

Accessory internal thoracic artery and its clinical significance

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Rezumat

Artera toracică internă accesorie și semnificația ei clinică

Artera toracică internă accesorie este un ram relativ mare din porțiunea inițială a arterei toracice interne, care a fost decelată la 4.54% din cele 22 de cadavre studiate în Institutul de Anatomie al Facultății de Medicină, Universitatea Aristotle din Thessaloniki. Traiectul acestei artere se întinde uzual pe fața internă a peretelui anterolateral toracic și diametrul său este uneori aproape cât al trunchiului arterei toracice interne. Credem că este esențială cunoașterea acestui ram arterial pentru chirurgii toracici în timpul preparării arterei toracice interne pentru revascularizarea coronariană precum și pentru chirurg în timpul montării drenajelor toracice pentru pneumotorax. În plus, trebuie cunoscută pentru interpretarea angiografiilor arterei subclavii.

Cuvinte cheie: artera toracică internă, ram accesoriu, importanță clinică

Abstract

The accessory internal thoracic artery is a relatively large branch of the initial part of the internal thoracic artery, which was found in 4.54% of 22 cadavers studied in the Institute of Anatomy of the Medical School of Aristotle University of Thessaloniki. The course of this artery lies usually in the inner

surface of the anterolateral thoracic wall and its diameter is sometimes almost equivalent to that of the main trunk of the internal thoracic artery. We think, that the knowledge of this arterial branch is essential for the thoracic surgeon during the preparation of the internal thoracic artery for coronary revascularization as well as for the surgeon during the placement of thoracic drainage for pneumothorax. Furthermore, it has to be kept in mind for the interpretation of angiographies of the subclavian artery.

Key words: internal thoracic artery, accessory branch, clinical value

Introduction

The accessory internal thoracic artery represents a branch of the trunk of the internal thoracic artery and although it is of certain surgical and practical interest it is not usually mentioned in the classical texts of Surgery and Anatomy (1,2,3). The aim of this study is to make the presence of this arterial variation known both to the radiologist, in order to assist him/her in the better interpretation of the arteriography of the subclavian artery, and the thoracic surgeon, in order to assist him/her in the safer surgical approach of the thorax. In addition the knowledge of such an abnormal vessel is useful to the anatomist in order not to confuse such an artery during the dissection of the thoracic wall.

Materials and Methods

During routine dissections of formalin-embalmed adult cadavers, that occurred in our anatomy teaching laboratory for educational and research purposes we examined 44

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internal thoracic arteries from 22 cadavers, 12 of which were male and 10 female. After dissection of the anterior wall of the thoracic cage the internal thoracic artery and its intrathoracic branches were carefully prepared. From our material we excluded all these small branches arising from the internal thoracic artery and reaching the uppermost intercostal spaces. We thought that these rami are the anterior intercostal branches of the internal thoracic artery.

Results

Totally, we found 2 accessory internal thoracic arteries (4.54%). The first one was found in a male cadaver aged 69 years old. The accessory arterial branch was originated from the upper part of the right internal thoracic artery and specifically at a distance of 2.3 cm from its origin from the medial portion of the subclavian artery (Fig. 1). The accessory artery was originated respectively at the level of the sternal end of the first rib just underneath the sternal end of the clavicle. Then, the artery followed an oblique course moving downwards and laterally in the inner surface of the anterolateral thoracic wall. The artery came to an end at the level of the fifth right intercostal space correspondingly to the posterior axillary line. This arterial branch was directed within the intrathoracic fascia, outside of costal pleura. In addition, the present branch had almost the same size with the main internal thoracic artery and was directed medial to the intercostal vessels and nerves. Finally, the accessory artery gave, at some points, small anastomotic branches to the adjacent intercostal arteries (Fig. 2).

The second accessory internal thoracic artery was found in a female cadaver aged 72 years old. That artery, which was originated from the right internal thoracic artery, was large and after following a similar course as the one previous mentioned came to an end at the level of the seventh right intercostal space correspondingly to the posterior axillary line. The characteristic feature of this artery was the fact that at the level of the fourth and fifth right intercostal space it directed lateral to the intercostals vessels and nerve (Fig. 3).

Discussion

The accessory internal thoracic artery is mentioned in the 7th edition of the *Nomina Anatomica* as "lateral costal branch" (4). Usually the presence of this significant accessory arterial branch is ignored in the classic textbooks of Anatomy (2,5,6). The first description of this artery was made by Heister in 1730, who used the term "lateral internal mammary artery" to describe it (7) while A. Otto in 1830 used the term "lateral costal branch" (8). In 1902 P. Poirier and C. Charpy (9) used the term "accessory internal mammary artery", while H. Nathan et al in 1982 (10) used the term "accessory internal thoracic artery". We consider that although the most appropriate term is the one used by *Nomina Anatomica* "lateral costal branch" of the internal thoracic artery, the most useful term in daily clinical practice is "accessory internal thoracic artery". Furthermore, this term is suitable because this

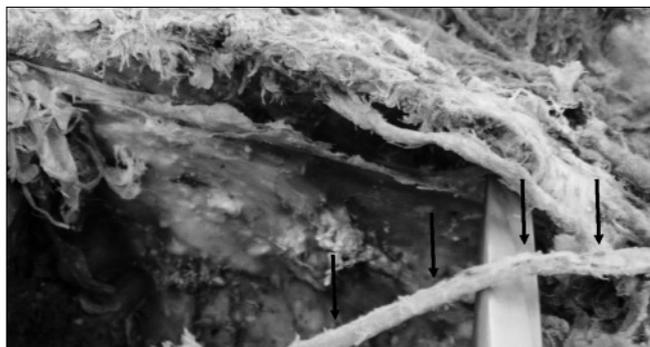


Figure 1. The initial part of the accessory internal thoracic artery (arrows) is distinguished which arises from the right internal thoracic artery of the male cadaver at a distance of 2.3 cm from its origin from the medial portion of the subclavian artery

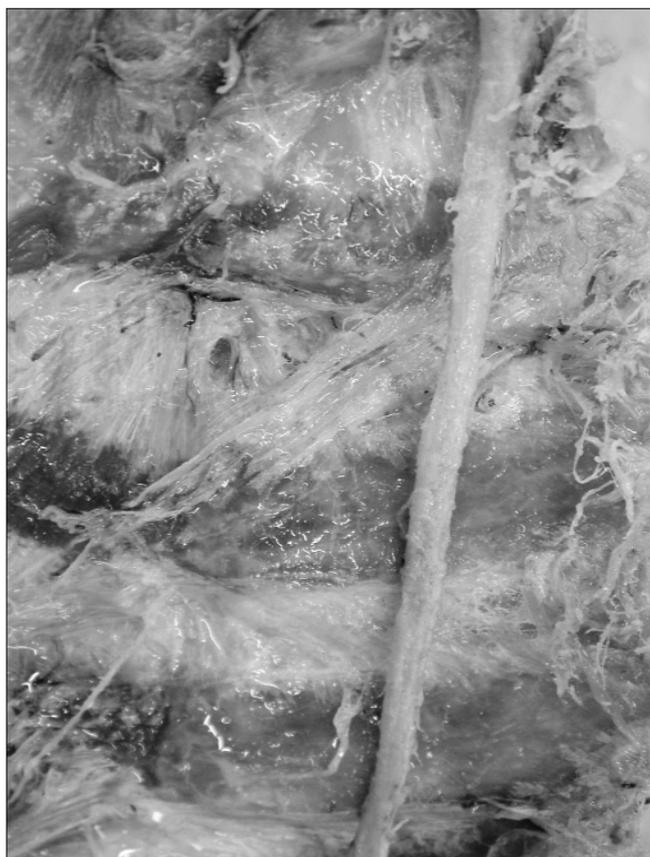


Figure 2. The course of the right accessory internal thoracic artery of the male cadaver along the inner surface of the lateral thoracic wall is seen

artery is very similar to the main branch of the internal thoracic artery, regarding its location and course.

Significant in this subject was the research of H. Nathan et al (10) who studied 60 cadavers and found this artery in an incidence of 10.8 %. In their material the artery: 1) in most cases had smaller diameter than the internal thoracic artery, 2) was accompanied constantly by two satellite veins, 3) constantly gave anastomotic branches to the intercostal

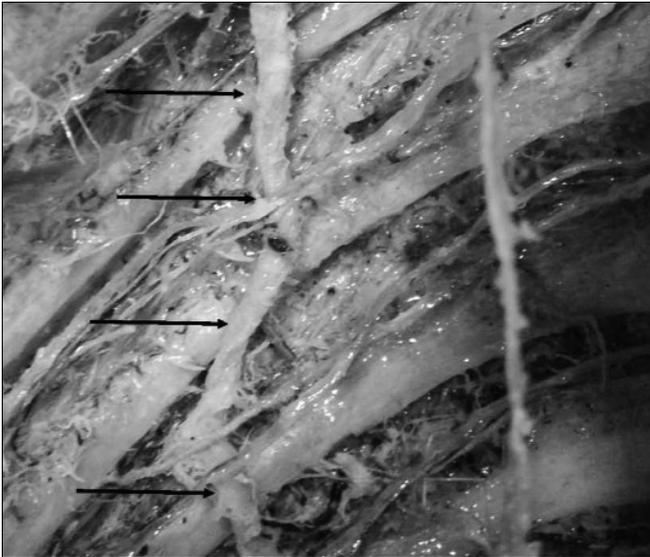


Figure 3. *The right accessory internal thoracic artery of the female cadaver, which is found respectively to the fourth and fifth intercostal directing lateral to the intercostal vessels and nerve, is seen (arrows)*

arteries and 4) in some cases it was lying lateral to the intercostal vessels and nerves. In our study the artery was found in an incidence of 4.54 %. E. Gardner et al (11) detected this artery in a frequency of 12.5 %. The low incidence in our study as well as in the study of H. Nathan et al is due to the fact that: 1) small arteries were not counted and 2) arteries that may have been accidentally dissected during dissection of the cadaver were not counted.

The knowledge of the possible presence of this artery is necessary both to the thoracic surgeon and the general surgeon when they have to place a drainage as management of a pneumothorax. Due to the topography and the relations of this artery it is possible that it may be ruptured in a case

of a fractured rib and have as a result haemothorax. The radiologist, the cardiologist and the thoracic surgeon must have knowledge of the potential presence of this arterial branch during the assessment and interpretation of the angiographies of the subclavian artery. Finally, the presence of this inconstant artery is of special interest for the thoracic surgeon when performing an aorto–coronary bypass, using for the bypass the internal thoracic artery.

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