Validation of Skull X-Rays as a Sensitive Screening Tool to Identify Recurrence after Cerebral Aneurysm Coiling

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Introduction

Aneurysm recurrence and coil compaction are recognized in the treatment of cerebral aneurysms with endovascular coiling. High rates of recurrence have prompted frequent follow-up of patients using expensive (MRA) and/or invasive (DSA) imaging modalities. We hypothesized that skull x-rays used to assess changes in the coil mass would be a sensitive and effective method to screen patients for aneurysm recurrence.

Methods

86 patients harboring 90 aneurysms were prospectively enrolled after endovascular coiling. Patients were studied post-procedure and at 6-month intervals with AP and lateral skull x-rays. DSA at 6-months was used as the gold standard to identify aneurysm recurrence. Skull x-rays were evaluated for changes in the morphology of the coil mass independently by 2 investigators who were blinded to angiographic findings. Discrepancies were resolved by consensus.

Results

DSA demonstrated recurrence or coil compaction in 37 aneurysms (41%). All of these aneurysms demonstrated changes in the morphology of the coil mass on skull radiographs resulting in sensitivity of detecting recurrence of 100% (CI 91-100%). Similarly, the absence of changes on skull radiographs was never associated with aneurysm recurrence (0/44). Of 53 aneurysms without recurrence on DSA, 44 demonstrated no change on skull radiographs and 9 demonstrated morphological changes for a specificity of 83% (CI 70-92%). The positive likelihood ratio (LR) was 5.9 (CI 3.2-11) and the negative LR was 0. Aneurysm recurrence was deemed significant enough to warrant retreatment in 13 recurrent aneurysms for an overall retreatment rate of 14%.

Conclusions

Morphological changes in the coil mass on skull x-rays are highly sensitive and effective in detecting both aneurysm recurrence and coil compaction in patients treated with aneurysm coiling. We propose that this methodology can be used to decrease the need for repeated expensive or invasive radiographic follow-up of coiled aneurysms.

Learning Objectives

By the conclusion of this session, participants should be able to 1) Recognized the risk of recurrence after aneurysm coiling, 2) Describe the use of skull x-rays to identify morphological changes in coils, 3) Identify skull x-rays as a sensitive method to identify aneurysm recurrence or coil compaction.

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