

Kinking of the Internal Carotid Artery

İTERNAL KAROTİD ARTERDE BÜKÜLME

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Summary

Identification of anatomical structures during surgical procedures is of vital importance for the surgeons. Any abnormalities of anatomical structures, especially of vascular origin, if unrecognized may lead to fatal complications.

In this presentation, kinking of internal carotid artery, encountered during neck dissection but not recognized radiologically, is presented with the literature review.

Key Words: Internal carotid artery, Kink, Neck dissection

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Özet

Ameliyatlar sırasında hayati önemi olan anatomik yapıların ortaya konması çok önemlidir. Özellikle vasküler yapılar olmak üzere anatomik yapılar tanınmazsa, ölümle sonuçlanabilecek komplikasyonlar meydana gelebilir.

Bu vaka sunumunda; preoperatif dönemde radyolojik olarak saptanmamış ancak boyun diseksiyonu sırasında karşılaştığımız internal karotid arterdeki yaylanma literatür gözden geçirilerek sunuldu.

Anahtar Kelimeler: İnternal karotid arter, Kıvrım, Boyun diseksiyonu

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Identification of the anatomic structures of the neck during neck dissection (ND) is of vital importance because of possible fatal complications. The most serious complication is related to the carotid artery. If internal carotid artery (ICA) or its anomaly is not recognized during any surgical intervention, fatal results may follow.

Most large arteries are stretched longitudinally by traction. When pressurized, some vessels are forced to elongate excessively and to buckle between constraining branches; clinically this is seen in patients with congenital kinking of arteries, arterial ectasia, aneurysms and hypertension (1).

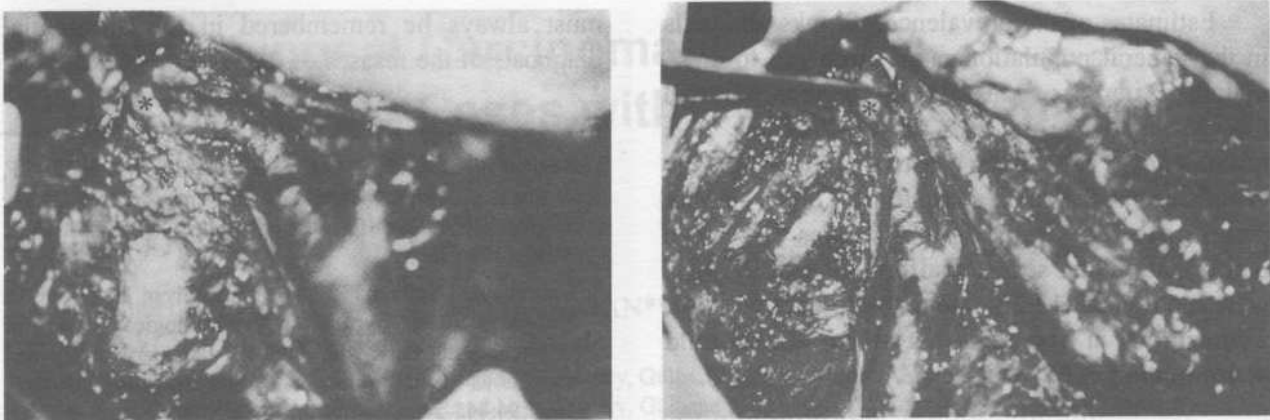
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In this presentation, ICA anomaly due to congenital kinking encountered during neck dissection is presented with a special emphasis on the importance of thorough knowledge of anatomy and a good surgical technique.

Case Report

A 63 year old man was admitted to the Department of Otolaryngology at the University of Çukurova Medical Faculty with the complaints of dyspnea, hemoptysis and weight loss. Physical examination and the computerized tomography (CT) revealed a transglottic mass with the existence of bilateral lymph nodes at the jugulodigastric region. Biopsy from the laryngeal mass was reported as epidermoid carcinoma and total laryngectomy with bilateral NDs was planned. During the right ND a solid mass was palpated at level II which was in accordance with the findings of CT. The mass is reached by an inferior approach



Figures 1 and 2. Internal carotid artery loop seen after completion of the neck dissection.
*: kinking of internal carotid artery

for better exposition. Careful dissection of the tissues continued over the common carotid and internal carotid arteries until the mass was reached. It was realized that the mass, palpated and considered as lymph node previously, was in fact the kinking of the ICA (Figs. 1 and 2). The lymph bearing tissues over the ICA kink was dissected carefully and included in the specimen. Following the total laryngectomy, the operation was completed without any complication.

Discussion

In any surgical intervention to neck it is very important to identify the anatomic structures to avoid any complications. Among these anatomical structures, carotid artery and its main branches are significant, considering their potentials for serious complications. The ICA malformations are not rare and one should be aware of these malformations in order not to cause a fatal complication. Redundancy of the ICA was assigned clinical significance when appreciated as a risk factor in tonsillectomy, adenoidectomy, and surgical treatment of peritonsillar abscess as well as in any surgical intervention to neck such as in ND (1). A kink may produce an opacity on a radiograph of the chest, or may appear as a pulsatile swelling in the neck or pharynx, thus causing difficulty in differential diagnosis. The mass should be palpated carefully during the operation which would prevent a possible complication. Failure of identification of the ICA anomalies preoperatively may be fatal. In this case presentation, the ICA anomaly was

misinterpreted as a lymph node but careful dissection of the mass during ND prevented a possible serious complication.

Most arteries follow a straight course. However some vessels are forced to elongate so much between constraining branches so that they buckle and become tortuous. There are two forces that tend to lengthen a vessel; the first one is due to traction and the second one is caused by pressure in the lumen (2). Traction, exerted by side branches and perivascular connective tissue, stretches arteries by pulling on them. Pressure in the lumen of the vessel pushes arteries from inside, causing them to extend (2). These two forces combine together to give the net longitudinal force that extends a vessel.

While these two forces considered above cause vessels to lengthen, retractive force exerted by the stretched arterial wall opposes them. Any condition that changes the balance of the forces described above may cause vessel lengthening and the development of tortuosity.

Redundancy of the ICA may be congenital, related to differential growth of the spine and descent of the great vessels into the chest (1). Another possible etiology is atherosclerotic degeneration of the the ICA (1). It has also been suggested that hemodynamic effects and lateral forces on the ICA, which is fixed at both ends, cause the vessel to loose its elasticity and become redundant with age (1,2). In this case, the kinking of ICA may be due to advanced age or to possible atherosclerosis.

Estimates of the prevalence of kinks and coils in the general population range from 4% to 66%, including autopsy series (3). It has been reported that an incidence of 16% to 19% of the ICA redundancy had been noted following the examination of various angiograms (1). In another series of 5542 angiograms, rates of mild malformation and severe malformation of the ICA were reported as 12.2% and 5.1% respectively (4). Tillmann et al reported that there was a mild malformation in 37% of the ICA specimens (5).

Conclusion

In this case, the ICA loop had not been detected with CT, but it was recognized during the neck dissection. This ICA malformation could easily lead to a fatal complication during surgery unless the surgeon is aware of the possible anomalies of the ICA. The ICA malformations

must always be remembered in the differential diagnosis of the masses of the neck.

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