Prognostic factors of lateral node metastasis in patients with rectal cancer

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Actuality: One of the main causes of local recurrence of rectal cancer is the regional lymph nodes metastasis. Existing methods of staging does not have absolute sensitivity and specificity. It is necessary to look for new methods of diagnosis, to identify risk factors and unfavorable prognosis of lateral metastasis in colorectal cancer, which will provide a more differentiated approach to the choice of treatment policy, indications for neoadjuvant chemoradiotherapy and / or lymph node dissection.

Purpose: to improve the results of diagnosis and treatment of patients with rectal cancer by finding adverse factors of metastasis in regional lateral lymph nodes and identifying patterns of the individual characteristics of blood supply of the rectum and the incidence of lateral metastasis

Materials and methods:

1. Analyzed correlation between the presence of MRA and lateral node metastasis in 175 patients with cancer of the rectum
2. Studed variants of the lateral metastasis based on the following factors: tumor localization; tumor differentiation (G); CEA; T and N tumor spread; presence /absence of distant metastases (M); presence or absence of middle rectal artery (MRA)
3. Performed statistical analysis of the data

Results:

1)MRA was found in 30,3% (n=53) of all the patients with rectal cancer. 91,9% (n=34) of all the group of patients with lateral metastasis around internal iliac arteries and their branches, around obturatory artery, had MRA (fig.1).

2)Factors significantly associated with lateral metastasis were:

- Localization in the lower third;
- Mesorectal metastases;
- The presence of the middle rectal artery;
- Locally advanced T3-T4 tumors;
- Increase of CEA more than 3.5 ng / ml.

3) It was proposed a formula based on the logistic equation for estimating the risk of lateral metastasis (Ψ):

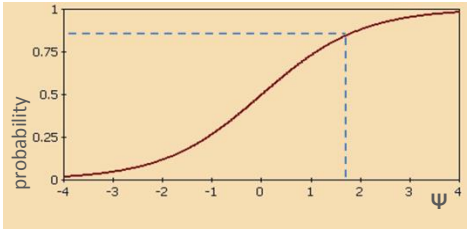
$$\Psi = A1*X1 + A2*X2 + A3*X3 + A4*X4 + A5*X5 + B$$

4) Regression coefficients for assessing the risk of lateral metastasis were as follows :

	Designation	Code for formula	Designation factor	Coefficient of equation
Tumor localization	X1	**1** – upper rectum **2** – middle rectum **3** – low rectum	A 1	22,69
The presence of the middle rectal artery	X4	**0** - no **1** - yes	A 4	26,03
T-category	X5	**1** - T1 **2** - T2 **3** - T3 **4** - T4	A5	1,10
Mesorectal metastases;	X2	**0** - no **1** - yes	A2	1,24
CEA	X3	**0** - < 3,5 **1** - ≥ 3,5	A3	21,23
Constant	B		B	- 94,85

Ψ for risk assessment: Ψ < -2,94 – the risk < 5 %
Ψ < 0 – the risk < 50%
Ψ > 0 – the risk > 50%
Ψ > 2,94 – the risk > 95%

5) We used a logistic curve to obtain the probability of lateral metastases :



The properties of the model:
Sensitivity = 91,9%;
Specificity = 97,8%;
Accuracy = 96,6%.

Conclusion:

1. MRA is a non-constant rectal vessel. There is a correlation between the presence of MRA and lateral lymph node metastasis ($p < 0,05$). Identification of MRA using radiological methods could be a prognostic factor of lareral metastasis in patients with rectal cancer.
2. The frequency of the lateral metastasis is significantly associated with the following factors: tumor localization, CEA, T-category, the presence of metastases in mesorectal lymph nodes , presence or absence of middle rectal artery
3. Visualization of MRA in patients with early rectal cancer of the rectum may be an indication for neoadjuvant treatment and, in some cases, be an indication for the extension of the volume of surgery.