MACHINE LEARNING TO IMPLEMENT THE ACCURACY OF MAGNETIC RESONANCE IMAGING (MRI) IN THE DETECTION OF LYMPH NODE METASTASIS IN PATIENTS WITH LOCALLY ADVANCED CERVICAL CANCER TREATED WITH NEOADJUVANT CHEMOTHERAPY

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Introduction/Background Concurrent cisplatin-based chemotherapy and radiotherapy plus brachytherapy is standard treatment for locally advanced cervical cancer (LACC). Platinum-based neoadjuvant chemotherapy (NACT) followed by radical hysterectomy is an alternative approach reserves for patients with stage IB2-IIIB disease. Therefore the correct pre-treatment staging is essential to the proper management of this disease. Pelvic magnetic resonance imaging (MRI) is the gold standard examination but studies about MRI accuracy in the detection of lymph node metastasis in LACC patients show conflicting data. Machine learning (ML) is emerging as a promising tool for unraveling complex non-linear relationships between patient attributes that cannot be solved by traditional statistical methods. Here we investigated whether ML might improve the accuracy of MRI in the detection of lymph node metastasis in LACC patients.

Methodology We analyzed retrospectively LACC patients who underwent NACT and radical hysterectomy from 2014 to 2020. Demographic, clinical and MRI characteristics before and after NACT were collected, as well as information about exclusion criteria were applied, 5 articles were included, A total of 104 articles were found. After the inclusion criteria were prospective or retrospective studies in English or Spanish comparing whole-body MRI findings grouped into zones according to the peritoneal carcinomatosis index (PCI) with operative findings at laparotomy and/or histology. Sensitivity and specificity for the detection of peritoneal disease by whole-body MRI, as well as post-test probabilities and ROC curve in each zone were calculated. A QUADAS-2 was performed for quality-of-evidence analysis and risk of bias. Heterogeneity was calculated through Cochrane’s Q and I2.

Results A total of 104 articles were found. After the inclusion and exclusion criteria were applied, 5 articles were included, with 275 women with suspected ovarian cancer being assessed through whole-body MRI. Specificity was greater than 75% in all anatomical areas and sensitivity less than 75% in all areas, except in areas PCI 0 86% (95% CI, 76–92%), PCI 1 75% (95% CI, 68–81%), PCI 4 80% (95% CI, 54–93%), PCI 6 86% (95% CI, 63–95%). PCI areas 5 and 7 were not evaluated because there were insufficient data in the articles reviewed.

Conclusion Whole body MRI has a high specificity to exclude the presence of peritoneal carcinomatosis in all areas of the PCI while the sensitivity varies depending on the area, being high in the center of the abdomen (PCI 0), right hypochondrium (PCI 1), left flank (PCI 4) and pelvis (PCI 6).