

## MR SPECTROSCOPY OF ENDOMETRIAL CANCER - INITIAL RESULTS AT 3T

G. Charles-Edwards<sup>1,2</sup>, R. Johnstone<sup>1</sup>, S. Natas<sup>1</sup>, and A. Jacques<sup>1</sup>

<sup>1</sup>Guy's & St Thomas' NHS Foundation Trust, London, United Kingdom, <sup>2</sup>King's College London, London, United Kingdom

### **Introduction**

Endometrial carcinoma is the most common gynaecological malignancy in Western countries. Poor prognostic factors are associated with high histological grade (grade 3 vs grade 1), high grade histological subtype (e.g. serous, clear cell, or sarcomatous) and with evidence of deep myometrial or cervical invasion on MRI. Preoperative assessment of these features is important in planning appropriate surgery. However, it is recognised that the biopsy-based histological grade does not always correspond with the final histological grade determined post-hysterectomy. This results in some patients having less aggressive initial surgery, while others will have unnecessary extensive lymph node dissection. Consequently there is a need for additional information to improve preoperative assessment. MR spectroscopy (MRS) has been used at 1.5T to provide metabolic information regarding endometrial cancer [1], although results have been hampered by poor SNR. 3T offers greater SNR and improved spectral resolution, but to our knowledge there are no reports of endometrial MRS at 3T in the literature.

### **Aim**

The goal of this work was to explore the potential of MRS at 3T to provide metabolic information of endometrial cancer.

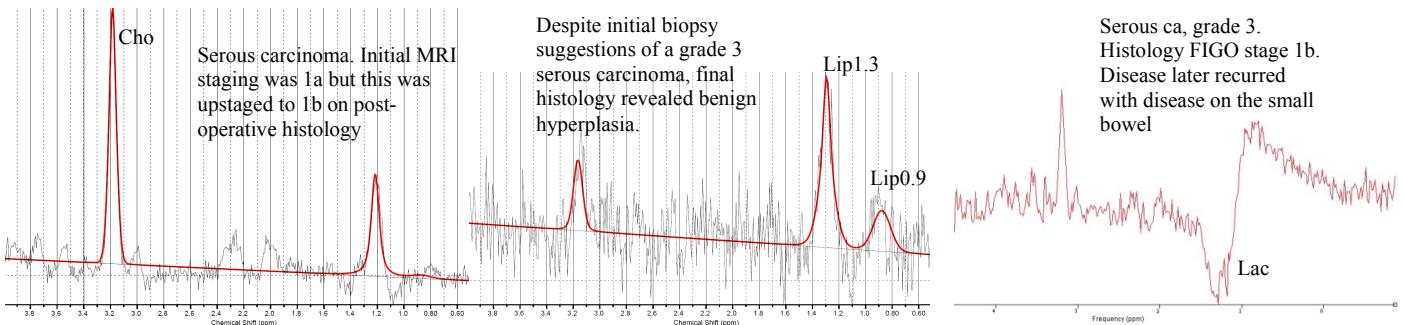
### **Methods**

Biopsy-proven endometrial cancer patients, referred for MRI scan as part of their clinical management, were invited to take part in this study. All patients gave informed consent, and the study was approved by the local research ethics committee. MRS data were acquired on a 3T Achieva MRI system (Philips, Best, Netherlands) using a 32 channel cardiac coil. A PRESS sequence was used with a TE of 144 ms to aid identification of any lactate that was present. Other sequence parameters were: TR = 2000 ms, 128 signal transients, 16 step phase cycle. The voxel size was adjusted to match the lesion seen on T2W MRI. An unsuppressed water MRS dataset was acquired and used as an internal reference to provide concentration values of metabolites in institutional units. MRS data were processed with LCModel [3] using a limited basis set of choline and lipids. The figure shows an example of voxel positioning on T2-weighted MR images.



### **Results**

One spectra at 3 T was excluded due to a poor shim (unsuppressed water FWHM > 20 Hz). Although the numbers and patient groups are too small to reveal significant correlations with pre and post operative grade/staging a number of observations have been made. A choline peak was apparent in most cases and was prominent in most higher grade tumours. Lipid peaks were observed in all cases, but were more prominent in lower grade tumours. The only tumour proven to be benign demonstrated a relatively small choline peak but prominent lipid peaks. An inverted lactate doublet at 1.3 ppm was observed in one case of a grade 3 serious carcinoma. Three example spectra are shown below demonstrating some of these findings.



### **Discussion**

To our knowledge this is the first report of MRS in endometrial cancer at 3T. Although the numbers are not yet large enough to show any correlation they demonstrate the potential information and variation of results that can be obtained in these patients. Further work is required to demonstrate any potential of MRS to improve preoperative MR-staging of endometrial cancer and hence better guide the most appropriate treatment.

### **References**

- [1] Celik O, *et al.* Eur J Obstet Gynecol Reprod Biol (2005)118:241-5.
- [2] FIGO. Int Journal of Gynecology and Obs (2009)105:103-4.
- [3] Provencher SW. Magn Reson Med (1993)30:672.