

Cervical radiculopathy due to intra-arterial infusion of cisplatin

TOSHIRO NISHIMURA, MD, JUN-ICHIRO SANADA*, MD, MITSURU FURUKAWA, MD

Abstract

A 55-year-old man with cervical radiculopathy (C5–C8) was referred to us following intra-arterial infusion of cisplatin (CDDP) because of a recurrent neck mass of laryngeal cancer. Three hours after the CDDP infusion, he had noticed general weakness of the left upper extremity and hypoaesthesia of the lateral side of the upper and lower arm. The next day he was diagnosed with left cervical radiculopathy of C5 to C8, which improved gradually and had resolved completely six months after the infusion. Even with proper positioning of the infusion catheter to minimize potential complications, for anatomical reasons there are always some risks of neural injury with intra-arterial infusion from branches of the subclavian artery. This procedure should be carefully indicated in the case of a large neck tumour that is perfused from the major branches of the subclavian artery.

Key words: Cisplatin; Intra-arterial Infusions; Radiculopathy

Introduction

Concomitant chemoradiation therapy has become the treatment of choice for advanced head and neck cancers because of the need to preserve an important organ like the larynx so as to maintain quality of life.¹ Among the chemoradiation therapies now being utilized, intra-arterial concomitant chemoradiation has been reported to have a very high local control rate.² Although the therapeutic effectiveness is high, intra-arterial injection of chemotherapeutic agents may cause serious complications such as vascular incidents (apoplexy) and functional impairment of preserved organs.² A case was referred to us with cervical radiculopathy (C5–C8) after intra-arterial infusion of cisplatin (CDDP), and here we report the case along with anatomical considerations of the complication.

Case report

A 55-year-old man was referred to Kanazawa University Hospital because of a recurrent neck mass of laryngeal cancer on the left side. Three years previously he had undergone total laryngectomy with right selective neck dissection at another hospital because of advanced laryngeal cancer. Another left neck mass had appeared one month previously in the left lower jugular chain and had grown very rapidly. On imaging studies, the tumour seemed to have invaded to deep muscular fascia, and so we recommended intra-arterial infusion of cisplatin (CDDP, 100 mg/m², three cycles) and concomitant radiation therapy to avoid further radical surgery.

The patient agreed to the treatment plan, and rapid infusion of cisplatin (100 mg/m²) was delivered through a trans-femoral intra-arterial microcatheter. It was performed under digital subtraction angiography and simultaneous computed tomography (DSA-CT). The DSA-CT imaging

revealed that the left superior thyroid artery had perfused the upper-ventral side of the tumour, and the occipital artery the more medial side of the tumour. The catheter was then moved to the subclavian artery, and it was revealed that the thyrocervical and the costocervical trunks had a common origin (Figure 1) and had perfused almost the entire tumour (Figure 2). A total amount of 170 mg CDDP was given; through the left thyroid artery (30 mg), the left occipital artery (20 mg), and the thyrocervical-costocervical common trunk (120 mg). Before the common trunk infusion, a provocative test using 2 per cent xylocaine 1 ml was performed to confirm any abnormal neurological symptoms. Because the patient had complained of only very mild pain around the neck without muscle weakness and sensory disturbance, the infusion was considered to be safe.

However, three hours after the CDDP infusion, he noticed general weakness of the left upper extremity and hypoaesthesia of the lateral side of the upper and lower arm. Next day a manual muscle test (MMT) of the major muscles of the left arm was graded 3 and he was diagnosed with left cervical radiculopathy of C5 to C8.

Because the palsy did not progress any further, and a nerve conduction test of both motor and sensory nerves was normal in the left arm, radiation therapy was undertaken with a total dose of 70 Gy with 35 fractions for 63 days after the event. The tumour responded very well and there was no evidence of the tumour after completion of the radiation treatment. Although the patient complained of stubborn pain around the neck and upper arm after the infusion, the pain was effectively eliminated by oral administration of oxycodone 15 mg/day for five months. The radiculopathy improved gradually and resolved completely six months after the infusion. Muscle power recovered completely (MMT: grade 5) and there was no abnormal sensation or pain around the neck and upper extremities.

From the Department of Otolaryngology and the *Department of Radiology, Kanazawa University Graduate School of Medicine, Kanazawa, Japan.

Accepted for publication: 24 March 2005.

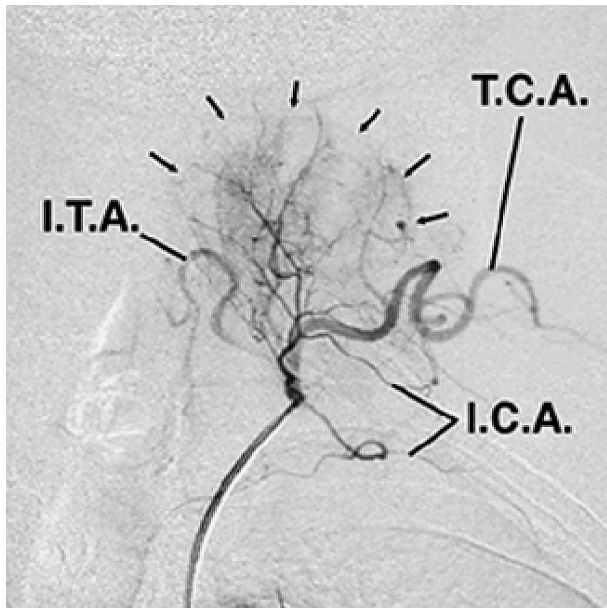


FIG. 1

Angiographic findings of the left thyrocervical trunk. Although the thyrocervical trunk was selectively chosen, the costocervical trunk was also visualized because of the common (or very close) origin of the two vessels. Small arrows indicate a tumour stain. ITA = inferior thyroid artery; TCA = transverse cervical artery; ICA = intercostal artery.

Discussion

On a MEDLINE search of medical literature, we have been able to find only one similar case report of brachial plexopathy, which occurred in a 38-year-old female with malignant fibrous histiocytoma of the left humerus.³ In that report, infusion of CDDP (150 mg/m²) of the axillary artery resulted in permanent neurological damage to the posterior cord of the brachial plexus.

Levy *et al.* reported the precise anatomy of blood perfusion of the brachial plexus and related structures,⁴ pointing out that the blood supply area of the subclavian artery encompasses the distal nerve root and the proximal



FIG. 2

Computed tomogram taken simultaneously under contrast medium infusion from the catheter placed as in Figure 1. Although the entire tumour was enhanced (small arrows), the dorsal part of the left metastatic neck mass was filled strongly with the contrast medium. The border between the tumour and the deep fascia, where the cervical radix and the brachial plexus exist, was clearly enhanced (long arrow). The preserved thyroid gland was also clearly visible (large arrow).

nerve trunks. The artery consistently supplies the entire distal nerve root of C5, C6, C7, C8, and T1 and all of the proximal trunks (superior, middle and inferior). Vascular supply usually takes place through direct unnamed branches of the following major branches of the subclavian artery: the costocervical trunk, the deep cervical artery or the thyrocervical trunk, the inferior thyroid artery, or the ascending cervical artery. Because of this anatomical condition, clinicians always risk cervical radiculopathy and brachial plexopathy in cases of intra-arterial infusion from the branches of the subclavian artery. The possibility of neural injury needs to be discussed with a patient before injection.

- This case report describes cervical radiculopathy after intra-arterial infusion of cisplatin
- Even with correct positioning of the infusion catheter there are risks of neural injury with intra-arterial injection of cytotoxic agents

Conclusion

Even with proper positioning of the infusion catheter to minimize potential complications, there are always risks of neural injury in cases of intra-arterial infusion from the branches of the subclavian artery for anatomical reasons. This procedure should be carefully indicated in cases of large malignant neck tumours that are perfused from the major branches of the subclavian artery.

References

- 1 Forastiere AA, Goepfert H, Maor M, Pajak TF, Weber R, Morrison W, *et al.* Concurrent chemotherapy and radiotherapy for organ preservation in advanced laryngeal cancer. *N Engl J Med* 2003;**349**:2091–8
- 2 Robbins KT, Doweck I, Samant S, Vieira F, Kumar P. Factors predictive of local disease control after intra-arterial concomitant chemoradiation (RADPLAT). *Laryngoscope* 2004;**114**:411–17
- 3 Kahn CE Jr, Messersmith RN, Samuels BL. Brachial plexopathy as a complication of intraarterial cisplatin chemotherapy. *Cardiovasc Intervent Radiol* 1989;**12**:47–9
- 4 Levy SM, Taylor GI, Baudet J, Guerin J, Casoli V, Pan WR, *et al.* Angiosomes of the brachial plexus: an anatomical study. *Plast Reconstr Surg* 2003;**112**:1799–806

Address for correspondence:

Dr Toshiro Nishimura,
Department of Otolaryngology,
Kanazawa University Graduate School of Medicine,
13-1 Takaramachi, Kanazawa,
Ishikawa 920-8641, Japan.

Fax: +81-76-234-4265

E-mail: nishimut@med.kanazawa-u.ac.jp

Dr T Nishimura takes responsibility for the integrity of the content of the paper.

Competing interests: None declared