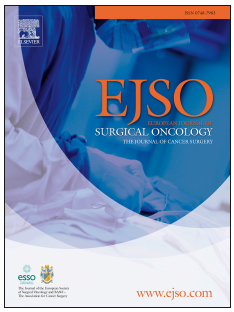
# Accepted Manuscript




Diffusion-weighted magnetic resonance imaging in locally advanced rectal cancer treated with neoadjuvant chemoradiotherapy

De Felice Francesca, Magnante Anna Lisa, Musio Daniela, Ciolina Maria, De Cecco Carlo Nicola, Rengo Marco, Laghi Andrea, Tombolini Vincenzo

PII: S0748-7983(17)30421-3

DOI: 10.1016/j.ejso.2017.03.010

Reference: YEJSO 4621

To appear in: *European Journal of Surgical Oncology*

Received Date: 25 January 2017

Revised Date: 9 March 2017

Accepted Date: 15 March 2017

Please cite this article as: Francesca DF, Lisa MA, Daniela M, Maria C, Carlo Nicola DC, Marco R, Andrea L, Vincenzo T, Diffusion-weighted magnetic resonance imaging in locally advanced rectal cancer treated with neoadjuvant chemoradiotherapy, *European Journal of Surgical Oncology* (2017), doi: 10.1016/j.ejso.2017.03.010.

# Diffusion-weighted magnetic resonance imaging in locally advanced rectal cancer treated with neoadjuvant chemoradiotherapy

De Felice Francesca[1], Magnante Anna Lisa[1], Musio Daniela[1], Ciolina Maria[2], De Cecco Carlo Nicola[2], Rengo Marco[2], Laghi Andrea[2] , Tombolini Vincenzo[1,3]
[1]Department of Radiotherapy, Policlinico Umberto I "Sapienza" University of Rome, Rome, Italy
[2]Department of Radiological Sciences, Oncology and Pathology Policlinico Umberto I "Sapienza" University of Rome - Polo Pontino, Latina - Italy
[3]Spencer-Lorillard Foundation Rome

Correspondence to:
Francesca De Felice
Department of Radiotherapy, Policlinico Umberto I "Sapienza" University of Rome,
Viale Regina Elena 326, 00161 Rome, Italy
Phone: +390649973411
Fax: +390649973411
e-mail fradefelice@hotmail.it

**Abstract**
*Purpose.* To analyze diffusion-weighted magnetic resonance imaging (DW-MRI) for treatment response assessment in locally advanced rectal cancer (LARC).
*Patients and methods.* Patients with histologically proven rectal adenocarcinoma, stage II-III disease, were enrolled and underwent surgery following neoadjuvant chemoradiotherapy (nCRT). All patients were referred for a DW-MRI protocol on a 3 Tesla MR-system, consisting of axial T2- weighted and DWI sequences prior (I), during (II) and after (III) nCRT. Corresponding apparent diffusion coefficient (ADC) values were calculated.
*Results.* Between February 2011 and June 2015, 37 patients participated in the study. All patients completed programmed treatment. Overall, 11 patients (29.7%) had pathologic complete response (pCR). No correlation between the mean pre- (ADC-I), during (ADC-II), post- (ADC-III) ADC and the reduction in tumor size after nCRT was recorded. No substantial difference in the ADC distribution was found between pCR and no-pCR patients. The ADC-II level significantly increased in the pCR cases ($T= 1.675$; $p < 0.05$).
*Conclusion.* ADC value could be useful for discriminating between the pCR patients and the no-pCR patients. Further studies are necessary to identify the optimal MRI parameters combination to predict tumor response to nCRT. It is hoped that these data will provide the basis for a more solid scientific evidence.

**Keywords:** rectal cancer; chemoradiotherapy; neoadjuvant treatment; diffusion-weighted; ADC; magnetic resonance imaging.