The study of the thoracic aorta represents one of the most frequent requests to cardiovascular Magnetic Resonance Imaging centers **(1).**

Congenital abnormalities of aortic arch represent less than 1% of all congenital cardiac defects. They occur with about an equal frequency in both sexes with no geographical or racial predominance **(2).**

Aortic malformations may be associated with other congenital heart abnormalities or may present independently as an incidental finding in asymptomatic patients **(3).**

There are five primary groups of anatomical arch anomalies: double aortic arch, right aortic arch with mirror image(i.e., normal) branching, right aortic arch with abnormal branching, left aortic arch with abnormal branching, and cervical aortic arch. Aortic arch anomalies are associated with a chromosome 22q11 deletion in approximately 20% of patients **(2).**

Clinically, aortic arch anomalies can be divided into those that cause (or likely to cause) physiological abnormalities and those that do not. Physiological abnormalities resulting from aortic arch anomalies include tracheobronchial compression, esophageal compression, and abnormal blood flow patterns **(2).**

Management of patients with congenital aortic arch anomalies is considered a diagnostic challenge relying on imaging. Routine imaging modalities, such as conventional X-ray and transthoracic echocardiography, have been recently complemented by MRI ***(4)*.**

For more than 30 years, conventional imaging techniques for detection and assessment of congenital anomalies of the aorta have been used such as chest X ray, echocardiography and angiography. Recently, considerable interest in congenital aortic diseases has been shown, due to technical progresses of non invasive imaging modalities. Among them, MRI almost certainly offers the greatest advantages **(3).**

Conventional X-ray angiocardiography has been considered as a gold standard for diagnosing congenital aortic arch anomalies for many years. But it is an invasive examination and has an ionizing radiation problem. Echocardiography is non invasive but it sometimes can not visualize the aortic arch clearly. Trans-esophageal echocardiography enables to clearly visualize the aortic arch but also is an invasive modality. MRI is a safe and non invasive technique ***(5).***

The diagnostic power of MRI lies in its ability to provide a wide range of information including anatomy, function, flow and chemistry, with minimal risk to the patient. Thus it is considered a valuable tool in clinical medicine and in research ***(6)***.

MRI also has the advantage of not exposing the patient to ionizing radiation. These advantages make MRI more practical for sick and young patients. MRI has proved to be effective in diagnosis of coarctation of the aorta, aortic arch anomalies with vascular rings, pulmonary arterial and venous connections, and complex univentricular lesions ***(7).***

With improvements in scanner technology, the ability of MRI to illustrate the thoracic vessels has significantly improved beyond gross

anatomic depiction. Dedicated software and pulse sequences for vascular imaging have become commercially available and offer improved reliability of vascular signal, resulting in enhanced diagnostic accuracy and confidence. Fast imaging, in particular, has improved all aspects of vascular imaging, and has enabled the comprehensive evaluation of most thoracic vascular conditions ***(8).***

A successful MR vascular depiction relies significantly on the proper selection and prescription of imaging pulse sequences. Because of the complex signal characteristics inherent to flowing blood and the complex geometry of many vascular territories, most thoracic vascular lesions can be well evaluated if the appropriate combination of pulse sequences is performed ***(8).***

Since MRI can usually not be brought to the bedside like the TEE, it may not be the first tool used in an emergency situation, but may be used for better definition of the diagnosis ***(9).***