European Journal of Gynaecological Oncology

IMR Press

Original Research

High diagnostic value of 18F-FDG PET/CT in detecting endometrial cancer in patients with precancerous endometrial lesions

Jessica Ruel-Laliberté[1,*], Paul Bessette[1], Éric Turcotte[2], Ophélie Belissant[2], Korine Lapointe-Milot[1]

[1] *Department of Obstetrics & Gynecology, Division of Gynaecologic Oncology, Université de Sherbrooke, Sherbrooke, QC J1H 5N4, Canada*

[2] *Department of Nuclear Medicine, Université de Sherbrooke, Sherbrooke, QC J1H 5N4, Canada*

*Correspondence: jessica.ruel-laliberte@usherbrooke.ca (Jessica Ruel-Laliberté)

DOI:10.31083/j.ejgo4206165

Submitted: 30 September 2021 Revised: 18 October 2021 Accepted: 25 October 2021 Published: 15 December 2021

Objective: Up to 60% of patients with a precancerous endometrial lesion will ultimately be diagnosed with endometrial carcinoma. In the context of endometrial carcinoma, adequate surgical staging—including lymph-node assessment—should be performed and dictate the necessity of postoperative adjuvant treatments. Our main objective was to evaluate the diagnostic performance of preoperative Positron Emission Tomography-Computed Tomography (PET/CT) in identifying concomitant endometrial cancer in patients with confirmed precancerous endometrial lesions. *Methods*: All women diagnosed with a precancerous lesion between 2010 and 2018 in our center were included in this retrospective cohort study. Patients were then divided into groups according to whether or not a PET/CT was performed preoperatively and the presence of endometrial carcinoma at the final pathology. *Results*: A total of 128 patients met the inclusion criteria, of which 66 underwent PET/CT. The sensitivity of PET/CT in identifying carcinoma was 78.3%, with a specificity of 79.1%. PET/CT failed to identify carcinoma in 5 out of 66 patients (7.6%). In the PET/CT group, 18 of 23 patients (78.3%) had adequate surgical staging, compared to only 4 of 31 patients (12.9%) in the standard group ($p < 0.00001$). *Conclusion*: Preoperative PET/CT reliably predicted the presence of endometrial carcinoma in women with precancerous endometrial lesions. Future trials should explore the value of adding PET/CT in the preoperative investigation of these patients to identify women who may be offered sentinel-lymph node mapping.

Keywords

Endometrial cancer; Precancerous endometrial lesions; Endometrial hyperplasia; Surgical staging; Lymphadenectomy; Endometrial intraepithelial neoplasia

1. Introduction

Endometrial cancer is the most frequently diagnosed gynecologic malignancy worldwide and the fifth most common cancer among women [1]. Due to abnormal uterine bleeding, most endometrial cancers are identified in early stages [2]. Up to 15% of cases of early-stage disease, however, present pelvic-lymph node metastases with or without para-aortic lymph-node metastases [3]. In 1988, the International Federation of Gynecology and Obstetrics (FIGO) changed endometrial-cancer staging from clinical to surgical-pathological classification, as it better correlates with disease spread, prognosis, and need for adjuvant therapy [4]. The need for adjuvant therapy rely primarily on stage of disease. Presence of metastasis to pelvic lymph changes the stage of the disease, therefore some experts advocate for systematic bilateral pelvic lymphadenectomy as part of adequate surgical management [5]. Others have argued in favor of not practicing lymphadenectomy in grade 1 endometrial cancer and basing postoperative management on high-risk features of uterine lesions such as tumor size, myometrial invasion, and lymphovascular invasion [6]. In contrast, a decision based on high-risk uterine lesions but with unknown nodal involvement has been shown to lead up to 30% of discrepancy in postoperative adjuvant-therapy recommendations [7]. Recently, sentinel lymph-node mapping has emerged as an alternative to standard of care (complete lymphadenectomy) since it has a high detection rate of metastasis and a lower risk of complications [8–10].

Up to 60% of women presenting precancerous endometrial lesions known as atypical hyperplasia (AH) or endometrial intraepithelial neoplasia (EIN) have an undiagnosed coexistent endometrial cancer [11, 12]. Since intraoperative frozen section pathology for detection of invasive disease has poor reliability and since several authors have demonstrated that hysterectomy in women with EIN may result in inadequate surgical management, some have argued to add pelvic lymphadenectomy to standard surgical management in patients with AH or EIN [13–18]. Preoperative identification of concomitant malignancies would allow for optimal surgical staging in these patients, while avoiding unnecessary lymphadenectomy in patients who do not have concurrent cancer.

Positron Emission Tomography-Computed Tomography (PET/CT) is a diagnostic tool gaining widespread popularity in investigating and managing endometrial-cancer patients, particularly in preoperative assessment of lymph-node metastases and assessment of endometrial-cancer recurrence [19]. Kakhki *et al.* [20] and Boonya-Ussadorn *et al.* [21] measured the sensitivity of PET/CT in predicting primary

endometrial tumors. They reported a sensitivity of 81.8% and 93.9%, respectively, compared to final pathological findings. Kitajima *et al.* [22] reported an association between a high ($\geq$12.7 g/mL) SUVmax (maximum standardized uptake value) of an endometrial lesion and the risk of recurrence and lymph node involvement. Little evidence is available regarding the use of PET/CT in endometrial precancerous lesions [23, 24]. We hypothesized that PET/CT is a sensitive, accurate tool in diagnosing coexistent malignancies in patients with premalignant endometrial lesions and, hence, allows for optimal surgical management.

2. Methods

2.1 Objectives

The main objective of this study was to evaluate the diagnostic performance of preoperative PET/CT in identifying coexistent endometrial cancer in patients with precancerous endometrial lesions. Secondary objectives are to measure the proportion of patients who have had adequate surgical staging according to the preoperative investigation (PET/CT or no PET/CT) correlated with final pathology. In this paper, adequate surgical staging includes assessment of lymph node status for patients with concomitant endometrial cancer. In addition, the occurrence of complications related to lymphadenectomy (conversion to laparotomy, trauma, increased blood loss, duration of surgery, and length of hospital stay) as well as the need for additional treatments (second surgery, adjuvant chemotherapy, external-beam radiotherapy, brachytherapy) are reviewed.

2.2 Population

All women diagnosed with a precancerous lesion (endometrial intraepithelial neoplasia [EIN] and atypical endometrial hyperplasia [AH])—confirmed by endometrial biopsy who had surgery in the year following the biopsy between 2010 and 2018 at the *Centre Hospitalier Universitaire de Sherbrooke*-an academic tertiary care center—were included. Women under 18 years of age at the time of surgery, carriers of another synchronous endometrial pathology, Lynch syndrome carriers, or those who were initially managed conservatively, as for fertility preservation, were excluded. In order to meet our primary objective, patients were then divided into groups according to whether or not a PET/CT was performed preoperatively and the presence of endometrial carcinoma at the final pathology. In order to meet our secondary objectives, patients were divided into groups according to whether or not they had preoperative PET/CT and if they had adequate surgical staging.

2.3 Intervention

Due to variations in practice between gynecologists at our center, some gynecologists order preoperative PET/CT for all their patients with precancerous endometrial lesions because they think that PET/CT is an accurate tool in diagnosing coexistent malignancies in patients with premalignant endometrial lesions and, hence, allows for optimal surgical management. PET/CT was performed using 18F fluorodeoxyglucose (18F-FDG) as per the standard clinical protocol. For the current study, the same nuclear-medicine physician (O.B.), not aware of final pathological results, interpreted all PET/CT.

2.4 Data collection and variables

Medical records were reviewed and a database of all demographics (clinical and pathological information) was created with Microsoft Excel 2019 (Mac Office 2019 version 16.52, Microsoft Corporation, California, USA). For the purpose of our study, the following data were retrieved from the database: (1) endometrial biopsy and surgical pathological results, grade, histology, and stage of disease; (2) preoperative information, including age, body mass index (BMI), and risk factors for endometrial malignancy; (3) intraoperative information, including type of surgery, staging procedure, estimated blood loss, length of surgery, and surgical complications; and (4) postoperative information, including length of hospital stay, need for adjuvant therapies or second surgery, recurrence, and cancer-related mortality.

2.5 Statistical analysis

Statistical evaluation was performed with nQuery advisor (Version IV, GraphPad Software DBA Statistical Solutions, California, USA) and Microsoft Excel 2019 softwares (Mac Office 2019 version 16.52, Microsoft Corporation, California, USA). Univariate analyzes were used to describe the characteristics of the population in each group (with a 95% confidence interval [CI]). Descriptive statistical analyzes were performed to assess diagnostic performance, including determination of sensibility, specificity, and positive and negative predictive values. Outcomes related to the diagnosis of endometrial cancer were compared between groups in which patients did or did not undergo PET/CT preoperatively using the chi-square test or Fisher's exact test for dichotomous values and Student's *t*-test for continuous variables. Probability levels (*p*-value) below 0.05 were considered statistically significant.

2.6 Methodological standards

Research ethics board approval was obtained for this retrospective cohort study. We estimated that preoperative PET/CT in patients with precancerous endometrial lesions would detect at least 75% of concomitant carcinomas.

3. Results

3.1 Patients

A total of 128 patients met the inclusion criteria between January 1, 2010, and December 31, 2018. The population consisted of 66 patients who had a PET/CT in the preoperative period and 62 patients in the standard group (no PET/CT). Groups were comparable for baseline characteristics, including age, previous use of hormone replacement therapy, and parity (Table 1). In the PET/CT group, 34.8% presented with carcinoma at final pathology compared to 50.0% in the standard group ($p = 0.107$). Stages were as follows: 45 IA, 4 IB, 3 II, and 2 IIIC1.

Table 1. Baseline characteristics*.

Baseline characteristics	PET/CT	Standard	Total	*p*-value
	n = 66	n = 62	n = 128	
Demographics				
Age (years) Median (IQR 25–75)	60.5 (55.0–67.0)	53.0 (57.0–63.0)		0.095
Body Mass Index (BMI)	39.1 (29.6–44.9)	31.6 (25.1–40.1)		0.009
Diabetes mellitus	19 (28.8)	10 (16.1)	29 (22.7)	0.096
Previous hormone replacement therapy	9 (13.6)	10 (16.4)	19 (15.0)	0.804
Parity				
Median (IQR 25–75)	2 (0–2)	2 (1–2)		0.784
0	18	12	30	
1	12	9	21	
2	22	27	49	
3	9	7	16	
4	3	4	7	
5 and more	2	1	3	
Endometrial biopsy				$p < 0.001$
Endometrial Intraepithelial Neoplasia (EIN)	49 (74.3)	21 (33.9)	70 (54.7)	
Atypical Endometrial Hyperplasia	15 (22.7)	37 (59.7)	52 (40.6)	
Can't exclude EIN	2 (3.0)	4 (6.4)	6 (4.7)	
Final pathology				
Endometrial carcinoma	23 (34.8)	31 (50.0)	54 (42.2)	0.107
Histology				$p < 0.001$
Endometriod	23 (35.4)	30 (48.4)	53 (41.7)	
Mixed	0	1 (1.6)	1 (0.8)	
EIN	29 (44.6)	8 (12.9)	37 (29.1)	
Atypical Endometrial Hyperplasia	6 (9.2)	9 (14.5)	15 (11.8)	
Benign	7 (10.8)	14 (22.6)	21 (16.5)	
Grade	n = 23	n = 31		0.05
1	22 (95.7)	22 (71)	44 (81.5)	
2	1 (4.3)	7 (22.6)	8 (14.8)	
3	0	2 (6.5)	2 (3.7)	
FIGO staging	n = 23	n = 31		0.919
1A	20 (87.0)	25 (80.6)	45 (83.3)	
1B	1 (4.3)	3 (9.7)	4 (7.4)	
2	1 (4.3)	2 (6.5)	3 (5.6)	
3C1	1 (4.3)	1 (3.2)	2 (3.7)	
Myometrial invasion	n = 23	n = 31		0.223
Absence of myometrial invasion	6 (26.1)	11 (35.5)	17 (31.5)	
$<$50%	16 (69.6)	15 (48.4)	31 (57.4)	
$\geq$50%	1 (4.3)	5 (16.1)	6 (11.1)	
Lymphovascular invasion (LVI)	n = 23	n = 30		1.000
Presence of LVI	3 (13.0)	3 (10.0)	6 (11.3)	
Lymph nodes	n = 66	n = 62		
Positive	3 (4.5)	1 (1.6)	4 (3.1)	
Negative	19 (28.8)	3 (4.8)	22 (17.2)	
Not assessed	44 (66.7)	58 (93.5)	102 (79.7)	
Type of surgery				
Vaginal hysterectomy	1 (1.5)	4 (6.5)	5 (3.9)	
Laparoscopically-assisted vaginal hysterectomy	54 (81.8)	29 (46.8)	83 (64.8)	
Total abdominal hysterectomy	7 (10.6)	27 (43.5)	34 (26.6)	
Total laparoscopic hysterectomy	2 (3.0)	2 (3.2)	4 (3.1)	
Robotic hysterectomy	2 (3.0)	0	2 (1.6)	

Table 1. Continued.

Baseline characteristics	PET/CT	Standard	Total	*p*-value
	n = 66	n = 62	n = 128	
Salpingo-oophorectomy				0.382
Hysterectomy alone	0	3 (4.8)	3 (2.3)	
Salpingo-oophorectomy	64 (97)	58 (93.5)	122 (95.3)	
Salpingectomy	2 (3.0)	1 (1.6)	3 (2.3)	
Lymph node assessment				
Pelvic lymph node dissection	22 (33.3)	4 (6.5)	26 (20.3)	$p < 0{,}001$
Para-aortic lymph node dissection	1 (1.5)	1 (1.6)	2 (1.6)	1.000
Sentinel lymph node biopsy	24 (36.4)	0	24 (18.8)	$p < 0.001$
Complications				
Surgical complications	6 (9.1)	2 (3.2)	8 (6.3)	0.275
Postoperative complications	8 (12.1)	12 (19.4)	20 (15.6)	0.332
Laparotomy conversion	2 (3.0)	3 (4.8)	5 (3.9)	0.673
Perioperative blood transfusion	0	0	0	1.000
Blood losses (mL)	150 (100–250)	100 (200–300)		0.195
Surgical duration (min)	190 (128.8–251.2)	95 (80–156.3)		$p < 0.001$
Lenght of hospital stay (days)	2 (1–2)	2 (2–3)		$p < 0.001$

*Unless specified, data are means (SD) or numbers (%).

Table 2. Correlation of PET/CT results with pathological findings.

Correlation of PET/CT iwith pathological findings	PET/CT positive	PET/CT negative	Total
Endometrial carcinoma on PET/CT			
Pathology positive	18	5	23
Pathology negative	9	34	43
Total	27	39	66
Lymp node on PET/CT			
Pathology positive	1	2	3
Pathology negative	4	59	63
Total	5	61	66

3.2 Primary outcome

Twenty-three patients (34.8%) in the PET/CT group had endometrial carcinoma at final pathology. PET/CT truly identified carcinoma in 18 patients, yielding a sensitivity of 78.3% (Table 2). Forty-three patients (65.2%) had no carcinoma at final pathology. PET/CT was negative in 34 out of these, yielding a specificity of 79.1%. PET/CT falsely identified nine carcinomas that were negative at final pathology and failed to identify carcinoma in 5 out of 23 patients, yielding a positive predictive value of 66.7% and a negative predictive value of 87.2%. Mean SUVmax in patients with coexistent carcinoma was 7.7 g/mL $\pm$ 4.1; mean tumor size on PET/CT was 31.3 $\pm$ 13.8 mm (Table 3).

3.3 Secondary outcomes

All patients for which PET/CT identified carcinoma underwent lymph-node assessment (pelvic lymphadenectomy and/or sentinel lymph node biopsy). Of the 62 patients in the standard group, 4 of them had lymph-node assessment based on clinical evaluation during surgery (6.5%) as compared to 22 of 66 patients (33.3%) based on PET/CT results in PET/CT group ($p < 0.00001$). No statistically significant differences were noted between the groups for surgical and postoperative complications, laparotomy conversion, or blood loss (Table 1). No statistically significant differences were noted between groups for mortality, cancer recurrence, or need for adjuvant treatments, including subsequent surgery (Table 3). Subgroup analyzes of patients who underwent lymphadenectomy did not show an increase in surgical complications or risk of laparotomy conversion as compared to those who did not have lymph-node assessment (Table 4). There was no surgical complication reported in the 9 patients in the PET/CT group who underwent unnecessary lymphadenectomy. Patients who underwent lymphadenectomy had an increased surgical duration (252.5 min [211.3–290.0]) compared to those who did not have lymph-node assessment (154.5 min [101.3–205.0]) [$p < 0.001$]. The mean maximum SUV was 7.7 for patients with positive PET/CT and endometrial carcinoma confirmed by pathology, as compared to 5.8 for patients with postivie PET/CT but negative pathology [$p = 0.122$] (Table 5).

4. Discussion

This is the largest study on the value of 18F-FDG PET/CT in detecting endometrial cancer in patients presenting with

Table 3. Adjuvant treatments and mortality.

Adjuvant treatments and mortality	PET/CT	Standard	Total	*p*-value
	n = 23	n = 31	n = 54	
Adjuvant treatments				
Adjuvant chemotherapy	1 (4.3)	1 (3.2)	2 (3.7)	1.000
Chemotherapy for recurrence	0	2 (6.5)	2 (3.7)	0.502
Adjuvant radiotherapy	3 (13)	3 (9.7)	6 (11.1)	1.000
Radiotherapy for recurrence	0	1 (3.2)	1 (1.9)	1.000
Vaginal brachytherapy	7 (30.4)	8 (14.8)	15 (27.8)	0.765
Vaginal brachytherapy for recurrence	1 (4.3)	0	1 (1.9)	0.426
Mortality	n = 18	n = 26	n = 40	
	0	2 (7.7)	2 (4.5)	0.505

*Date are numbers (%).

Table 4. Subgroup analyzes for PET/CT patients.

Subgroup analyzes for PET/CT patients	Lymph node assessment n = 22	No lymph node assessment n = 44	*p*-value
Surgical complications	0	6 (13.6)	0.167
Laparotomy conversion	0	2 (4.5)	0.549
Blood losses (mL)	175 (137.5–200.0)	150 (100.0–268.75)	0.716
Surgical duration (min)	252.5 (211.3–290.0)	154.5 (101.3–205.0)	$p < 0.001$

*Date are numbers (%) or median (IQR 25–75).

Table 5. Characteristics of PET/CT.

Characteristics of PET/CT		PET/CT positive for endometrial carcinoma n = 27	PET/CT positive for endometrial carcinoma and confirmed by pathology n = 18	PET/CT positive for endometrial carcinoma but absence of carcinoma at final pathology n = 9	*p*-value
SUV max					
	Mean (SD)	7.1 (3.61)	7.7 (4.08)	5.8 (2.08)	0.122
	Median (IQR 25–75)	6.1 (4.6–8.7)	7.8 (4.75–9.05)	5.6 (4.4–6.25)	
Tumor size (mm)					
	Mean (SD)	29.2 (13.3)	31.3 (13.8)		
	Median (IQR 25–75)	25 (18–39.8)	26 (19–44.5)		
PET/CT positive for lymph node		5 (7.6)	4 (23.5)		

*Date are numbers (%) or means (SD).

precancerous endometrial lesions. In this study, we observed that the application of preoperative 18F-FDG PET/CT to detect coexistent endometrial cancer yielded a sensitivity of 78.3% and specificity of 79.1%. The sensitivity is in the higher range compared to past studies (60%–83%) that measured the value of 18F-FDG PET/CT to detect lymph-node metastases in endometrial carcinomas [25–27]. In patients who underwent lymph-node assessment because of a suspected coexistent carcinoma on PET/CT, no increase in surgical complications and blood losses were noted, but the operating time was significantly longer. In patients with coexistent carcinoma at final pathology, 78.3% in the PET/CT group had adequate surgical staging, compared to only 12.9% in the standard group.

In our population, 42.2% of women presenting with precancerous lesions were ultimately diagnosed with endometrial cancer at final pathology, which is consistent with the literature [11]. In endometrial cancer, the identification of nodal involvement plays a crucial prognostic role for the recommendation of adjuvant postoperative therapy. Intraoperative frozen section for primary lesion has been shown to be inconsistent with final pathology in 25% to 50% of cases, leading to a significant amount of patients with endometrial carcinoma and unknown nodal involvement [16, 28]. Therefore, it is imperative to identify, as much as possible, coexistent endometrial carcinoma in patients with precancerous endometrial lesions before their surgical intervention in order to offer them adequate surgical staging.

Systematic bilateral pelvic lymphadenectomy was considered the mainstay of staging for endometrial cancer, but sentinel lymph-node mapping is now considered an alternative standard of care since it has a high detection rate of metastases (86 to 93%) and lower risk of complications [8, 29]. Women with coexistent carcinoma, however, need to be identified preoperatively since it is impossible to do sentinel lymph-node mapping after the uterus has been removed.

A decision based on high-risk uterine lesions when nodal involvement is unknown has been shown to lead to up to a 30% discrepancy in the follow-up of postoperative adjuvant-therapy recommendations [7]. The National Com-

prehensive Cancer Network (NCCN) recommends observation for patients with stage 1A, grade 1/2, endometrial cancer who are incompletely surgically staged [30]. Other patients should be imaged or surgically restaged. Exposing patients to a second surgery is not without consequences (second anesthesia, possible surgical complications, recovery period, delayed adjuvant treatment). The recommended imaging modality for incompletely surgically staged patients is chest/abdominal/pelvic computed tomography (CT). This procedure, however, has been shown to have poor positive predictive value in the case of nodal disease (50%) in endometrial-cancer patients [31]. In addition, more than 30% of patients with extrauterine disease have micrometastases, which are typically not detected by CT [32, 33].

The results of our study are consistent with those published by Wang *et al.* [23] In this retrospective study, they observed that PET/CT standardized uptake values (SUVpeak, SUVmax, and SUVmean) were useful in distinguishing between precancerous endometrial lesions and endometrial carcinoma. They retrospectively analyzed the metabolic parameters of PET/CT in patients with diagnoses of atypical endometrial hyperplasia or endometrial carcinoma confirmed by pathology. In patients with atypical endometrial hyperplasia mean SUVmax was 3.8 g/mL $\pm$ 1.6, while patients with endometrial carcinoma had a mean SUVmax 9.3 g/mL $\pm$ 3.8. In our population, patients with coexistent endometrial carcinoma had a mean SUVmax of 7.7 g/mL $\pm$ 4.1. Our results are also consistent with those of a prospective cohort study exploring the value of PET/CT for preoperative staging in endometrial carcinomas [34]. They showed that the SUVmax, SUVmean, and metabolic tumor volume (MTV) were significantly correlated with deep myometrial invasion, lymph-node metastasis, and high histological grade ($p < 0.015$). The authors concluded that PET/CT was a valuable tool for preoperative assessment of endometrial cancer. To our knowledge, no study evaluating the diagnostic value of preoperative PET/CT for surgical staging in patients with precancerous endometrial lesions has ever been conducted.

Alternatives to PET/CT include magnetic resonance imaging (MRI). It, however, has been shown to have low specificity (15.4%) and positive predictive value (50%) in characterizing malignant transformation in women with precancerous endometrial lesions [35]. In another retrospective study, MRI failed to identify 9 out of 21 patients with endometrial cancer. The authors concluded that MRI had no value in the management of precancerous endometrial lesions [36].

Estrogen receptor-based 16α-18F Fluoro-17β-estradiol (18F-FES) PET/CT is well established as a diagnostic and follow-up tool in patients with ER-positive breast cancer. As endometrial cancer is a steroid hormone-dependent cancer, it expresses estrogen receptors, similar to patients with breast cancer. In small studies, 18F-FES and 18F-FDG PET/CT ratio has been shown to be useful for the differential diagnosis of benign and malignant uterine tumors with no false-negative or false-positive findings [37]. More research is needed, but 18F-FES PET/CT could potentially become an important diagnostic tool in patients with EIN or endometrial cancer [38].

This study is the largest study evaluating the value of preoperative PET/CT in predicting the presence of endometrial carcinoma in women with precancerous endometrial lesions. All PET/CT were interpreted by a nuclear-medicine physician not aware of the results of final pathology. The results of our study must be interpreted in the light of some limitations. First, retrospective studies can have selection bias. Moreover, even if our sample size was respectable, it is too small to reveal a difference in the risk of recurrence and mortality between groups. In addition, as our center is an oncology referral center for multiple hospitals in the region, several endometrial biopsies were read by a general pathologist in these centers and were not reviewed by a gynecologic pathologist. That notwithstanding, it has been shown that only 2% of slide reviews evidenced discrepancies that would have affected treatment recommendations [39]. Moreover, reviewing slides takes time and can create treatment delays. Lastly, the classification of endometrial hyperplasia changed between 2010 and 2018, moving from WHO94 to WHO2014. The WHO94 classification was divided into four groups: non-atypical endometrial hyperplasia (simple and complex) and atypical endometrial hyperplasia (simple and complex). In contrast, the WHO2014 classification divides hyperplasia into two groups (benign and atypical hyperplasia/EIN) [40]. This new schema better identifies the precancerous lesions at risk of cancer. Since our population consisted of patients who were diagnosed with an atypical lesion between 2010 and 2018, some must have been diagnosed based on the WHO94 classification. However, majority of WHO94 classified atypical hyperplasias were reclassified as EIN in two studies, which suggests that this change in classification has little impact in our study [41, 42]. No statistically significant differences were noted between groups for mortality, cancer recurrence, or need for adjuvant treatments, including subsequent surgery. However, with such a small sample (n = 54), we did not have the statistical power to detect a difference.

5. Conclusions

In conclusion, the results of our study show that preoperative 18F-FDG PET/CT reliably predicted the presence of endometrial carcinoma in women with precancerous endometrial lesions. Future trials should explore the value of adding PET/CT in the preoperative investigation of these patients to identify women who may be offered sentinel-lymph node mapping.

Author contributions

JRL, PB and KLM designed the research study. JRL, ET and OB performed the research. JRL analyzed the data and wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate

Research ethics board approval was obtained for this retrospective cohort study by the *Comité d'Éthique du Centre Hospitalier Universitaire de Sherbrooke* (registration number 2020-3321).

Acknowledgment

Thanks to all the peer reviewers for their opinions and suggestions.

Funding

This project was supported by the Fonds des Résidents de l'Université de Sherbrooke (#CBS-205).

Conflict of interest

The authors declare no conflict of interest.

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