

以雙能電腦斷層虛擬高能量影像降低脊椎開刀經椎體部螺絲造成金屬假影提升診斷 正確性 並與單能量多切電腦斷層比較 DP082-SP

Elimination of Streak Artifacts by Transpedicular Screws in Patients with Spinal Instrumentation with Dual Energy Computed Tomography with Virtual Monochromatic Spectral High Energy Images and Compared with Mono-Energetic Multi-Detector CT

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**PURPOSE:** To evaluate application of dual energy computed tomography (DECT) with virtual monochromatic spectral (VMS) high energy images in eliminating streak artifacts caused by transpedicular screws (TPS) in patients after spinal instrumentation and compared with mixed images simulating mono-energetic multi-detector computed tomography (MDCT).

**MATERIAL AND METHODS:** From June 2010 to October 2012, 52 patients (19 men and 33 women, mean age of 62.7) underwent DECT for failed back syndrome after spinal instrumentations were recruited for study. The DECT machine was Siemens Somatom Definition Flash. The DECT images after processing with VMS 180 kVp images and mixed images (50% 80 kVp and 50% 140 kVp) simulating mono-energetic MDCT were collected for comparison. All the TPS were analyzed about possible violation or penetration of adjacent pedicle or vertebral cortex and screw loosening. The distinguishability of each transpedicular screw and adjacent cortex were evaluated with a 3-level scoring scale (0: ambiguous beyond evaluation; 1: equivocal; 2: confident) and compared the two image sets with paired t-test.

**RESULTS:** 70 TPS penetrating adjacent pedicular cortices, 55 TPS violating vertebral cortices and 33 TPS loosening were found on DECT. Significant statistic difference between the VMS 180 kVp and mixed 50% images ( $p < 0.001$ ) about distinguishability scores is noted from statistic analysis.

**CONCLUSION:** DECT with VMS 180 kVp high energy images can greatly reduce streak artifacts caused by TPS in spinal instrumentation, markedly superior to the mixed 50% 80 kVp and 50% 140 kVp images simulating conventional mono-energetic MDCT. So DECT with VMS high energy images can promote diagnostic accuracy about TPS position or loosening in failed back syndrome.

利用 3T MRI 的 3D-FIESTA 序列影像偵測自發性顱內低壓病人的硬膜缺損位置 DP083-SP  
Detection of Dural Defect Location in Spontaneous Intracranial Hypotension Patient by Using 3D-FIESTA Sequence in 3T MRI

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**PURPOSE:** The purpose of this study was to evaluate the role of 3D fast-imaging employing steady-state acquisition (3D-FIESTA) in 3T MRI for assessing whether dural defect or CSF leakage area in spontaneous intracranial hypotension (SIH) patients.

**METHODS:** Between January 2011 and October 2012, 12 SIH patients (7 men, and 5 women, median age 37 years old) presenting with orthostatic headache with spontaneous subdural effusions or intracranial venous enlargement were enrolled. Patients underwent a spine MRI with 3D-FIESTA sequence in 3T MRI. All the patients were treated with epidural blood patch procedure with the injection site at the detected CSF leakage level. The patients were asked to lie down at supine or prone position according to the dural defect location. Treatment results were evaluated clinically for 3 months.

**RESULT:** Dural defect were detected at the cervical (n=3), thoracic (n=8), or lumbar (n=1) spine. Single (n=5) or multiple (n=7) dural defect sites were detected. Only one dural defect was in the ventral site. Epidural blood patch procedure was applied in one level of all patients. Clinical improvement was achieved in all patients and without recurrent attack within 3 months follow up.

**CONCLUSION:** The 3D-FIESTA in 3T MRI allows the reliable detection of spinal CSF leaks and can offer the treatment guide. The targeted epidural BP procedure with compared post operation position is a safe and efficacious treatment.