INTRODUCTION

Head and neck paragangliomas (HNPGs) are rare and mostly benign neoplasms that comprise 3% of all paragangliomas and 0.012% of all cancers. Most HNPGs are located in the soft tissue near the head and neck. These lesions can be challenging to diagnose due to their location and the presence of highly vascular lesions bleed and cause damage to nearby structures. The diagnosis of a HNPG is done by physical and pathological examination combined with radiological imaging. While between 6-24% of HNPGs are malignant, the behavior of an individual PG cannot be distinguished by cytologic or histologic means as malignancy is only defined by a PG metastasizing to regional lymph nodes or distant sites. Hereditary PGs involve a succinate dehydrogenase (SDH) gene mutation, malignant forms being mainly observed in young patients who have multifocal tumors and a subunit B mutation.

As a sole first line investigation, FNAC can be an easy, time-efficient and accurate way to diagnose HNPGs. The dangers of causing damage to the nearby carotid artery and making these highly vascular lesions bleed and of causing damage to the nearby carotid artery have made FNAC a rare HNPG diagnostic tool in many countries. Altogether 34 HNPGs were examined and treated in our institution in the studied 27-year period. In 21% of cases FNAC was used as the first line diagnostic tool with or without ultrasound (USG) guidance. Radiological imaging (USG/CT/MRI) was always accompanied FNAC. Ten (71%) out of fourteen HNPGs were diagnosed correctly with FNAC. Nine of these were carotid body tumors (CBTs) and one a vagal PG.

FNAC can diagnose CBTs with good diagnostic accuracy. Paragangliomas arising in other regions of the head and neck can be challenging to diagnose without radiological, histopathological and immunohistochemical tools. Table 1 highlights studies where FNAC has been used in the diagnosis of HNPGs.

RESULTS

Thirty-four patients filled the criteria and were included in the study. Out of these 12 (35%) were men and 22 (65%) women (mean age, 51; age range, 14 – 90 years). Four (11%) PGs were malignant by having shown metastasis to regional lymph nodes or more distant sites. FNAC was performed with a 10 cc syringe and a 22/24 gauge needle following a standard procedure with or without USG guidance. There were no complications related to the procedure.

In 14 (41%) cases FNAC was used as the first line diagnostic tool with (10, 29%) or without (4, 12%) ultrasound (USG) guidance. Radiological imaging (USG/CT/MRI) was always accompanied FNAC. In 9 (26%) cases, core biopsy accompanied radiological imaging whereas in 12 (35%), clinical assessment combined with radiology resulted in the correct diagnosis of a PG. In 3 (9%) cases, FNAC was complemented by immunocytochemistry and in 6 (18%) immunohistochemistry accompanied core biopsy. In 1 case, FNAC, core biopsy, and immunohistochemistry were used.

Ten (71%) out of fourteen HNPGs were diagnosed correctly with FNAC. Eight of these were carotid body tumors (CBTs) and one a vagal PG while one CBT was treated conservatively. Of the incorrect or inconclusive FNAC diagnoses; one false diagnosis of a HNPG is done by physical and pathological examination combined with radiological imaging. While between 6-24% of HNPGs are malignant, the behavior of an individual PG cannot be distinguished by cytologic or histologic means as malignancy is only defined by a PG metastasizing to regional lymph nodes or distant sites. Hereditary PGs involve a succinate dehydrogenase (SDH) gene mutation, malignant forms being mainly observed in young patients who have multifocal tumors and a subunit B mutation.

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FNAC can diagnose CBTs with good diagnostic accuracy. Paragangliomas arising in other regions of the head and neck can be challenging to diagnose without radiological, histopathological and immunohistochemical tools. Table 1 highlights studies where FNAC has been used in the diagnosis of HNPGs.

Table 1. Studies where FNAC has been used in the diagnosis of HNPGs...

<table>
<thead>
<tr>
<th>Reference</th>
<th>Patients</th>
<th>Final diagnosis</th>
<th>FNAC diagnostic</th>
<th>Immunohistochemistry diagnostic</th>
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<tr>
<td>9</td>
<td>2</td>
<td>PG-like medullary thyroid carcinoma</td>
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<td>Yes</td>
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<td>Yes</td>
</tr>
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<td>1</td>
<td>PG of the parotid gland</td>
<td>Yes²</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td>8</td>
<td>Not differentiated</td>
<td>Yes</td>
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</tr>
</tbody>
</table>

¹ needed histopathological and immunochemical confirmation, ² needed histological (immunochemical + characteristic morphology) confirmation

MATERIALS AND METHODS

We retrospectively collected clinicoradiopathological data on all HNPGs treated at St George’s Hospital NHS Trust (London, England) between January 1st, 1986 and April 30th, 2013. We recorded patients’ demographic factors along with diagnostic and clinical details. The emphasis was on how the HNPGs were diagnosed and what difficulties were encountered if FNAC was used in their diagnosis.

CONCLUSIONS

Based on our experience, FNAC can diagnose CBTs safely and with good diagnostic accuracy. Paragangliomas arising in other regions of the head and neck can be challenging to diagnose without radiological, histopathological, and immunohistochemical tools. In particular, thyroid gland associated paragangliomas can mimic follicular neoplasm and C-cell-derived thyroid tumors.

REFERENCES