

Full Length Research Paper

Bilateral Radical Neck Dissection with Unilateral Internal Jugular Vein Reconstruction by Autologous Saphenous Vein

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Abstract

To evaluate the functional and patency results of one internal jugular vein replacement after bilateral radical neck dissection among head and neck cancer patients. We reviewed data from 32 patients undergoing bilateral RND with resection of both internal jugular veins since 1994 to 2010. They also had a reconstruction of one internal jugular vein (IJVs). In every case a vascular reconstruction was performed with an autologous saphenous vein graft (ASVG). 27 patients needed radiation therapy. All patients received anticoagulant therapy. Functional results were evaluated in terms of postoperative head and neck and neurological complications. In some patients a Doppler scan was performed to assess vein patency. Patients did not report neurological complaints after the postoperative period. Facial edema was noted in three patients. Two patients were alive and could be followed up upto 8 years. Five patients were dead, without any evidence of recurrence. In patients with long-term survival a Doppler scan confirmed the patency of the vein graft. Very few postoperative complications were reported and absence of neurological complaints made a unilateral internal jugular vein replacement after bilateral RND attractive. It could be suggested to use this complete excision in head and neck cancer.

Keywords: Head and Neck Cancer, Saphenous Vein Graft, Internal Jugular Vein, Radical Neck Dissections, Bilateral Internal Jugular.

INTRODUCTION

The classical radical neck dissection was described by Crile in 1906. To diminish morbidity associated with radical neck dissections, modified radical and selective neck dissections have been developed that preserves structures like the accessory nerve, the internal jugular vein and/or the sternocleidomastoid muscle (Bocca et al., 1984). Large vein preservation is important when microvascular free grafting is contemplated (de Bree et al., 2002).

During neck dissection, the current practice is to preserve the internal jugular vein in the majority of cases. However, sacrifice of bilateral internal jugular veins is required in rare cases. Simultaneous excision of both internal jugular veins is known to frequently cause fatal complications. A frequently used recipient vein in the head and neck is the internal jugular vein. The use of larger-calibre vessels like the internal jugular vein

have reduced the number of anastomotic failures (de Bree et al., 2002). A modified Saphenous vein graft (SVG) conduit such as a spiral SVG, (Leafstedt et al., 1985), a cylindrical SVG (Urayama et al., 1993; Sakamoto et al., 2004) or vein cuffs and patches, (Anandbabu and Neville, 2006) sometimes became a necessity for large recipient vessels, or to obtain a potentially good patency.

The lack of operative complications and the absence of postoperative neurologic complications make a unilateral internal jugular vein replacement after bilateral RND attractive, although the oncologic results remain poor (Dulguerov et al., 1998). Power Doppler ultrasound is a valuable diagnostic technique for determination of internal jugular vein patency and may be useful as screening method or in case of clinical suspicion of thrombosis to determine internal jugular vein patency.

Late internal jugular vein thrombosis may probably not effect free flap survival due to neovascularization (de Bree et al., 2002).

The procedure of one-stage thyroidectomy and bilateral neck lymph node dissection for well-differentiated thyroid carcinoma is safe, as it is mandatory that at least one unilateral internal jugular vein should be preserved (Pan et al., 2006).

Unfortunately, vein graft patency is limited by progressive intimal hyperplasia, with 80% 1-yr and 60% 5-yr patencies (Fitzgibbon et al., 1996; Veith et al., 1986). The exact mechanisms for these phenomena remain unclear (Jiang et al., 2004).

METHOD

We obtained permission from the medical ethics and law committee before commencing our study. We performed a clinical trial by studying 32 patients (20 males, 12 females) with head and neck cancer referred to our medical center by consultants from oncology department. Information was obtained regarding the medical record from the Shohada Medical Center. No patient reported history of heart failure or respiratory disorder. Patients were selected within the age range of 30 to 74 years old. Table 1 and 2 shows demographic information of the sample. For all the patients, we performed preoperative CT Scan, MRI, routine laryngoscopy, Doppler sonography from both the lower limbs and further obtained their consent for the same after admitting them.

We assessed the functional criteria (face edema and Doppler sonography) in planned intervals (one week after surgery, 3 weeks, 3 months, 6 months and 12 months after surgery). At the end of the follow up period, the patency rates for all grafts were assessed by the means of Doppler sonography and by it's bases. All of these data were imported in datasheets and were reviewed at the end of the follow-up period.

Surgical Techniques

When metastatic cervical nodes adhere to the bilateral IJV and both IJVs cannot be preserved, the greater saphenous vein harvested and used to anastomose the graft to the stump of the IJV in an end-to-end fashion.

The greater saphenous vein harvested by a vascular surgeon. Sutures of 4-0 silk are used to tie the branches of the vein, and distended the graft by used heparinized saline, which is carefully handled. After bilateral RND, 7-0 polypropylene suturing is used to anastomose the graft to the upper stump of the IJV and then to lower stump. Then side-to-end distal anastomosis is performed with partial suturing if the larger IJV lumen. Figure 1, 2.

RESULT

On the first post-operative day, 9 of the 10 vein grafts were normal patent, Peak flow velocity in the vein graft ranged from 10 to 135 cm/s (mean 44 cm/s). Follow-up was done in 2, 4, 8, 24 weeks and face edema on the first post-operative day in one patient. During follow-up in 7 (70 per cent) patients, a normal patent vein graft was found. Partial thrombosis of the interposition graft as an internal jugular vein were observed by power Doppler ultrasound in two (20 per cent) patients each and one patient unfortunately complete thrombosis. Hematoma was found in one patient which is controlled by opening the wound and irrigation with normal saline and good hemostasis. No patient with partial thrombosis of the graft (saphenous vein) developed edema of the head and neck.

CONCLUSION

Palliative internal jugular vein reconstruction after bilateral radical neck dissection for malignancy in which both jugular veins are sacrificed remains controversial (Comerota et al., 1986; Bricker and McAfee, 1952; Al-Ghamdi et al., 1991). The current and previous findings strongly indicate that the reconstruction of at least one internal jugular vein is highly recommended for patients requiring bilateral internal jugular vein sacrifice. Our type K method may represent a useful technique for this procedure (Kamizono et al., 2011). The surgical management of bilateral cervical node metastases of head and neck cancer is controversial. A major argument against bilateral RND with sacrifice of both IJVs has been perceived risk of postoperative mortality and severe sequelae. Increased intracranial pressure results from resection of both IJVs (Kerawala, 2010). Doppler ultrasound (duplex) combines conventional ultrasound (B-mode, gray scale), which measures vessel wall diameters and the anatomic orientation of adjacent tissue structures with Doppler, which measures by the Doppler principle. Color duplex techniques are based on the estimation of the mean Doppler frequency shift. Recently, a method of Doppler technique was described that is based on estimating the integrated. Doppler power spectrum is useful for determined by the velocity of red blood cells. Power duplex is even more sensitive in detecting slow blood flow as compared to colour duplex. Another advantage of power duplex over colour duplex is that it is less sensitive to the angle between flow direction and ultrasound beam.[18,19] Patients with carcinoma are well-known to be predisposed to the development of a hypercoagulability state. This is partly due to increased platelet count, together with enhanced platelet adhesiveness. Cancer patients have elevated levels of anti-haemophilic globulin (factor VIII) as well, which also may account for their propensity towards

Table 1. distribution of patients related to decade.

Age	Male	Female	No
30 - 40 Yr	2	-	2
40 - 50	4	3	7
50 - 60	5	5	10
60 - 70	5	3	8
70 - 74	4	1	5

Table 2. Patients and malignant disease.

Malignant disease	Male	Female
laryngeal cancer	13	3
S C C Oral cavity	4	4
Thyroid cancer	1	4
Other	2	1

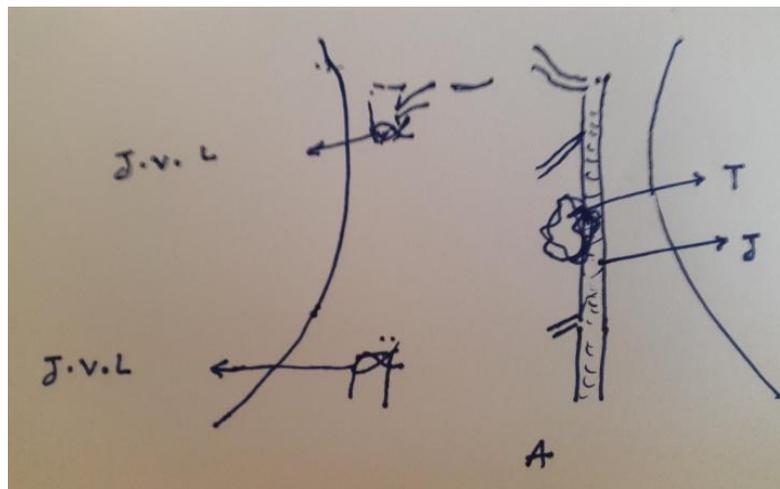


Figure 1. The right internal jugular vein was ligated and tumor invaded to the the left internal jugular vein

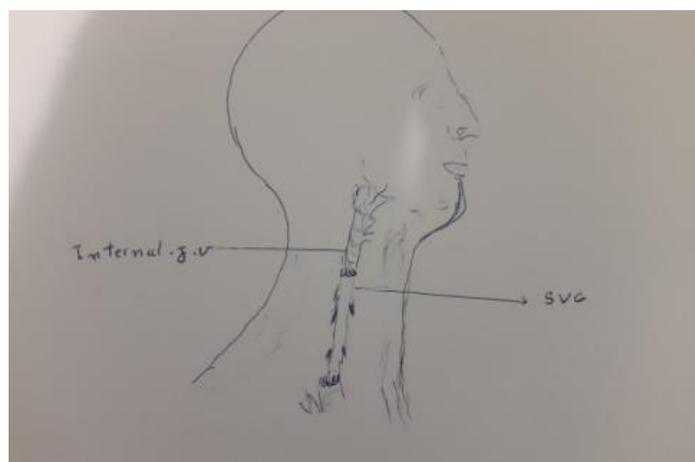


Figure 2. The right internal jugular vein was ligated and left side after enblock excisional resection of tumor and internal jugular vein the defect is improve with segment of saphenous vein

post-surgical clot formation (de Bree et al., 2002).

The majority of graft failures occurred in bypass grafts that were created using ePTFE. SFV internal jugular replacement is a useful option for simultaneous bilateral radical neck dissection that requires bilateral jugular vein resection. Successful internal jugular reconstruction using SFV has been reported by others (Bricker and McAfee, 1952; Al-Ghamdi et al., 1991).

On the first post-operative days, power Doppler ultrasound examination of the vein graft can be difficult, because edema of suture liens. At follow-up, scar tissue may hamper the examination. Patients who are plagued by obstructive iliofemoral venous disease and postphlebotic changes from chronic deep venous thrombosis in the axial veins of the lower limb may experience severe donor limb morbidity after removal of the SFPV (Hagino et al., 1997). This bypass will decrease the postoperative facial edema and associated complications and allow the patient to go on to radiation and chemotherapy in an expeditious and safe manner (Citrin, 1988). The current and previous findings strongly indicate that the reconstruction of at least one internal jugular vein is highly recommended for patients requiring bilateral internal jugular vein sacrifice (Kamizono et al., 2011). Therefore, we do not recommend removing the SFV in patients who have chronic lower extremity venous insufficiency.

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How to cite this article: Mousavi SR (2016). Bilateral Radical Neck Dissection with Unilateral Internal Jugular Vein Reconstruction by Autologous Saphenous Vein. *Int. Inv. J. Med. Med. Sci.* Vol. 3(2): 40-43