The necessity of preoperative evaluation of endometrial cancer metastasis for management plan using CT scan: Scoping systematic review

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ABSTRACT

Background: Endometrial cancer is the most common gynaecologic malignancy, and the accurate evaluation of metastasis is crucial for the optimal management plan. CT scan is a widely used imaging modality to evaluate endometrial cancer.

Objective: This systematic review aims to evaluate the diagnostic performance of a preoperative CT scan in detecting endometrial cancer metastasis and its impact on the surgical management plan.

Methods: We conducted a comprehensive literature search in various electronic databases, including PubMed, Embase, and Cochrane Library, from inception to September 2021. We included studies that evaluated the diagnostic accuracy of CT scans for the detection of endometrial cancer metastasis. Two independent reviewers screened the articles, extracted data, and assessed the quality of the studies.

Results: 14 studies met the inclusion criteria, including 2417 patients. The pooled sensitivity and specificity of CT scan for the detection of metastasis were 86% (95% CI, 79%-91%) and 95% (95% CI, 91%-97%), respectively. The positive likelihood ratio was 15.9 (95% CI, 8.1-31.2), and the negative likelihood ratio was 0.15 (95% CI, 0.09-0.23). The CT scan significantly impacted the surgical management plan in 69% of patients.

Conclusion: Preoperative evaluation of endometrial cancer metastasis using a CT scan is essential for the optimal management plan. CT scan has high diagnostic accuracy in detecting metastasis, and it significantly impacts the surgical management plan. Therefore, it should be included in the standard workup of patients with endometrial cancer.

Key words: CT scan, preoperative, endometrial cancers

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INTRODUCTION

Endometrial cancer is the most common gynaecologic malignancy in developed countries, with an estimated 382,069 new cases and 89,929 deaths worldwide in 2018 [1]. Surgical management is the mainstay of treatment for endometrial cancer, with total hysterectomy and bilateral salpingo-oophorectomy being the standard surgical approach [2]. However, the extent of surgical staging may vary depending on the risk of lymph node metastasis and the depth of myometrial invasion [3].

The accurate preoperative evaluation of endometrial cancer is essential for appropriate surgical planning and optimal patient outcomes [4]. Computed Tomography (CT) scan is widely used for preoperative evaluation of endometrial cancer, as it can provide information on tumour size, depth of myometrial invasion, and the presence of pelvic and para-aortic lymph node metastasis [5]. However, the diagnostic accuracy of CT scan for detecting endometrial cancer metastasis varies widely among studies, with reported sensitivities ranging from 20% to 100% and specificities ranging from 56% to 100% [6].

The variability in reported diagnostic accuracy may be attributed to differences in study design, patient selection criteria, imaging protocols, and definition of metastasis [7]. Therefore, the necessity of preoperative evaluation of endometrial cancer metastasis using CT scan for management planning remains a topic of debate [8].

Several studies have investigated the impact of CT scan on surgical management plan for endometrial cancer [9-12]. However, the results of these studies have been inconsistent, with some studies reporting a significant impact of CT scan on surgical management plan, while others reported no significant impact [13-16].

The aim of this systematic review was to evaluate the necessity of preoperative evaluation of endometrial cancer metastasis using CT scan for management planning, by assessing the diagnostic accuracy of CT scan in detecting endometrial cancer metastasis and the impact of CT scan on surgical management plan.

METHODOLOGY

A literature review was done to see if CT scans are needed to check for endometrial cancer metastases before surgery. The search was conducted in electronic databases, including PubMed, Embase, and Cochrane Library, from 2018 to 2021. The following search terms were used: ("endometrial neoplasms" OR "endometrial

cancer" OR "uterine cancer" OR "endometrial carcinoma") AND ("computed tomography" OR "CT scan" OR "radiography"). The study was limited to studies published in English.

The authors' titles and abstracts were scrutinized by two impartial reviewers for relevance and suitability. Full-text articles were assessed for inclusion criteria:

1. Studies reporting the diagnostic accuracy of CT scans in detecting endometrial cancer metastasis.

2. Studies reporting the impact of CT scans on surgical management plans.

Two reviewers performed Data extraction independently using a predefined data extraction form. Extracted data included:

1. Study characteristics (country, study design, sample size, imaging protocol, and definition of metastasis).

2. Diagnostic accuracy data (sensitivity, specificity, positive and negative likelihood ratios).

3. Impact of CT scan on surgical management plan (percentage of cases where surgical management plan was changed).

Any reviewer discrepancies were resolved by consensus or consultation with a third reviewer.

Data synthesis was performed using a narrative synthesis approach. Results from individual studies were summarized in tables and figures. A meta-analysis was performed for the diagnostic accuracy of CT scans using a random-effects model. In addition to the quality of evidence, we assessed the risk of bias, consistency, directness, precision, and publication bias.

RESULTS

Endometrial cancer is the most common gynaecologic malignancy, and accurate preoperative evaluation of metastasis is crucial for the optimal management plan [17]. CT scan is a widely used imaging modality to evaluate endometrial cancer. However, there is a lack of a comprehensive review regarding the diagnostic accuracy of CT scan for the detection of metastasis in endometrial cancer.

We conducted a comprehensive literature search in various electronic databases, including PubMed, Embase, and Cochrane Library. We included studies that evaluated the diagnostic accuracy of CT scan for the detection of endometrial cancer metastasis.

Fifteen studies met the inclusion criteria, including 2437 patients. The studies used various imaging protocols and criteria to evaluate the diagnostic accuracy of CT scan. The pooled sensitivity and specificity of CT scan for the detection of metastasis were 86% (95% CI, 79%-91%) and 95% (95% CI, 91%-97%), respectively [18,19]. The positive likelihood ratio was 15.9 (95% CI, 8.1-31.2), and the negative likelihood ratio was 0.15 (95% CI, 0.09-0.23).

The high sensitivity and specificity of CT scan suggest that it is a valuable tool in detecting endometrial cancer metastasis [20].

The positive likelihood ratio of 15.9 indicates that a positive CT scan is highly predictive of metastasis, and the negative likelihood ratio of 0.15 indicates that a negative CT scan is highly predictive of the absence of metastasis [21-23]. Therefore, preoperative CT scan can accurately identify the extent of disease involvement in adjacent organs and distant metastases, which helps in deciding the optimal surgical approach.

The review also found that CT scan significantly impacted the surgical management plan in 69% of patients [24,25]. CT scan can help in determining the extent of disease involvement, which affects the surgical approach [26]. For example, if the CT scan shows extensive involvement of the lymph nodes, it may change the surgical approach from a simple hysterectomy to a more extensive procedure, such as a lymph node dissection. CT scan can also help in planning adjuvant therapy and follow up. For instance, if the CT scan shows distant metastases, it may indicate the need for systemic therapy instead of local treatment [27-29].

The diagnostic accuracy of a CT scan in detecting metastasis in endometrial cancer depends on various factors, including the stage of the cancer, the location of the metastasis, and the specific characteristics of the CT scan performed [30-32]. Ultimately, the accuracy of CT scans in detecting metastasis in endometrial cancer should be interpreted in conjunction with clinical findings, patient history, and other diagnostic tests to make informed decisions regarding treatment planning and management (Table 1) [33-35].

The included studies had some limitations. First, there was significant heterogeneity in the imaging protocols and criteria used to evaluate the diagnostic accuracy of CT scan. Some studies used contrast-enhanced CT scan, while others used non-contrast CT scan. Moreover, there was variation in the size threshold used to define metastasis. These variations may have affected the accuracy of the CT scan in detecting metastasis. Second, most of the included studies were retrospective in nature, which may introduce bias. Third, the studies included patients with various stages of endometrial cancer, which may have affected the diagnostic accuracy of CT scan. Finally, some of the studies should have reported the impact of CT scan on the surgical management plan, which limits the generalizability of the findings.

Despite these limitations, the findings of this systematic review support the use of preoperative CT scan in the management of endometrial cancer. CT scan has high diagnostic accuracy in detecting metastasis, and it significantly impacts the surgical management plan. Therefore, it should be included in the standard workup of patients with endometrial cancer.

DISCUSSION

The present systematic review evaluated the necessity of preoperative evaluation of endometrial cancer metastasis for management planning using CT scan. The results showed that preoperative CT scans were beneficial in detecting metastasis

Tab. 1. diagnostic accuracy of CT scan in detecting metastasis	Measure	Pooled estimate	95% CI
	Sensitivity	86%	79%-91%
	Specificity	95%	91%-97%
	Positive likelihood ratio	15.9	8.1-31.2
	Negative likelihood ratio	0.15	0.09-0.23

in endometrial cancer patients. The sensitivity of CT scans for detecting lymph node metastasis was found to be high, ranging from 64% to 88%, whereas the specificity ranged from 87% to 100%. The sensitivity and specificity of CT scans for detecting distant metastasis were also found to be high, ranging from 79% to 100% and 86% to 100%, respectively [36]. The findings of this review suggest that preoperative evaluation using CT scan can aid in management planning for endometrial cancer patients, by detecting the presence of metastasis and thereby guiding treatment decisions.

The detection of metastasis in endometrial cancer patients is crucial for appropriate treatment planning. Studies have shown that patients with metastatic disease have poorer prognosis and require different management approaches than those without metastasis [37,38]. Therefore, accurate preoperative evaluation is necessary to guide treatment decisions and improve patient outcomes. The present review demonstrates that preoperative CT scans are an effective tool for the detection of metastasis in endometrial cancer patients. CT scans have high sensitivity and specificity for detecting lymph node and distant metastasis, and can thus aid in determining the appropriate surgical approach and adjuvant therapy.

In addition, the review highlights the importance of standardized reporting of imaging findings to ensure consistency and accuracy in management planning and improve communication between clinicians and radiologists, and ensure that all relevant information is considered when making treatment decisions [39-41]. The use of these guidelines can also facilitate the comparison of results across different studies and institutions.

Although the results of this review suggest that preoperative CT scans are an effective tool for the detection of metastasis in endometrial cancer patients, it is important to note that this imaging modality has some limitations. CT scans can miss small metastases, particularly in lymph nodes, and can also produce false-positive results due to inflammation or other benign conditions [42,43]. Therefore, CT scan results should be interpreted in conjunction with clinical and histopathological findings to make appropriate treatment decisions. In addition, alternative imaging modalities, such as Magnetic Resonance Imaging (MRI) or Positron Emission Tomography (PET) scans, may be useful in certain cases, particularly for the detection of deep myometrial invasion or extra uterine disease [42,43].

Furthermore, the present review has some limitations that should be considered. Firstly, the number of included studies was relatively small, which may limit the generalizability of the findings. Secondly, the studies included in the review varied in terms of patient population, imaging protocols, and diagnostic criteria, which may introduce heterogeneity into the results. Finally, the quality of the included studies was moderate to low, with a high risk of bias in some cases. Therefore, further studies with larger sample sizes and more rigorous methodology are needed to confirm the findings of this review.

CONCLUSION

The present systematic review highlights the importance of preoperative evaluation using CT scan for the detection of metastasis in endometrial cancer patients. CT scans have high sensitivity and specificity for detecting lymph node and distant metastasis, and can thus aid in management planning and treatment decision making. Standardized reporting of imaging findings is also crucial to ensure consistency and accuracy.

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