دور الأشعة المقطعية المتعددة الشرائح في تقييم مرضى الطوارئ الذين يعانون من آلام حادة بالصدر رسالة مقدمة توطئة للحصول على درجة الماچستير في الأشعة التشخيصية

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Use of multislice CT for the evaluation of emergency room patients with chest pain

Essay study submitted for partial fulfillment of the master degree of Radiodiagnosis

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INTRODUCTION:

Given the robust clinical performance of CCTA for exclusion of acute coronary syndrome in emergency department patients, as well as the widespread use and proven clinical accuracy of ct angiography for diagnosis of acute aortic dissection (*Willoteaux S, et al2008*), (*Shiga T,et al 2006*), and pulmonary embolism (*Ghaye B,et al 2002*), (*Quiroz R,et al 2005*).

A "triple rule out" scan protocol to simultaneously exclude all three potentially fatal causes of acute chest pain with a single scan is an attractive option .A conventional cardiac CTA "field of view" includes the anatomy between the carina and the diaphragm. A "triple rule out" scan protocol involves coverage of the entire lung from apices to diaphragm. Well over 50% of acute chest pain cases represent non cardiac conditions for patients with acute chest pain presented with a non cardiac condition (*Gallagher MJ, et al* 2008).

Images of thoracic and non cardiac findings are obtained as a "by-product" available to the expert reader. The wider anatomical coverage during the "triple rule out" scan allows images of these findings to be obtained. Diseases that can be detected include pericardial thickening and/or effusions, esophageal pathology, pneumonia, pulmonary nodules, pneumothoraces, mediastinal masses, pleural effusions and

masses, as well as chest wall abnormalities (*Onuma K,et al* 2006).

Aim of Work:

The aim of this work is to evaluate the rule of multislice CT for the evaluation of emergency room patients with chest pain to review the clinical evidence supporting the use of what is called "triple rule out" technique for triage of patients with acute chest pain.

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مقدمة:

لعبت الأشعة المقطعية دورا هاما في تشخيص ضيق الشرايين التاجية في مرضى حالات الطوارئ, كما أن الإستخدام واسع المجال للأشعة المقطعية متعددة الشرائح بالصبغة قد أثبت كفاءته إكلينيكيا في تشخيص تمدد الشريان الأورطي المتمزق الحاد والجلطة الرئوية.

إن تقنية "الأستبعاد الثلاثي" والتي تستطيع في نفس الوقت استبعاد الثلاثة أسباب المؤدية للوفاة في المرضى الذين يعانون من آلام حادة بالصدر أصبحت اختيار مرغوب فيه.

إن الأشعة المقطعية المتعددة الشرائح التقليدية للقلب توضح التشريح مابين نهاية القصبة الهوائية الى الحجاب الحاجز. كما أنها توضح تغطية كاملة من أعلى الرئة وحتى الحجاب الحاجز.

إن حوالي خمسون بالمائة من المرضى الذين يعانون من الآم حادة بالصدر يكونون حالات غير قلبية. وكلما زادت التغطية التشريحية خلال تقنية الأستبعاد الثلاثي كلما سمحت بتصوير هذه الحالات. ومن الأمراض الممكن تشخيصها بتقنية الاستبعاد الثلاثي الأرتشاح حول القلب, أمراض المرئ, الالتهاب الرئوي, البؤر الرئويه, أورام القفص الصدري, أورام وارتشاح الغشاء البلوري, وعيوب القفص الصدري.

الهدف من البحث:

يهدف هذا البحث إلى توضيح دور الأشعة المقطعية المتعددة الشرائح بالصبغة واستخدامها بتقنية الاستبعاد الثلاثي في مرضى ألام الصدر الحادة بقسم الطوارئ.

Introduction

Given the robust clinical performance of CCTA for exclusion of acute coronary syndrome in emergency department patients, as well as the widespread use and proven clinical accuracy of ct angiography for diagnosis of acute aortic dissection (Willoteaux et al., 2008; Shiga et al., 2006), and pulmonary embolism (Ghaye et al., 2002; Quiroz et al., 2005).

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Aim of the Work

Introduction and Aim of the Work

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Anatomy of the Coronaries and Great Thoracic Vessels

Anatomy of the Coronary Arteries:

The human heart has two coronary arteries named after the location of their main branches in the coronary sulcus. The right and left Coronary arteries arise from the ascending aorta in its anterior and left posterior sinus respectively. The term dominant is used to refer to the coronary artery that gives the posterior interventricular (descending) branch (which supplies the posterior part of the ventricular septum and often part of the posterolateral wall of the left ventricle). This is usually the left coronary artery (70%) which is also invariably the larger of the two vessels. where the posterior interventricular (descending) branch may be either bilateral, arise from both right coronary artery and the left circumflex artery, or absent and replaced by a network of smaller vessels given off from both right and left coronary arteries (*Shah*, 2005).

1-Right coronary artery (RCA):

RCA arises from the anterior (right coronary) aortic sinus and gives right conus artery, anterior atrial and ventricular rami, posterior descending artery, and artery of the sino-atrial node.

Branches of the RCA:

A. Right conus artery:

Is the first branch of RCA (may arise separately from the anterior aortic sinus in 36% of cases) (Shah, 2005).

B. Anterior atrial and ventricular rami:

Diverge from the first segment of the RCA (extending from its origin to the right margin of the heart).

C. Posterior descending artery (PDA):

As the RCA approaches the crux, it produces one to three posterior inter-ventricular rami, but only one runs in the interventricular sulcus, known as the posterior inter ventricular or posterior descending artery (PDA), After the PDA, the RCA continue as a single postero-lateral (PL) branch (Shah, 2005).

D. The artery of the sino-atrial node:

Is an atrial branch, distributed largely to the myocardium of both atria, mainly the right. Its origin is variable, arising from the RCA in 65% and from LCA in 35% (usually from its circumflex branch) (*Shah*, 2005).

2-<u>Left main coronary artery (LCA):</u>

The left coronary artery is larger in caliber, supplying a greater volume of myocardium, including almost all the left ventricle and atrium except in the "right-dominance" condition where the right coronary supplies the inferior surface of the left ventricle. And gives:

- **A)** The anterior inter-ventricular (descending) artery, also named as the left anterior descending artery, LAD.
- B) The left circumflex artery (LCX) in the pericardial fat and usually has no branches (Shah, 2005).

Branches of LAD:

- A. Septal branches
- B. Diagonal branches
- C. A branch to RV (occasionally) (Rayn et al., 2004).

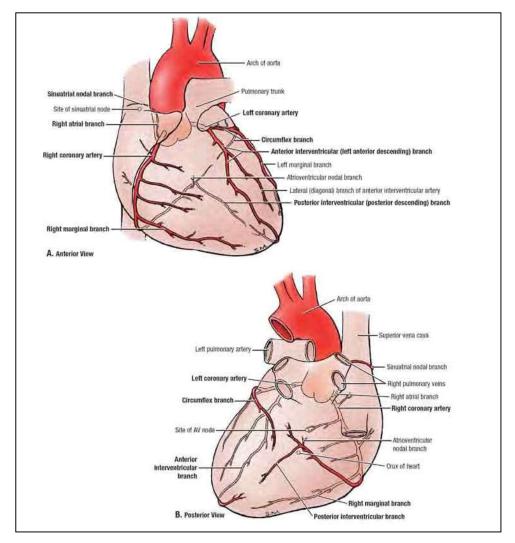


Fig. (1): Supply of the heart by coronaries. (a) Demonstrate anterior view of the heart. (b) Demonstrate posterior view of the heart (Quoted from Grants Atlas of Anatomy, 2009) Author Anne MR