Carotid body tumour

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The tumours arising from the carotid body are very rare. In a recent survey, Wilson (1964) estimated not more than 500 cases could be culled from the world literature, since Marchand (1891) first recorded a paper on this subject. Based on the incidence alone, there is every justification in recording the following case.

Nowadays tumours are arising with increasing frequency from the tissues other than carotid body which are embryologically and histologically similar to it. The common sites of such type of tumours are the jugular bulb, and the tympanic body, along the course of tympanic branch of glossopharyngeal nerve in the middle ear.

Case report

A male, aged 28 years, was admitted in the E.N.T. ward with a complaint of a painless and progressively increasing swelling in the right side of neck just below the angle of jaw, of 1½ years' duration. During the past 1½ years, he was treated at various centres with anti-tuberculous treatment, and his tonsils were removed.

Examination of the neck revealed a swelling in the right carotid triangle, of the size of 2 in. × 1½ in., partly under the cover of sternomastoid. It was mobile from side to side but not from above downwards. The swelling was not tender or warm, and margins were diffuse. The mass can be compressed and presents transmitted pulsations from carotid artery. On auscultation of the mass, a bruit was heard.

Ear, nose and throat examination was essentially negative, and even systemic examination including his blood pressure and pulse did not reveal any abnormality.

A preliminary diagnosis of carotid body tumour was made and he was investigated for the same. A preliminary plain X-ray of lateral view of the neck as well as of the chest was done, and they did not show any abnormality. A carotid angiogram was done (Fig. 1) which showed a tumour mass, richly supplied by blood vessels and splaying of the carotid bifurcation. The internal carotid was very well visualized, but the external carotid was comparatively less well visualized (Fig. 2). The investigations were completed by doing a routine urine, blood examination and also Mantoux test, which showed no abnormality.

An exploration of right side of neck was done and the tumour mass was found occupying the gap between the external and internal carotid arteries (Fig. 3). A small part of the tumour also extended over the common carotid artery. The tumour was completely excised along with a portion of external carotid to which it is adherent and the internal carotid was saved. During

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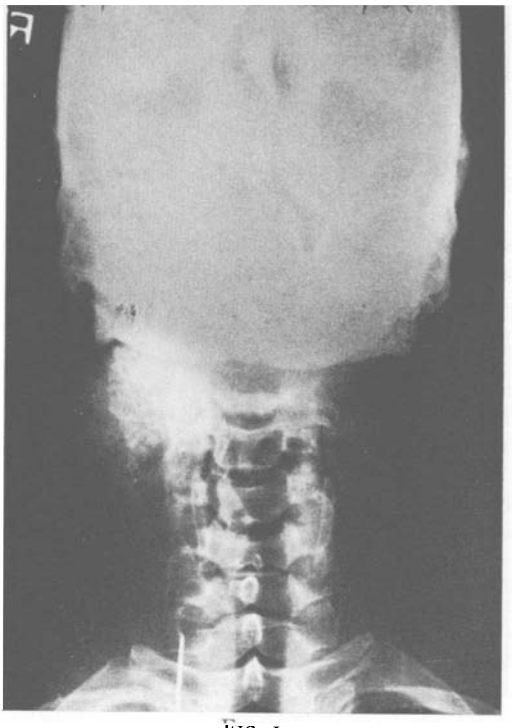


FIG. 1.
Carotid angiogram showing the rich vascularity of the tumour.

this procedure the common, internal and external carotids had to be clamped for a few minutes at a time, because of its angiomatous nature. The wound was closed in layers with a drain at its dependent part.

During the post-operative period he had temporary hemiplegia and facial nerve paralysis, probably due to intermittent carotid occlusion. He recovered from all these within a week. There was euphoria, which took a fortnight to settle down.

Pathology report of the tumour

Macroscopic appearance. Soft, globular mass of tissue weighing 15 g. and measuring $4 \times 3 \cdot 2 \times 1 \cdot 4$ cm. At the lower portion a small groove is seen which is the impression produced by the carotid artery. Sectioned surface shows a fleshy dark red mass (Fig. 4).

Microscopic appearance. Shows circumscribed tumour mass without capsule; tumour composed of cell nests or acini, each nest walled off by a thin fibrous tissue from the others. Large epithelium-like cells with faint cytoplasm and distinct nucleus seen. In places the tumour is highly vascular. Acini are, in places, separated by vascular channels from one another. In general tumour presents a typical pattern of Carotid Body Tumour (Fig. 5).

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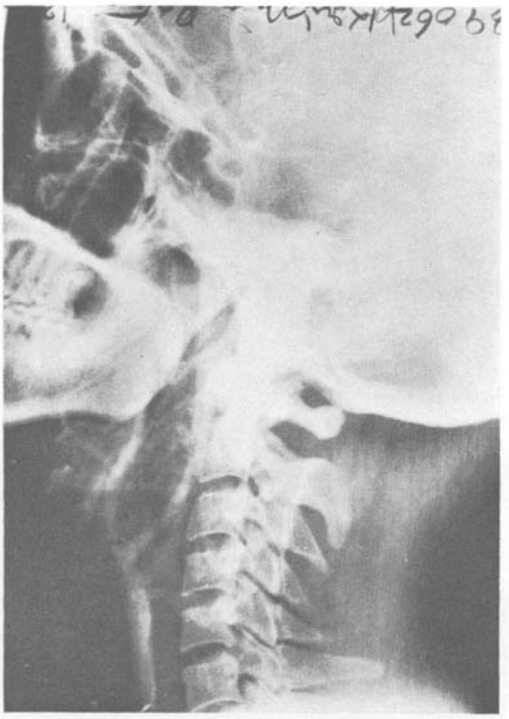


FIG. 2.
Carotid angiogram showing the splaying of the carotid bifurcation.

Discussion

In the medical literature there is no more controversial swelling in the neck than the carotid body tumour. The surgeon is faced with conflicting opinions regarding its diagnosis, nature, and treatment.

The criteria for diagnosis, as summarized by Goldberg (1947), are (1) history of several years' duration of a slowly growing painless mass in the neck; (2) a firm oval mass in the region of the bifurcation of the common carotid artery; (3) free lateral but no, or very limited, vertical motility; (4) decrease in size on compression of the common carotid artery and (5) transmitted but not expansile pulsation. As the tumour increases in size, there may be pressure on the neighbouring structures particularly on the vagus and hypoglossal nerves and the sympathetic nerve trunk. It may be present as a swelling in the pharynx on further increase in size. An aspiration biopsy, as an evaluating procedure regarding the nature of the masses in the neck, is not of much benefit in the case of carotid body tumour, as in most instances the pathologist sees nothing but blood in the submitted specimen. A carotid angiogram will certainly produce a characteristic picture, splaying both the carotids by the mass, and also, gives an idea of the vascularity of the tumour. The ultimate diagnosis can best be made by exploration of the neck and the classical vascular network can be easily recognized, as one reaches the carotid bifurcation.

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FIG. 3.
Photograph showing the tumour at the bifurcation of carotid, just before its removal.

As to the nature of the tumour, according to many pathologists including Willis (1962), it is essentially a benign neoplasm with a few exceptions. Although there is evidence supporting the view that these are malignant, it can be flatly rejected. Essentially the malignancy of a tumour is established by the characteristics of its cells, and its spread. Mitotic figures are very rare and pleomorphism, which is exhibited in this tumour is not uncommon and it is present less markedly in certain other benign tumours e.g. parathyroid adenoma, cortical adenoma and pleochromocytoma of adrenal according to LeCompte (1951). The capsule is intact and the adjacent structures are intact. There are a few recorded cases wherein there is a spread to regional lymph nodes, as well as remote organs such as, liver, lungs and bones. It is very difficult to identify the sources of tumour from the section of these glands, as they may be metastatic deposits in the carotid lymph nodes, from an undetected primary tumour elsewhere, or, it may be a direct spread from the tumour itself. A prolonged clinical duration of most of these tumours is also an evidence against its malignancy. Considering the above points there are no valid criteria to stamp this as a malignant tumour.

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FIG. 4.
Section of the tumour showing fleshy dark red mass.

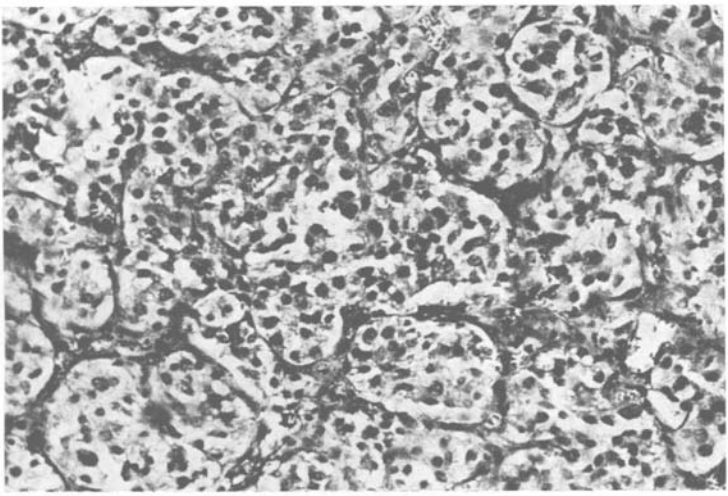


FIG. 5.
Section of the tumour H.E. stain 10 × 20 showing large epithelial cells with faint cytoplasm and distinct nucleus with sinusoids.

The main controversy in the treatment lies whether to leave the tumour without operation, taking into consideration its benign nature and its slow growth, or to operate on it, as soon as diagnosed. This uncertainty in the treatment of the tumour, is due to its close relation to carotid vessels in the neck and to the consequential events, if the flow of blood in the internal carotid artery is either temporarily or permanently interrupted. The events under these circumstances may range from death to a temporary or permanent hemiplegia.

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The age of the patient and the size of the tumour are to be taken into consideration, while deciding to operate these tumours. It is a commonly accepted opinion that younger individuals will tolerate carotid occlusion better than older individuals and also that these tumours grow slowly. So, in an individual of 60 or 70 years with a carotid body tumour, it is better to leave it alone, since the life expectancy of such an individual and the chances of dying of some other unrelated cause are high enough to preclude subjecting him to a potentially serious operation of such a slow growing tumour. But, if this is encountered in the earlier decades of life, it is almost definite that such a tumour is going to cripple the patient and kill him before he has lived his span of life. In such cases it is advisable to operate.

In the case of larger tumours, there is a greater chance for interference with carotid flow during their removal than in smaller growth, though the size does not ensure us in the preservation of the vessel. This entirely depends upon the involvement of the vessel.

Radiotherapy has no effect on these tumours and all the statements to the effect that 'tumour was held in check' or 'regression has been achieved' only reiterate the true nature of the tumour, that it tends to remain stationary, or grows slowly for years.

Summary

A case of carotid body tumour, successfully removed was reported together with views regarding certain problems it presents to a surgeon.

Acknowledgement

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