of treatment of complicated and locally advanced rectal cancer

A.V. Shelekhov

Irkutsk Regional Oncology Hospital

Chief physician: Professor, Ph. D. Dvornichenko V. V.

Morbidity

- The morbidity of rectal cancer among Russian men of 11.0, and among women -7,1 per 100 000 population.
- In the Irkutsk region, the morbidity of rectal cancer is in 6th place, accounting for 4.9% of total cancer incidence, RF of 5.0%.
- Identified 28064 cases in 2016. Mortality at 1 year of 23.1%
- The prevalence per 100 000 population in 2006 to 73.1% in 2016 – 105,6%

- *Состояние онкологической помощи населению России в 2016 году Под ред. А.Д. Каприна, В.В. Старинского, Г.В. Петровой - М.: МНИОИ им. П.А. Герцена - филиал ФГБУ «НМИРЦ» Минздрава России, 2017.*

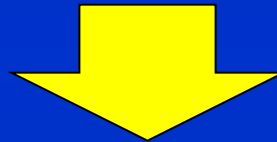
Complicated forms of rectal cancer (rate 70%)

- Tumor stenosis
- Abscess
- Fistula
- Tumour rectal bleeding

- Яицкий Н.А. Опухоли толстой кишки / Н.А. Яицкий, В.М. Седов, С.В. Васильев. – М.: Медпресс-информ, 2004. – С. 153-201.
- Trompetas V. Emergency management of malignant acute left-sided colonic obstruction / V. Trompetas // Ann. R. Coll. Surg. Engl. – 2008. - Vol. 90, № 3. – P. 181-186.
- Hoedema R.E. The Management of Lower Gastrointestinal Hemorrhage. Dis. Colon Rectum. 2005; 48(11): 2011-2024.

Complicated forms of rectal cancer (rate 70%)

- Tumor stenosis
- Abscess
- Fistula
- Tumour rectal bleeding



RT + Surgery – 41,5%; CRT + Surgery – 1,7%; Surgery - 54,7%

- Яицкий Н.А. Опухоли толстой кишки / Н.А. Яицкий, В.М. Седов, С.В. Васильев. – М.: Медпресс-информ, 2004. – С. 153-201.
- Trompetas V. Emergency management of malignant acute left-sided colonic obstruction / V. Trompetas // Ann. R. Coll. Surg. Engl. – 2008. - Vol. 90, № 3. – P. 181-186.
- Hoedema R.E. The Management of Lower Gastrointestinal Hemorrhage. Dis. Colon Rectum. 2005; 48(11): 2011-2024.
- Состояние онкологической помощи населению России в 2016 году Под ред. А.Д. Каприна, В.В. Старинского, Г.В. Петровой - М.: МНИОИ им. П.А. Герцена - филиал ФГБУ «НМИРЦ» Минздрава России, 2017.

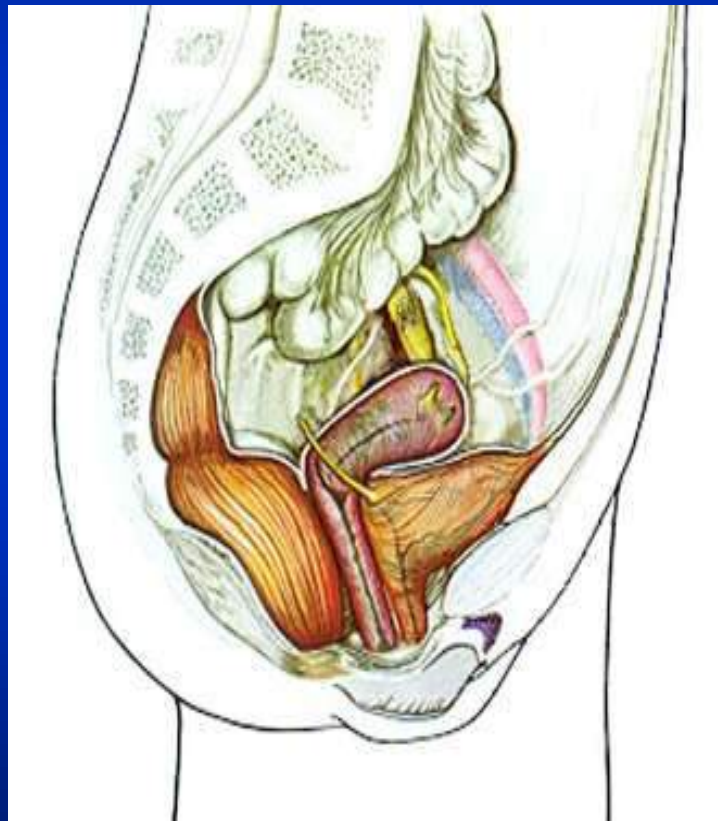
Low advance rectal cancer

- Reducing the number of sphincter-preserving operations
- Increase the number of tumor recurrence
- Low cancer survival rates

-Lino-Silva L.S., Loaeza-Belmont R. Mesorectal Invasion Depth in Rectal Carcinoma Is Associated With Low Survival.// Clin Colorectal Cancer. 2017 Mar;16(1):73-77.

-Rullier E., Denost Q., Vendrely V., Rullier A., Laurent C. Low rectal cancer:classification and standardization of surgery. Dis Colon Rectum. 2013May;56(5):560-7.

Anatomic features of the rectum



AJCC Cancer Staging Manual (CG3.01)

- The subclassification of stage T3 is as follows:
- **T3a:** Minimal invasion: <1 mm beyond the border of the muscularis propria
- **T3b:** Slight invasion: 1–5 mm beyond the border of the muscularis propria
- **T3c:** Moderate invasion: >5 mm–15 mm beyond the border of the muscularis propria
- **T3d:** Extensive invasion: > 15 mm beyond the border of the muscularis propria.

The subdivision of T3 into T3a, T3b, T3c and T3d refines definition of the depth of infiltration and may be prognostically significant, as well as being useful in the planning of further therapy. Alternatively, the distance of tumour invasion beyond the muscularis propria may be given as a measurement in millimetres.

AJCC (American Joint Committee on Cancer) (2002). AJCC Cancer Staging Manual, 6th edition. Springer-Verlag, New York.

Compton CC (2006). Key issues in reporting common cancer specimens: problems in pathologic staging of colon cancer. Arch Pathol Lab Med 130(3):318–324.

Washington MK (2008). Colorectal carcinoma: selected issues in pathologic examination and staging and determination of prognostic factors. Arch Pathol Lab Med 132(10):1600–1607.

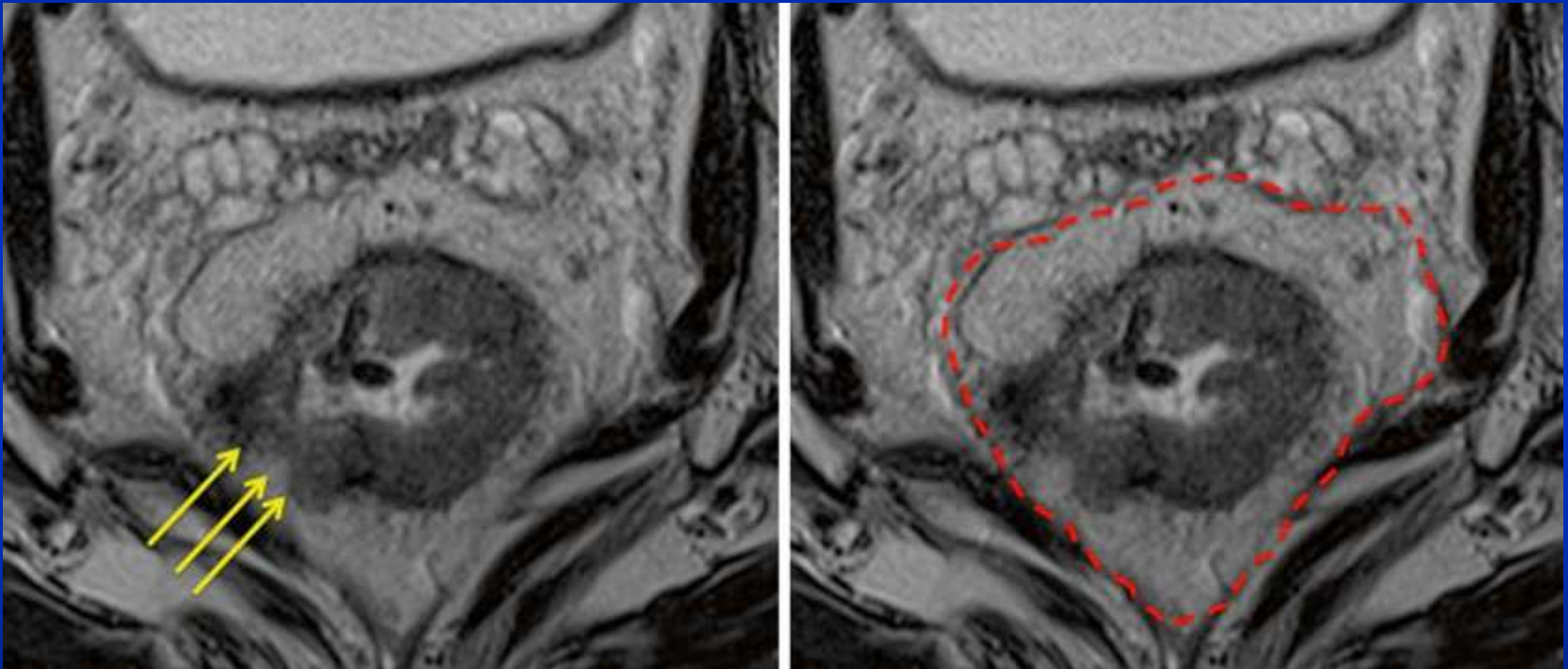
RT + Surgery VS Surgery

Study	n	Reduce: RT+Surgery	Reduce: Surgery	p	Survival
St. Marks	475	17	24	0,05	NS
NWRCG	284	12,8	36,5	0,001	NS
EORTC	466	15	30	0,003	NS
Stockholm I	849	10,8	22,8	0,01	NS
Stockholm II	479	5,4	12,9	0,01	NS
Swedish RCT	1165	11	27	0,001	0,004
Dutch	1861	2,4	8,2	0,001	NS

The results of treatment of stage T3a, T3b

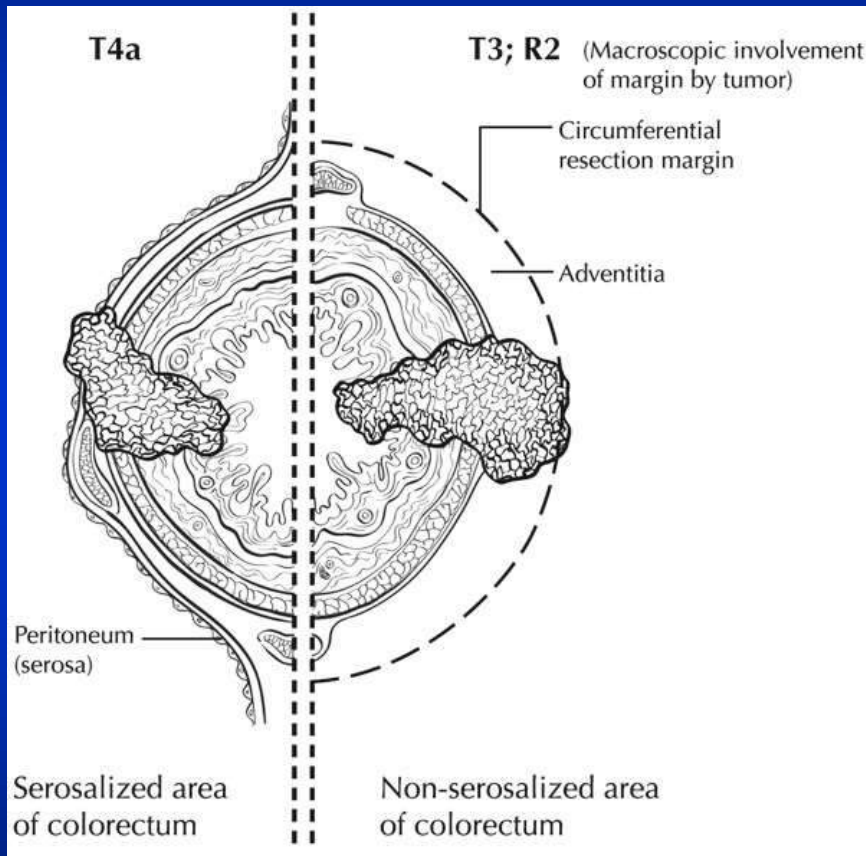
Study	Recurrence T3a (%)	Recurrence T3b (%)	Survival T3a (%)	Survival T3b (%)
Nicholls 1995	5	30	80	20-40
Merkel 2003	10,4	26,3	85,4	54,1

Positive criteria MRF+ (involvement of the own fascia of the rectum in the neoplastic process)



Burton S, Brown G, Daniels I, et al. MRI identified prognostic features of tumors in distal sigmoid, rectosigmoid, and upper rectum: treatment with radiotherapy and chemotherapy. Int J Radiat Oncol Biol Phys. 2006;65:445–51.

Circumferential Resection Margins - CRM



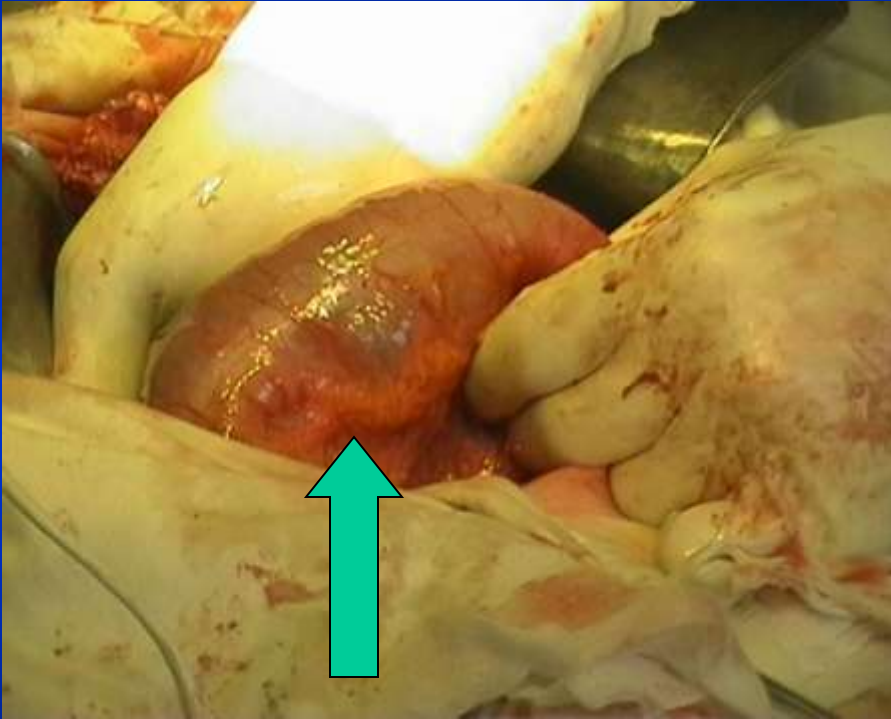
P. Quirke

Involvement of the lateral edge of resection in the tumor process, 27% of patients 85 % of them were identified with local recurrence ($p < 0.001$)

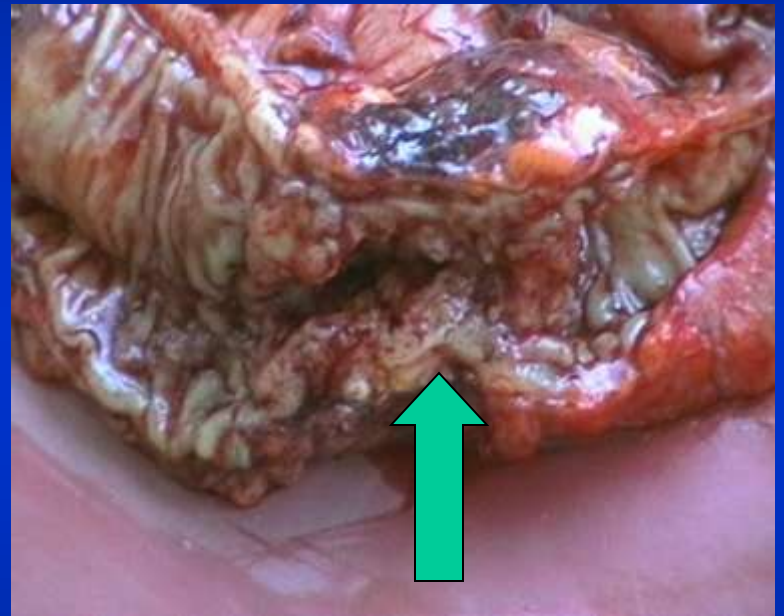
The critical distance from the tumor to its own fascia, it is assumed the distance of 1 mm or less, in this case, the CRM is considered positive.

Circumferential margin involvement after mesorectal excision of rectal cancer with curative intent. Predictor of survival but not local recurrence? P. Quirke et al. Dis Colon Rectum. 1998 Aug;41(8):979-83

Bad preparation of the colon: obstructive surgical option.



Loop of the colon is filled dense stool



The cause of the poor training - the presence of neoplastic stenosis

Tumour rectal bleeding

- Frequency: 10-15% of cases
- Profuse bleeding occurs in 2-7,4% of cases
- Is a contraindication to neoadjuvant chemoradiotherapy



- *Hoedema R.E. The Management of Lower Gastrointestinal Hemorrhage. Dis. Colon Rectum. 2005; 48(11): 2011-2024.*

Treatment tactics

- Minimal surgical intervention aimed at eliminating bowel obstruction, then some time after the elimination of intoxication, conduct radical surgery (Pugaev A.V., Achkasov E. E. 2005, J. J. Farrell, 2008)
- The simultaneous radical surgery (C. Ionescu, T. Cvasciuc 2007; M. Vukovich, N. Moljević 2008).

- *Пугаев А.В. Обтурационная опухолевая толстокишечная непроходимость / А.В. Пугаев, Е.Е. Ачкасов. – М.: ПРОФИЛЬ, 2005. – 224 с.*
- *Farrell J.J. // Curr. Opin. Gastroenterol. - 2007. - Vol. 23, № 5. - P. 544-549.*
- *Ionescu C. Colectomy in emergency surgery / C. Ionescu, T. Cvasciuc, D. Grecea, S. Ionescu // Chirurgia (Bucur). – 2007. – Vol. 102, № 5. – P. 537-541.*
- *M. Vuković, N. Moljević // Med. Pregl. – 2008. – Vol. 61, № 1. P. 43-47.*

Preoperative radiotherapy VS postoperative

Study	N	Recurrence: RT+S	Recurrence S+RT	p	survival
Pahlman	471	14,3	26,8	0,05	NS
Sauer	823	6	13	0,05	NS

The advantages of preoperative radiation therapy (M. Ajlouni, 2002)

- Decreased viability and tumor cell death - reducing the likelihood of dissemination of viable cells during the operation.
- Before the operation the tumor cells more sensitive to irradiation (oxygenation).
- Regression of tumors of the distal rectum - increased percentage of sphincter-preserving operations.
- Reduce the severity of radiation damage to the pelvic organs.
- Significantly reduced disease-free survival when performing preoperative radiation therapy.

Challenges in the treatment of complicated rectal cancer

- To create conditions for conducting pre-operative chemotherapy and radiation therapy in the treatment of colorectal cancer.
- To achieve the reduction of the percentage of completion of obstructive operations
- Performing radical surgical volume, confirmed by the numbers of relapse-free survival.

Rectal cancer (own study)

- Control group (n=102) surgery+postoperative radiation therapy (1996-2003)
- The basic group (n=108) – to eliminate the complication + preoperative radiotherapy + surgical treatment (2003-2017)
- In clinical groups revealed significant differences in the distribution of patients by sex, age, stage of the disease

Methods surgical decompression

- The restoration of the lumen of the rectum by endoscopic recanalization;
- Stenting of neoplastic stenosis of the rectum;
- Laparoscopic colostomy.

-Яновой В.В. Временная декомпрессивная лапароскопическая ассистированная колостомия / В.В. Яновой, А.С. Мартынов, Ю.В. Доровских // Хирургия. – 2002. – № 2. – С. 33–36.

- Jakobs R. Endoscopic laser palliation for rectal cancer - therapeutic outcome and complications in eighty-three consecutive patients / R. Jakobs, J. Miola, A. Eickhoff, H.E. Adamek // Z. Gastroenterol. – 2002. – Vol. 40, № 8. – P. 551–556.

-Morino M. Malignant colonic obstruction managed by endoscopic stent decompression followed by laparoscopic resections / M. Morino, A. Bertello, A. Garbarini, G. Rozzio // J. Surg. Endosc. – 2002. – № 16. – P. 1483–1487.

Temporary stenting

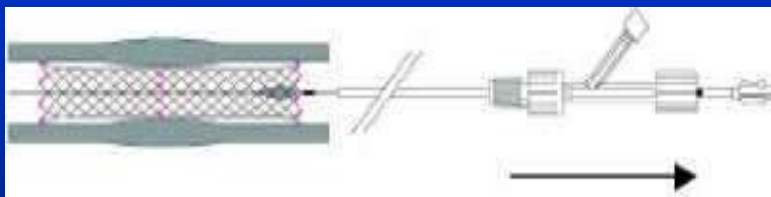
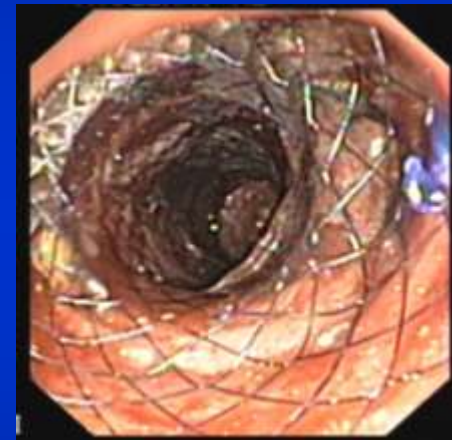


Diagram of the stent of the company MI-TECH (South Korea) and its location in the lumen of the rectum (19 patients)

Combined endoscopic recanalization (17 patients)



Nd: YAG Laser
mediLas 4100
("FIBERTOM",
Germany)



Monopolar
diathermocoagulation UES –
40 ("OLYMPUS", Япония)



Endoscopic
electrocoagulation forceps

Laparoscopic colostomy (72 patients)



Mobilization of the
colon



The capture clip
EndoBabcock

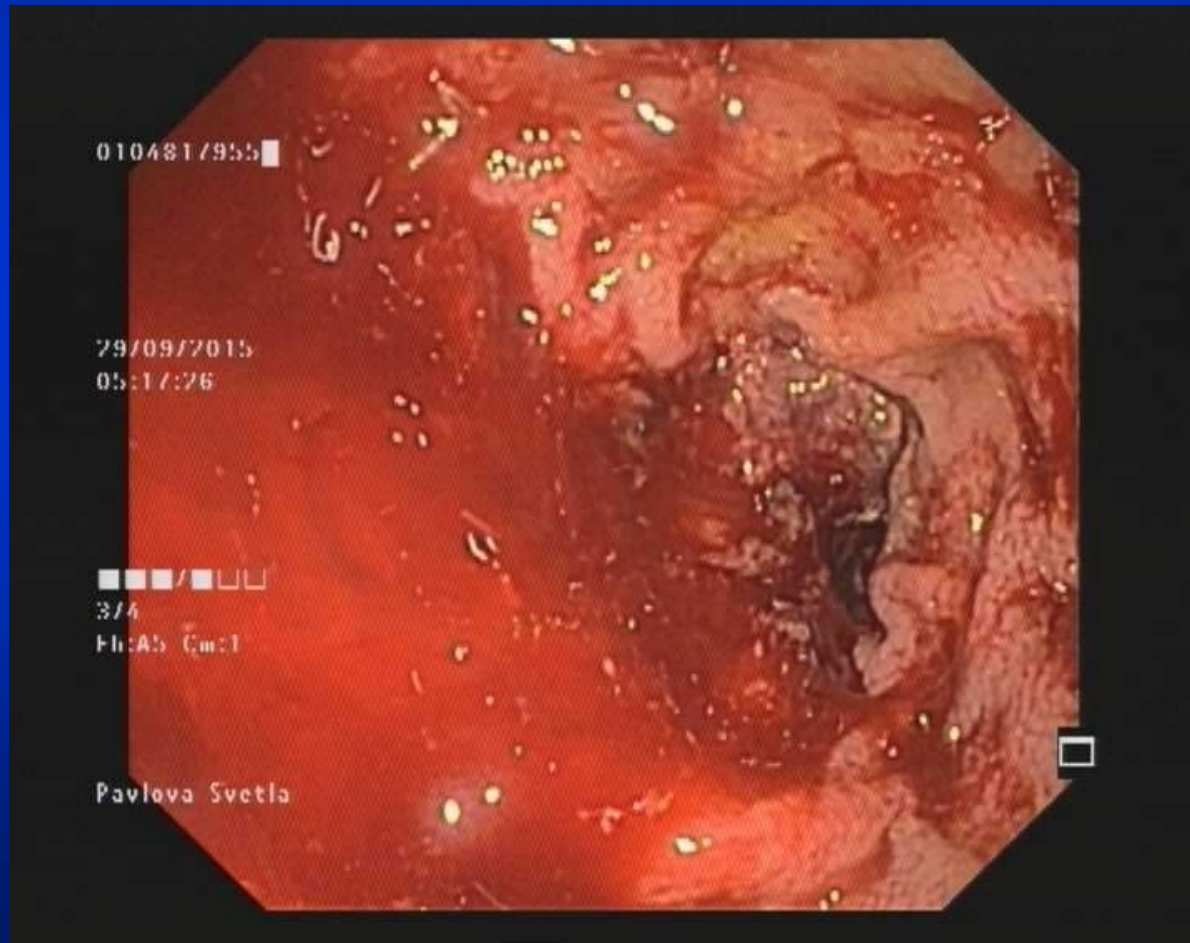


Fixation of the
colostomy

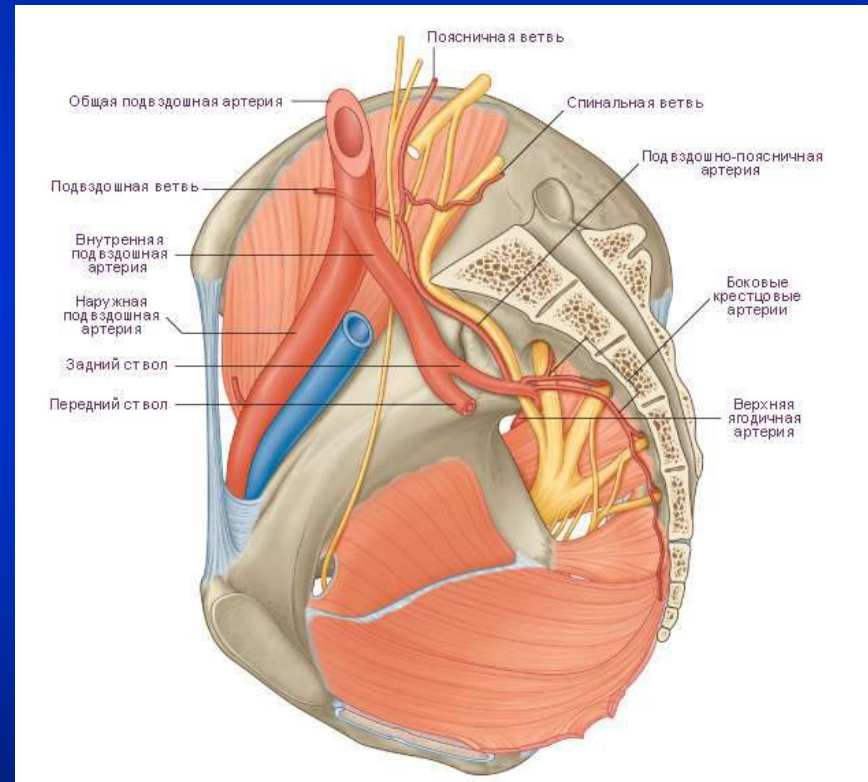
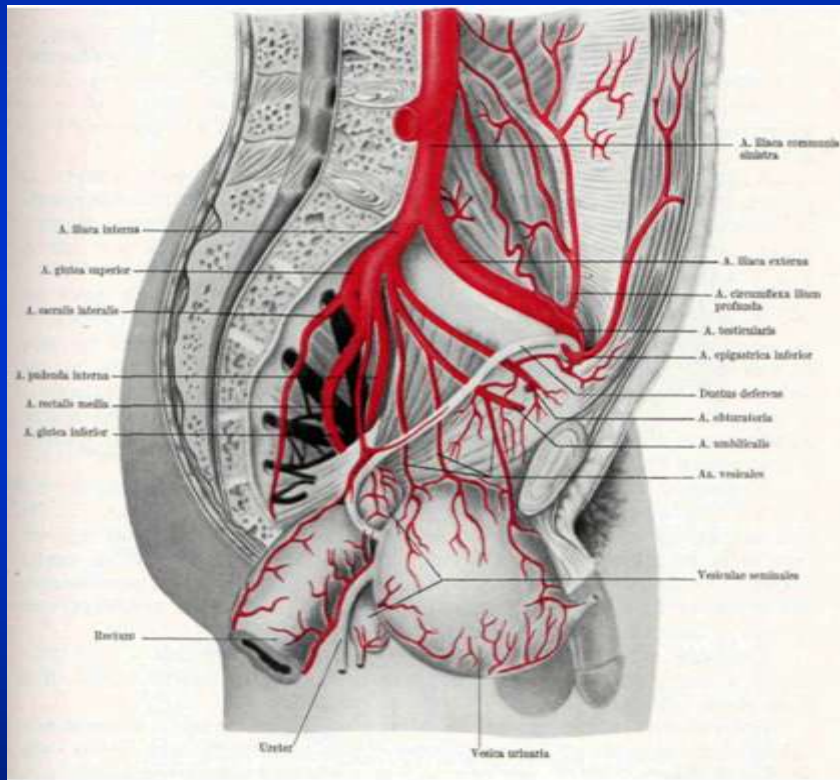
Angiography (16 patients)

- Radiology complex “GE INNOVA 4100” (General Electric, USA)
- Catheters SIM3 4-5F, Cobra2 4-5F, Roberts (Balton Ltd., USA)
- Ultravist 300 (Schering, Germany) 100-150 ml
- cisplatin at the dosage of 20 - 40 mg (infusion time for 5 minutes)
- Hemostatic sponge

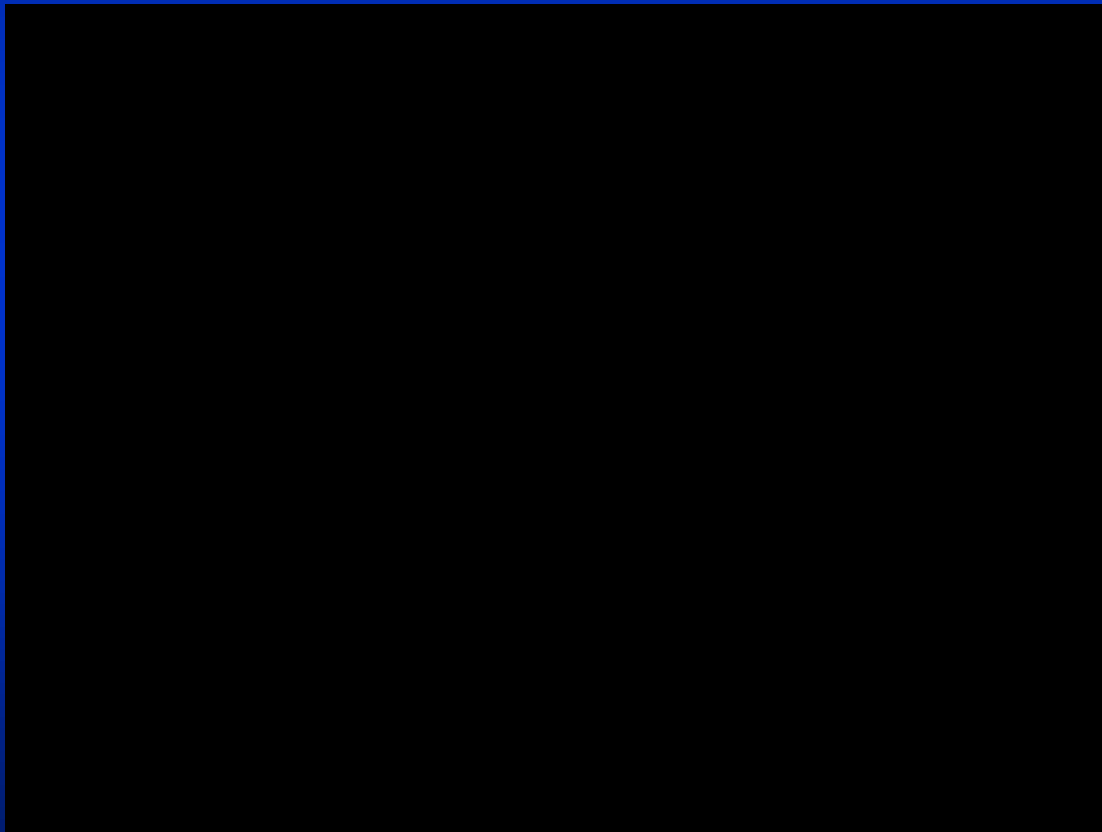
Endoscopic examination of the rectum prior to angiography



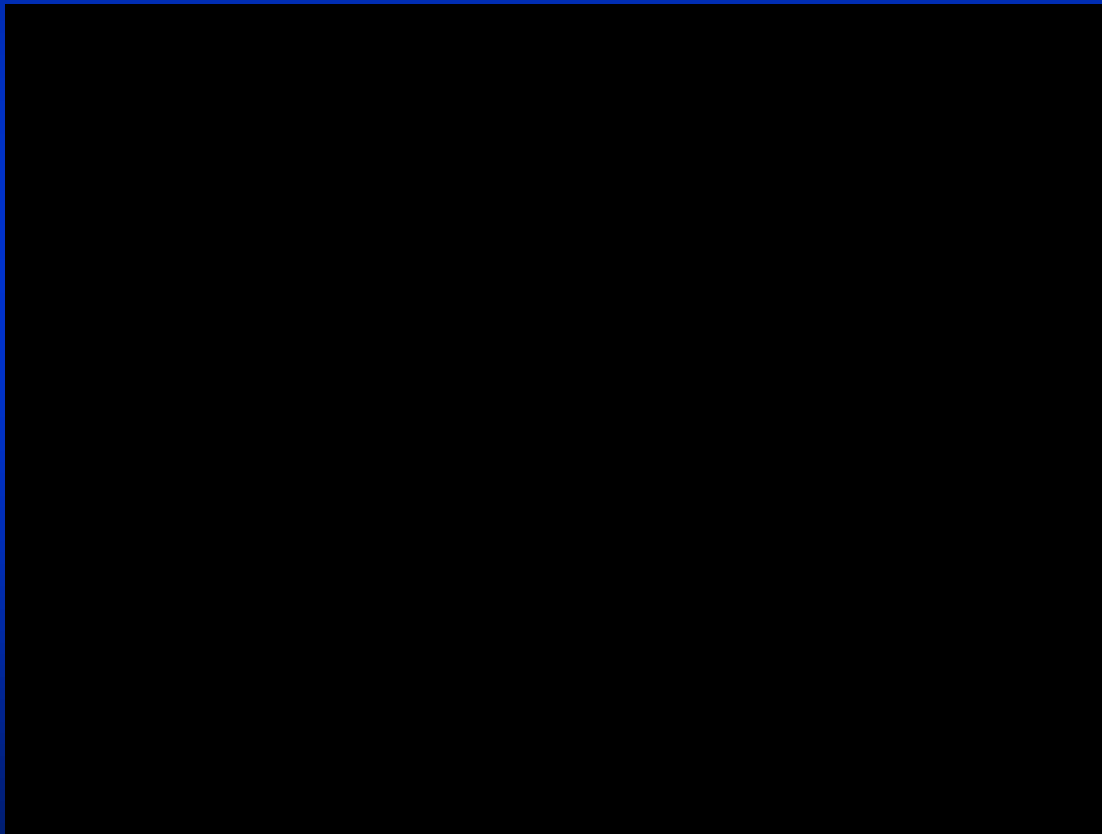
The level of occlusion of the internal iliac artery



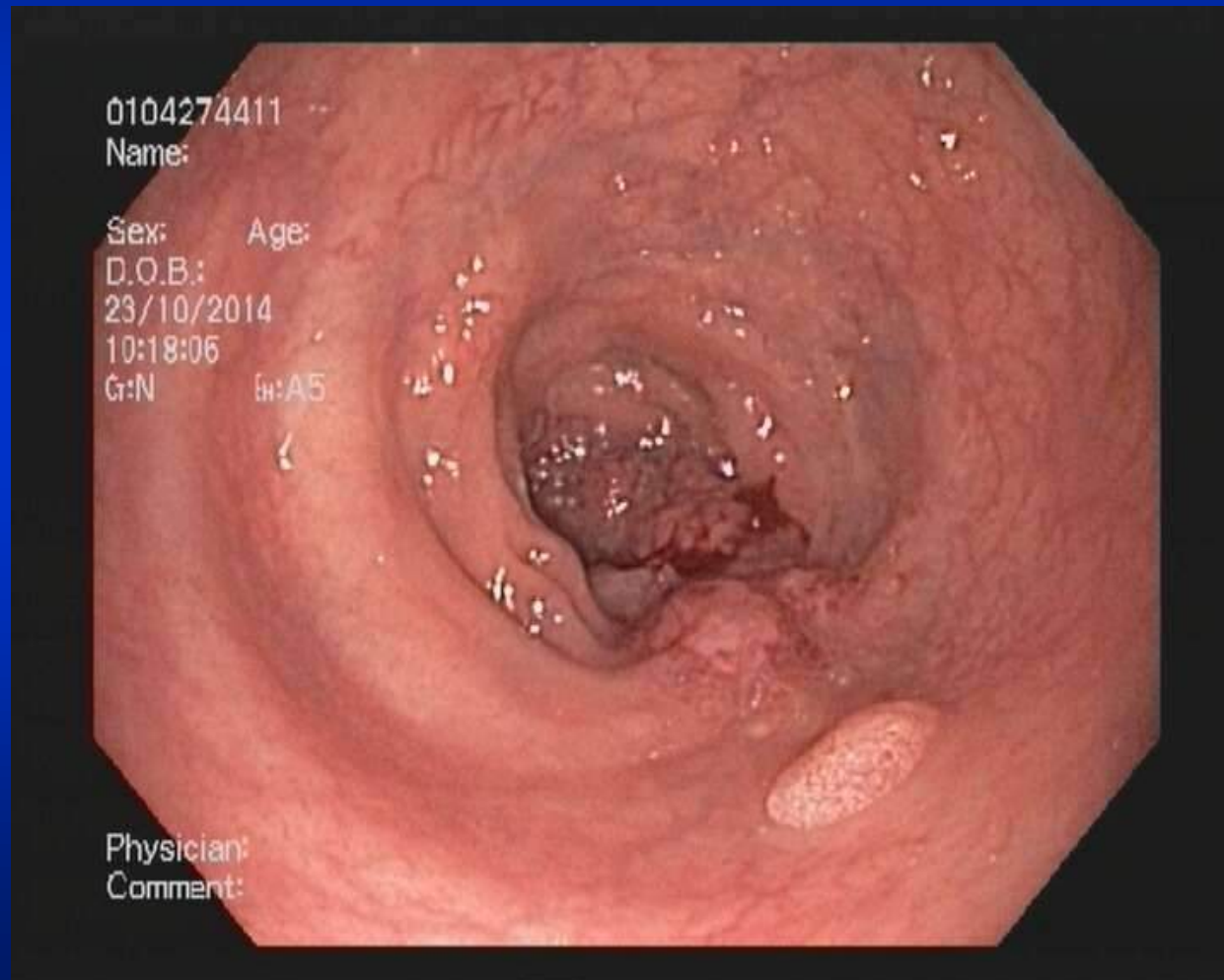
Angiography of the superior rectal artery (the introduction of the chemotherapeutic agent, followed by embolization hemostatic sponge, pendulum stasis of contrast



Chemoembolization of the internal iliac artery on the left (at the level of bifurcation into the anterior and posterior branches)



Endoscopic control after embolization



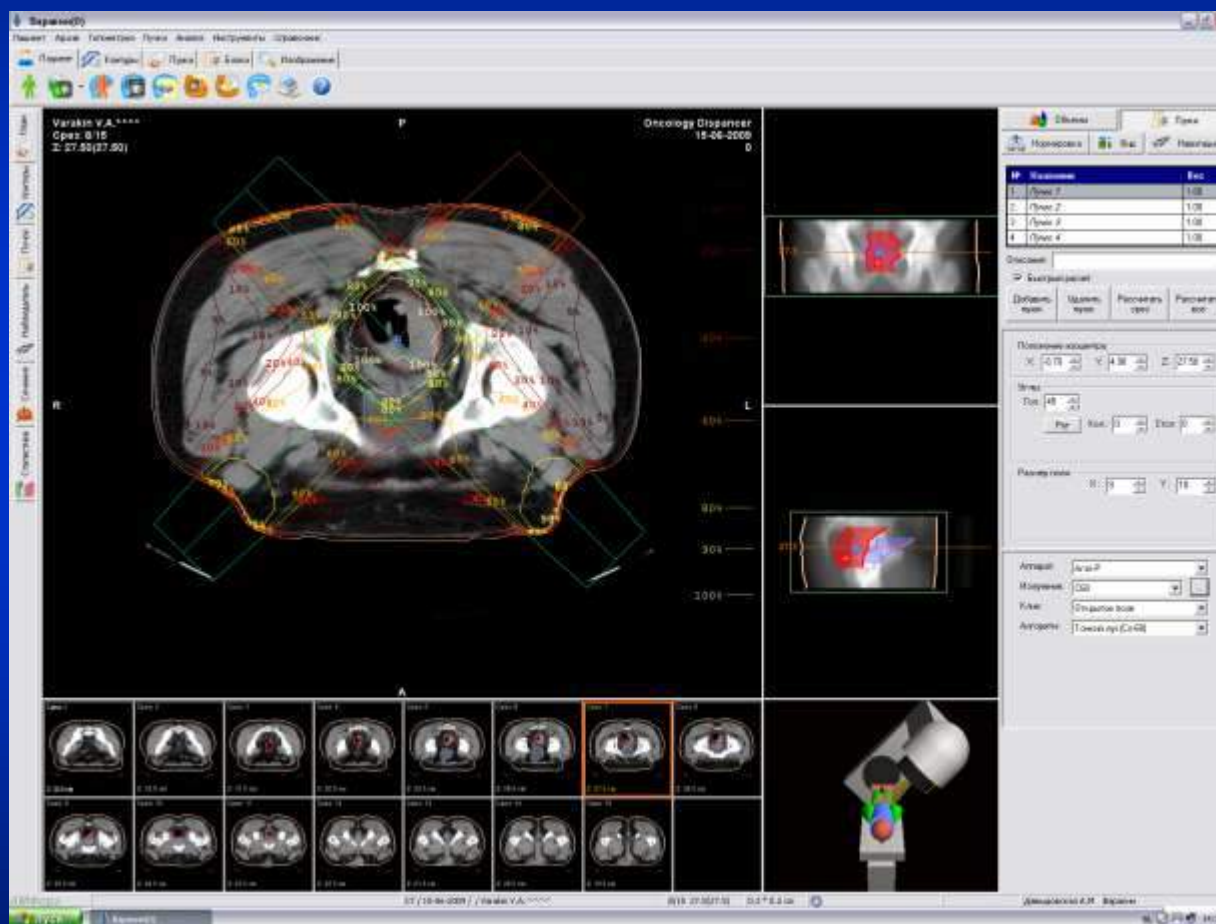
Results:

- Signs of ongoing bleeding from the lumen of the rectum is not marked (FC)
- Postembolization syndrome is not marked
- 1 complication — necrosis of the sigmoid colon

Methods of neoadjuvant therapy in the basic group

- 20 patients for preoperative radiation therapy 5 X 5 Gr.
- 19 patients dynamic fractionation of SOD 46 G augmented radiomodulators as follows: – 5-fluorouracil 750 mg for 5 days before radiation therapy and platidium 30 mg for 3 days on the background of the major factions.
- 49 patients chemoradiotherapy of rectal cancer: the combination of preoperative radiation therapy in the classic mode fractionation of the average focal dose of 46 Gy with oral intake of capecitabine at a total daily dose of 3000 mg (1.26 m2).
- 20 patients, where the treatment we had installed a stage III disease, we conducted neoadjuvant chemotherapy in combination with preoperative radiation therapy. In the first stage of treatment was carried out remote gamma-therapy of classical fractionation with simultaneous appointment from the first day of chemotherapy according to the scheme IFL.

Markings were made on the CT scan SOMATOMAR.TX increments of 1 cm. Dosimetric planning was carried out on two-dimensional planning system RX-PLAN and three-dimensional planning system "amphora". Irradiation of the rectum planned with four fields.



Three-dimensional planning system "Amphora".



RapidArc red color is contoured by a volume summarizing the 100% dose (the primary tumor and areas of potential nodal metastasis). The remaining volume receives a dose of not more than 80%, the soft tissue of not more than 20%

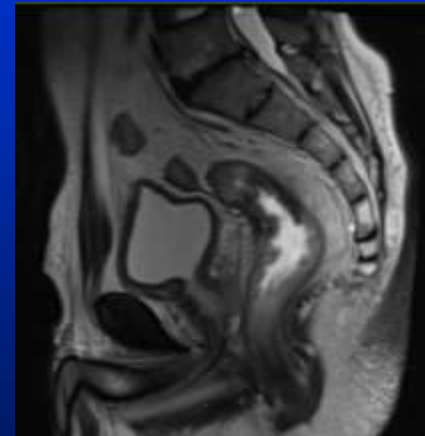
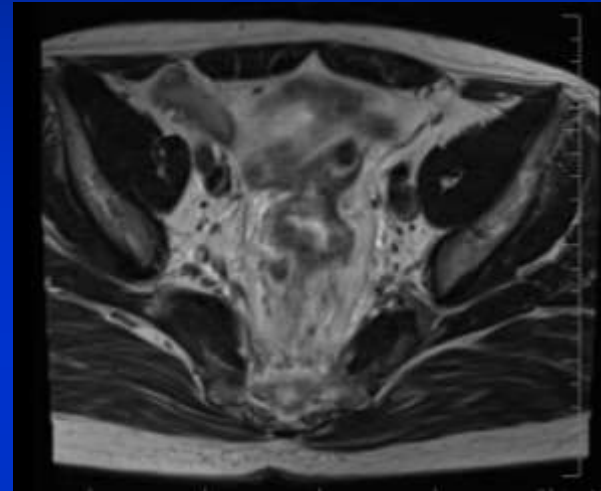
static treatment 4 - field capacity of 100% of the dose beyond the borders of the PTV (the calculation is performed according to the clinical requirements and does not exceed permitted volumes QUANTEC).

Methods of evaluating the effectiveness of preoperative CRT

- Fibrocolonoscope GF-H180AL, «OLYMPUS», Japan
- Endoscopic ultrasound HAWK 2102 EXL «B-K Medical», Denmark
- MRI Siemens magnetom Espree 1,5 T

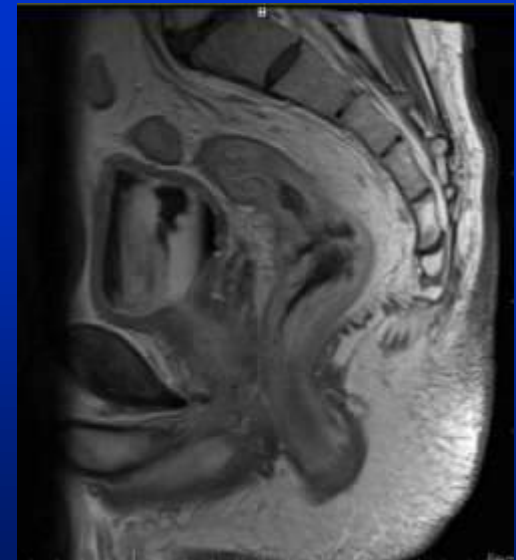
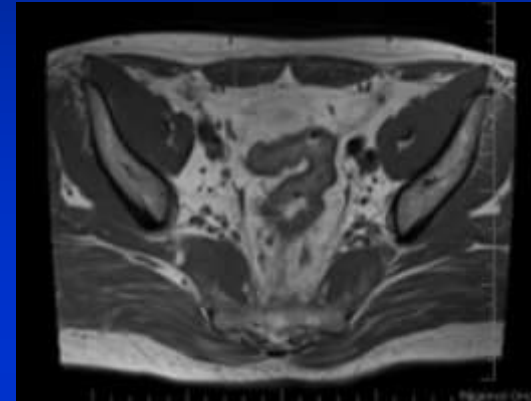
MRI before CRT

- Thickened walls of the rectum due to tumor growth
- Contraction and deformation of the lumen of the rectum
- The lack of differentiation of layers
Increase pararectal lymph nodes up to 1 cm



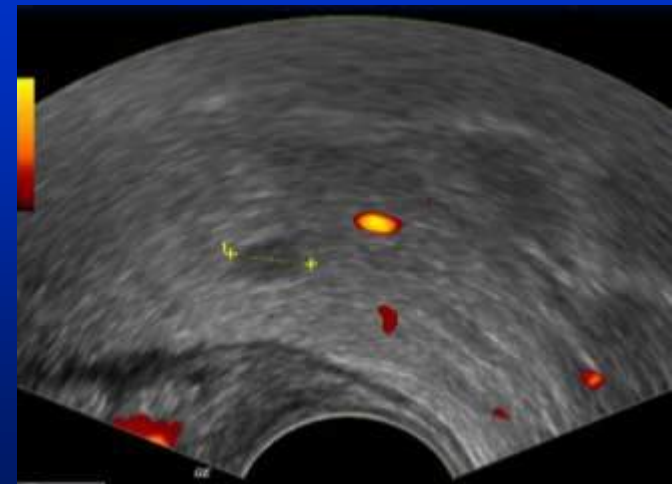
MRI after CRT

- The reduction in wall thickness due to the resorption of tumor
- The emergence of differentiation of layers
- The absence of enlarged lymph nodes due to the reduction of tumor



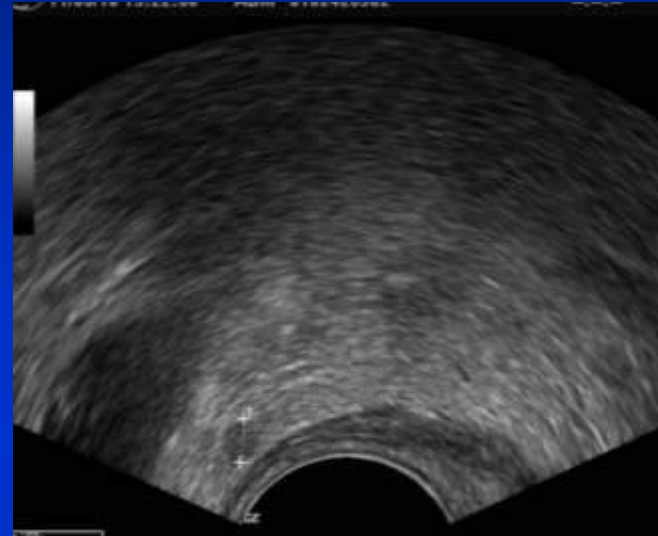
TRUS before CRT

- Education reduced echogenicity, up to 12mm thick
- Jagged, rising to serosa, inhomogeneous structure without blood flow.
- Lymph nodes of round shape with clear contours 7-8mm

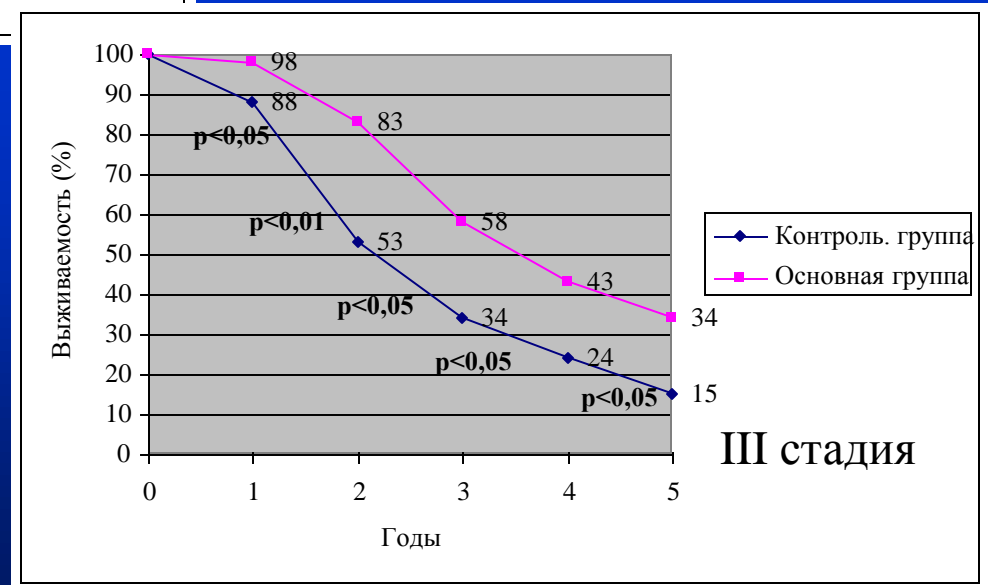
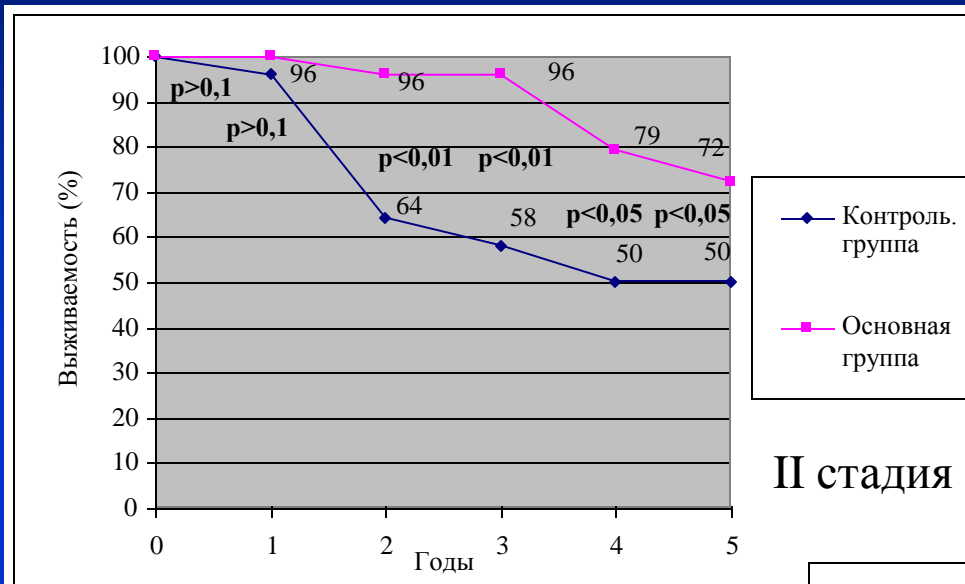


TRUS after CRT

- The tumor thickness to 8mm
- The degree of infestation no change
- Describe the lymph nodes was reduced to 4-5mm.



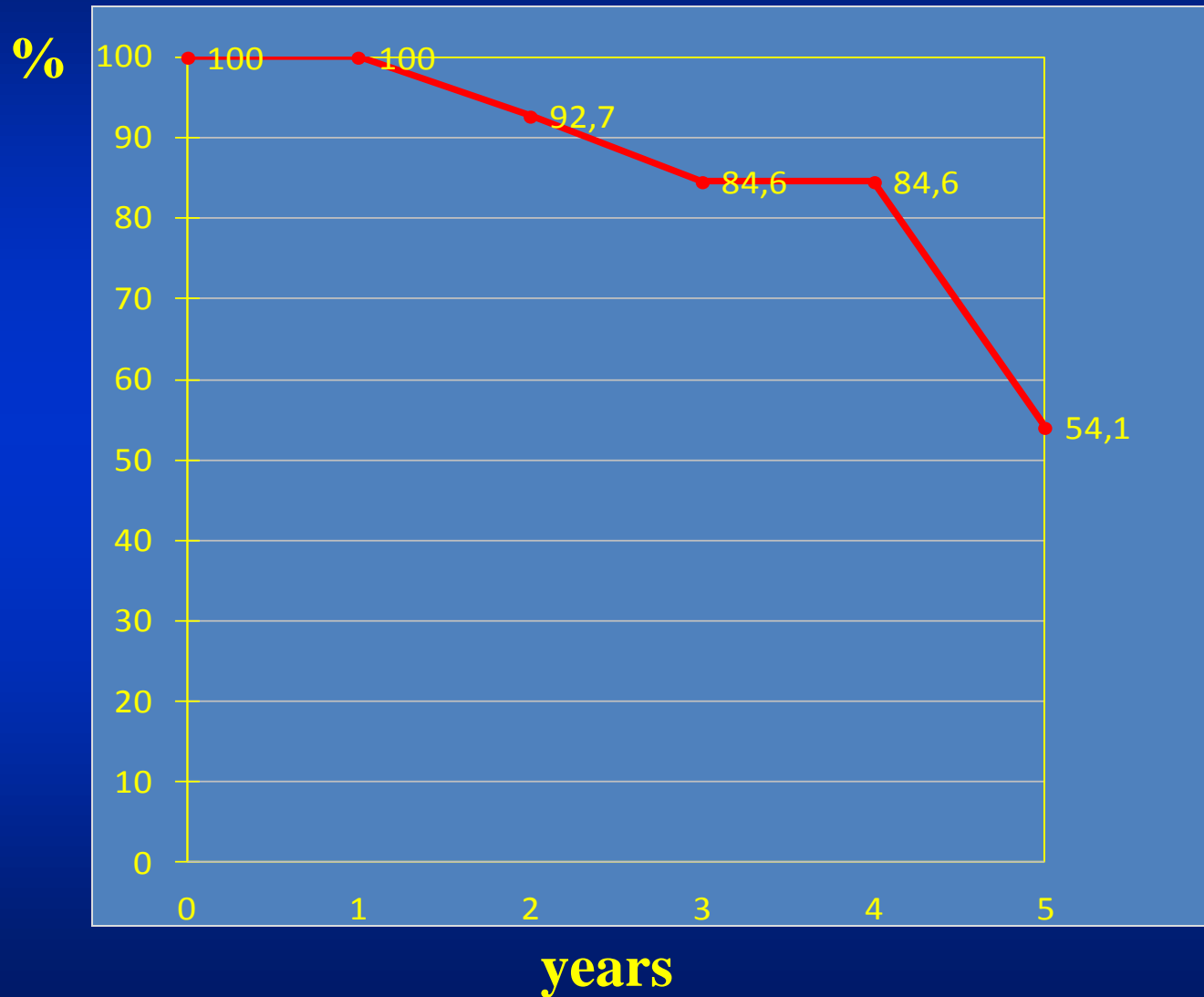
A comparative analysis of the five-year survival rate in groups of patients with rectal cancer



Results of surgical treatment

Group	Anastomosis	Obstructive resection	APR	Complicate	Mortality
Basic	72,7%	13,8%	13,8%	6,8%	1,5%
Control	37,5%	44,9%	17,6	5,2%	1,7%
P	0,01	0,01	0,05	NS	NS

Survival after CRT (IFL) III stage



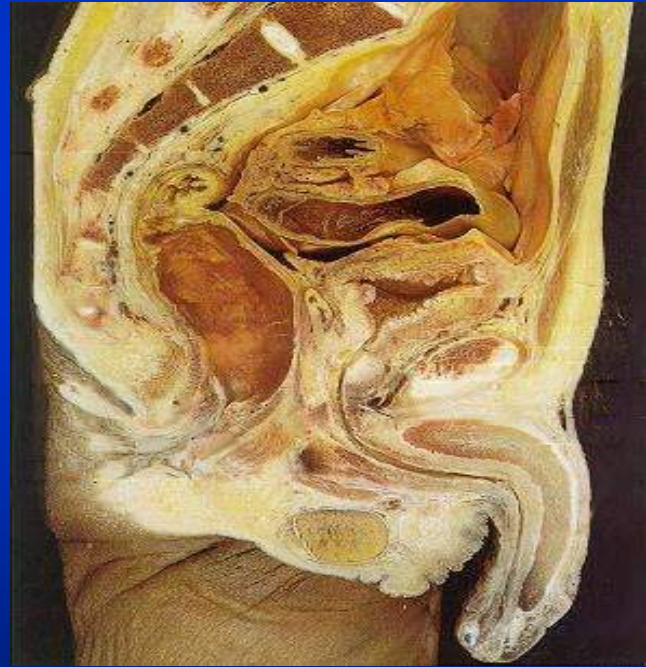
Resume

- Relief of complications arising in the course of developing rectal cancer
- Allows for neoadjuvant chemoradiotherapy; to minimise obstructive resection;
- To increase the percentage sphincteroplasty resection;
- Increase five-year survival.

Locally advanced forms of upper and middle rectal cancer with invasion of adjacent organs

- T4;
- The most frequent localization;
- Poor prognosis;
- Exclusion from the treatment algorithm neoadjuvant CRT.

"Target organs" of invasion of rectal cancer



Prediction T4a and T4b

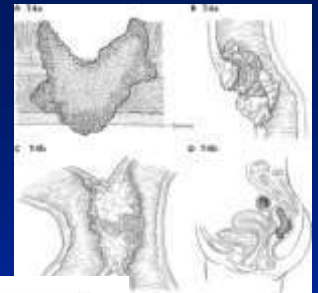


Table 3. SEER Colon Cancer Analysis, 5-Year Relative and Observed Survival by TN Category of Disease in Patients With Invasive Cancer and Evaluable TN Category

TN Category	No. of Patients	SEER 5-Year Relative Survival Rate (%)	SE	TNM Stage (6th edition)	Proposed TNM Stage (7th edition)*	SEER 5-Year Observed Survival Rate (%)	SE
T1N0	10,930	97.4	0.6	I	I	78.7	0.5
T2N0	12,931	96.8	0.6	I	I	74.3	0.4
T3N0	40,338	87.5	0.4	IIA	IIA	66.7	0.3
T4aN0	5,020	79.6	1.0	IIIB	IIIB	60.6	0.8
T4bN0	3,088	58.4	1.3	IIIB	IIIC	45.7	1.0
T1-2N1a	1,913	90.7	1.5	IIIA	IIIA	73.7	1.2
T1-2N1b	1,221	83.0	2.0	IIIA	IIIA	67.2	1.6
T1-2N2a†	377	79.0	3.6	IIIC	IIIA/IIIB†	64.7	3.0
T3N1a	8,759	74.2	0.8	IIIB	IIIB	58.2	0.6
T4aN1a	1,311	67.6	2.0	IIIB	IIIB	52.2	1.5
T3N1b	9,107	65.3	0.8	IIIB	IIIB	51.7	0.6
T1-2N2b	122	62.4	6.5	IIIC	IIIB	51.8	5.3
T4aN1b	1,460	54.0	1.9	IIIB	IIIB	42.1	1.5
T3N2a	5,331	53.4	1.0	IIIC	IIIB	42.8	0.8
T4aN2a†	982	40.9	2.1	IIIC	IIIC	32.5*	1.7
T3N2b	3,235	37.3	1.2	IIIC	IIIC	30.4	0.9
T4bN1a	845	38.5	2.2	IIIB	IIIC	30.6	1.8
T4bN1b	929	31.2	2.0	IIIB	IIIC	25.4	1.6
T4bN2a	730	23.3	2.1	IIIB	IIIC	18.3	1.6
T4aN2b	671	21.8	2.2	IIIB	IIIC	17.5	1.7
T4bN2b	653	15.7	1.9	IIIC	IIIC	12.9	1.5

Abbreviation: SEER, Surveillance, Epidemiology, and End Results.

*Proposed changes in substaging of stages I/III (bold type), based on expanded outcomes in SEER data analyses.

†Patients with T2N2a colon lesions fared better than patients with T2N2a rectal lesions; both categories placed in stage IIIB.

‡Patients with T4aN2a colon lesions fared worse than patients with T4aN2a rectal lesions; both categories placed in stage IIIC.

Leonard L. Gunderson, John Milburn Jessup, Daniel J. Sargent, Frederick L. Greene, and Andrew Stewart. Revised Tumor and Node Categorization for Rectal Cancer Based on Surveillance, Epidemiology, and End Results and Rectal Pooled Analysis Outcomes// *Journal of Clinical Oncology* volume 28 _ number 2 _ Vol. 28 – N. 2 - January 10 2010

Types of surgical operations used in the Irkutsk Oncology center

- Low anterior resection of rectum in combine with:
- Resection of the bladder
- Hysterectomy
- Bladder removal and prostate
- Resection of intestine
- Resection of the sacrum
- Resection of the common and external iliac vessels



Locally advanced forms of low rectal cancer with invasion of adjacent organs

- A high percentage of local tumor recurrence
- The possibility of using preoperative CRT (pre-colostomy);



Locally advanced forms of low rectal cancer with invasion of adjacent organs

- The most common infestation in the posterior wall of the vagina;
- Use as a plastic material omentum and the Sartorius muscle



Locally advanced forms of low rectal cancer with invasion of adjacent organs

- Plastic with m. sartorius





Thank You for Your attention !