Chemodectoma of larynx

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Chemodectoma affecting the larynx is an extremely rare tumour. Only eleven cases have been reported in the world literature.

Chemodectoma, otherwise known as non-chromaffin paraganglioma or glomus tumour, is a tumour arising from the chemoreceptor cells. The presence of these cells in relation to the great vessels arising from the heart and in the neck is well known. The clinical course of chemodectoma of carotid body and glomus jugulare is well documented but very little is recorded about laryngeal chemodectoma.

We describe below, in some detail, a case of chemodectoma of the larynx which had most of the typical clinical characteristics of this little-known entity.

Case report

G.T., a 61-year-old retired stores clerk was seen in December 1961 at the Neurosurgical Department of Killearn Hospital, Glasgow, with a history of agonizing, paroxysmal pain in the right side of his throat and right ear. A diagnosis of glossopharyngeal neuralgia was made and a right glossopharyngeal neurectomy was carried out through a small posterior fossa craniotomy. This procedure relieved his pain only for six weeks and after a short period the patient was lost to follow-up.

In March 1966, he was seen in the E.N.T. Department at the Western Infirmary, Glasgow, with spasmodic pain in the right side of his throat, radiating to the right ear and right side of face. He also complained of dysphagia. Clinical examination was normal and barium swallow proved negative. Oesophagoscopy was essentially normal but for what appeared to be some fullness in the post-cricoid region. The mucosa over this was smooth. A biopsy showed no abnormality. The original diagnosis was retained and the patient responded well to carbamazepine.

In December 1968, he returned with persistent right-sided throat pain, dysphagia and hoarseness. Indirect laryngoscopy showed a red, fleshy, lobulated mass in the right supraglottic region. The right vocal cord was obscured by the growth. There were no palpable cervical nodes. The trachea was central but tender just below the cricoid cartilage. Direct laryngoscopy confirmed the mirror findings and also showed involvement of the right vocal cord and subglottic region. The left half of the larynx was normal. Biopsy showed a partly necrotic mass of tissue in which clefts in the eosinophilic connective tissue were lined by what appeared to be columnar epithelial cells. Stains for mucin and amyloid gave negative results. It was thought that the tumour was not of laryngeal origin but possibly from an endocrine gland in the neck. Because of the doubtful

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nature of this tumour, a second biopsy was carried out. Electronmicroscopy confirmed the endocrine nature of this tumour. Serum calcium and 5.H.I.A.A. were normal. Patient's blood pressure was 150/90 mm. Hg.

In March 1969, a right partial laryngectomy was performed. The tumour after being inspected from within was removed with most of the right thyroid ala and the right antero-superior part of the cricoid cartilage. Macroscopically a complete excision was achieved. A lymph node, close to the thyroid ala, was separately submitted for histology. It was interesting to note that there was a transient rise of his blood pressure when the tumour was handled. His post-operative blood pressure was 120/70 mm. Hg.

The resected specimen consisted of cartilage and tumour, the combined dimensions of which were $4 \times 3 \times 1.5$ cms. The histological appearances varied considerably. In some places, the tumour cells were arranged in the form of nests of cells bounded by a delicate fibro-vascular framework. In other areas, the cells were arranged in irregular sheets with little connective tissue stroma. Mitotic figures were rarely seen. The tumour was separated from the laryngeal epithelium by a band of collagen. The epithelium showed only a minor degree of ulceration. Noradrenaline was detected by the Falck test at a concentration of 0.145 μg per g. The microscopical and pharmacological findings were diagnostic of chemodectoma. The separately submitted lymph node showed the same histology. The pathological aspects of this case have been discussed in detail by Vetters and Toner (1970).

He made an uneventful recovery and could speak fairly well. Seven months after the operation, he developed stabbing pain in the right ear and his voice deteriorated. Laryngoscopy showed a few granulations on the right aryepiglottic fold which were removed. Histology did not show tumour tissue.

In May 1970 (14 months after the operation), patient complained of constant burning pain in the right side of his throat associated with severe discomfort in the right side of his neck, and pain shooting to his right ear. Dysphagia and laryngeal pain on phonation were also present. The larynx was extremely tender and there was a tender mass in the upper one-third of his neck on the right side, separate from the larynx. Direct laryngoscopy showed an irregular swelling on the right side of his larynx. The subglottic region was clear. Biopsy did not show any tumour. A right cervical block dissection was carried out and the submitted specimen showed secondaries of chemodectoma in the cervical nodes, infiltrating the sternomastoid muscle. This relieved his pain for a few weeks.

In October 1970, a soft mobile node became palpable on the left side of his neck and, in view of the highly metastatic nature of this tumour which was becoming obvious, he was subjected to a course of radiotherapy to both sides of his neck. The dose received was 6,000 rads over a period of six weeks. The lymph node on the left side did not regress.

In January 1971, nearly nine years after the onset of his initial symptoms and twenty-two months after the original operation, he developed a very tender pink nodule, a centimetre in diameter, in his palate. Treatment with cryosurgery was attempted and, after four sessions, only a minimal regression of the nodule was noticed. Shortly after, a small tender nodule 1.5 cms. in diameter, looking like a 'pink sebaceous cyst' was noticed in the scalp on the right parietal region.

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This was subjected to a single dose of 1,700 rads, resulting only in partial regression.

In March 1971, he developed dyspnoea and his dysphagia increased. The larynx appeared puffy and oedematous. His dyspnoea improved on prednisolone. Direct laryngoscopy and biopsy showed recurrence of chemodectoma. Tissue for biopsy was taken from the level of the original right vocal cord. He was commenced on cyclophosphamide, 50 mg. twice a day.

The scalp nodule excised in May 1971 proved to be chemodectoma histologically. Shortly after, a second similar nodule appeared a little posterior to the first. In early August 1971 the palatal nodule was excised, as cryosurgery failed to maintain the initial regression. Once again, this lesion proved to be a chemodectoma histologically. In late August 1971, two painful lesions appeared, one in the right occiput and the other in the right posterior triangle of neck. Both these lesions histologically proved to be chemodectoma. The pain disappeared following excision.

On 30 September 1971 he was admitted with abdominal discomfort. He was generally unwell and had lost 3 stones in weight. Once again, he had a tender nodule just below the umbilicus. He improved on high protein diet and was transferred to a convalescent home.

He died at home in January 1972.

Discussion

The carotid body was first recognized by Von Haller (1743). Marchand, in 1891, first described tumours arising from the carotid body. Guild (1941) was the first to call these growths glomus tumours. Mulligan (1950) suggested the name chemodectoma as they are believed to arise from chemoreceptor cells which react to the pH of blood. Chemodectoma of the larynx was first reported in 1955 (Andrews, 1955; Zeitlhofer, 1955; Blanchard and Saunders, 1955).

Embryologically, the chemoreceptor cells are derived from the neuroepithelial elements of cranial nerves that migrate to localized areas of mesodermal condensation. These areas are situated around vessels of embryonic branchial arches. The chromaffin system originates in ganglion cells of the sympathetic nervous system (Mendelow, 1957). Laryngeal chemodectoma arises from the paraganglia or chemoreceptors of the larynx (Martinson, 1967). There is a paired superior laryngeal glomus body lying just above the anterior ends of the vocal cords (Watzka, 1963) and a paired laryngeal glomus body, lying between the anterior and posterior branches of the recurrent laryngeal nerve in the space between the cricoid and thyroid cartilages (Kleinsasser, 1964). Of the eleven cases previously reported, the tumour was supraglottic in nine, and it would therefore appear that the majority of chemodectoma of the larynx arose from the superior laryngeal glomus body.

Burmon (1956) made a comprehensive study of 416 reported cases of chemodectoma arising from all sites. He came to the conclusion that they

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were locally invasive. Distant metastases were rare but regional lymph node involvement was known. According to him, these tumours are compatible with long life. Note, however, that none of the cases studied by him had the tumour originating in the larynx. Willis (1967) believes that this group of tumours, with the exception of glomus jugulare, are relatively benign, spreading only rarely to lymph nodes or distant sites. Some authors (Burmon, 1956; Marcuse, 1956) believe in the multicentric origin of this tumour but they emphasize that this can only be established after excluding metastases, especially if one or more of the growths should be at sites not included in the accepted distibution of paraganglionic tissues. The so-called 'distant metastases in the palate and skin of our case might well have been due to a multicentric origin. It has to be mentioned here that lymph node involvement is always characteristic of metastases (Reese, 1963) and hence the nodal involvement in our case was most certainly a secondary.

Very little is known about the clinical features of chemodectoma of the larynx. From a review of the previously reported cases (Andrews, 1955; Blanchard *et al.*, 1955; Zeitlhofer, 1955; Hartmann, 1960; De Barros, 1962; Baxter, 1965; Gignoux *et al.*, 1965; Wockel *et al.*, 1965; Martinson, 1967), both sexes are equally affected. The average age in this group of cases is 44 years. It is worthy to note that three of these cases appeared at the ages of 14 years, 21 years, and 27 years. The tumour, when first seen, varied in size from that of a rice grain to a cherry. The average duration between the onset of symptoms and diagnosis was nineteen months. Thackeray (Vetters and Toner, 1970) emphasizes severe spasmodic laryngeal pain which may be induced by swallowing as the most characteristic symptom, even though present only in a minority of cases. This symptom was present in two of the previously reported cases (De Barros, 1962; Wockel *et al.*, 1965). Our own case presented with this symptom which persisted till his death. Hoarseness and dyspnoea were common symptoms in most of the cases whereas dysphagia was present only in two cases (Baxter, 1965; De Azevedo-Gamas, 1968). Our case also had dysphagia. Pain should suggest this type of tumour. Carcinoma is not painful in the early localized stage. It is interesting to note that whenever the tumour was removed from our patient, there was an immediate relief of pain, although this relief was temporary.

The diagnosis is established by a biopsy and it must be emphasized that because of the submucosal origin of these tumours, a deep biopsy is always necessary (Andrews, 1955). Most of these tumours are quite small at the onset and would appear to remain so for some time and, therefore, it may be that micro-laryngoscopy would help in early diagnosis. The Falck test for catecholamine assay in the tumour tissue would further help to confirm the diagnosis. In our case, there was clinical evidence of noradrenaline secretion.

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The final outcome of this condition is not very well understood as the follow-up in the reported cases has been short. In none of the reported cases has there been any lymph node or distant metastases noted. Our case, with ten years' duration of the disease shows a more sinister behaviour pattern with nodal involvement; first on the ipsilateral and later on the contralateral side of the neck. The palatal and skin 'secondaries' appeared in the ninth year. The general condition of the patient rapidly deteriorated after the skin secondaries appeared. It is interesting to observe that all these distant nodules were extremely tender. It is tempting to suggest the strong possibility of a pain producing substance that may be secreted by this tumour but further study is necessary.

The behaviour pattern seen in our case has already been noted by Thackeray and Ranger (Vetters and Toner, 1970). Out of their six cases, two have had fatal dissemination of tumour and two others have developed metastases over a period of several years.

In view of this fatal outcome which has recently come to light, it would appear that a radical excision with a wide margin is the only hope for cure. It would, however, be difficult to prognosticate if in fact the 'distant metastases' are of multicentric origin. These tumours are radio-resistant (Mendelow, 1957) and the lack of response of the cervical nodes and the scalp nodule seen in our case confirms this point.

Summary

A case of chemodectoma of the larynx is presented. The clinical features have been discussed in detail with a review of the world literature. In view of the late dissemination, a long follow-up is emphasized.

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