Multidetector CT in Diagnosing Disorders of Thoracic Aorta

Essay

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دور الأشعة المقطعية المتعددة المقاطع في تشخيص آفات الشريان الأورطى الصدري

رسالة
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List of Abbreviations

3D → three-dimensional

ATAI → acute traumatic aortic injury

COA → coarctation of the aorta

CPR → curved-planar reformation

CT → computed tomography

CTA → computed tomography angiography

IAA → interrupted aortic arch

IMH → intramural hematoma

MDCT → multidetector-row computed tomography

MDCTA → multidetector-row computed tomography angiography

MIP → maximum intensity projection

MPR → multiplanar reformation/reconstruction

PAU → penetrating atherosclerotic ulcer

SSD → shaded-surface display

SVAS → supravalvular aortic stenosis

TAI → traumatic aortic injury

TEE → trans-esophageal echocardiography

VE → virtual endoscopy

VR → volume rendering

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Introduction

The clinical presentation of diseases involving the thoracic aorta ranges from a large number of asymptomatic patients with a clinical undetectable thoracic aneurysm to patients with symptoms of severe chest pain as a result of acute aortic dissection. Thoracic aortic disease often remains undiagnosed until a life threatening complication occurs or the disease is discovered serendipitously on imaging studies performed for other purpose. MDCT imaging of the aorta is used to diagnose various acute and chronic conditions, including aortic aneurysm, aortic dissection, intramural haematoma, penetrating atherosclerotic ulcer, traumatic injury, rupture, inflammatory disorders and congenital malformations ***(Abbara et al., 2007).***

MDCT with a rapid bolus intravenous injection of contrast enables the fast and noninvasive evaluation of the thoracic aorta. From this data, thin sliced contagious axial images are replacing conventional angiography and now playing a dominant role in the evaluation of aortic diseases ***(Koji et al., 2005).***

MDCTA offers several advantages over conventional aortography in evaluation of the thoracic aorta. State-of-the-art MDCT scanners with improved temporal and isotropic resolution, enable volumetric acquisition that provides clear

anatomic delineation of thoracic aorta, its tortuous branches and adjacent aneurysm and pseudo aneurysms. In contrast with the projectional technique of conventional aortography, these frequently overlapping structures can affect visualization and delineation of anatomic relationships. In addition MDCTA allows simultaneous delineation of true and false luminal flow channels in thoracic aortic dissections, intramural hematomas communicating with the aortic lumen, as well as direct visualization of the aortic wall and non communicating intramural hematomas ***(Rubin et al., 2006).***

Recent progress in MDCT has enabled detailed examination of the aorta and its branches. MDCT can evaluate the status of the vascular wall, including calcification, plaque, and inflammation. It can provide information on the vascular lumen. Mural thrombus or the extension of a thrombosed false lumen can also be evaluated accurately ***(Takase et al., 2006)***.

Aim of the work

The aim of this study is to emphasize the role of MDCT in diagnosis of different thoracic aortic diseases.

Anatomy of the thoracic aorta

The aorta is the main systemic artery of the body (Fig. 1). It arises from the aortic orifice of the left ventricle behind the third left intercostal space at the margin of the sternum. It ends on the anterior surface of the fourth lumbar vertebra by dividing into right and left common iliac arteries. It is divided into thoracic and abdominal portions ***(Romanes, 1997)***.

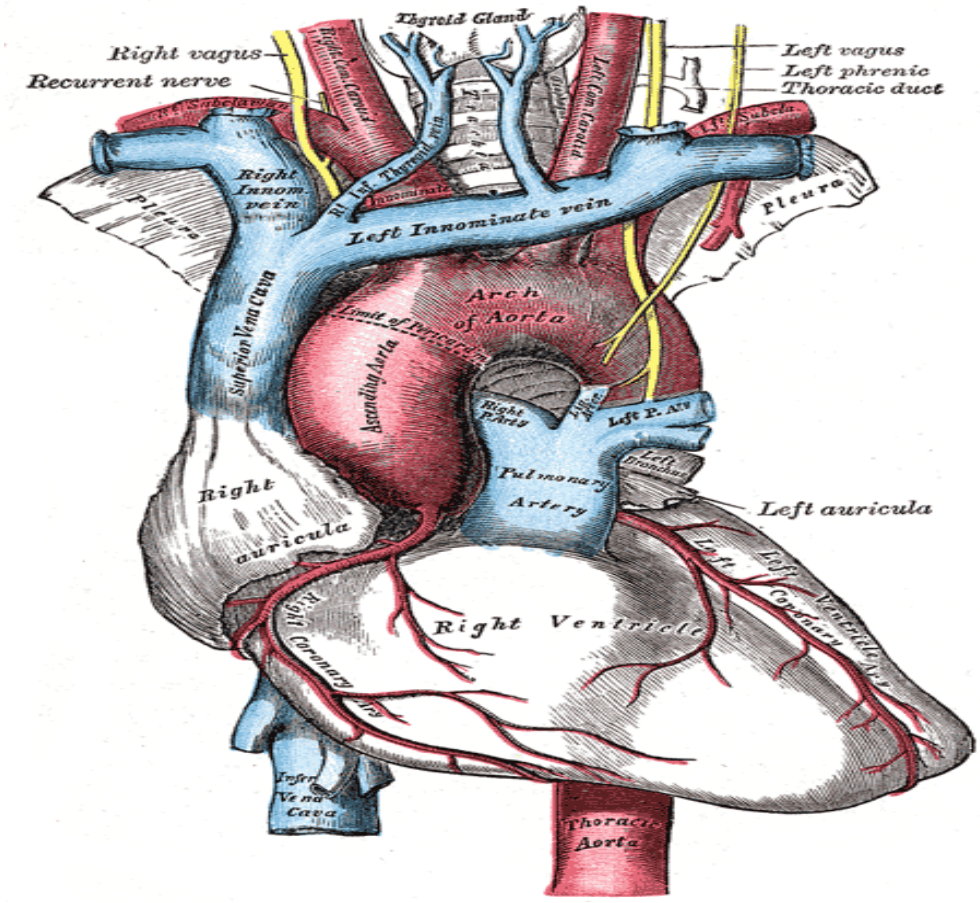

Figure (1): The heart and great vessels **(*Quoted from Williams et al., 2005).***