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Biojet MRI/TRUS fusion: A new computerised registration system
M. Valerio, H.U. Ahmed, M. Emberton
University College London, United Kingdom

The use of multi-parametric MRI has allowed lesions to be targeted in order to improve the detection of clinically significant prostate cancer, using fewer cores that may derive improved risk stratification. As a consequence, various platforms are being developed in order to allow MRI/TRUS fusion, which may facilitate the dissemination and diffusion of this novel diagnostic pathway. In this video, we present the complete workflow and demonstrate a case of targeted biopsy using one of these new systems, named Biojet (GeoScan).

The device is composed of an external computer, a stepper with a stabilizer and a tracking system. The prostate MR images are uploaded into the Biojet software prior to the procedure and the prostate and any suspicious lesions are contoured separately. During the procedure, after calibrating the stepper and the brachytherapy grid to the ultrasound image, the MRI and the TRUS are synchronised using the tracking system in a rigid manner. The Biojet system allows real-time visualization of the needle biopsy in all the areas of the prostate, and particularly in the region suspected to harbour prostate cancer. This allows the surgeon to guide the needles exactly to the pre-defined areas. In this video, we show a successful ‘hit’ via a transperineal approach. The system can also work via a transrectal approach.

This system is being currently evaluated in our unit in a prospective real-practice setting. Consecutive patients, either treatment-naïve or following radiotherapy, who have a suspicion of disease on MRI (radiological score 4 or 5) will undergo transperineal Biojet-targeted as well as our current standard of care, cognitive-targeted biopsy. This will be followed by full prostate sampling using a modified Barzell transperineal template prostate mapping approach. This study design will allow us to compare the accuracy of MRI/TRUS rigid registration to that of MRI-cognitive biopsy.