

## An Uncommon Case of Carotid Artery Tandem Lesion - Difficult Management Decision and Literature Review

Shoib RF\*, O'Brien A, Siddique A, Sinha DM, Lognathan T and Guyler PC

Department of Stroke Medicine, Southend University Hospital, Prittlewell chase, Southend on sea SS0 0RY, UK

### Abstract

We report a case of 84 years old lady who was admitted to our acute stroke unit with two episodes of tingling and numbness in left arm over last seventy two hours. Magnetic Resonance Imaging (MRI) showed right posterior parietal infarction. Subsequent carotid vascular imaging confirmed right internal carotid artery and right brachiocephalic significant stenosis. Her case was discussed in stroke/vascular surgery multidisciplinary team meeting and then with interventional radiology team at one of our tertiary referral centres and she was transferred. She underwent retrograde angioplasty with stent insertion at right brachiocephalic origin. Carotid endarterectomy was deferred as a preprocedure carotid angiogram showed right internal carotid artery stenosis of less than 50%. She made very good recovery with no complications and was discharged from hospital on day seven.

**Keywords:** Tandem lesion; Angiogram; Endarterectomy; Stenting

### Introduction

Multilevel atherosclerotic disease involving origin of brachiocephalic artery and ipsilateral internal carotid artery is uncommon, but can lead to therapeutic dilemma when it comes to management decision making for treating physician and surgeons. A recently devised single stage procedure with carotid endarterectomy and retrograde stenting is becoming a more popular choice, as it is least invasive and carries less morbidity and mortality.

### Case

Eighty four years old lady was referred to acute stroke team by our emergency department. She presented with two episodes of tingling and numbness across her left whole arm over last seventy two hours. Each episode lasted for fifteen to twenty minutes with complete resolution of symptoms. Her past medical history included hypertension and hypercholesterolemia. She was on aspirin 75 mg, simvastatin 20 mg, felodipine 5 mg and perindopril 2 mg. She was living alone and her pre-morbid modified Rankin score was zero. She used to smoke in past but stopped about 35 years ago.

On admission her systemic and detailed neurological examination was completely normal. She was diagnosed with Transient Ischemic Attack (TIA) and on risk stratification ABCD2 her score was 3 (low risk), but as her symptoms happened twice over last seventy two hours so she was admitted to acute stroke unit as high risk Transient Ischemic Attack (TIA). On day of her admission she had an MRI scan of her brain that showed a right posterior parietal infarction on DWI sequence (Figure 1). On the same day she had a carotid Doppler scan that showed peak systolic velocity of 8.6 cm/sec and end diastolic velocity of 6.4 cm/sec in right common carotid artery and peak systolic velocity of 28.1 cm/sec and end diastolic velocity of 10.4 cm/sec in right internal carotid artery with monophasic flow pattern (Figure 2). Computed Tomogram Carotid Angiogram (CTA) was performed which confirmed heavily calcified aortic arch with significant stenosis of right brachiocephalic artery at its origin and also a second long segment of circumferential narrowing of the calibre of the right internal carotid artery just after bifurcation (Figure 3).

Her case was discussed in detail in our stroke/vascular surgery multidisciplinary meeting and her images were linked to interventional radiology department at our tertiary referral centre. During this

period she had two further episodes of left arm tingling that lasted for fifteen minutes each and each resolved completely. A single stage intervention was planned and she was transferred once all arrangements were in place. She had balloon angioplasty of proximal stenosis (right brachiocephalic artery) via a retrograde approach just below right common carotid artery bifurcation after application of neuroprotection in form of right internal carotid artery clamp. After successful angioplasty a stent was inserted (Figure 4). Right internal carotid artery stenosis was not operated as a preoperative angiogram confirmed it to be less than 50% stenosis.

Following intervention she made a very good recovery and was discharged home on day seven. She was followed up in our out patient clinic in three weeks. Clinically she was well. She had a carotid Doppler scan that showed that there was a good flow (PSV 66.9 cm/sec) in the right common carotid artery. There was plaque noted in the right bulb as well as at the origin of the right internal carotid artery but not causing flow limitation (Figure 5).

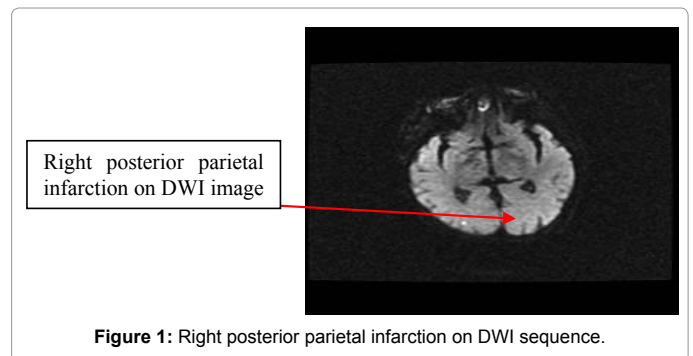


Figure 1: Right posterior parietal infarction on DWI sequence.

\*Corresponding author: Shoib RF, Acute Stroke Registrar, Department of Stroke Medicine, Southend University Hospital, Southend-on-Sea, SS0 0RY, UK, E-mail: shoibrf@hotmail.com

Received August 19, 2013; Accepted September 27, 2013; Published September 30, 2013

Citation: Shoib RF, O'Brien A, Siddique A, Sinha DM, Lognathan T, et al. (2013) An Uncommon Case of Carotid Artery Tandem Lesion - Difficult Management Decision and Literature Review. J Clin Trials 3: 143. doi:10.4172/2167-0870.1000143

Copyright: © 2013 Shoib RF, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

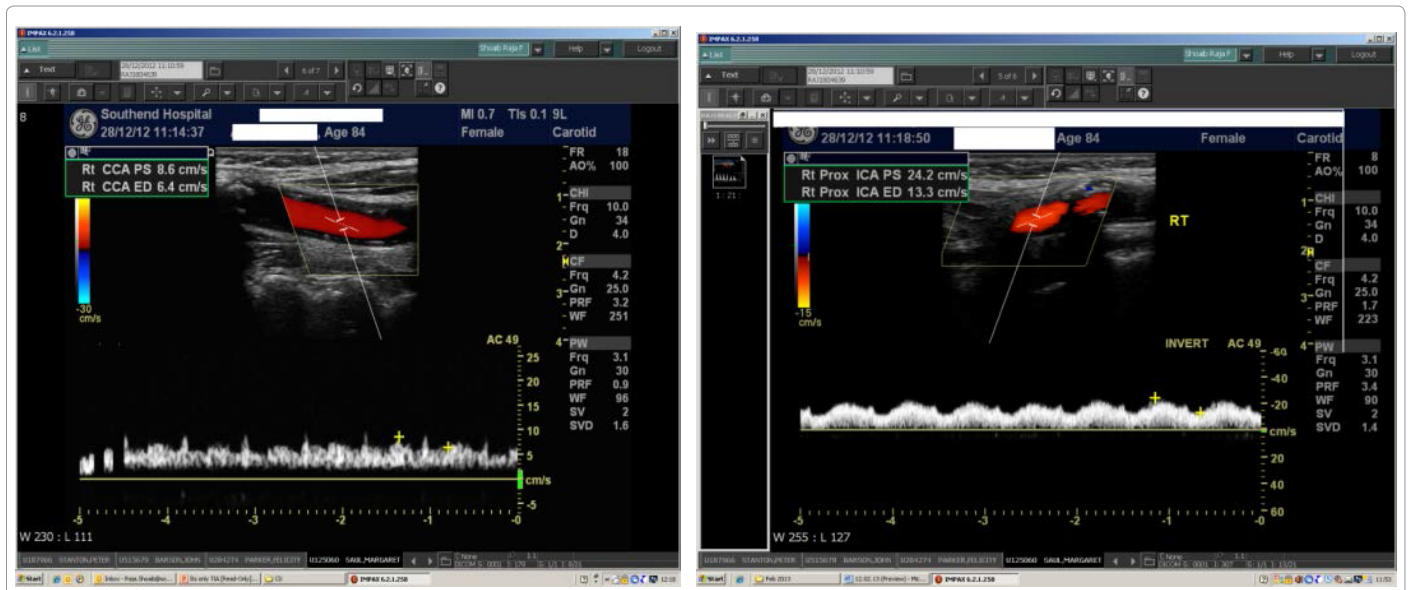


Figure 2: Right internal carotid artery with monophasic flow pattern computed tomogram carotid angiogram.

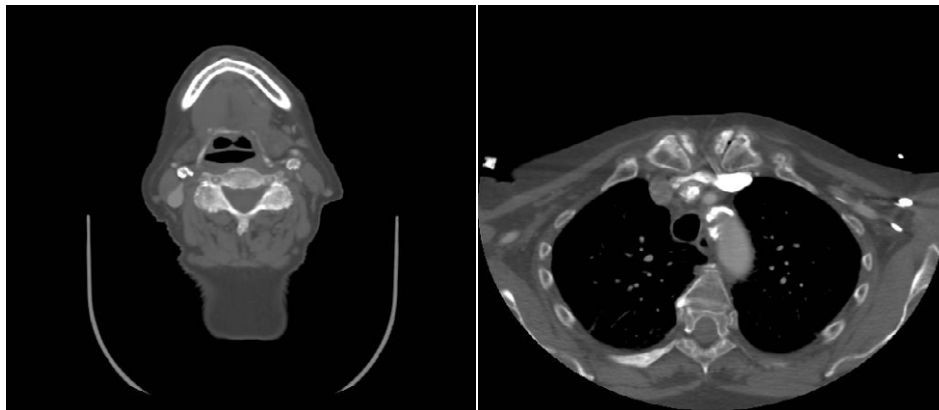


Figure 3: Right internal carotid artery just after bifurcation.

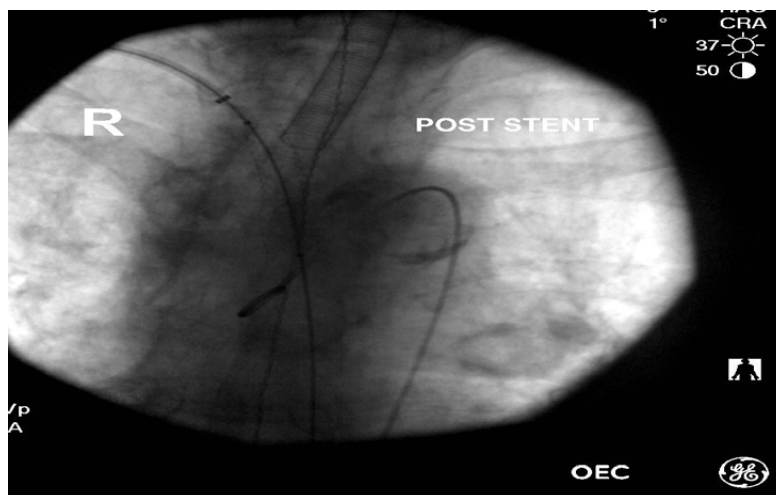


Figure 4: Successful angioplasty a stent was inserted.

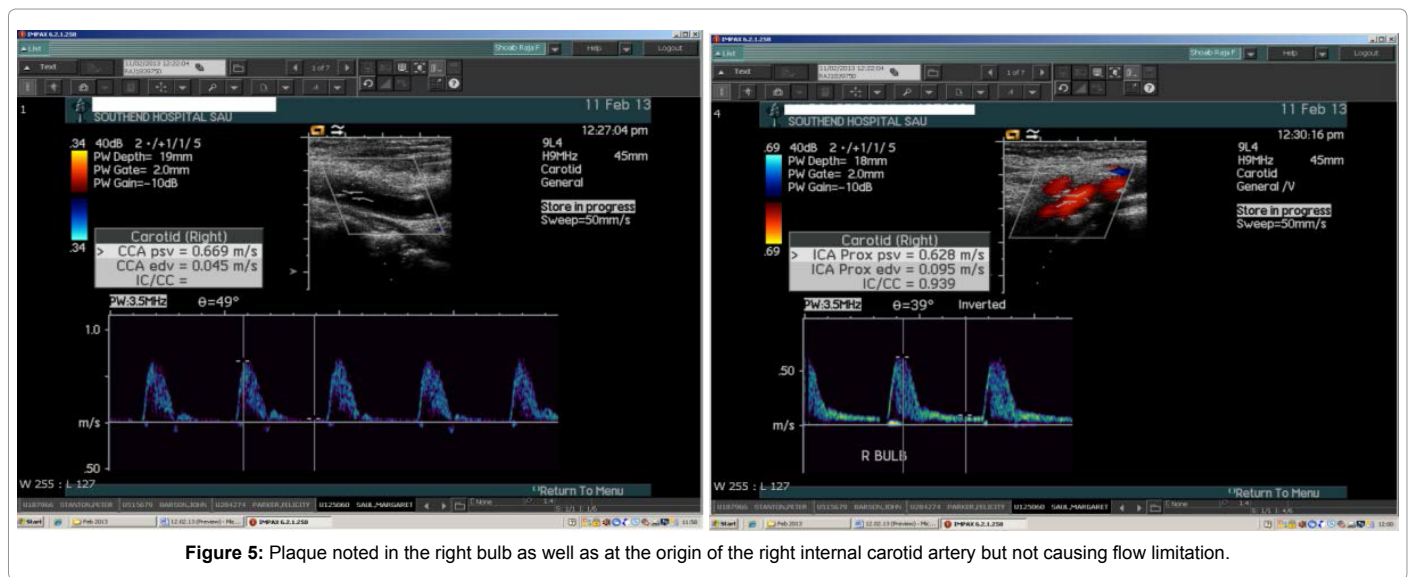


Figure 5: Plaque noted in the right bulb as well as at the origin of the right internal carotid artery but not causing flow limitation.

## Discussion

Atherosclerotic plaque formation with development of a high grade stenosis at major branches of aortic arch (brachiocephalic and left common carotid artery) is less frequent finding on clinical and radiological examination than typical location of carotid bifurcation and proximal internal carotid artery. Carotid endarterectomy is an accepted and most commonly performed procedure for high grade (more than 50% NASCET) stenosis of carotid artery in all symptomatic and selected asymptomatic patients [1-3]. Multilevel atherosclerotic lesions in brachiocephalic artery or common carotid artery and ipsilateral internal carotid artery are less common finding. Literature has shown its incidence around 4.8% [4]. Presence of two lesions on same side increase risk of ischemic neurovascular event and haemodynamic compromise as any one plaque can be source of thromboembolism. No diagnostic technique can identify which lesion is symptomatic.

Due to location of proximal lesion within chest wall open surgical intervention is not a popular choice as it needs sternotomy, exposure of great vessels and anatomical reconstruction. An alternate is endovascular treatment in form of stenting, but antegrade crossing of tight aortic arch osteal lesions via brachial or femoral approach carries a significant risk of periprocedural embolic event before neuroprotection is applied [5].

As per basic haemodynamic principle if there are two lesions in one system proximal has to be treated first [6]. Deitrich devised a very good single stage technique for treating both lesions simultaneously. This involves opening of common carotids artery just below bifurcation after neuroprotection and insertion of guide wire to proximal lesion, performing retrograde angioplasty and placing a stent followed by carotid endarterectomy [7].

Tandem lesions of brachiocephalic or common carotid artery and ipsilateral internal carotid artery are more and more diagnosed due to better quality imaging facilities (CT and MRI scans). Older surgical techniques carried a very high mortality rate 0.5 to 2.2% for extra anatomical bypass and 6-19% for open thoracic approach [8-11]. This newer single stage hybrid procedure has shown good results in both

peri operative morbidity and mortality and long term follow up [1], also the angioplasty site has been noted to be patent more than 85% over five year follow up [12].

## References

1. North American Symptomatic Carotid Endarterectomy Trial Collaborators (1991) Beneficial effect of carotid endarterectomy in symptomatic patients with high-grade carotid stenosis. *N Engl J Med* 325: 445-453.
2. (1998) Randomised trial of endarterectomy for recently symptomatic carotid stenosis: final results of the MRC European Carotid Surgery Trial (ECST). *Lancet* 351: 1379-1387.
3. (1995) Endarterectomy for asymptomatic carotid artery stenosis. Executive Committee for the Asymptomatic Carotid Atherosclerosis Study. *JAMA* 273: 1421-1428.
4. Sfyroeras GS, Karathanos C, Antoniou GA, Salepsis V, Giannoukas AD (2011) A meta-analysis of combined endarterectomy and proximal balloon angioplasty for tandem disease of the arch vessels and carotid bifurcation. *J Vasc Surg* 54: 534-540.
5. Halliday AW, Thomas D, Mansfield A (1994) The Asymptomatic Carotid Surgery Trial (ACST). Rationale and design. Steering Committee. *Eur J Vasc Surg* 8: 703-710.
6. Grego F, Frigatti P, Lepidi S, Bonvini S, Amista P, et al. (2003) Synchronous carotid endarterectomy and retrograde endovascular treatment of brachiocephalic or common carotid artery stenosis. *Eur J Vasc Endovasc Surg* 26: 392-395.
7. Diethrich EB, Marx P, Wrasper R, Reid DB (1996) Percutaneous techniques for endoluminal carotid interventions. *J Endovasc Surg* 3: 182-202.
8. Berguer R, Morasch MD, Kline RA, Kazmers A, Friedland MS (1999) Cervical reconstruction of the supra-aortic trunks: a 16-year experience. *J Vasc Surg* 29: 239-246.
9. Owens LV, Tinsley EA Jr, Criado E, Burnham SJ, Keagy BA (1995) Extrathoracic reconstruction of arterial occlusive disease involving the supraaortic trunks. *J Vasc Surg* 22: 217-221.
10. Thompson BW, Read RC, Campbell GS (1980) Operative correction of proximal blocks of the subclavian or innominate arteries. *J Cardiovasc Surg (Torino)* 21: 125-130.
11. Berguer R, Morasch MD, Kline RA (1998) Transthoracic repair of innominate and common carotid artery disease: immediate and long-term outcome for 100 consecutive surgical reconstructions. *J Vasc Surg* 27: 34-41.
12. Vermeulen T, Hendriks JM, Baeten M, Lauwers P, Van Schil P (2011) Endarterectomy combined with retrograde stenting for tandem lesions of the carotid artery. *Acta Chir Belg* 111: 312-314.