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Meyer's loop tractography for image-guided surgery depends on imaging protocol and hardware

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ABSTRACT

Introduction: Surgical resection is an effective treatment for temporal lobe epilepsy but can result in visual field defects. This could be minimized if surgeons knew the exact location of the anterior part of the optic radiation (OR), the Meyer's loop. To this end, there is increasing prevalence of image-guided surgery using diffusion MRI tractography. Despite considerable effort in developing analysis methods, a wide discrepancy in Meyer's loop reconstructions is observed in the literature. Moreover, the impact of differences in image acquisition on Meyer's loop tractography remains unclear. Here, while employing the same state-of-the-art analysis protocol, we explored the extent to which variance in data acquisition leads to variance in OR reconstruction.

Methods: Diffusion MRI data were acquired for the same thirteen healthy subjects using standard and state-of-the-art protocols on three scanners with different maximum gradient amplitudes (MGA): Siemens Connectom (MGA=300 mT/m); Siemens Prisma (MGA=80 mT/m)