The Journal of Laryngology & Otology (2010), ***124***, *341–344.*

doi:10.1017/S0022215109990855

Clinical Record

Duplication of internal jugular veins: case report

B Y W Wong, D R Strachan, E L Loney*

Abstract

Objectives: We report a rare case of internal jugular vein duplications, in order to raise the level of awareness of this anomaly amongst ENT surgeons, radiologists and intensive care practitioners. We briefly review and discuss the related literature.

Case report: Duplicated internal jugular veins are a rare anatomical finding. They may be subclinical, or may present with neck swellings that may be mistaken for laryngocoeles or branchial cysts. We present a case of bilateral internal jugular vein duplication in a young adult. The referral was made on the basis of intermittent neck swelling, dyspnoea and dysphagia. Conservative treatment was instigated, and symptoms improved without surgical intervention.

Conclusions: Only a handful of cases of duplicated internal jugular veins have been reported. The current case is unique, as no previously reported cases have presented with dyspnoea and dysphagia. We suggest a conservative approach, as there is currently no evidence that duplicated internal jugular veins cause any adverse health outcomes.

Key words: Duplicate; Jugular Veins; Internal

Introduction

Duplication of the internal jugular vein (IJV) is a rare anatomical finding with an estimated incidence of approximately 0.4 per cent among the general population.[1] Twelve such cases have been published in the English language literature.[1–9] However, only two cases of bilateral IJV duplication have been reported (one being a cadaveric finding).

We present a case of bilateral IJV duplication, and we review the literature on IJV duplication (both unilateral and bilateral) with particular regard to the presentation, diagnosis and clinical significance of this finding.

Case report

A 21-year-old woman presented to the ENT clinic with a one-year history of intermittent, right-sided neck swelling. During each episode, she complained of associated dyspnoea and dysphagia. The swelling occurred once a month, lasting one to two days. She had no other significant past medical history.

On examination, there was no obvious swelling. A systemic ENT examination was unremarkable.

A branchial cyst was suspected and a computed tomography (CT) scan requested. The scan showed bilateral duplicated IJVs running anterior to the main venous channels, commencing at the angles of the mandible (Figure 1). Inferiorly, both sets of duplicated IJVs united at the sternal notch and drained into the left brachiocephalic vein (Figure 2). On three-dimensional, surface-rendered views, apparently normal anterior and exterior jugular veins were well demonstrated (Figures 3 to 5).

The diagnosis was explained to the patient and reassurances given. No active intervention was undertaken.

The patient was symptom-free for one year. However, her symptoms then recurred, with an additional sensation of neck tightness. Again, conservative treatment was instigated, and the patient's symptoms improved without surgical intervention.

Discussion

The IJVs are the major venous drainage channels in the head and neck. They begin at the jugular foramen, run lateral to the carotid artery in the carotid sheath, and join the subclavian vein behind the sternoclavicular joints to form the brachiocephalic veins. The anatomical course of the jugular veins is usually very consistent; however, anomalies do occur, which may present as a neck swelling or be an incidental ('subclinical') finding.[10] It has been observed by Downie *et al.* that previous reports of IJV anomalies have used the terms 'duplicated' and 'fenestrated' interchangeably, and these authors have proposed more accurate usage of these terms.[9] The main difference between these two conditions is that duplicated IJVs comprise two separate branches along the whole length of the normal pathway, whereas in fenestrated IJVs the two branches reunite before draining into the subclavian veins.[9] Downie *et al.* have suggested that the development of fenestrated and duplicated IJVs differs, because phlebectasia (i.e. congenital dilatation of veins) is only found in duplicated IJVs. However, such a suggestion is debatable due to the limited number of cases.

To our knowledge, 12 cases of duplicated IJVs have been reported: 10 unilateral and two bilateral. Only three cases presented with clinical symptoms, and were subsequently diagnosed on imaging. Of the nine subclinical cases, six were intra-operative findings during neck dissection, two

From the Departments of Ear, Nose and Throat and *Radiology, Bradford Royal Infirmary, UK.
Accepted for publication: 6 May 2009. First published online 19 August 2009.

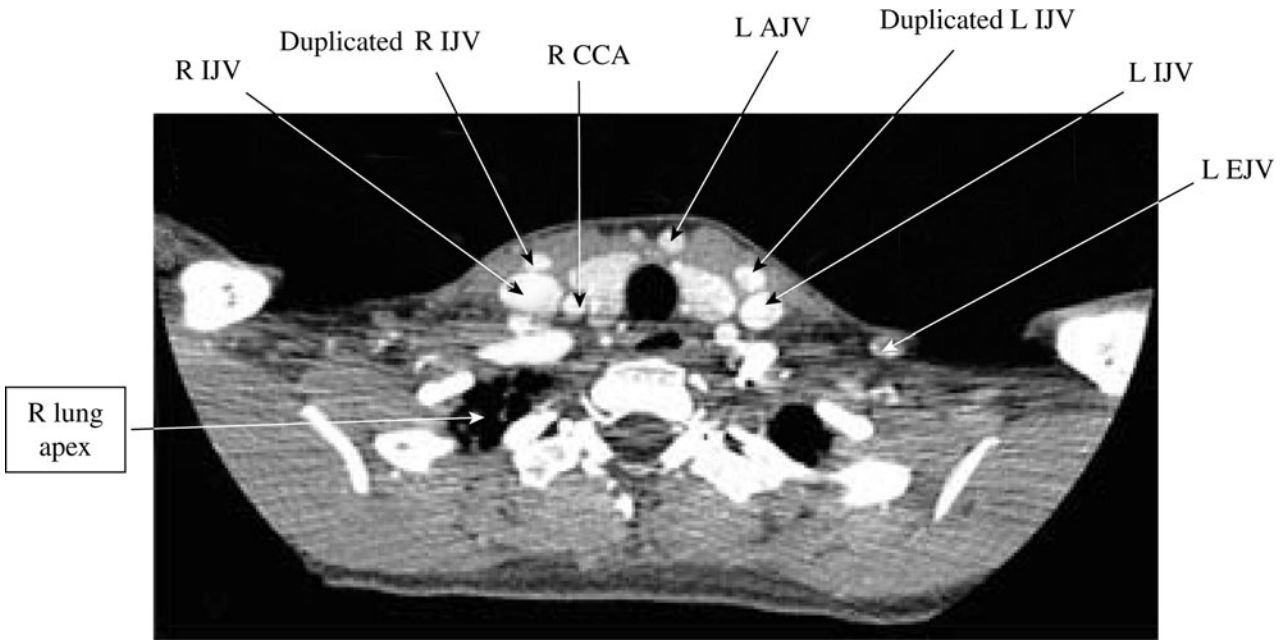

FIG. 1
Axial, post-contrast computed tomography scan at the level of the lung apices. R = right; L = left; IJV = internal jugular vein; AJV = anterior jugular vein; EJV = external jugular vein; CCA = common carotid artery

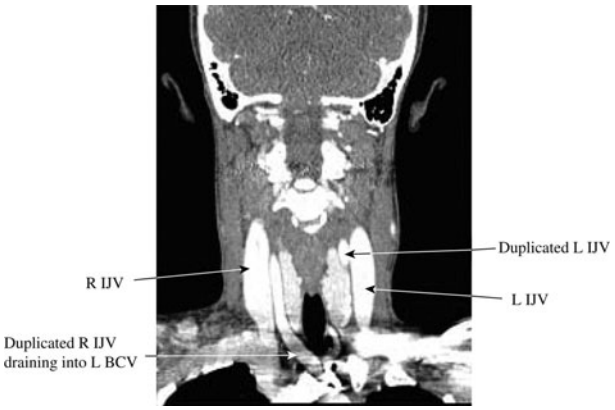

FIG. 2
Coronal, reformatted computed tomography image showing the duplicated right internal jugular vein (IJV) draining into the left brachiocephalic vein. R = right; L = left; BCV = brachiocephalic vein

were incidental findings from a head CT investigation for a cerebrovascular event, and one case was a finding from cadaveric dissection. A detailed summary of the 12 cases is given in Table I.

- **Duplicated internal jugular veins (IJVs) are a rare anomaly with an approximate incidence of 0.4 per cent**
- **They are usually subclinical, but can present with transient neck swelling**
- **The presented case had duplicated IJVs with the clinical features of dysphagia and dyspnoea, in addition to the usual neck swelling**
- **Head and neck surgeons, radiologists and intensive care practitioners should all be aware of this rare anomaly**

Of the three cases presenting with clinical features, the only complaint was neck swelling upon straining or performing the Valsalva manoeuvre. Notably, phlebectasia was found only in the three patients with duplicated IJVs. All other cases were incidental findings and had no symptoms prior to the discovery of duplicated IJVs. It would appear that duplicated IJVs, present in isolation, are usually subclinical unless associated with phlebectasia. As most duplicated IJVs are discovered as incidental findings, the prevalence of this anomaly is undoubtedly underestimated.

To date, no complications have been reported due to the presence of duplicated IJVs; however, intra-operative discovery of this anomaly certainly makes neck dissection more time-consuming and potentially more difficult. Fortunately, the majority of patients now undergo imaging prior to major neck surgery, which should identify the condition.

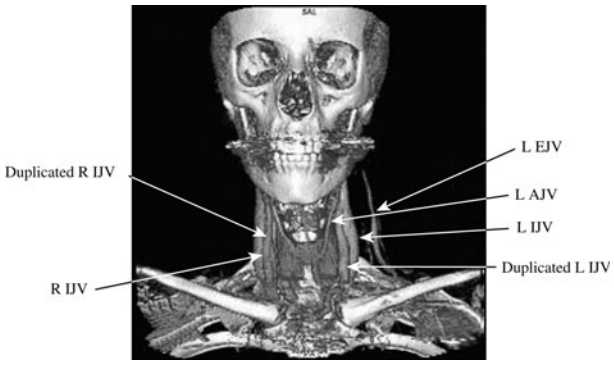

FIG. 3
Three-dimensional, surface-rendered, computed tomography image showing both duplicated internal jugular veins (IJVs). R = right; L = left; EJV = external jugular vein; AJV = anterior jugular vein

https://doi.org/10.1017/S0022215109990855 Published online by Cambridge University Press

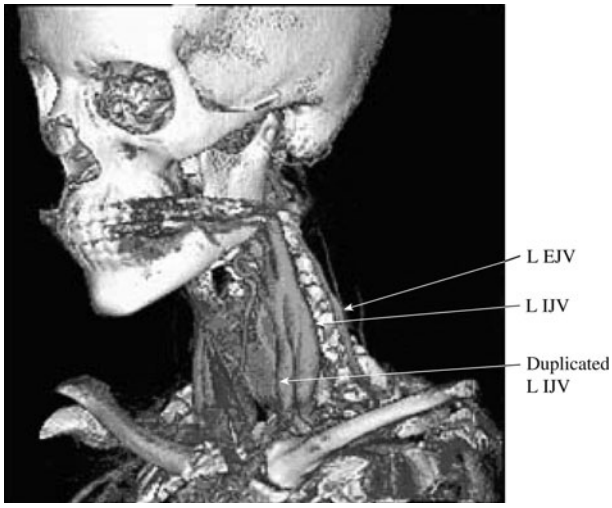

FIG. 4

Three-dimensional, surface-rendered, computed tomography image showing the duplicated left internal jugular vein (IJV). L = left; EJV = external jugular vein

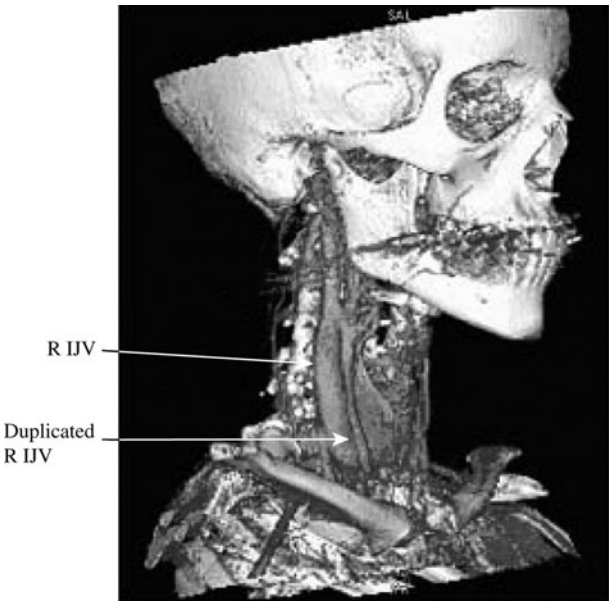

FIG. 5

Three-dimensional, surface-rendered, computed tomography image showing the duplicated right internal jugular vein (R IJV).

One point worthy of discussion is the use of the duplicated IJV for central venous access. It is important for any surgeon, physician or intensive care practitioner to be aware of this rare anatomical finding, as cannulation of a duplicated IJV may lead to an unusual course on follow-up radiographs. Similarly, radiologists should be aware of such anomalies when reporting imaging of the neck; a finding of duplicated IJVs should be clearly documented in the patient's medical records, and explained to them.

Conclusion

Over the last decade, advances in imaging and the development of surgical approaches have revealed more cases of duplicated IJVs. The presented case provides additional information regarding clinical presentation, as our patient not only had intermittent neck swelling but also dyspnoea and dysphagia. Clinicians should be aware of the rare possibility of duplicated IJVs in patients presenting with neck swellings. If such an anomaly is diagnosed, we would conclude that a conservative approach is indicated, as there is currently no evidence that duplicated IJVs cause any adverse health outcome.

References

1 Prades JM, Timoshenko A, Dumollard JM, Durand M, Merzougui N, Martin C. High duplication of the internal jugular vein: clinical incidence in the adult and surgical consequences, a report of three clinical cases. *Surg Radiol Anat* 2002;**24**:129–32
2 Towbin AJ, Kanal E. A review of two cases of fenestrated internal jugular veins as seen by CT angiography. *AJNR Am J Neuroradiol* 2004;**25**:1433–4
3 Munoz Guerra MF, Campo FR, Gias LN, Diaz Gonzalez FJ. Double internal jugular vein. *Plast Reconstr Surg* 2000;**106**:1434–1435
4 Sylaidis P, Bardsley A. Montgomery P. Duplication of internal jugular vein. *Arch Otolaryngol Head Neck Surg* 1997;**123**:1358
5 Gonzalez-Garcia R, Román-Romero L, Mancha de la Plata M. The rare phenomenon of internal jugular vein duplication. *Otolaryngol Head Neck Surg* 2007;**137**: 847–8
6 Turan-Ozdemir S, Coskun H, Balban M. Phlebectasia of the external jugular vein associated with duplication of the internal jugular vein. *Clin Anat* 2004;**14**:522–5
7 Rossi A, Tortori-Donati P. Internal jugular vein phlebectasia and duplication: case report with magnetic

TABLE I

PREVIOUS REPORTS OF DUPLICATED INTERNAL JUGULAR VEINS: SUMMARY

Study	Year	Cases (*n*)	Diagnostic method	Duplication side	Clinical features?
Som *et al.*[8]	1985	1	CT	R	Y
Sylaidis *et al.*[4]	1997	1	Neck dissection	R	N
Munoz Guerra *et al.*[3]	2000	1	Neck dissection	R	N
Rossi *et al.*[7]	2001	1	US scan & MRA	Bilat	Y
Prades *et al.*[1]	2002	3	Neck dissection	L	N
			Neck dissection & MRA	R	N
			Neck dissection	R	N
Towbin & Kanal[2]	2004	2	CT angiography*	L*	N*
Turan-Ozdemir *et al.*[6]	2004	1	CT	R	Y
Downie *et al.*[9]	2007	1	Cadaver dissection	Bilat	N
Gonzalez-Garcia *et al.*[5]	2007	1	Neck dissection	L	N

*Both cases. CT = computed tomography; US = ultrasound; MRA = magnetic resonance angiography; R = right; bilat = bilateral; L = left; Y = yes; N = no

https://doi.org/10.1017/S0022215109990855 Published online by Cambridge University Press

resonance angiography features. *Pediatr Radiol* 2001; **31**:134
8 Som PM, Shugar JM, Sacher M, Lanzieri CF. Internal jugular vein phlebectasia and duplication: CT features. *J Comput Assist Tomogr* 1985;**9**:390–2
9 Downie SA, Schalop L, Mazurek JN, Savitch G, Lelonek GJ, Olson TR. Bilateral duplicated internal jugular veins: case study and literature review. *Clin Anat* 2007;**20**: 260–6
10 Denys BG, Uretsky BF. Anatomical variations of internal jugular vein location: impact on central venous access. *Crit Care Med* 1991;**19**:1516–19

Address for correspondence:
Mr D R Strachan,
ENT Department,
Bradford Royal Infirmary,
Bradford BD9 6RJ, UK.

E-mail: drstrachan@aol.com

Mr D R Strachan takes responsibility for the integrity of the content of the paper.
Competing interests: None declared