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W E Phillips, 2nd, F R Murtagh and J Brenner

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Recognition of the Aberrant Right Subclavian Artery on Cervical Spine MR

W. Eugene Phillips II, F. Reed Murtagh, and Jeff Brenner

Summary: Neuroradiologists performing cervical spine MR scans are reminded that an aberrant right subclavian artery is detectable on sagittal cervical spine views. This review of 335 consecutive patients revealed two such anomalies for a prevalence of 0.6%, which compares favorably with the published range of occurrences in the literature (0.5 to 2%).

Index terms: Arteries, subclavian; Arteries, abnormalities and anomalies; Arteries, anatomy; Arteries, magnetic resonance; Spine, magnetic resonance

The aberrant right subclavian artery (ARSA) is the most common anomaly of the aortic arch vessels, classically occurring in 0.5 to 2% of the population (1–5). An ARSA is one that arises as the distal branch of the aortic arch rather than as a branch of the brachiocephalic trunk. Magnetic resonance (MR) can be a valuable adjunct to traditional radiographic studies of vascular anomalies of the aortic arch, which is well recognized throughout the literature. The purpose of this article is to illustrate the appearance of the ARSA on sagittal cervical spine MR views and to remind neuroradiologists of this appearance.

Materials and Methods

A retrospective review of 335 consecutive patients (4 months to 83 years of age; mean, 39 years) undergoing MR studies of the cervical spine from September 1991 to November 1991 were reviewed. There were 145 male and 190 female patients. All MR scans were performed at 1.5 T. Sagittal T1- and sagittal and axial gradient echo T2-weighted pulse sequences were available. Sagittal, 3- to 5-mm (1-mm "gap") spin-echo (450 to 600/15 to 25/1 to 2 [repetition time/echo time/excitations]) and axial 5-mm (2.5-mm "gap") spin-echo (2500 to 2800/30 to 40) images were obtained and evaluated in all patients.

Results

Two patients of the 335 were found to contain this anomaly, a prevalence of 0.6%. The prevalence of normal findings was the same in male and female patients (one boy, 11 years of age; one girl, 17 years of age). There were 144 healthy male patients and 189 healthy female patients. The level at which the aberrancies were found was at the second thoracic vertebrae in both cases (Figs 1 and 2).

Discussion

The first case in the medical literature of an aberrant right subclavian artery (ARSA) was recorded in 1735 by Hunauld (5). The first radiographic diagnosis was reported by Kommerell in 1936 (6). The most common symptom is dysphagia, so-called dysphagia lusoria, found in approximately 10% of cases (4). The anomaly is most often asymptomatic, however, as was the case with our patients. Embryologically, the ARSA develops when the fourth aortic arch on the right is disrupted in the embryo and the artery arises from the right dorsal aortic root (3). In the majority of cases, the ARSA runs posterior to the esophagus (7). It uncommonly courses between the trachea and esophagus and rarely passes anterior to the trachea.

With the abundance of cardiothoracic and neurosurgical procedures related to the aortic arch, esophagus, and anterior vertebrae, the surgeon might benefit from knowing of this aberrancy (8). Various anomalies that are associated with the presence of an ARSA include coarctation of the aorta, tetralogy of Fallot, and interrupted aortic arch (7).

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University of South Florida, College of Medicine, Department of Radiology, Tampa, FL 33612, and University Diagnostic Institute, University of South Florida, Florida, Tampa, FL 33612.

Address reprint requests to W. Eugene Phillips II, 3018 Ridgecrest Drive, Augusta, GA 30907.

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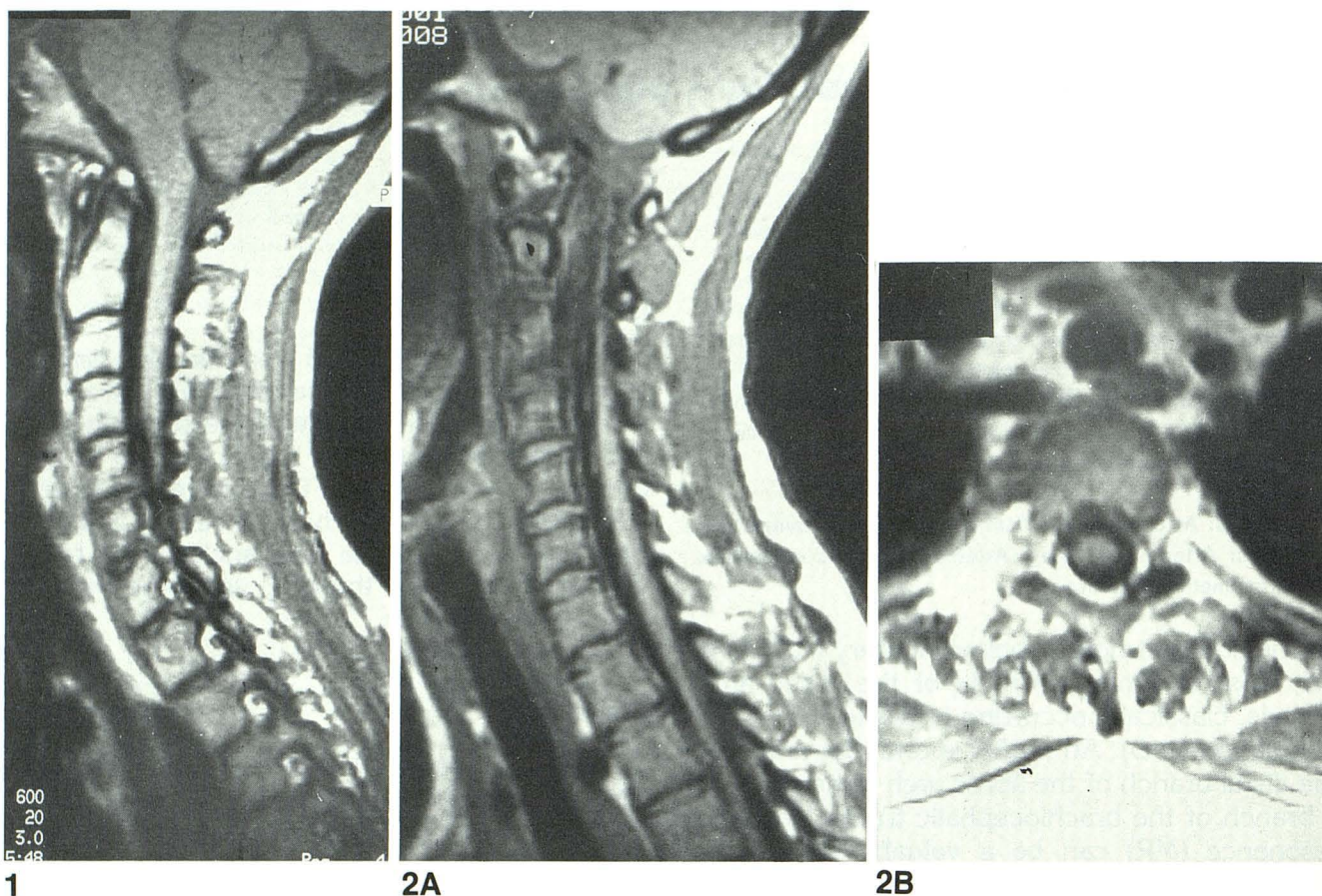


Fig. 1. Sagittal MR image of a normal right subclavian artery (NSA arrow).

Fig. 2. A, ARSA (SA arrow) coursing posterior to the esophagus (E) seen in sagittal plane.

B, ARSA (SA arrow) seen in the axial plane. Notice the relation of the subclavian artery to the esophagus (E).

An ARSA is often recognized by radiologists by posterior indentation of the esophagus during barium esophagrams, subtle findings on chest radiographs, computed tomography, angiography (fluoroscopically), and most recently now by MR (2). MR can show the ARSA as it arises from the most cephalad portion of the aorta and crosses to the right, passing anterior to the esophagus (Fig 2). MR provides highly sensitive anatomic findings without exposure to radiation or the necessity for an invasive procedure.

Conclusion

Our finding of 0.6% of patients with ARSA compares favorably with published values. This illustrates the clinical efficacy of sagittal cervical spine MR for detecting ARSA. It is important to suspect ARSA because it can be easily overlooked. MR imaging is emerging as the best

noninvasive vehicle for the study of the cardiovascular system.

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The patient was in grade III. The 1-week follow-up angiogram showed still some residual filling of the aneurysm (Fig 2B). The 1-year follow-up showed that the aneurysm was occluded and, most importantly, demonstrated the real happy face sign (Fig 2C). This patient is now neurologically intact.

Again, in wide-necked aneurysms, crossing the neck area with several loops of sizeable GDCs (Fig 3) is the next technical challenge in the development of this still-evolving

endovascular technique. In small-necked aneurysms (neck diameter equal or less than 4 mm) it is already possible, with the currently available GDCs, to fill the body and neck of an aneurysm with complete aneurysm occlusion. Ciao, Giuseppe!

Guido Guglielmi
Neuroendovascular Therapy Service
University of California, Los Angeles
School of Medicine

Erratum

In our November/December 1993 issue, the second sentence in the first paragraph on page 1406 of the article "Recognition of the Aberrant Right Subclavian Artery on Cervical Spine MR" should have read, "MR can show the ARSA as it arises from the most cephalad portion of the aorta and crosses to the right, passing posterior to the esophagus (Fig 2)." (The article was published with the word *anterior* instead of *posterior*.)

Figures 1 and 2 (A and B) from the article appear below. The arrows mentioned in the figure legends were inadvertently omitted from the figures published. Figure 2 shows the ARSA passing posterior to the esophagus.

The editors regret the errors.

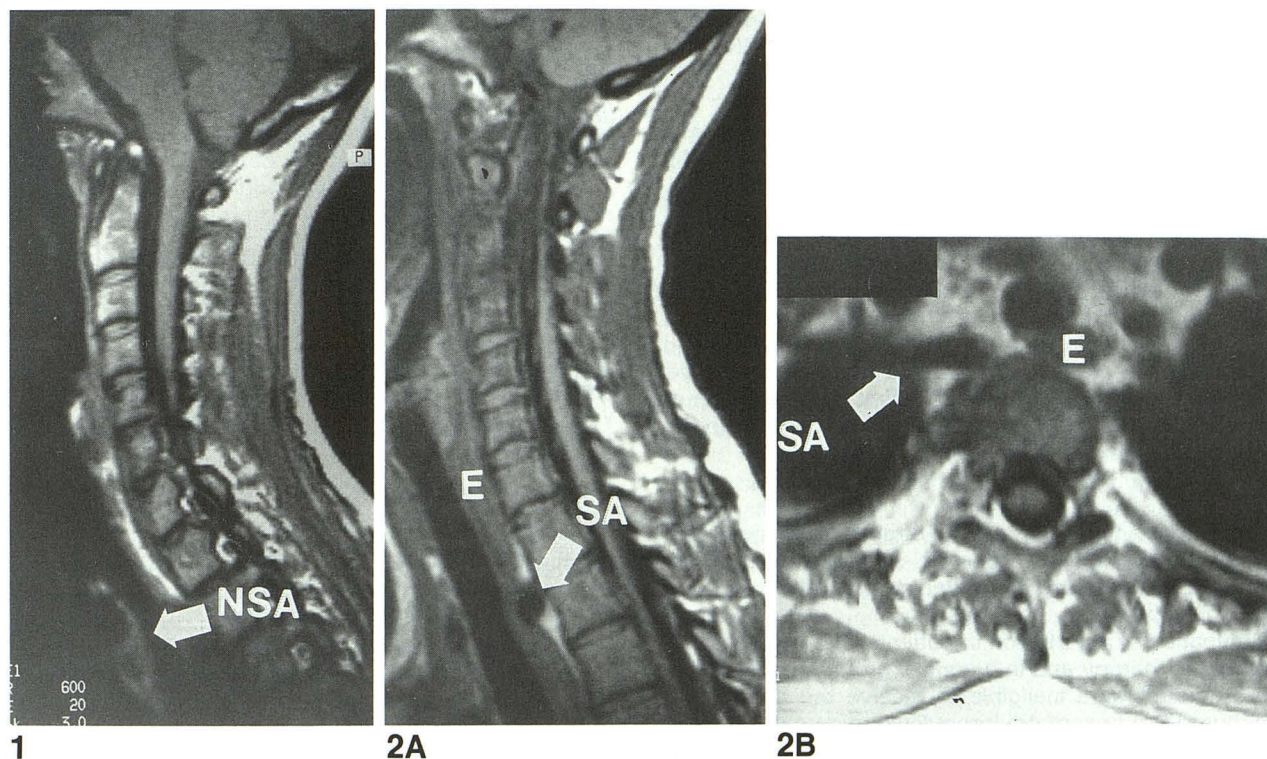


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