




Research Article

Modern methods of diagnosis of endometrial carcinoma

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Summary

The main methods of histological diagnosis of endometrial carcinoma are dilatation and curettage, fractional curettage, and diagnostic hysteroscopy with endometrial biopsy. This retrospective study aims to compare the preoperative histological results obtained by different diagnostic methods with the postoperative ones in patients with endometrial carcinoma and determine the most accurate and safest method for diagnosing the disease. From 06.2020 to 09.2023, a retrospective study was conducted on 80 patients with histologically proven carcinoma of the endometrium, treated at University Hospital Saint Marina-Pleven. The mean age of the patients was 58.04 ± 10.46 , ranging from 28 to 78. The comparative analysis of the discrepancies of the histological verification methods in the evaluation of the preoperative and postoperative histological result showed that a statistically significantly higher percentage of discrepancies (19.5%) had the dilatation and curettage compared to the zero discrepancy of the hysteroscopy (0.0%). The relative proportion of discrepancies of the fractional curettage is 14.3%. The cytological result was negative for tumor cells in 97.5% and positive in 2.5%. In all patients with a positive cytological result for tumor cells, the method of histological verification was dilatation and curettage. Performing diagnostic hysteroscopy and observing safety principles such as creating low intrauterine pressure and short operative time is a safe and reliable method for diagnosing endometrial carcinoma.

Key words: Endometrial cancer, dilatation and curettage, hysteroscopy

Introduction

According to the World Cancer Research Fund International, endometrial carcinoma is the sixth most common cancer in women and the fifteenth most common cancer overall. Estimates show that annually, over 420,000 women are diagnosed with endometrial carcinoma and over 95,000 die of this disease. Endometrial carcinoma is most often diagnosed between the ages of 65 and 75. The average age of diagnosed patients has been decreasing in recent years, a fact that some experts attribute to the rising rates of obesity in the population (Mahdy et al. 2024).

The most common and early clinical manifestation of endometrial carcinoma is postmenopausal bleeding, which occurs in 90% of cases (Liberis et al.



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2021). It is essential the endometrial carcinoma to be diagnosed in the first stage of the disease. The five-year survival rate for patients at this stage of the disease is about 74–91% (Liu et al. 2023).

The main methods of histological diagnosis of endometrial carcinoma are dilatation and curettage, fractional curettage, and diagnostic hysteroscopy with endometrial biopsy. Dilatation and curettage is one of the most commonly used methods for histological verification. Because this procedure is performed blindly, there is a risk that endometrial carcinoma will not be histologically proven (Sone et al. 2020). According to Liu et al. (2015), the false negative rate is 7.75%. However, the fraction curettage with the material from the uterine cavity and the cervical canal provides more accurate information about the stage of the disease. The visual control under which hysteroscopy is performed allows a detailed view of the uterine cavity and the cervical canal, as well as visualization of even small lesions and their targeted biopsy.

This retrospective study aims to compare the preoperative histological results obtained by different diagnostic methods with the postoperative ones in patients with endometrial carcinoma and determine the most accurate and safest method for diagnosing the disease.

Materials and methods

From 06.2020 to 09.2023, a retrospective study was conducted on 80 patients with histologically proven carcinoma of the endometrium, treated at University Hospital Saint Marina-Pleven. A documentary method was used, examining the medical records of randomly selected patients with endometrial carcinoma.

Data were entered and processed with the statistical packages IBM SPSS Statistics 25.0. and MedCalc Version 19.6.3. $p < 0.05$ was accepted as a level of significance at which the null hypothesis is rejected.

All information was processed with the following statistical methods:

1. Descriptive analysis – the frequency distribution of the considered signs is presented in tabular form.
2. Graphical analysis – for visualization of the obtained results.
3. Fisher-Freeman-Halton exact test, Fisher's exact test and χ^2 test - for testing hypotheses about the presence of dependence between categorical variables.
4. Comparing relative shares.
5. Non-parametric tests of Kolmogorov-Smirnov and Shapiro-Wilk - to check the distribution for normality.
6. Non-parametric Mann-Whitney test - for testing hypotheses of difference between two independent samples.
7. Non-parametric Wilcoxon test - testing hypotheses about a difference between two dependent samples.
8. Correlation analysis - for testing hypotheses about the existence of a relationship between two quantitative characteristics.
9. Criteria for validation of screening tests. The following criteria are used to assess the validity of the screening (diagnostic) test: sensitivity, specificity, positive predictive value, negative predictive value, and precision (% of correct answers).

Results

The study covers 80 women treated at the Obstetrics and Gynecology Clinic of University Hospital Saint Marina–Pleven. The mean age of the patients was 58.04 ± 10.46 , ranging from 28 to 78. The most significant number (37 or 46.3%) are from the 60+ age group, followed by 50–59 years with 28 (35.0%), and the least (1 or 1.3%) - under 30 years (Fig. 1).

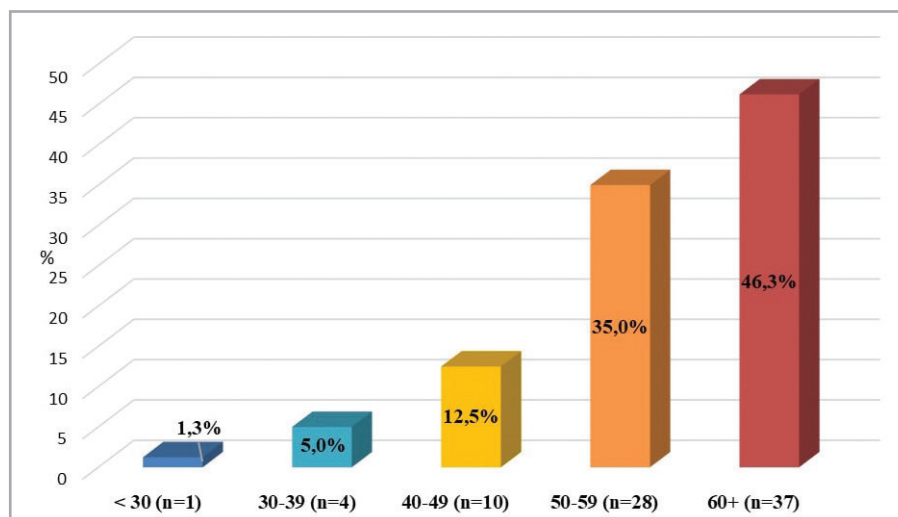


Figure 1. Age distribution.

Three main methods have been used for preoperative histological verification: dilatation and curettage, fractional curettage, and hysteroscopy. Subsequently, 69 patients underwent robot-assisted total hysterectomy with bilateral salpingo-oophorectomy, and 11 patients underwent robot-assisted radical hysterectomy with bilateral salpingo-oophorectomy and lymphatic dissection in different volumes. The most frequently used method for preoperative histological verification in the covered individuals was dilatation and curettage (51.3%), followed by fractional curettage with 26.3%, and the least applied method was hysteroscopy (22.5%) (Table 1).

Table 1. Frequency distribution of histological verification methods.

| Histological verification methods | n | % | Sp |
|-----------------------------------|----|-------|-----|
| Dilatation and curettage | 41 | 51.3 | 5.6 |
| Fractional curettage | 21 | 26.3 | 4.9 |
| Hysteroscopy | 18 | 22.5 | 4.7 |
| Total | 80 | 100.0 | |

The comparative analysis of the discrepancies of the histological verification methods in the evaluation of the preoperative and postoperative histological result showed that a statistically significantly higher percentage of discrepancies (19.5%) had the dilatation and curettage compared to the zero discrepancy of the hysteroscopy (0.0%). The relative proportion of discrepancies of the fractional curettage is 14.3%. The study found a significant difference between the histological results obtained from dilatation and curettage and those obtained from hysteroscopic examination ($p = 0.046$) (Table 2).

Table 2. Comparative analysis of discrepancies of histological verification methods in assessing preoperative and postoperative histological result.

| Histological verification method | Number of patients | Number of discrepancies | % of discrepancies |
|----------------------------------|--------------------|-------------------------|--------------------|
| 1. Dilatation and curettage | 41 | 8 | 19.5 |
| 2. Fractional curettage | 21 | 3 | 14.3 |
| 3. Hysteroscopy | 18 | 0 | 0.0 |

A comparative analysis of the inconsistencies of histological verification methods in the assessment of preoperative and postoperative tumor grading was performed. The results show that the highest percentage of discrepancies (43.9%) has the dilatation and curettage, followed by fractional curettage with 28.6%, and the smallest (22.2%) – hysteroscopy. The difference between the discrepancies of the three methods is without statistical significance ($p > 0.05$) (Tables 3, 4).

Table 3. Comparative analysis of discrepancies of histological verification methods in assessing preoperative and postoperative tumor grading.

| Histological verification method | Number of patients | Number of discrepancies | % of discrepancies |
|----------------------------------|--------------------|-------------------------|--------------------|
| 1. Dilatation and curettage | 41 | 18 | 43.9 |
| 2. Fractional curettage | 21 | 6 | 28.6 |
| 3. Hysteroscopy | 18 | 4 | 22.2 |

Table 4. Dependence between histological verification method and discrepancies between pre- and postoperative tumor grading.

| Histological verification method | Preoperative grading | Frequency | Postoperative grading | | |
|----------------------------------|----------------------|-----------|-----------------------|-------|-------|
| | | | G1 | G2 | G3 |
| Dilatation and curettage | G1 | n | 15 | 3 | 1 |
| | | % | 60.0 | 37.5 | 12.5 |
| | G2 | n | 6 | 3 | 2 |
| | | % | 24.0 | 37.5 | 25.0 |
| | G3 | n | 4 | 2 | 5 |
| | | % | 16.0 | 25.0 | 62.5 |
| Fractional curettage | G1 | n | 8 | 0 | 1 |
| | | % | 61.5 | 0.0 | 33.3 |
| | G2 | n | 5 | 5 | 0 |
| | | % | 38.5 | 100.0 | 0.0 |
| | G3 | n | 0 | 0 | 2 |
| | | % | 0.0 | 0.0 | 66.7 |
| Hysteroscopy | G1 | n | 8 | 2 | 0 |
| | | % | 80.0 | 40.0 | 0.0 |
| | G2 | n | 2 | 3 | 0 |
| | | % | 20.0 | 60.0 | 0.0 |
| | G3 | n | 0 | 0 | 3 |
| | | % | 0.0 | 0.0 | 100.0 |

Regarding the histological verification methods in assessing preoperative and postoperative FIGO stage, the results show that with the highest rate of discrepancies (39%) is dilatation and curettage, followed by hysteroscopy with 38.9%. The fractional curettage has the smallest relative share of discrepancies

(9.5%). This percentage is significantly lower than those of the other two methods, which are not statistically different from each other (Table 5).

Table 5. Comparative analysis of discrepancies of histological verification methods in assessing preoperative and postoperative FIGO stage.

| Histological verification method | Number of patients | Number of discrepancies | % of discrepancies |
|----------------------------------|--------------------|-------------------------|--------------------|
| 1. Dilatation and curettage | 41 | 16 | 39.0 |
| 2. Fractional curettage | 21 | 2 | 9.5 |
| 3. Hysteroscopy | 18 | 7 | 38.9 |

In all patients, peritoneal lavage was aspirated for cytological examination. The cytological result was negative for tumor cells in 97.5% and positive in 2.5%. In all patients with a positive cytological result for tumor cells, the method of histological verification was dilatation and curettage (Table 6).

Table 6. Distribution of patients by cytology.

| Cytology | n | % | Sp |
|----------|----|-------|-----|
| Negative | 78 | 97.5 | 1.7 |
| Positive | 2 | 2.5 | 1.7 |
| Total | 80 | 100.0 | |

Discussion

Several methods can detect endometrial carcinoma. Accurate and correct preoperative staging is key to subsequent management. Determination of the histological variant of the tumor, tumor grading, myometrial and cervical invasion are of utmost importance for its adequate treatment. One of the most commonly used methods is dilatation and curettage. It is a blinded procedure, and in 60% of patients, less than 50% of the area of the uterine cavity is curetted, which makes targeted collection of material for histological examination difficult and sometimes impossible (De Wit et al. 2003). Therefore, the risk of a false negative result after performing a dilatation and curettage is significantly high at around 11% (Epstein et al. 2001). Hysteroscopy allows viewing of the cervical canal and uterine cavity. Through it, even small lesions can be visualized and biopsied.

Our study showed a 19.5% discrepancy of preoperative histologic result after dilatation and curettage versus postoperative histologic result, a 14.3% discrepancy after fractional curettage, and zero discrepancy after hysteroscopy. Larson et al. (1995) described discordance of the histological result after dilatation and curettage in 23% of 131 patients with endometrial carcinoma. Hsuan Su et al. (2015) reported that in 127 patients with endometrial carcinoma who underwent dilatation and curettage, discordance with the postoperative result occurred in 12.6% (16 patients). Dokara-Friedrich et al. (2024) reported that of 139 patients with endometrial carcinoma, 15.8% of the fractional curettage was falsely positive for endocervical tumor invasion, and in another 11.5%, the result was falsely negative. Their results show 70.9% sensitivity of fractional curettage and 73.8% specificity of fractional curettage. Hsuan Su et al. (2015) described that in 97.3% of patients with endometrial carcinoma proven after

hysteroscopy, there was a match with the postoperative result, and the result did not match in only 2.6% of cases. The results show that the diagnosis of endometrial carcinoma and histological evidence of cervical invasion is much more accurate and reliable after performing hysteroscopy than with dilatation and curettage or a fractional curettage.

The issue of the spread of tumor cells through the fallopian tubes into the abdominal cavity after hysteroscopy in patients with endometrial carcinoma is still debatable. Our study showed that in all patients who underwent hysteroscopy, peritoneal cytology was negative for tumor cells. It is positive only in 2.5% of the patients, and as a method of histological verification, the dilatation and curettage was chosen for them. Hong-lan et al. (2010) reported that positive peritoneal cytology was observed in 5.6% of patients who underwent hysteroscopy and in 6.1% of patients who underwent dilatation and curettage. Bradley et al. (2004) described that hysteroscopy increases the risk of dissemination of tumor cells into the abdominal cavity. 8.2% of patients with hysteroscopy and 6.9% of patients after dilatation and curettage had a positive cytological result. Egarter et al. (1996) demonstrated the conversion of negative cytology to positive after hysteroscopy followed by laparoscopy. Dong et al. (2021) described in their meta-analysis involving 3,364 patients that the hysteroscopy may increase the risk of tumor cells spreading through the fallopian tubes. The leading factor is not the stage of the disease but the intrauterine pressure, which is created during the hysteroscopy. When it is above 80 mmHg, the risk is extremely high, it decreases at a pressure below 70 mmHg and is practically minimal at a pressure below 40 mmHg. Zerbe et al. (2000) reported that prior tubal ligation did not prevent the spread of tumor cells into the abdominal cavity after hysteroscopy. At the same time, dilatation of the cervical canal and curettage of the uterine cavity in patients with abnormal genital bleeding may also increase the risk of dissemination of tumor cells into the abdominal cavity (Selvaggi et al. 2003). Sonoda et al. (2001) demonstrated that the use of a uterine manipulator during laparoscopically assisted vaginal hysterectomy significantly increased the risk of positive cytology in patients with endometrial carcinoma compared with that in patients undergoing abdominal hysterectomy.

Conclusion

Performing diagnostic hysteroscopy and observing safety principles such as creating low intrauterine pressure and short operative time is a safe and reliable method for diagnosing endometrial carcinoma. Thus, it allows both an accurate preoperative histological result and a correct preoperative staging of the disease, with an extremely low risk of false negative results and dissemination of tumor cells through the fallopian tubes into the abdominal cavity.

Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statements

The authors declared that no clinical trials were used in the present study.

The authors declared that no experiments on humans or human tissues were performed for the present study.

Informed consent from the humans, donors or donors' representatives: University Hospital Saint Marina–Pleven

The authors declared that no experiments on animals were performed for the present study.

The authors declared that no commercially available immortalised human and animal cell lines were used in the present study.

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Author contributions

Data curation: TKS. Formal analysis: DGD, TKS, ZG. Investigation: DGD, TKS, ZG. Methodology: ZG. Software: EP. Supervision: NH. Validation: EP, MV. Visualization: MV. Writing - original draft: DGD. Writing - review and editing: NH.

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Data availability

All of the data that support the findings of this study are available in the main text.

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