

High-resolution 3D MR imaging of the sellar and parasellar space using SPACE at 3.0 T

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Purpose

Spin-echo (SE) sequence has advantage for sellar and parasellar imaging over gradient-echo (GE) sequence due to less susceptibility effect. However for higher resolution, high SAR at 3T makes it difficult to obtain T1-weighted 3D SE images. Sampling perfection with application-optimized contrasts by using different flip angle evolutions (3D-SPACE) with parallel imaging has recently realized high-resolution 3D SE images for clinical use. The purpose of this presentation is to describe advantages of high-resolution 3D MR imaging of the sellar and parasellar regions using SPACE, inclusive of discussion on image characteristics of 3D-SPACE.

Outline of Contents

1. Review and explain technical basis of 3D-SPACE.
2. Important parameters of 3D-SPACE, which influence on image quality.
3. Characteristics of 3D-SPACE images compared with 2D-SE or 3D-GE images (advantages and disadvantages).
4. Detailed description of normal anatomy around sellar and parasellar regions by 3D-SPACE images compared with the conventional images.
5. Clinical cases visualized with 3D-SPACE, including pituitary adenoma, parasellar tumors and inflammatory diseases that affect sellar and parasellar regions.

Summary

High-resolution 3D MR imaging using SPACE has important advantages in the following points: 1) high-resolution volume images that allows multi-planer reconstruction, 2) less susceptibility artifact and 3) superior contrast of Gd-contrast agent. High-resolution 3D MR imaging using SPACE at 3T can be very helpful for imaging of complicated small anatomical structures at sellar and parasellar regions, which may be applicable at other regions such as brain stem or inner ear.

Figure

52-year-old female with IgG4-related hypophysitis. T2-SPACE image (left) shows pituitary stalk thickening suggesting pituitary stalk mass. T1-SPACE after Gd contrast material administration shows distinct less enhancing lesion posterior to the anterior pituitary (center). MPRAGE-CE image (right) did not apparently depict the lesion.

