Value Of The MRI In The Preoperative Staging Of Endometrial Cancer

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Citation

Abstract

Aims:
This is a retrospective observational study aimed to assess accuracy of the MRI as a predictive tool for histopathological staging, correlation between MRI, transvaginal scan (TVS) and hysteroscopy, in relation to the histopathological (H/P) staging and the compliance to the NHS fast track guidelines.

Material and methods:
The study population comprises 66 patients diagnosed and treated from endometrial cancer either locally or through referral to tertiary centre between January 1999 and May 2006. Data were collected regarding following parameters: hysteroscopic findings, TVS findings, MRI findings, management outcome, H/P staging, agreement between MRI and H/P. Data analysis was conducted with regards to significant correlation between different diagnostic modalities, correlation between MRI and H/P and degree of compliance with NHS rules.

Results
A significant positive correlation was found between endometrial histopathological (H/P) staging and preoperative hysteroscopic findings (p=0.04). Considering the pathological staging, significant correlations were found between transvaginal scan (TVS) and hysteroscopy (P=0.03) and also MRI (P=0.04). Sensitivity of the MRI as a predictive tool for the pathological staging was (79%). This was higher in early stage I endometrial cancer in than stages II and more (35%) with a NPV for stage I EC of 93%. The unit was found to be compliant in 89.5% of cases to the 31 day decision /treatment interval and in 95.5% to the referral/treatment interval

Conclusion
MRI scans offer clinical benefit in terms of triaging the patients for referral to tertiary centre. There is benefit associated with the use of the TVS as a primary screening tool owing to the significant correlation between the TVS and MRI,and significant correlation between the TVS and the outpatient hysteroscopy. The interesting association between polypoid lesion and early stage EC would encourage the set up of RCT to show the clinical effectiveness of local hysteroscopic resection, and the subtotal hysterectomy versus the current management of TAH+BSO.

INTRODUCTION

Endometrial cancer is the second most common gynaecological malignancy. The incidence has increased by 55% in the last 10 years which has contributed to the overall increase in female cancer ([1]). Because endometrial cancer has a good overall cure rate and is thought to be easily cured it has received less attention than the other gynaecological malignancies ([2]). Survival and cure rate are high for those women with early stage, low risk disease but are significantly worse for those with high risk disease (high risk tumour histology and advanced stage). It has been postulated that the average increase in the survival for endometrial cancer for each five year period is 2.9% ([3]). This is low in comparison with cervical cancer (3.2%) reflecting the earlier stage of diagnosis brought about through the introduction of the effective national cervical cancer screening. In most of the geographical areas the majority of women are managed by general gynaecologist. Accurate staging is important for the following reasons: it allows the prognosis for the

individual patient to be determined, it allows for selection of the high risk women to be offered post operative adjuvant radiotherapy

TVS endometrial thickness is considered to be a valuable screening tool in low risk patient with post menopausal bleeding; its NPV in detection of endometrial cancer is increasing from 48% to 99.6% by adding pipelle sampling ([4]). High risk postmenopausal patients need further assessment by hysteroscopic evaluation owing to the low NPV of the TVS in these cases ([5]). Magnetic resonance Image (MRI) should be considered for preoperative surgical staging (grade B recommendation) ([6]). Although it is valuable tool in detection of myometrial invasion; however its accuracy in the prediction of the surgical staging has never been evaluated by randomized studies.

AIM OF THE STUDY

This a retrospective observational study aimed to assess three important aspects of in the local management protocol of the endometrial cancer:

First the correlation between the preoperative MRI assessment and the postoperative histopathological staging.

Second, correlation between the preoperative TVS, hysteroscopic assessment and MRI in relation to the postoperative H/P assessment.

Third, the degree of compliance to the NHS fast track service.

STUDY POPULATION

Cases recruited from January 2000 to May 2006 under the EC code were 103. Ten patients died before completing the treatment. Five patients with recurrence referred for radiotherapy, one Lieomyosarcoma, one Mixed Mullerian tumor and two endometrial sarcoma. Only sixty six cases with histologically proven endometrial cancer were included.

MATERIAL AND METHODS

The mean age of menopause in population studied is 61ys.Age at the diagnosis ranges from 60-70 years. Data were collected from the electronic patient data base system and from the patient's notes .The following information was collected ; age of menopause, age at diagnosis of EC, presence or absence of risk factors (obesity, hypertension and diabetes),hysteroscopic findings, TVS findings, MRI findings, management outcome , recurrence, pipelle

diagnosis, H/P staging, agreement between MRI and H/P.

Statistics were performed using the SPSS version 11. Further analysis was done using Chi-square test of significance to determine the degree of significance whenever a correlation was found between two factors. The accuracy of the MRI as predictive tool for the postoperative H/P staging was evaluated.

RESULTS

A total of 57.6% of patients underwent total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH&BSO) as the only treatment. For 42.4%, the treatment comprised TAH&BSO and radiotherapy. Recurrence occurred in 9.1% of cases.

H/P versus TVS 57 out of the 66 patients (86.3%) showed TVS findings of ET>5mm, endometrial polyp or both. Four patients did not do TVS and only one patient had a TVS<5mm.

H/P and Hysteroscopy 15 out of the 66 (43.9%) hysteroscopy showed abnormal endometrium. 51 out of the 66 (56.1%)hysteroscopy showed endometrial polyp, of those 42 (75.6%) patients turned to be stage I EC.

Applying Chi square test of significance reveals a statistically significant relation between the H/P stage I and hysteroscopic findings of endometrial polyp (P<0.05) (Table1)

Figure 1

Figure 1: Correlation between Hysterosocopy and H/P
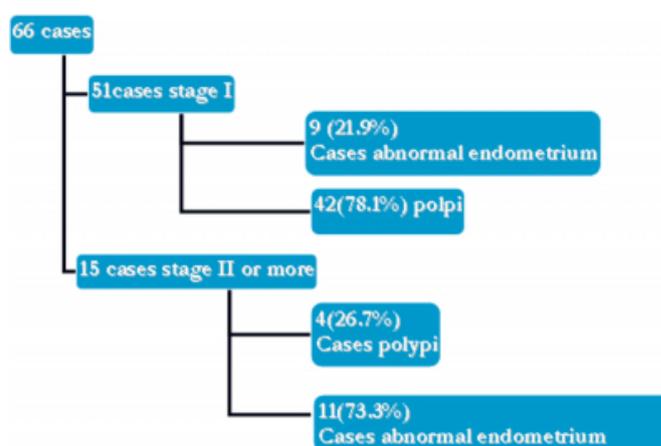
MRI versus TVS 56 out of the 66(84.8%) both TVS and MRI showed an image stigmata of endometrial pathology. 5 patients did not perform MRI for weight problem. Applying Chi square test of significance reveals a statistically significant relation between TVS an MRI (P<0.05) (table1)

Hysteroscopy versus TVS 60 out of the 66 (90.9%) both TVS and hysteroscopy showed pathological findings, in 43(65.1%) there was thick endometrium and in 17(25.7%) there were evidence of endometrial polypi in both. Applying Chi square test of significance reveals a statistically significant relation between the TVS and hysteroscopic findings (P<0.05) (Table1).

H/P versus agreement between the H/P and MRI

In 47 out of the 66 (71.2%) there was a correspondence between the MRI and H/P staging whilst there was non correspondence in 19(28.7%). Out of the 52 patients with H/P staging of stage I, 41 (78.8%) concurred with the MRI whilst 21.2 % of them did not. There was a tendency for the MRI to under stage in this group. Of the 13 patients with stage II, only 6 (46%) corresponded with MRI staging. (Table1) The degree of accuracy of the MRI in prediction of the histopathological staging was tested and results were shown in Table 2.

Figure 2

Table 1: Significance of the correlation between different variables

Variables	Correlation coefficient	P value (Chi square)	Significance
H/P stage versus TVS	0.065	0.1	NS
H/P stage versus Hysteroscopic findings	0.63	0.04	significant
H/P stage versus Recurrence	0.004	0.008	significant
H/P staging versus agreement with MRI	0.033	0.02	significant
H/P stage versus age of menopause	0.22	0.15	NS
TVS/MRI	0.002	0.04	significant
TVS /Hysteroscopy	0.06	0.03	significant

Figure 3

Table 2: Sensitivity and Specificity of MRI Scan in Prediction of Endometrial Cancer Staging

Index	Overall	Stage I	Stage II and more
Sensitivity	81%	79%	35%
Specificity	71.2%	62.1%	10%
NPV		93%	57.8%
PPV		58%	12.7%

DISCUSSION

This study was designed to review both the quality and clinical use of MRI in our practice. We were also able to test the correlation between pre- operative TVS, hysteroscopic assessment and MRI, and post-operative histopathological assessment.

In our study hysteroscopy shows positive findings in all cases. In 43.9% there was an abnormal endometrium and in 56.1 %(28 cases) there was an endometrial polyp. Of the latter 28(75.6%) turned to be stage I EC. There was statistically significant correlation between the pre-treatment findings of endometrial polyp and the subsequent diagnosis of stage I EC. When the statistical parameter was calculated in combination with the growth pattern of the endometrial lesion, there was a positive test probability of 75.6%. A positive likelihood ratio of 0.83 for a post treatment diagnosis of stage I EC with the presence of polypoidal growth was found.

In a systematic review for assessment of the hysteroscopic accuracy in the diagnosis of endometrial cancer, it was found that a positive hysteroscopy increase the probability of cancer to 71.8% whereas, a negative hysteroscopy reduce the probability of cancer to 0.6% ([7]).

Tadashi et al ([8]) found that there is a highly significant correlation between the absence myometrial invasion and the presence of pedunculated endometrial cancerous polyp with a sensitivity of 92% and positive predictive value of 72%. The above correlation may raise the possibility of using Local hysteroscopic resection in surgically frail patient or subtotal hysterectomy in case of surgically inaccessible or difficult total hysterectomy (e.g. obese patients).

The possible reason of our local high NPV and sensitivity

may be the introduction of the 1.5 T MRI scanners which has a superior quality to the old 1T scanner. This was coincides with the local change in the quality control guidelines of the MRI report. This finding is in agreement with Losco et al ([9]) who found a sensitivity of 90%, a specificity of 71%, PPV 93% and NPV of 63% for the MRI in detection of myometrial invasion. In assessing the depth of myometrial invasion, Nakao Y et al ([10]) reported the accuracy of MRI as 62.1%. As to the presence of cancerous myometrial invasion, the PPV was 94.4%, however, the NPV was only 42.2%. This denotes that the MRI offers a significant clinical utility in identification and triage of the cases between local surgical management and referral to tertiary centre .However care should be taken as low specificity mean that some of the cases may be under staged by the MRI.

In the study of the correlation between the TVS and the endometrial cancer, there is statistically significant correlation between the TVS findings (ET, polyp or both) and the presence of endometrial cancer. However we could not find any significant correlation between certain sonographic findings and histopathological staging.

In a systematic review of the use of the TVS in preoperative staging of endometrial cancer ([11]), it was found that sonographic findings like structure and demarcation of the endometrium increase diagnostic specificity only when combined with the measurement of endometrial thickness however, the presence of a fluid within the uterine cavity does not seem to be useful in differentiating malignant from benign disorders. Nevertheless, TVS has not been widely accepted to predict the depth of myometrial invasion or cervical infiltration.

Our previous departmental audit found a sensitivity of 96.8% and NPV is only 48% for endometrial thickness in detection of endometrial cancer. When pipelle sample was added the NPV increased to 99.6%. Gull et al ([12]) have tested the reliability of endometrial thickness (cut off value, < or =4 mm) as a diagnostic test for endometrial cancer was assessed: Sensitivity, 100%; specificity, 60%; positive predictive value, 25%; and negative predictive value, 100%.

In this study there was a statistically significant correlation between the TVS and hysteropscopy as well as TVS and MRI findings. This denotes that with a positive TVS of endometrial thickness >5mm, endometrial polyp or both the likelihood of finding an endometrial lesion in the hysteroscopy is 91% and in the MRI scan is 89.7%.

According to the NHS guidelines, patients with suspected genital malignancy should have been treated within 61 days from the date of their referral by the general practitioner (GP) and within 30 days from the date of diagnosis and decision by the gynaecologist.

Calculation of the time interval from the GP referral to the treatment found that our department was compliant with the NHS fast track guidelines in 95.5% of cases. With regard to the decision treatment interval we were compliant in 89% of cases. Of the 7 patients breaching the target, 2 were breached because of the delay in the treatment at the tertiary centre which made the actual compliance percentage 92%. (Table 3)

Figure 4

Table 3: Cancer waiting time report.

Period in days	GP to treatment	Decision to treatment
<20	0	53 patients (80%)
20-30	2 patients (3%)	6 patients (9.5%)
31-50	53 patients (80%)	5 patients (7.5%)
50-60	8 patients (12.5%)	2 patients (3%) (breaches at the tertiary oncology centre)
>61	3 patients (4.5%)	0
Total	66 patients (100%)	66 patients (100%)

GP to treatment interval target is 61 days
Decision to treatment interval target is 31 days

The main non-surgical benefit of concentrating care to the hands of designated gynaecologists in an oncology centre, are the coordination of the patient care, improved staging and recording of accurate prognostic factors and greater recruitment to the clinical trial. It is clear that whoever cares for endometrial cancer patients must set a quality standard, as in the cancer centre. The first step is accurate data collection. There is a mandatory need for a universal form, or data base, where all data about the patient is introduced, facilitating audit procedure as well as rapid retrieval of these data when needed e.g. in cases of recurrence.

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