CASE REPORT

Incidental discovery of a new and clinically important anatomic variant of the internal thoracic artery in a young male trauma patient

Kirsteen R. Burton,¹ Noah Ditkofsky^{1,2}

¹Medical Imaging, University of Toronto, Toronto, Ontario, Canada

²Medical Imaging, University of Toronto, Sunnybrook Health Sciences Center, Toronto, Ontario, Canada

Correspondence to

Dr Kirsteen R. Burton,
kirsteen.burton@utoronto.ca

Accepted 7 December 2017

SUMMARY

The internal thoracic artery (ITA) is the largest thoracic wall artery and is clinically important primarily for use in coronary artery bypass grafting. A number of anatomic variants of the ITA have been reported; however, bilateral, aberrant lateral branches of the ITA never have. The importance of this finding lies in the positioning of the artery at a potential chest tube insertion site. Here, we report the identification, on CT scan, of this rare variation in a young male trauma patient.

BACKGROUND

The internal thoracic artery (ITA) is the largest artery of the thoracic wall and is important clinically, for many reasons. A number of anatomic variants of the ITA have been described; however, bilateral, aberrant lateral branches of the ITA have never been previously reported.

CASE PRESENTATION

A 23-year-old man of Lithuanian descent presented to the emergency department by ambulance after a fall down 15 steps. The patient had no thoracic complaints but due to distracting facial injuries, a trauma imaging protocol was requested.

INVESTIGATIONS

A trauma protocol CT evaluation was performed, specifically, including CT chest, abdomen, pelvis, brain and spine. This demonstrated no acute injuries; however, incidental note was made of bilateral

Figure 2 (A) Axial CT image of the upper thorax showing bilateral, aberrant internal thoracic arteries. (B) Axial CT image at the level of the main pulmonary artery bifurcation showing bilateral, aberrant internal thoracic arteries. (C) Axial CT image at the level of the mid-left ventricle showing the right, aberrant internal thoracic artery.

aberrant internal thoracic arteries (figures 1, 2A–C and 3)

OUTCOME AND FOLLOW-UP

The patient was discharged home with plastic surgery follow-up consultation for facial injuries.

DISCUSSION

The ITA (previously called the internal mammary artery) is the largest artery of the thoracic wall. It normally arises from the proximal segment of the subclavian artery in the base of the neck. It courses

Figure 1 Coronal CT image of bilateral, aberrant internal thoracic arteries within the upper thorax.

Figure 3 Reconstructed, three-dimensional CT image showing the origins of the bilateral, aberrant internal thoracic arteries.

CrossMark

To cite: Burton KR., Ditkofsky N. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2017-222838

inferiorly to supply the anterior thoracic and abdominal walls, from the clavicles to the umbilicus. Directly, or via its branches, the ITA also supplies the sternum, breasts, mediastinum, thymus, pericardium and phrenic nerves.¹ In the setting of thoracic aortic occlusion or stenosis, such as severe coarctation of the aorta, the ITA provides an important collateral supply and is the most commonly used vessel in coronary artery bypass surgery because of superior long-term patency rates and duration and quality of life of patients.^{1,2} The ITA is often mobilised during coronary artery bypass grafting to enable perfusion of the myocardium.³

A few anatomic variants of the ITA have been described. The most common is an anomalous origin, for example, from the subclavian artery or its branches, or a common origin with the

thyrocervical trunk.^{2,4} The ITA may also give rise to additional branches or have a terminal trifurcation with an extra xiphoid branch.^{5,6} A case report of a single, aberrant lateral branch of the ITA has been reported, but never bilateral branches.⁷

Contributors KRB and ND both contributed equally to the creation of this manuscript, specifically, to the conceptualisation, drafting and revision of this manuscript.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

© BMJ Publishing Group Ltd (unless otherwise stated in the text of the article) 2018. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

Learning points

Recognition of anatomic variants of the internal thoracic artery is very important clinically, as:

- ▶ It is frequently used as a coronary artery bypass graft⁸; and shunting away from the graft may occur in patients.
- ▶ Anatomic variants, such as the one presented here, may complicate chest tube insertions resulting in bleeding, with anatomic variation.
- ▶ Their presence may complicate catheterisation.⁸
- ▶ Variation may result in poor sternotomy healing, as it is the main blood supply to the sternum.
- ▶ It is the pivotal distributary vessel in the anterior chest wall used in plastic surgery, specifically breast reduction and flap procedures.⁹

REFERENCES

- 1 Paliouras D, Rallis T, Gogakos A, *et al.* Surgical anatomy of the internal thoracic arteries and their branching pattern: a cadaveric study. *Ann Transl Med* 2015;3:212.
- 2 Parakevas G, Natsis K, Tzika M, *et al.* Abnormal origin of internal thoracic artery from the thyrocervical trunk: surgical considerations. *J Cardiothorac Surg* 2012;7:63.
- 3 Chavanon O, Romary B, Martin C, *et al.* Anatomical study of the internal thoracic arteries; implications for use in coronary artery bypass graft surgery. *Surg Radiol Anat* 2016;1–8.
- 4 Andreou AY, Iakovou I, Vasiliadis I, *et al.* Aberrant left internal thoracic artery origin from the extrascapular part of the subclavian artery. *Exp Clin Cardiol* 2011;16:62.
- 5 Internal thoracic artery | Radiology Reference Article | Radiopaedia.org. radiopaedia.org. <http://radiopaedia.org/articles/internal-thoracic-artery> (accessed 11 Jun 2016).
- 6 Kps R, Dutta S, Narayana K. A rare variant of the internal thoracic 'mammary' artery. *Eur J Anatomy* 2004;8:35–8.
- 7 Salve VM, Ratnaprabha C. An aberrant right lateral branch from right internal thoracic artery. *IJAV* 2010.
- 8 Vorster W, du Plooy PT, Meiring JH. Abnormal origin of internal thoracic and vertebral arteries. *Clin Anat* 1998;11:33–7.
- 9 Palmer JH, Taylor GI. The vascular territories of the anterior chest wall. *Br J Plast Surg* 1986;39:287–99.

Copyright 2017 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow