

Superior sagittal sinus thrombosis complicating neck dissection

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Abstract

Objective: To report a superior sagittal sinus thrombosis occurring as a rare complication of neck dissection, and to present a review of published literature.

Case report: A 42-year-old man underwent an elective neck dissection for a tumour stage 2, node stage 2_b, tonsillar squamous cell carcinoma, prior to chemoradiotherapy. During surgery, the right internal jugular vein was sacrificed as part of the resection, as tumour was adherent to it. Two weeks after surgery, the patient was readmitted with seizures. Subsequent computed tomography and magnetic resonance venography confirmed a superior sagittal sinus thrombosis. The patient was subsequently anticoagulated and underwent radiotherapy without further complication. A review of pre-operative imaging indicated a dominant internal jugular vein, ligation of which may have been a factor in the subsequent sagittal sinus thrombosis.

Conclusion: Superior sagittal sinus thrombosis following neck dissection is a rare occurrence, with little reported in the literature. Dominant internal jugular vein anatomy may be evident on pre-operative imaging. An awareness of this complication may be helpful to surgeons contemplating sacrifice of the internal jugular vein.

Key words: Neck Dissection; Thrombosis; Surgery; Cancer; Sagittal Sinus

Introduction

Neck dissection is a commonly performed oncological procedure. Cerebral venous thrombosis following neck dissection is rarely reported. We report such a case, in which pre-operative cross-sectional images indicated a dominant internal jugular venous system; subsequent ligation of this vessel probably resulted in venous stasis and thrombus formation. Although this complication is rare, consideration of the venous drainage shown on pre-operative imaging may alert surgeons to the fact that ligation of a dominant vein could result in thrombosis.

Case report

A 42-year-old man with a tumour stage 2, node stage 2_b, tonsillar squamous cell carcinoma underwent a right modified radical neck dissection prior to chemoradiotherapy. During surgery, the right internal jugular vein was sacrificed as there was tumour adherent to it, being ligated high adjacent to the skull base. The sternomastoid muscle and accessory nerve were both preserved during surgery.

In the immediate post-operative period, the patient recovered without complication and was discharged home.

Two weeks post-operatively, the patient attended the emergency department with repeated seizures (a de novo presentation). Computed tomography (CT) of the head with contrast indicated bilateral parenchymal haemorrhage within the right and left frontal lobes, consistent with a sagittal sinus thrombosis (Figure 1). A subsequent magnetic resonance venogram confirmed absence of flow within the superior sagittal sinus, extending into the right

transverse sinus towards the jugular foramen (Figure 2). Normal flow was evident in the contralateral transverse sinus. The patient was anticoagulated with enoxaparin to facilitate subsequent radiotherapy and discharged home after one week.

On re-examination of the pre-operative CT scans, the patient appeared to have a markedly dominant right internal jugular vein, compared with the contralateral side (Figure 3). Following ligation of this dominant right internal jugular vein, an extensive intracranial venous thrombosis had occurred.

Discussion

Central venous thrombosis is a rare event, and a far less common cause of stroke than arterial disease. Seizures are a feature, and may become recurrent. Multiple causative factors have been suggested in the literature. Infective conditions, such as frontal or sphenoidal sinusitis, may lead to central venous thrombosis. Trauma may also be an aetiological factor; indeed, even mild head trauma has been associated with cerebral sinus thrombosis. In addition, hypercoagulable states such as pregnancy, lupus, antiphospholipid syndrome, nephritic syndrome and specific haematological disorders (e.g. protein C or S deficiency) have all been implicated in the formation of central venous thrombosis.^{1–3}

Sagittal sinus thrombosis following neck dissection appears to be an extremely rare occurrence. A literature review utilising the Medline, Embase and CINAHL databases, and using the keywords 'neck dissection',

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FIG. 1

Coronal computed tomography scan demonstrating bilateral parenchymal haemorrhages (black arrows).

'thrombosis' and 'cerebral', revealed only one previous reported case of sagittal sinus thrombosis following neck dissection.⁴

The thrombosis reported in the present case appears to have been a consequence of sacrifice of the dominant internal jugular vein during neck dissection. Drainage of the superior sagittal sinus is typically to the right transverse sinus, which in turn forms the right internal jugular vein. The right internal jugular vein typically has greater flow than the left. Ligation of the internal jugular vein during surgery is thought to lead to a compensatory increase in flow through emissary veins and the contralateral jugular vein.

Sagittal sinus thrombosis following neck dissection may result from a propagating thrombus extending from the

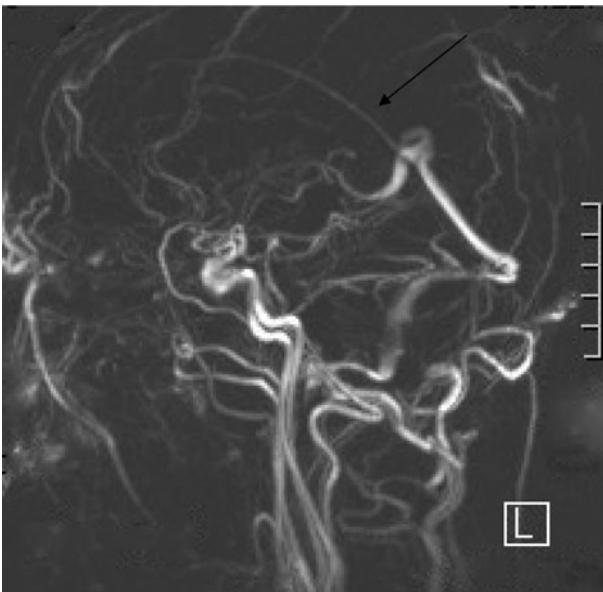


FIG. 2

Lateral view of a three-dimensional phase contrast magnetic resonance venogram, showing occlusion of the superior sagittal sinus (black arrow).



FIG. 3

Post-contrast, axial computed tomography scan indicating a dominant right internal jugular vein (black arrow).

ligated stump of the internal jugular vein. In patients with a very dominant right internal jugular system, ligation may prompt venous stasis and hence thrombus formation. Sagittal sinus thrombosis following neck dissection was first described in 1951 at autopsy.⁵ Subsequently, it has rarely been reported as a consequence of neck dissection, but should be considered by clinicians managing patients who present with headache, altered consciousness or seizures post-operatively. Findings on CT are subtle and may be present in only approximately 25 per cent of scans.² Magnetic resonance imaging and magnetic resonance venography are the investigations of choice.^{6,7}

- Neck dissection is a commonly performed oncological procedure
- Cerebral venous thrombosis following neck dissection is rarely reported
- Surgeons planning neck dissections should be aware of this rare complication; careful examination of pre-operative axial imaging may help determine if the patient has a particularly dominant internal jugular venous system, which may predispose to central venous thrombosis
- Computed tomography findings are subtle and only present in approximately 25 per cent of scans; magnetic resonance imaging and magnetic resonance venography are the investigations of choice

Surgeons planning neck dissections should be aware of sagittal sinus thrombosis as a rare complication. Judicious examination of pre-operative axial imaging may help determine if the patient has a particularly dominant internal jugular venous system, which may predispose to central venous thrombosis.

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