Utility of PET-CT for nodule discrimination in the SUMMIT Study

P Verghese[1], A Bhamani[1], R Prendecki[1], A Creamer[1], J Dickson[1], C Horst[1], S Tisi[1], H Hall[1], CR Khaw[1], M Mullin[1], S Algodayan[2], F Fraioli[2], K Gyertson[2], S Dawadi[3], A Hacker[3], J McCabe[1], A Hackshaw[3], A Nair[2], SM Janes[1], N Navani[1]

[1] Lungs for Living Research Centre, UCL Respiratory, University College London, London
[2] University College London Hospitals NHS Foundation Trust, London
[3] CRUK & UCL Cancer Trials Centre, University College London, London

INTRODUCTION

Lung cancer screening with low-dose CT (LDCT) allows early diagnosis in high-risk asymptomatic individuals. Positron emission tomography / computed-tomography (PET-CT) is widely established in the diagnostic evaluation of symptomatic suspected early-stage lung cancers, however its role in assessing screen detected pulmonary nodules is yet to be determined.

We describe the utility of PET-CT for lung nodule discrimination in a lung cancer screening cohort.

METHODS

The SUMMIT Study (NCT03934866) aims to assess implementation of LDCT lung cancer screening in a high-risk population and validate a multi-cancer early detection blood test.

Participants with suspected malignant nodules were referred for further investigation, and outcomes collected via study database, National Cancer Registration and Analysis Service and patient record review. PET-CT was considered positive if nodule standardised uptake value (SUVmax) was ≥2.5 or moderate/intense on BTS ordinal scale.

RESULTS

We report 630 patients who underwent PET-CT for a suspected malignant nodule.

563 patients had persisting suspicious nodules, of which 388 were diagnosed with malignancy.

380 lung cancers and 8 non-lung cancers (2 lymphoma, 2 bowel, 1 oesophageal, 1 thymoma, 1 sarcoma, 1 melanoma).

PET-CT was positive in 317/563 (56%): 256 were lung cancer, 6 non-lung cancers and 55 benign.

PET-CT was negative in 246/563 (44%): 124 were lung cancer, 2 non-lung cancers and 120 benign.

RESULTS

The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of PET-CT in discriminating benign from malignant nodules was 68%, 69%, 83% and 49% respectively, at this SUVmax threshold. Area under the receiver-operating curve (AUROC) is 0.770 (95% CI: 0.730, 0.809; p<0.001), demonstrating acceptable, rather than excellent, test performance (figure 1).

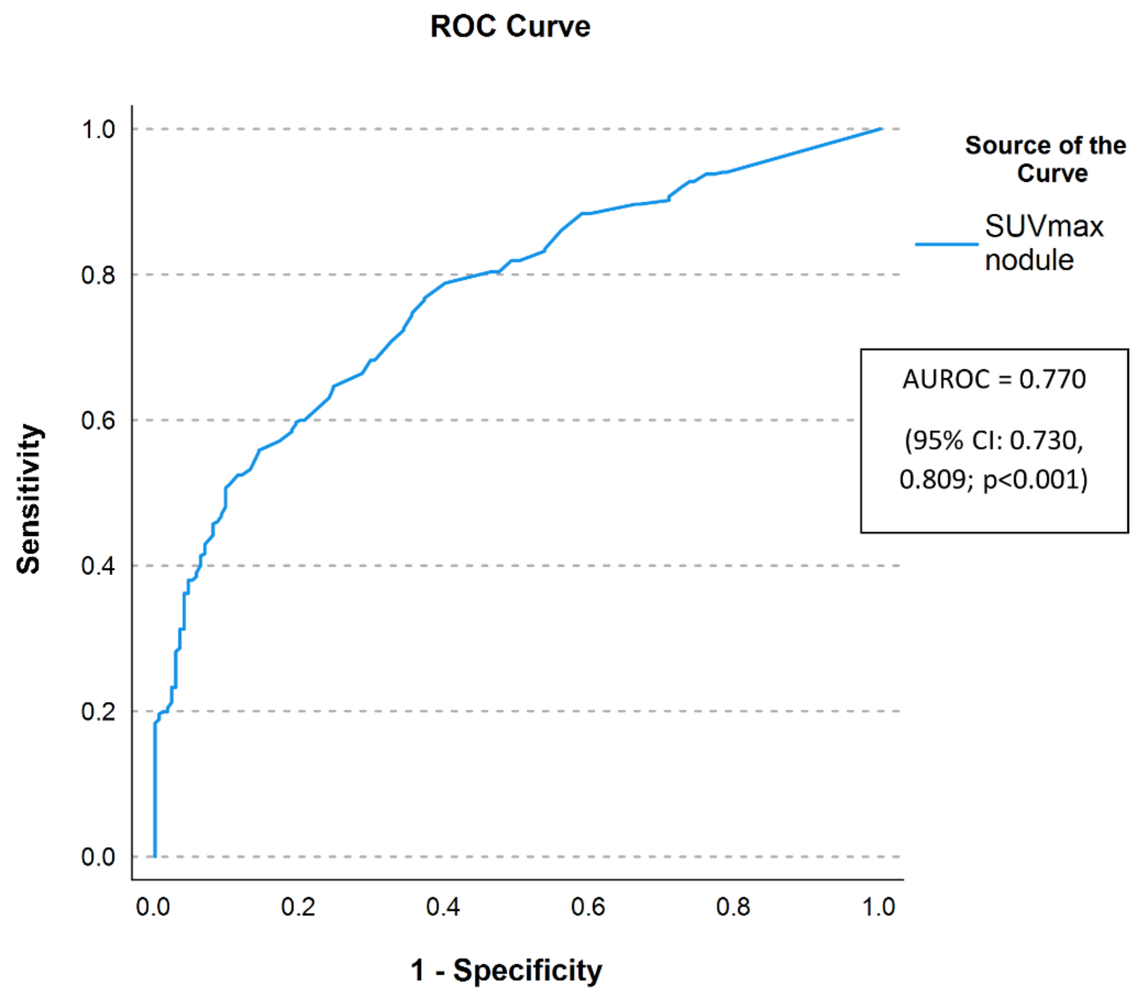

Figure 1. Receiver-operating curve for SUVmax of pulmonary nodule on PET-CT

DISCUSSION

We demonstrate that PET-CT has sub-optimal sensitivity, specificity and NPV in discriminating malignant from benign nodules in a screening cohort. Further work is ongoing to determine the role of PET-CT in evaluating screen detected nodules.

THE SUMMIT STUDY IT'S ABOUT TIME DETECT EARLY. TREAT EARLY. LET'S TACKLE CANCER.
Cancer Research UK and UCL Cancer Trials Centre
90 Tottenham Court Road, London, W1T 4TJ
Enquiries: +44 (0)20 7679 9898, F: +44 (0)20 7679 9899
lungsforliving Leading Lung Cancer Research
GRAIL
NHS University College London Hospitals NHS Foundation Trust