INTRODUCTION

Recent studies have assessed whether multiparametric magnetic resonance imaging (mpMRI) of the prostate can be a cost-effective initial screening tool for prostate cancer (1), effectively reducing the numbers of patients who undergo biopsy and increasing the diagnosis of prostate cancer. A proposed model is that mpMRI of the prostate should be carried out prior to biopsy in patients who are deemed to be at risk of prostate cancer as opposed to proceeding to transrectal US guided biopsy of the prostate prior to MRI (NICE guideline (2)).

A recent study (3) proposed that for those undergoing mpMRI with active surveillance - for every 1000 mm suspected of prostate cancer, using mpMRI would avoid 340 biopsies, detect an additional 20 significant cancers, and detect 10 fewer insignificant cancers compared with active surveillance alone. A Dutch study (4), in an analysis of cost effectiveness of mpMRI prior to biopsy (using a costing of 345 euros per MRI), found that using mpMRI prior to biopsy was a cost effective model.

PIRADS scoring systems (1) are used to calculate the likelihood of the presence of cancer based on the overall score of up to four modalities of MRU. The original PIRADS scoring system used four modalities: T2 weighted imaging (T2W), diffusion weighted imaging (DWI), and dynamic contrast enhanced imaging (DCE) and spectroscopy (MRS) being omitted.

In our study we set out to determine which of the four modalities showed enhanced imaging (DCE) (MRS being omitted) (T2W), diffusion weighted imaging (DWI), and dynamic contrast enhanced imaging (DCE) in a selected patient cohort to establish the modality correlated best with radiological findings of malignancy. We evaluated four parameters (T2W, DWI, MRS, and DCE) in a selected patient cohort to establish the parameters used in mpMRI without a compromise in accuracy.

In our institution mpMRI composing of T2W, DWI, MRS and DCE could facilitate a more cost effective screening programme to be implemented for this patient group. Reduced scan time and costs would strengthen the case for a modified mpMRI to be used prior to Transrectal US guided biopsy in selected active surveillance patients.

RESULTS

121 patients who were suspected of having low volume prostatic carcinoma (ov DRE, PSA assessment) underwent mpMRI i.e standard T2w, DWI, MRS and DCE. Standard PIRADS (V1) radiological assessment was carried out in 121 patients, the first 100 were double reported by two radiologists that remaining 21 were reported by a single radiologist. Pearson correlation coefficients were calculated for each parameter against the total PIRADS score to assess the potential prognostic value for each modality at T2w, DWI, MRS and DCE.

METHODS

121 patients who were suspected of having low volume prostatic carcinoma (ov DRE, PSA assessment) underwent mpMRI i.e standard T2w, DWI, MRS and DCE. Standard PIRADS (V1) radiological assessment was carried out in 121 patients, the first 100 were double reported by two radiologists that remaining 21 were reported by a single radiologist. Pearson correlation coefficients were calculated for each parameter against the total PIRADS score to assess the potential prognostic value for each modality at T2w, DWI, MRS and DCE.

RESULTS

121 patients analysed: selected cohort - suspected low volume disease. (+1 = perfect positive, -1 = perfect negative, 0 = no linear correlation) T2w = 0.754 DWI = 0.8264 MRS = 0.6596 DCE = 0.5953

Of the 121 patients reviewed 21% fell into the probably malignant/malignant category based on a PIRADS score of 13-20.

CONCLUSION

DWI/ADC mapping demonstrated the best prognostic correlation to overall PIRADS score. The showed the next most accurate correlation. In this patient cohort MRS and DCE imaging were of less value in prognostic correlation. Therefore it would be reasonable to propose that for an effective screening programme in potential small volume Ca prostate patients, MRI could be tailored to T2W and DWI imaging only. Elimination of contrast combined with a reduction in scan time would significantly enhance patient tolerance and reduce morbidity. The resulting time and cost savings could facilitate a more cost effective screening programme to be implemented for this patient group. Reduced costs would strengthen the case for a modified mpMRI to be used prior to Transrectal US guided biopsy in selected active surveillance patients.

REFERENCES

2. Prostate cancer: diagnosis and management. NICE Clinical Guideline No. [CG75]. Published date: January 2014