

THE IMAGING OF RECTAL AND ANAL CANCERS

THE ROLE OF MRI IN MANAGMENT OF DISTAL GASTROINTESTINAL CANCERS

SHORT SUMMARY

The thesis consists of two independent researches.

RECTAL CANCER

Colorectal cancer is the most frequent malignant disease among both males and females worldwide. The treatment of rectum cancers changed a lot during the last decade. The multidisciplinary treatment is performed according to the tumor stage; therefore the accurate staging is important. The survival statistics in the last years indicated the necessity of new TNM staging system. The latest 7th UICC and 7th AJCC TNM classification brought a lot of modification with focusing on the prognostic factors. The imaging modalities, mainly the MRI is defining a lot of present and future available prognostic factors.

The aim of the study was to compare the MRI and pathological data of the following prognostic factors in rectal cancer as a) T and N stage, b) infiltration of perirectal tissue, c) infiltration of circumferential resection margin (CRM), d) infiltration of adjacent organs.

Our study shows the retrospective analysis of diagnostic imaging of the patients diagnosed and treated in the National Institute of Oncology.

869 patients with verified RC were analysed from 01.01.2008. to 31.12.2011. retrospectively.

In case of 418 patients beside the MRI scan the treatments were performed also in our institute. 451 patients did not have MRI scan before the treatment or the treatment was performed in another institute so they were excluded from the study. After baseline MRI scan the treatment was performed in our institute in 418 out of 869 patients. . The early stage (T1, T2) tumors which were with MRI node negative had surgery after the examination. In these early stage tumors the hystopathological stage was compared to the MR based local tumor status. The accuracy of MR was analysed in this early RC group regarding the T and N stage, the involvement of perirectal fatty tissue, and regarding the differentiation between T2/T3. The locally advanced (T3, T4 and/or N1-3, clinically stage II-III) RC patients received chemoradiotherapy (CRT).

The MRI scans were performed on a 1,5 T Magnetom Symphony (Siemens, Erlangen, Germany), and phased array coils were used. For the pelvis axial T1 and T2 weighted images and also STIR sequences were done with large field of view (FOV) and slice thickness of 5mm. For the tumor thin slice T2w sequences sequences with small FOV were performed with HR technique. After this iv. Gd based contrast agent was administered and 3D T1 weighted fat suppressed images were acquired.

The locally advanced RC patients received chemoradiotherapy (CRT). The histopathological and the radiological stage of the treated tumors were compared in 134 patients out of 141. The lack of appropriate histopathological report, 7 patients were excluded.

In our study, among the patients received ChT, in 83% (110 patients) T3 tumor, in 18% (24 patients) T4 tumor was found. In 84 out of 134 patients the tumor showed size-reduction, in 22 patients (16.4%) could be achieved by the applied therapy. In 1 patient (0.75%) complete regression was detected by the MR examination. 122 patients out of 134 had the tumor in the T3/T4 stadium after the applied therapy.

Comparing the MRI findings with the histological results the MRI result was the same in 62.6% predicting the T stage, the accuracy was mildly decreased, 66.4%. In 31% of the cases the MRI showed the tumor more extended as it was reported in the histological results. Despite the sensitivity of the MR experiment in determining the T stadium was high, 96.7%, the specificity was quite low, 67.9%.

The accuracy of the restaging MRI determining the invasion of the tumor to the perirectal fat tissue was 73.6%. The MRI determined the perirectal fat invasion correctly in 81 patients out of 134. The sensitivity was high 98.3%, the specificity was low (41.7%), whereas the positive predictive value was moderate. The NPV was 95.5%.

In determining CRM involvement the accuracy of the yMRI examination, correlated with the histological results was 81%, the sensitivity was 100%. The specificity was 59%, the positive predictive value was 70.9%. The negative predictive value was 100%.

Detection of infiltration of adjacent organs the yMRI accuracy was 100%.

The accuracy in determining the lymph node state after CRT is quite moderate, 67.2%.

In our MR examinations the position of the tumor inside the intestinal wall, the invasion of the tumor to the adjacent fat tissue, the lack of infiltration of the perirectal fascia, or the infiltration of the adjacent organs could safely determined. After CRT it has a prognostic value to determine the tumors localized in the intestinal wall, because the complete responders, who had down-staging or tumor regression, has a better disease-free survival and better local control, than those, who did not respond to chemotherapy.

The MRI provides high resolution, multilane information. With MRI the stage of disease could be estimated very accurately, and the patients who are eligible for neoadjuvant chemotherapy could be selected. The MRI is the best method to assess the preoperative therapy efficiency, and it is very important to monitor the down-staging which is crucial in planning the further therapy. The MRI could assess with high reliability the involvement of the CRM, which is the border of the TME. The MRI provides information about the involvement of the adjacent structures, and because of that

about the necessity of the extended surgery, to avoid the most frequent cause of the local recurrence, the positive resection margin.

ANAL CANCER

The MRI is of great importance in the assessment and in the therapy of AC. The MRI provides high resolution, and because of that an informative method in planning the irradiation therapy.

In case of AC the aim of study was:

1. To define the role of MRI
 - a) in the evaluation of tumor staging
 - b) after therapy of anal cancer
2. To define the main features of tumor signal intensity and volumetry before and after the CRT
3. To compare the clinical and MRI data of AC
4. To find relation between disease free survival (DFS) and AC patients gender, age, T and N stage of tumor before and after CRT
5. To compare the primary AC and relapsed tumor and nodal stage
6. To establish a Hungarian data base of AC adequate for analytical and educational purposes and, to collect clinico-pathological data on long term follow-up in order to find scientific answers to the questions of etiology, pathology and clinical behavior. To join with International Rare Cancers Data Base.

67 patients with histologically verified AC were analyzed retrospectively in our Institute between 2006 and 2012. All patients had a primary staging examination. 39 patients out of 67 had follow-up scans besides primary staging. To assess the distant metastases CT was performed.

The 67 patients were treated with CRT.

The MRI is the adequate method to assess the efficiency of the therapy, and to assess the residual tumor. The MRI scans after the therapy is the baseline scan to the further follow-up scans. The baseline scan is of great help in assessing the possible tumor recurrence, and the possible metastases, and the possible secondary primary tumors, and because of that the life expectancy of the patients greatly improves.

Recently the MRI is not widely applied in the diagnosis and in the treatment of the anal carcinomas, the treatment and the follow-up relies mainly on the clinical examinations. Defining the local tumor and lymph node state has an increasing role with the wide application of the personal, intensity modulated RT. The information of the MR examination enables a more precise RT planning, which affects the outcome of the disease.