



Thyrocervical trunk perforation: A rare vascular complication during cardiac intervention through right radial approach: A case report and literature review

Masood Ayyub Ghori ^{a,*}, Abdulmajeed Al Zubaidi ^a, Asim Khwaja ^b

^a Cardiac Science Department, Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates

^b Radiology Department, Sheikh Khalifa Medical City, Abu Dhabi

^{a,b} United Arab Emirates

Trans radial artery access (TRA) is considered a relatively safe approach for percutaneous coronary intervention (PCI), by virtue of its fewer access related peripheral vascular complications. Central arterial complications are rare. We are presenting a case report wherein thyrocervical trunk (TT), a branch of first part of right subclavian artery (RSA) was perforated during intervention through right radial approach, resulting in deep neck hematoma, compressing the trachea and surrounding structure. To our knowledge, this is the first reported case of TT perforation by a hydrophilic wire during a staged cardiac catheterization after primary PCI through right radial approach. Knowledge of such a rare complication, its early recognition, and endovascular treatment might spare a patient with recent acute coronary syndrome on double antiplatelet medications, from surgical intervention and fatal outcome.

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Keywords: Right radial artery access, Thyrocervical trunk perforation, Tracheal compression

1. Introduction

Cardiac intervention via right radial artery is generally a safe procedure and central arterial complications are rare. We report a case wherein thyrocervical trunk (TT), a branch of the

first part of right subclavian artery (RSA) was perforated while accessing the coronary vessels through right radial artery. To our knowledge, this is the first reported case of TT perforation during a staged cardiac catheterization after primary percutaneous coronary intervention (PCI) through right radial approach. Knowledge of such a rare

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* Corresponding author at: Cardiac Science Department, Sheikh Khalifa Medical City, Abu Dhabi, P.O BOX 767820, United Arab Emirates.

E-mail address: mghori@seha.ae (M.A. Ghori).



P.O. Box 2925 Riyadh – 11461KSA
Tel: +966 1 2520088 ext 40151
Fax: +966 1 2520718
Email: sha@sha.org.sa
URL: www.sha.org.sa

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complication, its diagnosis, and management might be of interest for the interventional cardiologists, radiologists, and vascular surgeons.

2. Case report

A gentleman, aged 61 years, presented with ST-elevated acute myocardial infarction. After guideline recommended double antiplatelet and anticoagulation administration, the patient was taken to the catheterization laboratory for primary PCI

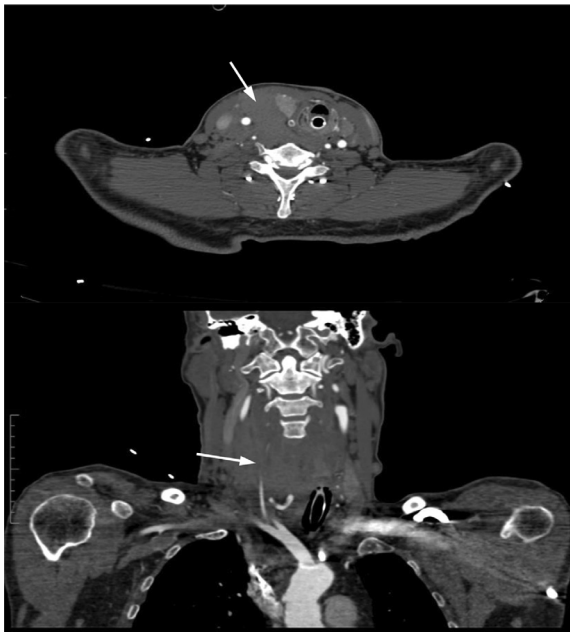


Fig. 1. CT angiogram axial and coronal views, show large right neck hematoma (arrows). CT = computed tomography.

through trans radial artery access (TRA). The culprit lesion in the right coronary artery was stented without any complication. A lesion in the left anterior descending artery was considered significant and was left for Stage PCI.

For the second intervention, the same arterial access was attained. After a few diligent attempts with a standard 0.014-inch 190cm HI-TORQUE BALANCE MIDDLEWEIGHT Guide Wire with HYDROCOAT Hydrophilic Coating (Abbott Vascular, Santa Clara, CA, USA) first and TERUMO Runthrough NS Extra Floppy 0.014-inch (.36 mm) 180cm (TERUMO CORPORATION, HATAGAYA, SHIBUYA-KU TOKYO, JAPAN) wire later, the operator was able to pass the wire through the convoluted part of the Subclavian and Innominate vessel. The intervention was concluded with a stent to Left Anterior Descending Artery (LAD).

While still in the catheterization room, the patient complained of pain in his neck, had shortness of breath, and cough. Examination of the neck revealed a tender swelling over the lower part of the neck pushing the trachea and larynx to the left. Presuming a wire-induced deep arterial perforation, protamine sulfate was administered, and intensivist secured the airway with a glide-scope to avert complete airway obstruction.

Urgent contrast computed tomography (CT) angiogram of neck and chest revealed a large right-sided neck hematoma displacing the trachea and most of the midline neck structures to the left (Fig. 1).

After much deliberation among the cardiologist, interventional radiologist, and vascular surgeon, the patient was transferred to the radiology suite.

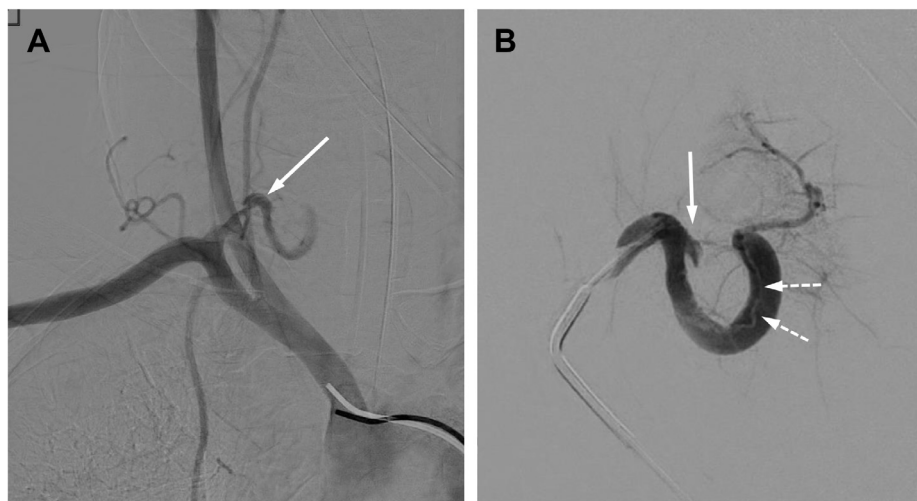


Fig. 2. Angiograms of brachiocephalic trunk (A) and thyrocervical trunk (B) show pseudoaneurysm (solid white arrows) and dissection flap (broken white arrows) involving the thyrocervical trunk.

Through the right common femoral artery access, selective angiogram of the brachiocephalic trunk, right common carotid, and right subclavian artery revealed patent and unremarkable vessels. Subselective angiogram of the right TT showed dissection extending several centimeters along the course of the artery and small pseudoaneurysm arising a short distance from the origin, without any active extravasation at the time of the angiogram (Fig. 2). Transcatheter embolization was completed using Interlock-18 Fibered IDC Occlusion Coils (Boston Scientific, Marlborough, MA, USA) and a 7 x12.5 mm Amplatzer Vascular Plug (Abbott Vascular, Santa Clara, CA, USA) inserted through a 2.7F Progreat microcatheter (Terumo Interventional Systems, Somerset, NJ, USA) (Fig. 3). Selective angiogram of the left subclavian artery showed no contralateral arterial supply to the area of interest in the right neck.

The patient tolerated the procedure well without immediate complication and was transferred to the Intensive Care Unit where he remained on mechanical ventilation for 6 days. Thereafter, the patient made an uneventful recovery and was discharged from the hospital in a stable condition and was doing well during his follow up visits.

3. Discussion

Radial and femoral approaches are both safe and effective for PCI. However, the lower rate of local vascular complications may be a reason to use the radial approach [1]. A recent metaanalysis of 33 studies showed that transradial approach for diagnostic Coronary Angiography (CA) or PCI (or

both) in Coronary Artery Disease (CAD) may reduce short-term Major Adverse Cardiac Events (MACE), cardiac death, all-cause mortality, bleeding, and access site complications [2]. Improved quality of patient's life after the procedure, and reduced hospital costs [3] are additional advantages.

With growing body of evidence in favor of TRA for CA and intervention, European Society of Cardiology guidelines for the management of Acute Coronary Syndrome (ACS) recommended TRA as the preferred method of access (Class I indication) [4]. Recently American Heart Association (AHA) has also proposed a "Radial-first" strategy for patients with acute coronary syndromes in the United States [5].

Radial artery spasm is common but its perforations, forearm hematomas, and pseudoaneurysm formation are much less common [6]. Dissection, perforation, and pseudoaneurysm formation of brachial, subclavian, costocervical trunk, and innominate arteries are rare [7–11].

We are presenting a case report wherein TT was inadvertently perforated by a guide wire during cardiac catheterization through the right radial access. To our knowledge, this is first reported case of TT perforation during a staged cardiac catheterization after primary PCI through TRA. Analogous to this, Farooqi et al [9] have published a case with similar effects on the surrounding structures, mandating tracheal intubation and therapeutic radiological intervention, but in a different clinical setting and the vessel implicated was costocervical trunk.

TT is one of the three branches of the first part of the subclavian artery. Atherosclerotic narrowing and tortuosity at innominate-subclavian artery junction requires a meticulous advancement of the interventional hardware, especially when operating with a TERUMO Runthrough NS Extra Floppy wire (TERUMO CORPORATION- JAPAN) as the same. Such kind of slippery wires inherently have higher risk of perforation as compared with others and might easily slip to one of the aforementioned branches, causing dissection, perforation, neck and mediastinal hematoma, as in our case.

As in the index case, prompt detection of the complication is of utmost importance to prevent any fatal outcome, which might, otherwise, dismiss the benefits of a successful coronary intervention. Endovascular treatment by Interventional radiologist can save the patient from surgical intervention, especially in context of recent acute coronary syndrome, coronary stent

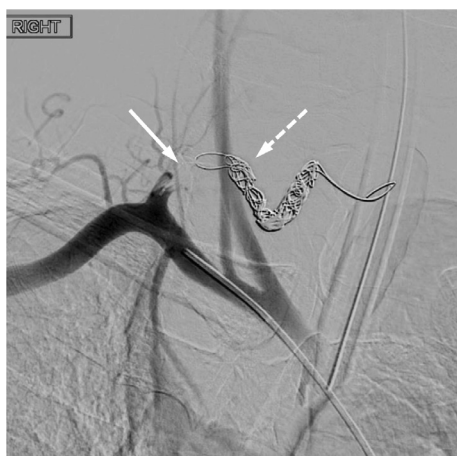


Fig. 3. Angiogram following embolization with microcoils (broken white arrow) and Amplatzer plug (solid white arrow) shows occlusion of the target vessel.

placement, and guideline directed antiplatelet therapy.

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