Purpose: The purpose of this work is to implement the CS-based MRI in DCE-MRI to develop a new method that can exhibit both high temporal and high spatial resolution results, which are significant for DCE-MRI and related diagnosis. **Method and Materials:** By exploring the DCE specific characteristic that administration of contrast agent (CA) induces change only in image signal intensity in certain areas such as vessels and lesions, no significant change in anatomical structure, we have developed a novel approach, Reference imAge based Compressed sEnsing (RACE) to capitalize the sparsity and compressibility of DCE-MRI. Phantom experiments have been performed on an MAGNETOM ESSANZA 1.5T MRI scanner (Siemens, Erlangen, Germany)focusing on the study of temporal and spatial resolution, respectively. Spatial finite difference (SPD) is chosen to be the sparse transformation. 3D radial sampling is implemented as under sampling scheme. The reconstruction is based on solving a constrained total variation (TV)-norm minimization problem. **Results:** According to the phantom experiments, during a same time course, much more (up to 10 times) time frames can be obtained with RACE which means higher temporal resolution. The comparisons demonstrate that the details of the dynamic curves can be detected using RACE especially when the intensity varying rate is high (Fig.3 c). Meanwhile, the spatial resolution is not degraded. **Conclusion:** This work proved that RACE, which properly explored the features of DCE-MRI, can significantly improve the temporal resolution of DCE-MRI without degrading its spatial resolution. **Conflict of Interest (only if applicable):** Phantom experiments are supported by Siemens Mindit Magnetic Resonance Ltd. Co.