Head and neck paragangliomas: Update on laryngeal paraganglioma

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Abstract

Introduction

Head and Neck paragangliomas are mostly benign, slow growing tumours originating from sympathetic and parasympathetic ganglia, most frequently from carotid bodies, jugular, tympanic, vagal paraganglia and rarely from the larynx. This aimed to highlight the peculiarities of Laryngeal paragangliomas as per presentation, diagnosis and treatment.

Method

Review of literature and published peer reviewed works in Medline and HINARI databases for articles in English language from 1970 to 2015 was done.

Results

The diagnosis is primarily made on light microscopy and sometimes special staining might be required. It should be confirmed by immunohistochemical studies. The main stay of treatment is surgery. Primary radion theraphy with adjuvant chemotheraphy has been reported with variable success in other head and neck paragangliomas but has not been reported on the laryngeal paragangliomas with success.

Conclusion

While surgery is still the goal standard in treating head and neck paragangliomas with very limited data on the role of radiotherapy. It is pertinent to consider the role and future of radiotherapy in the treatment of paraganglioma of the larynx.

Keywords: Paraganglioma, Larynx, Management, Surgery; Radiotherapy

Introduction

Head and Neck paragangliomas are rare, slow-growing, vascular, submucosal neuroendocrine tumours originating from the parasympathetic nervous system.[i,ii] Carotid body is the commonest site then jugulotympanic and vagal paragangliomas.[iii] It rarely occurs in the larynx. Surgery has been the mainstay of treatment of laryngeal paragangliomas. Although external beam radiotherapy has been used as primary and adjuvant treatment of paragangliomas of the carotid body and jugulotympanicum, its use in laryngeal paragangliomas is not widely published.[iv]

Classification

There are two main groups of neuroendocrine neoplasms of the larynx. Those of epithelial origin (typical carcinoid, atypical carcinoid and small cell neuroendocrine carcinoma) and those of neural type (paraganglioma).[v] Paragangliomas are uncommon, slow-growing, generally benign tumor, arising from paraganglion cells derived from the neural crest as part of the diffuse neuroendocrine system. Most frequently found in the head and neck with the commonest site being carotid bifurcation and jugulotympanic area. The larynx is a much less involved site and supraglottis, when involved is the commonest site.[vi] First documented case of laryngeal paraganglioma was reported by Blanchard and

Saunders[vii] in 1955. Since then, there have been fewer than 90 cases reported in the literature.

Clinical Presentation

Typically, laryngeal paraganglioma shows slight female preponderance, with a male:female ratio of 1:3 around fourth to sixth decade of life.[viii, ix] The youngest patient diagnosed was at the age of 5 years.[x] Superior laryngeal artery provides the blood supply to most laryngeal paragangliomas.[xi] Depending on the site and size, patients presents with hoarseness, dyspnea, stridor, foreign body sensation or dysphasia. Wheezing, cough and vocal fold paralysis have been reported.[xii] These symptoms are often from the obstruction to the laryngeal inlet (figures 1 and 2).

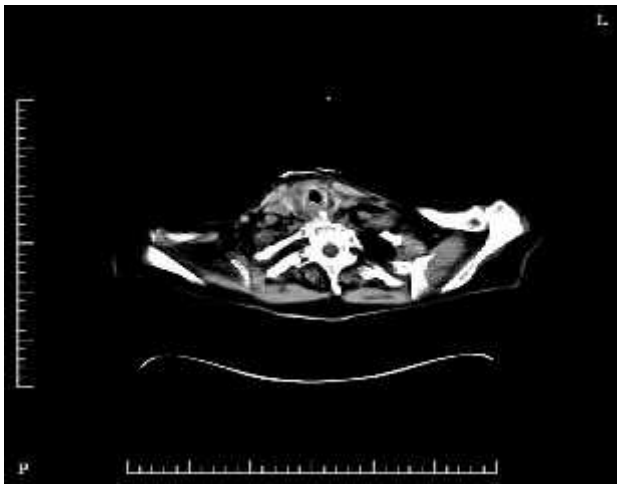

Figure 1: Axial computed tomography scan showing a right-sided, supraglottic, soft tissue mass. L= left; P = posterior

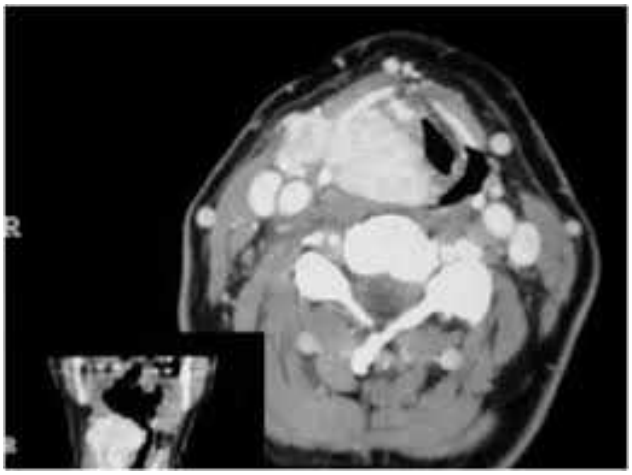

Figure 2: Axial computed tomography scan showing a right-sided, smooth supraglottic mass obscuring laryngeal inlet

Typical appearance on laryngoscopy is a red or blue, lobulated, smooth submucosal mass.[8]

It is important to differentiate laryngeal paraganglioma from other neuroendocrine tumours such as; malignant melanoma; metastatic renal cell carcinoma, medullary carcinoma of the thyroid gland and atypical carcinoid because of the higher malignant potential and differences in treatment.[xiii]

Laryngeal paragangliomas grossly appear well-circumscribed, tan, brown or reddish-brown, submucosal masses.[xiv] Histopathologically, they consist of two cell types – chief cells and sustentacular cells – in a Zellballen pattern which is typical (figures 3, 4 and 5), but not diagnostic of paraganglioma. This pattern can also be found in carcinoid tumours, melanomas and medullary carcinomas of the thyroid.[xv] The chief cells (figure 5), are polygonal with abundant, granular cytoplasm and round nuclei with 'salt and pepper' chromatin.

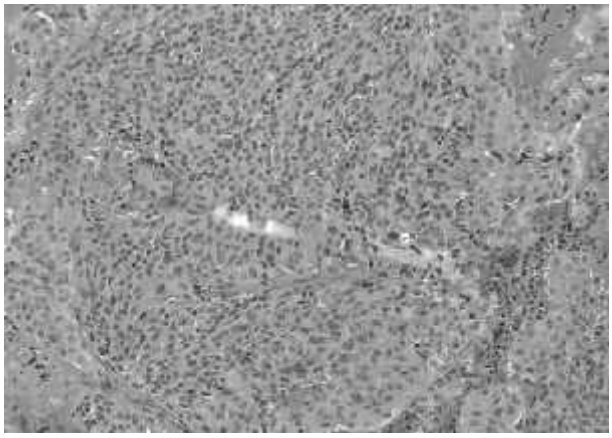

Figure 3: Photomicrograph of the tumour showing polygonal cells in a typical nested or 'Zellballen' arrangement. (H&E; ×200)

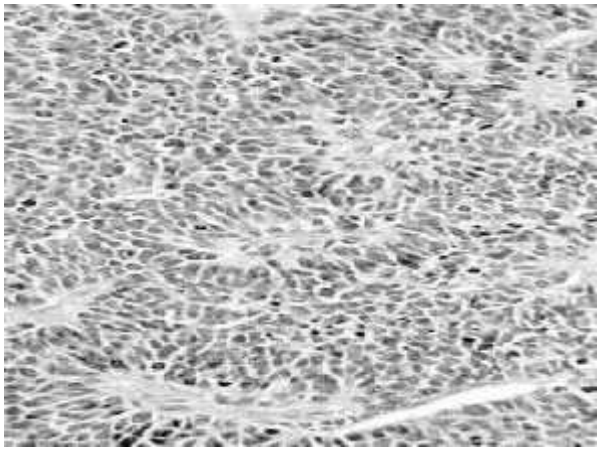

Figure 4: Photomicrograph of the tumour showing typical nesting or 'Zellballen' arrangement (H&E; ×200)

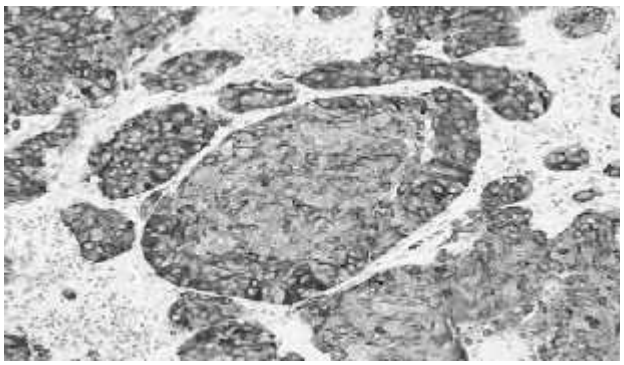

Figure 5: Photomicrograph showing central chief cells stained for chromogranin (×200)

Nuclear pleomorphism may be present, but mitotic figures are rare and tumour necrosis is absent. The sustentacular cells are spindled cells at the periphery of the nests, which are apparent on immunostaining with S-100.[11,15]

Magnetic Resonance Imaging (MRI) with gadolinium enhancement is the diagnostic imaging modality of choice.[9,xvi] Myssiorek et. al. reported using MRI with ^{111} in pentetreotide to determine tumor extent and multifocality and found it as effectively as angiography.[8,12,xvii] CT scan is reserved for suspicion of cartilage destruction.[xviii] (Figures 5 and 6) Some investigators have tried angiography which offers an advantage of selective embolization.[9,xix]

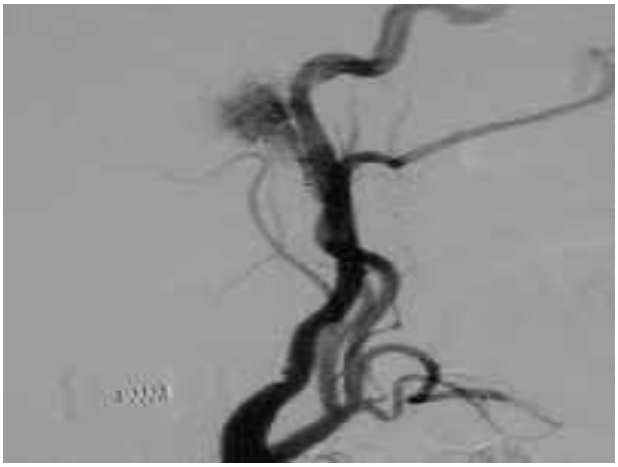

Figure 6: Angiogram demonstrating intense vascular supply from branches of the carotid artery

Diagnosis is made from clinical history, examination and preoperative biopsy for histopathology is recommended,[xx,xxi] although these patients do bleed excessively when biopsied and often require some

form of airway intervention as typically was the case in most patients.

Treatment

Surgery is the goal standard of treatment. Previously, Cryosurgery was attempted, but was out –fashioned due to subsequent requirement of laryngofissure.[xxii] Endoscopic resection resulted in higher recurrence rate.[xxiii] Microlaryngoscopy with laser excision yielded mixed results.[10,16] more successful open surgical approaches includes supraglottic laryngectomy,[8] total laryngectomy,[xxiv] laryngofissure and lateral thyrotomy.[8] There is very limited data on the application of radiotherapy in the treatment of laryngeal paraganglioma,[10] although, it has been used with good results in the treatment of carotid body and jugulotympanic paraganglioma, primarily to limits its growth and reduce its size.[xxv,xxvi] Pharm et. al. reported a case of laryngeal paraganglioma presenting three months after radical radiotherapy for squamous cell carcinoma (SCC), hence questioned the effectiveness of radiotherapy as a treatment modality for laryngeal paraganglioma.[4] Smolarz et al reported successful tumour size reduction to 2 mm with external beam radiotherapy, in which the patient has remained symptoms free at five-year follow up.[xxvii]

Conclusion

Laryngeal paraganglioma is an uncommon neuroendocrine tumour recently observed with increasing frequencies. Histological misdiagnosis still exists despite advancement in light and electronic microscopy which calls for immunohistochemical studies. Differenting the exact histological type requires thorough knowledge on its clinical presentation in addition to laboratory studies. CT scan and angiography plays complimentary preoperative roles. Although surgery is the traditional gold standard of treatment in Laryngeal paraganglioma, there is very limited data on the application of radiotherapy or chemotheraphy as a whole. It is pertinent to consider the potential role and future of radiotherapy in the treatment of paraganglioma of the larynx.

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Conflict of interest: Nil