

Internal jugular vein duplication with absent carotid sheath detected during ultrasound-guided pediatric central venous catheter placement

Kenji Kayashima · Keiko Imai · Koji Murashima

Received: 12 April 2013 / Accepted: 2 May 2013 / Published online: 22 May 2013
© Japanese Society of Anesthesiologists 2013

Keywords Internal jugular vein duplication · Carotid sheath · Central venous catheter placement

To the Editor:

Internal jugular vein (IJV) duplication is rare and is often found only incidentally during surgery [1] or imaging [2, 3] or during anatomical studies on cadavers [4]. We encountered an IJV duplication by chance during ultrasound-guided pediatric central venous catheter (CVC) placement.

A 4-year-old girl (height, 97 cm; weight, 13.6 kg) presented for repair of tetralogy of Fallot complicated by dextrocardia, polysplenia, right side descending aorta, inferior vena cava defect, partial anomalous pulmonary venous return, and persistent left superior vena cava (SVC). The right SVC led to the coronary sinus and right atrium and the left IJV, confluent with the hemiazygos vein, connected to the left-sided SVC. The patient's parents provided informed consent for all procedures and for publication of the case report. For CVC placement, the patient was supine with small rolled towels under her shoulders, and her neck extended and rotated approximately 15° to the right. The ultrasound apparatus, equipped with a 6/13 MHz probe (NanoMaxx®; SonoSite, Tokyo, Japan), was kept perpendicular to all planes of the skin. We discovered a 6.3 mm wide × 4.6 mm thick × 10.0 mm deep lateral lower left

IJV and a 3.4 mm × 2.7 mm × 8.2 mm medial upper left IJV (Fig. 1a) at the mid-portion of her neck. The lateral and medial IJV joined caudally near the clavicle (Fig. 1b). The distance between the common carotid artery (CCA) and the duplicate IJVs gradually increased toward the periphery. The lateral lower IJV was successfully punctured (Fig. 1c) with a Jelco® Plus 24-G catheter-over-needle device (Smith Medical, Tokyo, Japan). A 0.018-inch guidewire (SafeGuide® Microneedle Seldinger Kit; Covidien Japan, Tokyo) was advanced through the outer catheter (Fig. 1d) and the CVC was placed over the guidewire with placement confirmed by chest radiography. There were no complications during placement or after removal of the CVC.

IJV duplication has been reported as an incidental finding [1–4]. In this case, we discovered the IJV duplication during ultrasound-guided CVC placement. Our patient was a child with a complex set of congenital anomalies. We speculated that in her case, the IJV duplication was related to polysplenia. Cardiac anomalies in patients with polysplenia are mainly shunting anomalies. In addition, bilateral SVCs have been observed in 6 of 12 previously reported cases, 4 in patients with interruptions of the inferior vena cava. On the other hand, approximately 5–10 % of infants with polysplenia may have no associated anomalies [5].

As noted, in this case the distance between the CCA and the duplicate IJVs gradually increased. The CCA and the IJV usually run parallel and have some overlap in the carotid sheath; in our patient, however, it seemed there was no carotid sheath. In cases of IJV duplication that involve overlap between the lateral or medial IJV and the CCA, which would result in greater risk of mispuncture, ultrasound can enable detailed examination of the anatomical relationships between the IJV and the CCA and promote quality outcomes.

K. Kayashima (✉) · K. Imai · K. Murashima
Department of Anesthesia, Kyushu Kosei Nenkin Hospital,
1-8-1 Kishinoura, Yahatanishi-ku, Kitakyushu-city 806-8501,
Fukuoka, Japan
e-mail: ken5ji5ka5ya5shi5ma@nifty.com

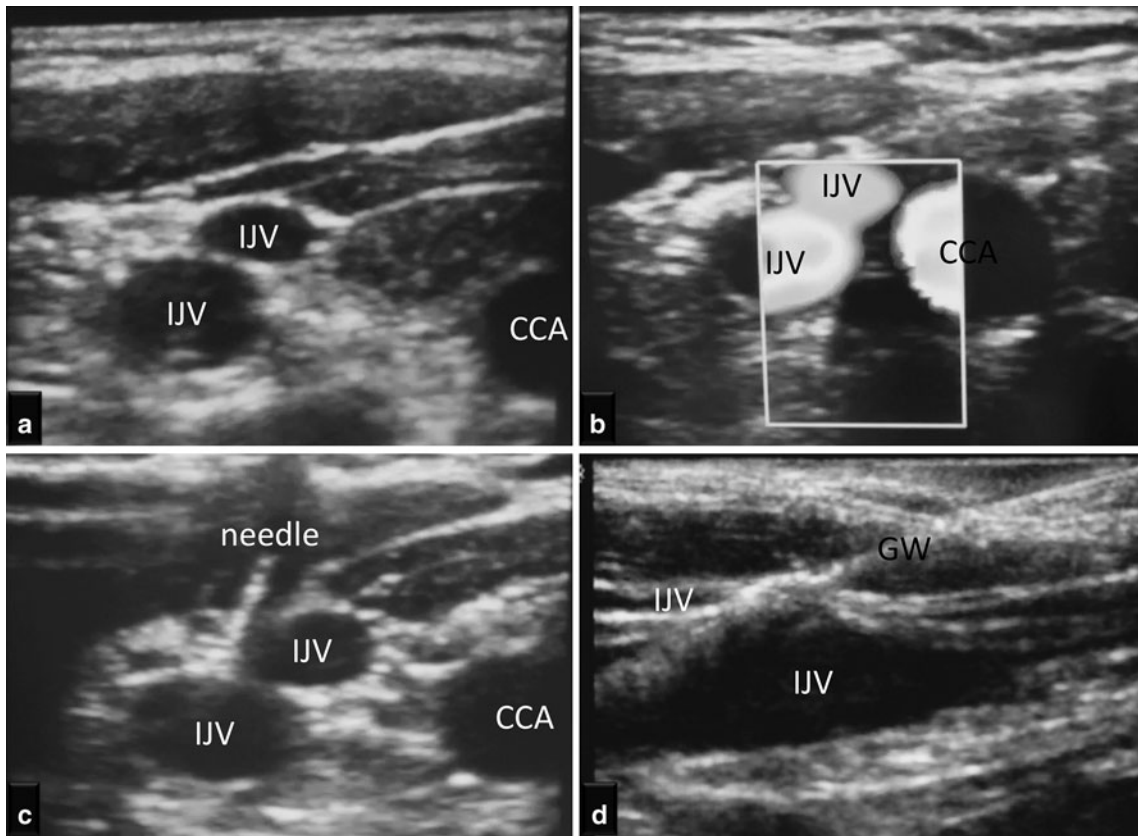


Fig. 1 Out-of-plane ultrasound images of the duplicate left internal jugular vein (IJV). **a** Out-of-plane image of the lateral lower left IJV, 6.3 mm wide, and the medial upper left IJV, 3.4 mm wide, seen in mid-neck. **b** The lateral and medial IJVs joined at a more caudal site

near the clavicle. **c** Needle puncture toward the lateral lower left IJV. **d** In-plane ultrasound image of the lateral and medial left IJV. *IJV* internal jugular vein, *CCA* common carotid artery, *GW* guidewire

References

1. Prades J, Timoshenko A, Dumollard J, 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. Som PM, Shuar JM, Sacher M, Lanzieri CF. Internal jugular vein phlebectasia and duplication: CT features. *J Comput Assist Tomogr.* 1985;9:390–2.
3. Rossi A, Tortori-Donati P. Internal jugular vein phlebectasia and duplication: case report with magnetic resonance angiography features. *Pediatr Radiol.* 2001;31:134.
4. 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.
5. Moller JM, Nakib A, Anderson RC, Edwards JE. Congenital cardiac disease associated with polysplenia: a developmental complex of bilateral “Left-Sidedness”. *Circulation.* 1967;36:789–99.