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Abstract Details

PRESENTATION TYPE: Case Report Poster

CURRENT CATEGORY: Interventional

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Young Investigator Award Eligible: Does Not Apply

Abstract

TITLE: Novel technique using MRI/X-ray overlay to guide sclerotherapy for treatment of low-flow vascular malformations in children

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ABSTRACT BODY:

Purpose or Case Report: Currently, 2-dimensional (2D) X-ray imaging is the standard imaging modality for guiding sclerotherapy as it provides real-time visualization of the sclerosing agent distribution. However, fluoroscopy does not provide soft-tissue lesion characterization. 3-dimensional (3D) magnetic resonance imaging (MRI) details the extent of the lesion, but is traditionally viewed on a separate monitor. This abstract describes the novel technique of using syngo InSpace 3D/3D Fusion and syngo iPilot Dynamic software applications (Siemens Healthcare AG, Forchheim, Germany) to superimpose 3D MRI on live 2D fluoroscopy for real-time monitoring of the sclerosing agent distribution within the vascular malformation.

Methods & Materials: Initially, the pre-procedural 3D MRI dataset is segmented using the volume-of-interest punching and color rendering tools from syngo InSpace 3D to visualize the lesion. A 3D rotational C-arm Computed Tomography (syngo DynaCT) dataset is acquired without radiation and merged with the MRI dataset using 3D/3D Fusion in order to register the MRI volume to the C-arm and patient table positions. Using iPilot Dynamic, the MRI volume is then registered to the anatomic region of the patient in two fluoroscopic planes, frontal and lateral (2D/3D registration). During the procedure, iPilot Dynamic overlays 3D MRI lesion on real-time fluoroscopic images.

Results: Thirteen sclerotherapy procedures using 3D/3D Fusion and iPilot Dynamic were performed in 5 males and 8 females, with a mean age of 11.09 years. Locations of the lesion include head and neck (7/13), lower extremity (3/13), and upper extremity (3/13). A post-procedural physician questionnaire reported an increase in intra-procedural lesion treatment confidence in 10/13 procedures performed using this technique.

Conclusions: MRI/X-ray overlay brings 3D lesion information directly to the interventional procedure, enabling physicians to monitor real-time sclerosing agent distribution within the lesion. Our preliminary results show that the added information acquired by this technique increases physician confidence of lesion therapy during the procedure. One limitation of the current technique is interval growth of lesion and patient, especially when there is a significant time lapse between the MR study and the interventional procedure.

SUPPLEMENTAL DATA: MR Overlay 1.pdf

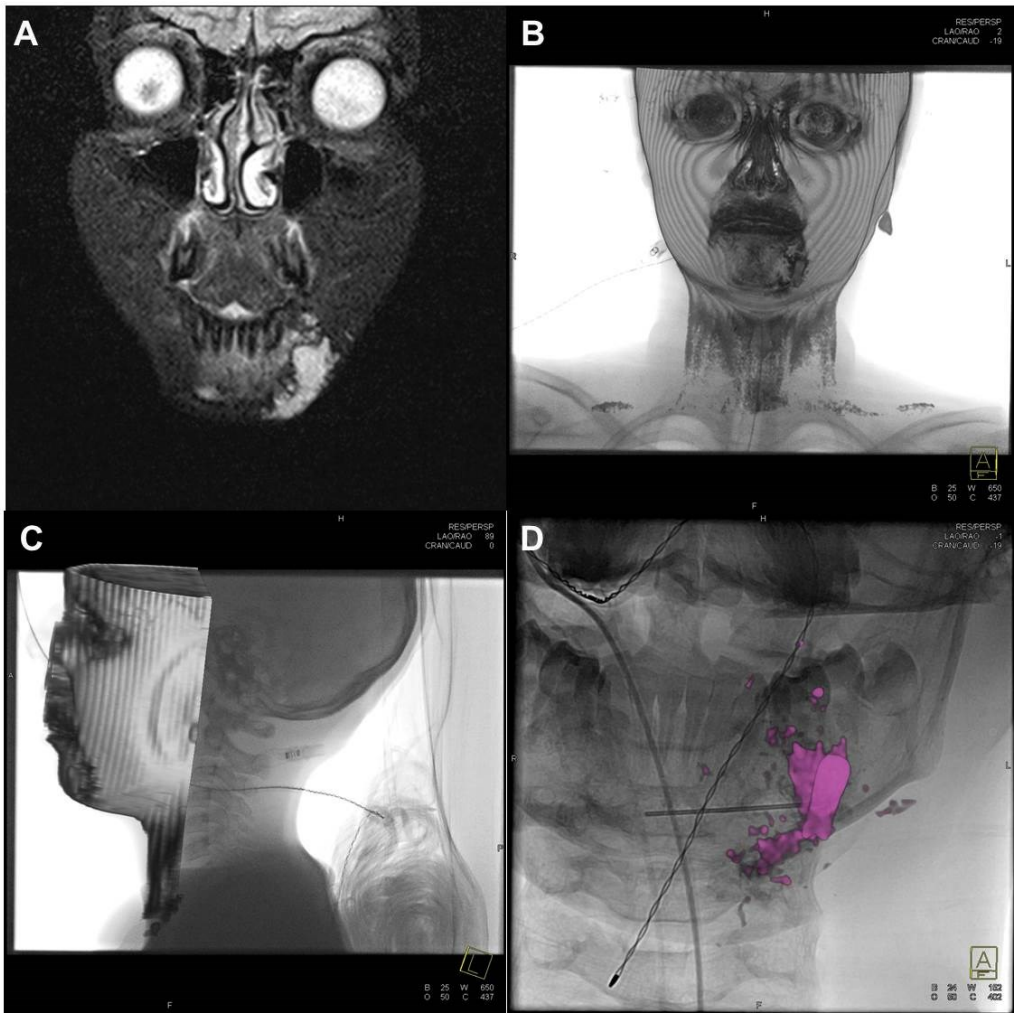

Figure 1: **A)** T2 STIR coronal MRI showing vascular malformation in the left submandibular **B)** anterior-posterior & **C)** lateral fluoroscopic images showing MRI registration **D)** vascular malformation shown in MRI (pink) superimposed on the grey-scale fluoroscopic image.