



Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/16233

DOI URL: <http://dx.doi.org/10.21474/IJAR01/16233>



RESEARCH ARTICLE

EVALUATION OF THE PERFORMANCE OF MAGNETIC RESONANCE IMAGING IN THE EXPLORATION OF THE LOCOREGIONAL EXTENSION OF ENDOMETRIALCANCER: ABOUT 42 CASES

H. Bouhia, H. Benmessaoud, H. Ahmut, F. Babaouyoub, A. Lachger, S. ElMajjaoui, H. ElKacemi, T.
Kebdani, K. Hassouni and N. Benjaafar

Department of Radiotherapy, National Institute of Oncology, University Mohammed V of Rabat, Morocco.

Manuscript Info

Manuscript History

Received: 10 December 2022

Final Accepted: 14 January 2023

Published: February 2023

Abstract

Introduction and purpose of the study : Endometrial cancer is the third most common gynaecological cancer in Morocco; its therapeutic management depends on a precise staging of radiological (myometrial invasion, cervical and ganglionic involvement) and histological (histological type and degree of differentiation) initial workup. This pre-treatment evaluation may over or under treat patients, hence the aim of this work which will evaluate the contribution of magnetic resonance imaging in assessing myometrial invasion and lymph node involvement.

Materials and Methods: This is a single-centre retrospective study of a series of patients operated for endometrial cancer who underwent preoperative pelvic MRI in our Institute between January 1, 2014 and January 1, 2018. MRI data were collected from initial reports and compared with postoperative histological data.

Results and statistical analysis: 42 patients were included. Deep myometrial infiltration was found in 21 patients on MRI versus 25 patients on histology, with a sensitivity of 64% and specificity of 70.58%; a positive predictive value of 76.19% and a negative predictive value of 57.14%. Pelvic and/or lombo-aortic adenopathies were found in 11 patients on MRI compared to 6 patients on Histology with a sensitivity of 66.66% and specificity of 81.57%, a positive predictive value of 36.36% and a negative predictive value of 93.93%.

Conclusion: According to our study, MRI is not sufficiently accurate to detect the percentage of myometrial invasion and to identify the lymph node status.

Copy Right, IJAR, 2023,. All rights reserved.

Introduction:-

Pelvic MRI(Magnetic Resonance Imaging)is the key examination in the preoperative locoregional extension assessment of endometrial cancer, as the clinical examination does not allow exploration of the degree of myometrial invasion or regional lymph node extension.

Corresponding Author:- H. Bouhia

Address:- Department of Radiotherapy, National Institute of Oncology, University Mohammed V of Rabat, Morocco.

It therefore makes it possible to orientate the surgical management and complementary procedures (lymph node dissection), thus avoiding postoperative complications frequently observed in patients often presenting associated comorbidities.

The aim of our study was to retrospectively evaluate the performance of preoperative locoregional assessment in endometrial cancer; in this case pelvic MRI in determining the degree of myometrial invasion and regional lymph node involvement.

Materials And Methods:-

Patient Selection and Methodology :

This is a single-centre retrospective study of a series of patients operated on for endometrial cancer who underwent preoperative pelvic MRI in our Institute between January 1, 2014 and January 1, 2018.

Patients who had neoadjuvant chemotherapy; did not have a definitive pathology result, or whose pathology result was not consistent with WHO(World Health Organization) Type I or II endometrial carcinoma were excluded.

Epidemiological and clinical data of the patients as well as MRI data and pathological findings of the surgical specimen were collected from the initial MRI reports and then compared with postoperative histological data with interest in the degree of myometrial invasion (superficial: <50% of myometrial thickness, or deep: > or =50%), and the presence of pelvic and/or lombo-aortic lymph node involvement.

The approach and surgical procedure as well as additional procedures were collected from the operative reports

The diagnosis of endometrial cancer was retained by anatomopathological analysis of the preoperative histological work-up made by biopsy or biopsy curettage of the endometrium, supplemented by the radiological work-up made by pelvic MRI objectifying the locoregional extension, thus allowing a provisional staging of the cancer.

Pathological examination of the surgical specimen allowed the initial histological diagnosis to be confirmed or affirmed and the disease to be staged according to the FIGO 2009 classification.

Statistical analysis :

Data concerning patient (age; menopausal status; pathological history; reason for consultation); histological type; percentage of myometrial invasion and presence of pelvic and/or lombo-aortic adenopathy according to MRI and data from the analysis of the surgical specimen were entered, coded and analysed on an Excel file.

MRI data and pathological findings of the surgical specimen were collected from the initial MRI reports and then compared with postoperative histological data with interest in the degree of myometrial invasion (superficial: <50% of myometrial thickness, or deep: > or =50%), and the presence of pelvic and/or lombo-aortic lymph node involvement.

The sensitivity, specificity, positive and negative predictive values of MRI in relation to the results of the pathological analysis of the final surgical specimen were performed manually.

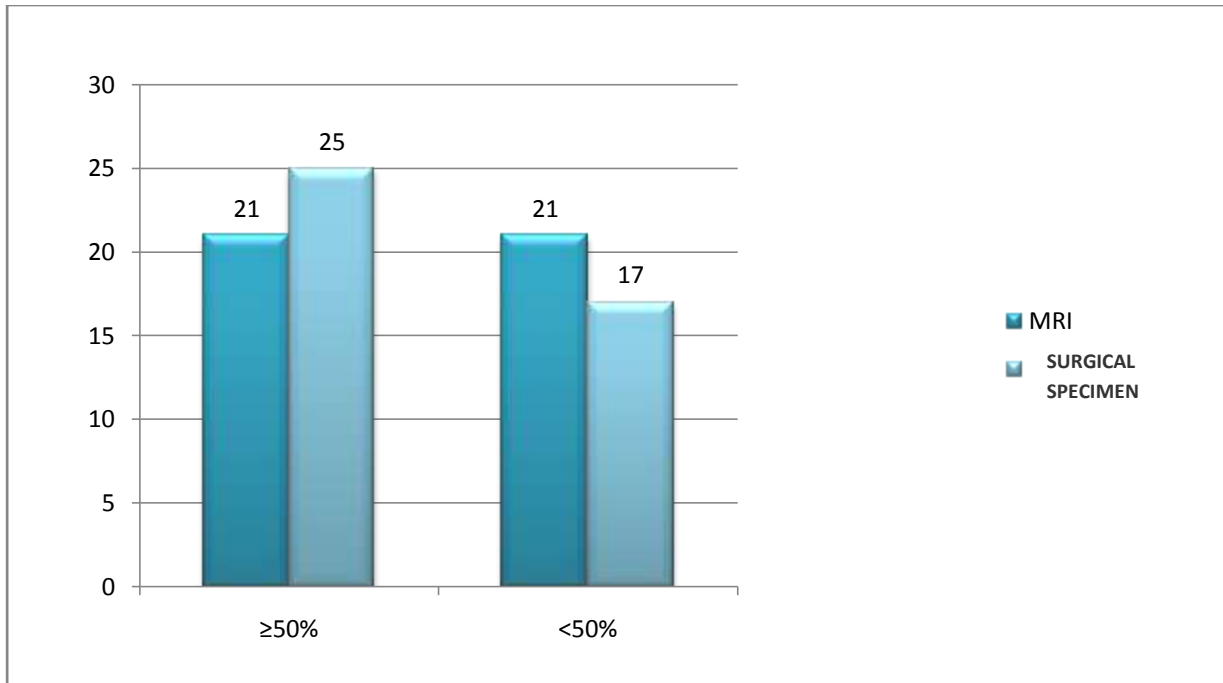
Results:-

Interpretation of results :

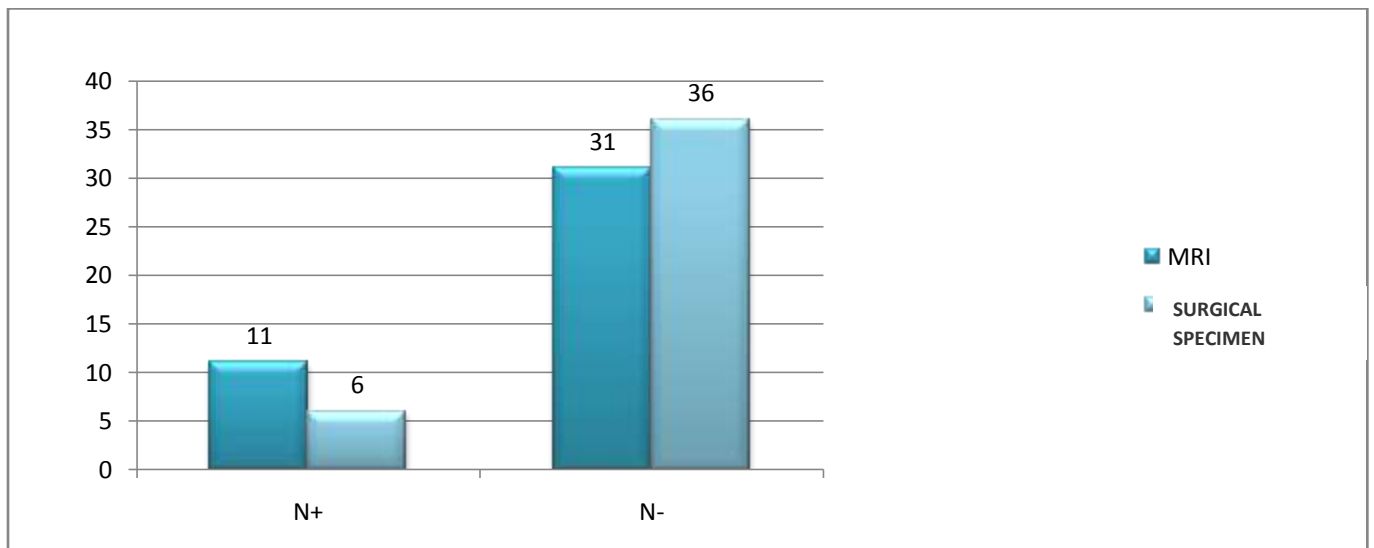
42 patients were included.

Deep myometrial infiltration was found in 21 patients on MRI compared to 25 patients on histology, with a sensitivity of 64% and specificity of 70.58%; a positive predictive value of 76.19% and a negative predictive value of 57.14% (Graph 1; Table 1).

Pelvic and/or lombo-aortic lymph node involvement were found in 11 patients on MRI compared to 6 patients on histology with a sensitivity of 66.66% and a specificity of 81.57%, a positive predictive value of 36.36% and a negative predictive value of 93.93% (Graph 2, Table 1).



Graph 1:- Degree of myometrial infiltration on MRI and on the surgical specimen.



Graph 2:- Pelvic and/or lomboarctic lymph node involvement on MRI and on the surgical specimen.

	Sensitivity	specificity	PPV	NPV
Myometrial invasion	64%	70,58%	76,19%	57,14%
Presence of pelvic ADP* and /or LA** ADP	66,66%	81,57%	36,36%	93,93%

Table 1:- MRI performance in the evaluation of myometrial infiltration and lymph node involvement in endometrial cancer.

PPV : positive predictive value.

NPV : negative predictive value.

* Adenopathy** lomboarctic.

Discussion:-

Optimal therapeutic management of endometrial cancer is based on precise preoperative staging in terms of radiology (myometrial invasion, cervical and lymph node involvement), and histology (histological type and degree of differentiation).

Several imaging tools are used to assess tumour extension with variable diagnostic performance ranging from pelvic ultrasound to FDG-Pet scans [1-2].

Currently, MRI remains the examination of choice for locoregional exploration of endometrial cancer and therefore guides optimal treatment [3,4].

Myometrial invasion :

The depth of myometrial invasion and the histopronostic grade remain independent risk factors for lymph node metastasis. However, the greater the myometrial invasion, the greater the risk of pelvic and aortic lymph node involvement [5].

On MRI, the invasion of the myometrium is visualised in T2-weighted sequences, as the endometrial cancer has an intermediate T2 signal (interruption of the hypointense junctional zone).

The sensitivity and specificity of MRI for myometrial invasion is highly variable according to a 2015 meta-analysis of 50 studies (variable sensitivity of 33.3% and 99.1% with an overall estimated sensitivity of 80.7%) [6, 1, 7,8 ,9].

The menopause, the presence of polyps, fibroids, adenomyosis, intra-cavity haemorrhage, suspicion of involvement of a horn of the uterus, distension of the uterine cavity with thinning of the junctional myometrium are responsible for poor visibility of the junctional zone and constitute the sources of error classically found in the literature.

Indeed, in postmenopausal women the myometrium and the junctional zone atrophy, making it difficult to assess myometrial invasion [10].

In addition, the assessment of myometrial invasion at the uterine horns is difficult due to the progressive thinning of the myometrium at this level [11].

In addition, the presence of myomas; a polyploid form of cancer; can cause distension of the uterine cavity and thinning of the myometrium and thus make it difficult to assess myometrial invasion [12].

In our series: Deep myometrial infiltration was found in 21 patients on MRI versus 25 patients on histology, with a sensitivity of 64% and a specificity of 70.58%; a positive predictive value of 76.19% and a negative predictive value of 57.14%.

Lymph node involvement :

The criteria for suspicion of pelvic adenopathy on MRI are: increased lymph node size, irregularity of contours, loss of oval axis and heterogeneous central signal.

The performance of MRI in detecting lymph node involvement is variable according to the meta-analysis of Luomaranta et al.

Indeed, the sensitivity of MRI ranged from 17.0% to 70.6% with an estimated overall sensitivity of 43.5%.

In the study by Antonsen SL et al comparing the performance of MRI and FDG-Pet scan in detecting lymph node involvement in endometrial cancer; the sensitivity of MRI and FDG-Pet scan was (58.8% VS 74.2%) and specificity (92.8% VS 92.8%) [13].

These data conclude that both techniques have good specificity but low sensitivity for the detection of lymph node involvement.

Thus, lymph node dissection remains the essential technique for detecting lymph node involvement, especially for patients at risk.

However, a new validated technique is used in endometrial cancer: the sentinel node technique [14, 15].

In our series, consistent with the literature, pelvic and/or lumboaortic adenopathy was found in 11 patients on MRI compared to 6 patients on histology with a sensitivity of 66.66% and specificity of 81.57%, a positive predictive value of 36.36% and a negative predictive value of 93.93%.

Limitations:

Several limitations were encountered in our study.

Indeed, this is a retrospective monocentric study involving only 42 patients over a short period of time with all the resulting biases.

Most patients had low risk endometrial adenocarcinoma. Indeed, myometrial invasion and lymph node involvement correlates with the histopronostic type and grade and the performance of MRI may therefore be poor.

In addition; MRI scans were performed in different radiology centres with different machines and interpreted by different radiologists sometimes not specialised in gynaecological imaging without double reading or systematic rereading responsible for inter-examination and inter-observer variability.

Conclusion:-

According to our study, MRI is considered to have insufficient sensitivity in the evaluation of myometrial invasion and lymph node involvement, but MRI has a high specificity and negative predictive value in the absence of lymph node involvement.

These results are in line with the data in the literature, hence the interest of other tools which are currently being evaluated (3D ultrasound; FDG-pet scan; sentinel lymph node technique) to ensure optimal management of our patients.

Reference:-

- [1] Rossard L, Rua C, Duquesne M, Vilde' A, Marret H, Body G, et al. Relevance of imaging in preoperative evaluation of patients with endometrial cancer. *Gynecol Obstet Fertil* 2013; 41(11):641-7.
- [2] Antonsen SL, Jensen LN, Loft A, Berthelsen AK, Costa J, Tabor A, et al. MRI, PET/CT and ultrasound in the preoperative staging of endometrial cancer - A multicenter prospective comparative study. *Gynecol Oncol* 2013;128(2):300-8.
- [3] Endometrial cancer, collection Recommendations et référentiels. Boulogne Billancourt: Collective work published by InCa; 2010.
- [4] Baekelandt MM, Castiglione M. Endometrial carcinoma: ESMO Clinical Recommendations for diagnosis, treatment and follow-up. *Ann Oncol* 2009;20(Suppl. 4):iv29-31.
- [5] GOG 210 report, Cresman et al, 2017.
- [6] Luomaranta A, Leminen A, Loukovaara M. Magnetic resonance imaging in the assessment of high-risk features of endometrial carcinoma: a meta-analysis. *Int J Gynecol Cancer* 2015;25(5):837-42
- [7] Andreano A, Rechichi G, Rebora P, Sironi S, Valsecchi MG, Galimberti S. MR diffusion imaging for preoperative staging of myometrial invasion in patients with endometrial cancer: a systematic review and meta-analysis. *Eur Radiol* 2014;24(6):1327-38
- [8] Ortashi O, Jain S, Emmanuel O, Henry R, Wood A, Evans J. Evaluation of the sensitivity, specificity, positive and negative predictive values of preoperative magnetic resonance imaging for staging endometrial cancer.
- [9] Shrivastava S, Barmon D, Katakai A, Deka P, Sharma J, Choudhary B, et al. Magnetic resonance imaging in pre-operative staging of endometrial cancer. *Indian J Cancer* 2016;53(1):181.
- [10] Manfredi R, Mirk P, Maresca G, Margariti PA, Testa A, Zannoni GF, et al. Local regional staging of endometrial carcinoma: role of MR imaging in surgical planning. *Radiology* 2004;231(2):372-8
- [11] Kinkel K. Pitfalls in staging uterine neoplasm with imaging: a review. *Abdom Imaging* 2006;31(2):164-73.

- [12] Beddy P, O'Neill AC, Yamamoto AK, Addley HC, Reinhold C, Sala E. FIGO staging system for endometrial cancer: added benefits of MR imaging. *RadioGraphics* 2011;32(1):241–54
- [13] Antonsen SL, Jensen LN, Loft A, Berthelsen AK, Costa J, Tabor A, et al. MRI, PET/CT and ultrasound in the preoperative staging of endometrial cancer - A multicenter prospective comparative study. *Gynecol Oncol* 2013;128(2):300-8.
- [14] Ballester M, Dubernard G, Le' curu F, Heitz D, Mathevet P, Marret H, et al. Detection rate and diagnostic accuracy of sentinel-node biopsy in early stage endometrial cancer: a prospective multicentre study (SENTI-ENDO). *Lancet Oncol* 2011;12(5):469-76.
- [15] Holloway RW, Abu-Rustum NR, Backes FJ, Boggess JF, Gotlieb WH, Jeffrey Lowery W, et al. Sentinel lymph node mapping and staging in endometrial cancer: a Society of Gynecologic Oncology literature review with consensus recommendations. *Gynecol Oncol* 2017;146(2):405-15.