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Main Article

Lipomas of the head and neck: presentation variability and diagnostic work-up

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Abstract

Introduction: Head and neck lipomas have seldom drawn attention in the literature, except in isolated case reports.

Aims: This study aimed to assess the presentation variability of head and neck lipomas as well as the relative importance and efficiency of pre-operative diagnostic methods used.

Materials and methods: A retrospective review was undertaken of medical records and imaging studies of 24 patients with histopathologically proven head and neck lipomas, over a three-year period.

Results: The 24 patients had 26 lipomas. Men predominated (62.5 per cent). The posterior subcutaneous neck was the most common site. Three patients had deep lipomas affecting the hypopharynx, larynx and parotid gland; all were correctly diagnosed pre-operatively. Computed tomography (CT) scan with specific radiodensity recording was the preferred pre-operative investigation.

Conclusions: Lipomas should be considered in the differential diagnosis of soft-tissue head and neck masses even in rare locations. A CT or magnetic resonance imaging scan can correctly diagnose a lipoma pre-operatively, thereby allowing better treatment planning.

Key words: Head and Neck Neoplasms; Lipoma; Hypopharynx; Larynx; Parotid

Introduction

Lipomas are the most common neoplasms of mesenchymal origin, arising in any location where fat is normally present. The solitary, ordinary lipoma has provoked relatively little interest in the literature. This is not entirely surprising when one considers that most lipomas grow insidiously and cause few symptoms other than the effects of a localized mass. Of the variety of lipomatous benign tumours that occur, over 80 per cent are ordinary lipomas and only about 13 per cent of these occur in the head and neck region, most commonly in the posterior neck.[1,2] Rarely, lipomas can occur in the anterior neck, infratemporal fossa, oral cavity, pharynx, larynx and parotid gland.[3]

Lipomas are slow-growing, nearly always benign, adipose tumours that are most often found in the subcutaneous tissues. They are composed microscopically of mature white adipose tissue arranged in lobules, many of which are surrounded by a delicate fibrous capsule.[2,4]

Rarely, a lipoma has been known to infiltrate surrounding tissues, most notably skeletal muscle, in which case it is referred to as an infiltrating lipoma. Infiltrating lipomas exist in two anatomical forms: the more common intermuscular variety and the rarer intramuscular form. The intermuscular infiltrating lipoma grows in between large muscle bundles. It probably arises from intermuscular fascial septae and only secondarily infiltrates the adjacent muscle. The intramuscular lipoma originates between muscle fibres within the muscle bundles themselves. It infiltrates and passes through the intermuscle septae. The fibres of muscle entrapped within the tumour growth frequently appear atrophic. Intramuscular lipomas are exceedingly rare in the head and neck region.[5–7]

Lipomas usually occur sporadically, but rarely they can be associated with several inherited disorders, including hereditary multiple lipomatosis, Gardner's syndrome and Madelung's disease.[8] While solitary lipomas are generally more common in women, multiple tumours (referred to as lipomatosis) are more common in men.[9] Hereditary multiple lipomatosis, an autosomal dominant condition, is characterized by widespread, symmetric lipomas appearing most commonly over the extremities and trunk.[9,10] Lipomatosis may also be associated with Gardner's syndrome, an autosomal dominant

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condition involving intestinal polyposis, cysts and osteomas.[8] The term Madelung's disease, or benign symmetric lipomatosis, refers to a peculiar distribution of fatty tissue around the cervical region, shoulders and proximal upper extremities. Patients with Madelung's disease, often men who consume alcohol, may present with the characteristic 'horse-collar' cervical appearance. These subcutaneous deposits of fat are non-encapsulated and poorly circumscribed, with tongue-like extensions of fat between muscle groups. Occasionally, these patients experience swallowing difficulties, respiratory obstruction and even sudden death.[4,9,11]

The literature on head and neck lipomas is limited and has primarily been in the form of separate case reports. The purpose of this article is to study the demographic criteria of head and neck lipomas, possible presentations, and the relative importance and efficiency of different pre-operative investigations used in their diagnosis.

Materials and methods

The present study included all patients who underwent surgical resection for head and neck masses that proved to be lipomas on histopathology, over a three-year period, at the Department of Otolaryngology – Head & Neck Surgery, Alexandria Main University Hospital, Alexandria, Egypt. The medical records and imaging studies of these patients were retrospectively reviewed. The following data were recorded: age, sex, presenting symptoms, site, pre-operative investigations and operative procedure employed, along with clinical follow up.

Results and analysis

From October 2001 to September 2004, 24 patients were diagnosed as having head and neck lipomas. There were 15 men (62.5 per cent) and nine women (37.5 per cent), ranging in age from 16 to 65 years, with a mean age of 53.5 years. Twenty-one patients (87.5 per cent) had superficial (subcutaneous) lipomas and three patients (12.5 per cent) had deep (visceral) lipomas.

There were 23 lipomas among the 21 patients with superficial subcutaneous tumours. Eight patients had their tumours on the right side of the neck, 10 on the left side, one in the anterior midline (Figure 1), and two had bilateral tumours. Twenty lipomas occurred in the posterior neck triangle (87 per cent) while only three were located in the anterior neck (13 per cent), with the supraclavicular fossa being the most common site of origin in this study (Table I).

The main presentation of superficial subcutaneous lipomas was a slow-growing, painless neck swelling that was noted by the patient for periods ranging between six months and seven years prior to surgery. Resected lipomas ranged in size from 20 × 15 mm to 120 × 60 mm. The diagnosis was suspected clinically (i.e. non-painful, round, mobile mass with a characteristic soft, doughy feel). Imaging studies helped in reaching a correct diagnosis in all cases as well as in defining the exact extent of the tumour. Pre-operatively, four cases received sonography, 14 cases computed tomography (CT) scans and three cases magnetic resonance imaging (MRI) scans. Six cases received fine-needle aspiration biopsy (FNAB). All cases of superficial lipomas were excised using incisions made in the skin overlying the mass, with no complications.

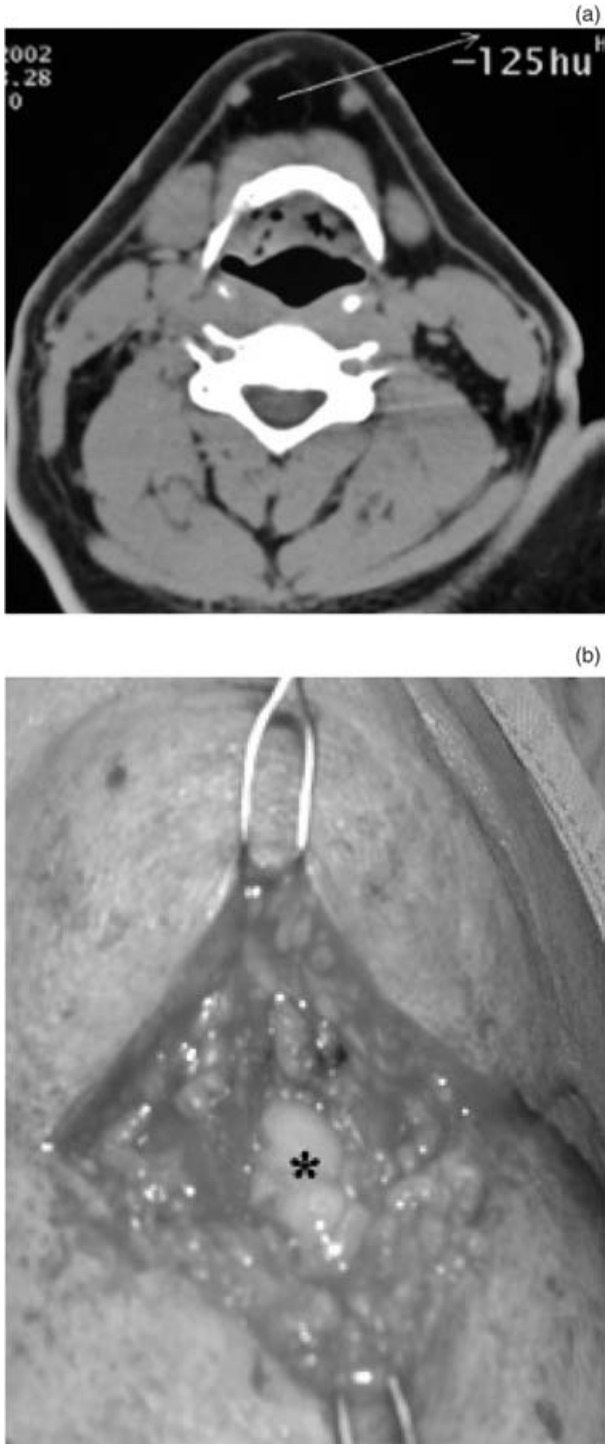

FIG. 1
Anterior midline lipoma. (a) Pre-operative computed tomography scan demonstrating low attenuation of the mass (−125 Hounsfield Units). (b) Operative view showing the subcutaneous midline lipoma (*).

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TABLE I

SITES OF HEAD AND NECK LIPOMAS*

Site	Sub-site	$n = 26$
Superficial (subcutaneous)		
Anterior neck	Submental	1
	Submandibular	2
Posterior neck	Occipital	6
	Supraclavicular	14
Total		23
Deep (visceral)		
Hypopharynx	Left posterolateral wall	1
Larynx	Left aryepiglottic fold	1
Parotid	Right parotid tail	1
Total		3

*24 patients

Post-operative histopathological examination of the resected specimens confirmed the diagnosis.

Deep visceral lipomas were noted in only three cases in this series (Table I). There was one case of hypopharyngeal lipoma that occurred in a 63-year-old man who presented with a history of intermittent dysphagia for solids of about two year's duration, with recent attacks of airway obstruction. Barium-swallow radiography showed a smooth hypopharyngeal mass, while a CT scan established the lipomatous nature of the tumour. The mass was pedunculated and prolapsed into the oesophagus, and the patient reported its occasional regurgitation into the oral cavity. Transoral endoscopic division of the swelling's pedicle, located in the left posterolateral hypopharyngeal wall, was done. The well encapsulated, smooth-surfaced, 90×35 mm swelling was resected in one piece and histopathology proved it to be a lipoma. The patient remained well and free from recurrence 36 months after tumour excision (Figure 2).

Our case of laryngeal lipoma occurred in a 54-year-old man. His main complaint was a change in quality of voice of eight month's duration. He developed dyspnoea on exertion two months before admission. The patient's physical examination was notable for mild inspiratory stridor. Flexible laryngoscopy revealed an extensive submucosal swelling obliterating the left side of the supraglottic larynx and obscuring the airway. A CT scan of the neck revealed a well circumscribed, very low density lesion highly suggestive of lipoma. The mass was endoscopically removed by first de-roofing using CO_2 laser and then resection of the mass was performed using micro-laryngoscopic instruments. The patient recovered from anaesthesia without needing a tracheotomy and remained without complaints and free from recurrence 16 months after surgery (Figure 3).

There was one case of parotid lipoma that occurred in a 16-year-old boy. The patient presented with a painless, slowly growing swelling below the right ear lobule. The tumour was located within the tail of the right parotid gland (intraglandular). Both CT scan and MRI demonstrated the lipomatous nature of the tumour. The tumour was completely resected along with the superficial lobe of the parotid gland. Pathological examination demonstrated

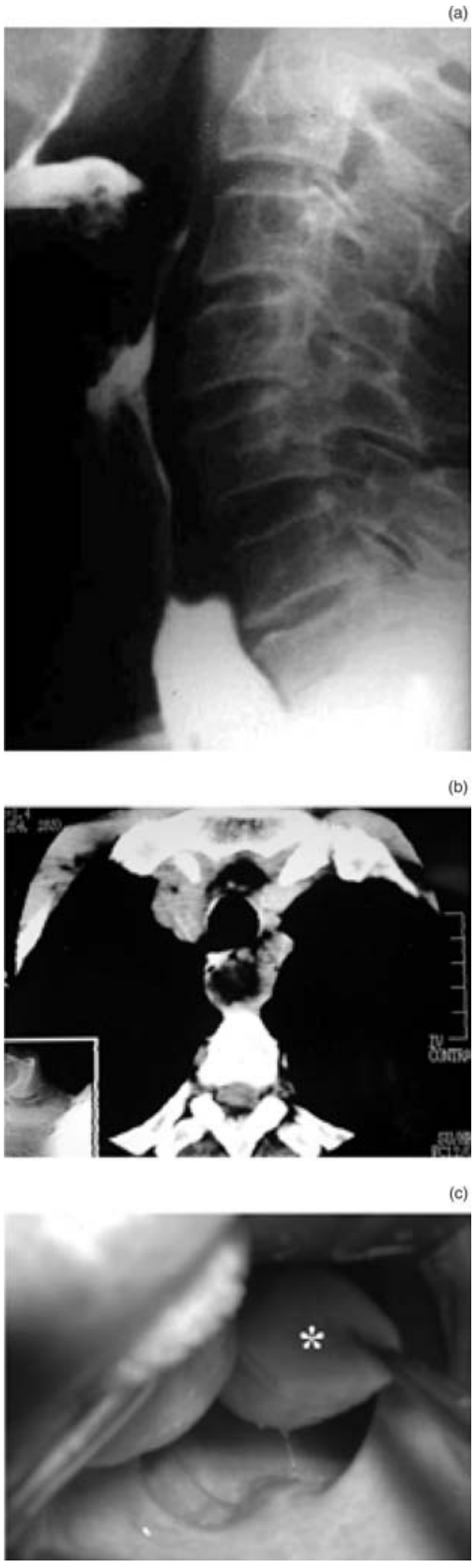

FIG. 2

Hypopharyngeal lipoma. (a) Pre-operative barium swallow showing a smooth hypopharyngeal mass. (b) Computed tomography scan showing a low-attenuation, septated mass within the thoracic oesophagus. (c) Operative view showing delivery of the lipoma (*) in the oral cavity before dividing its pedicle.

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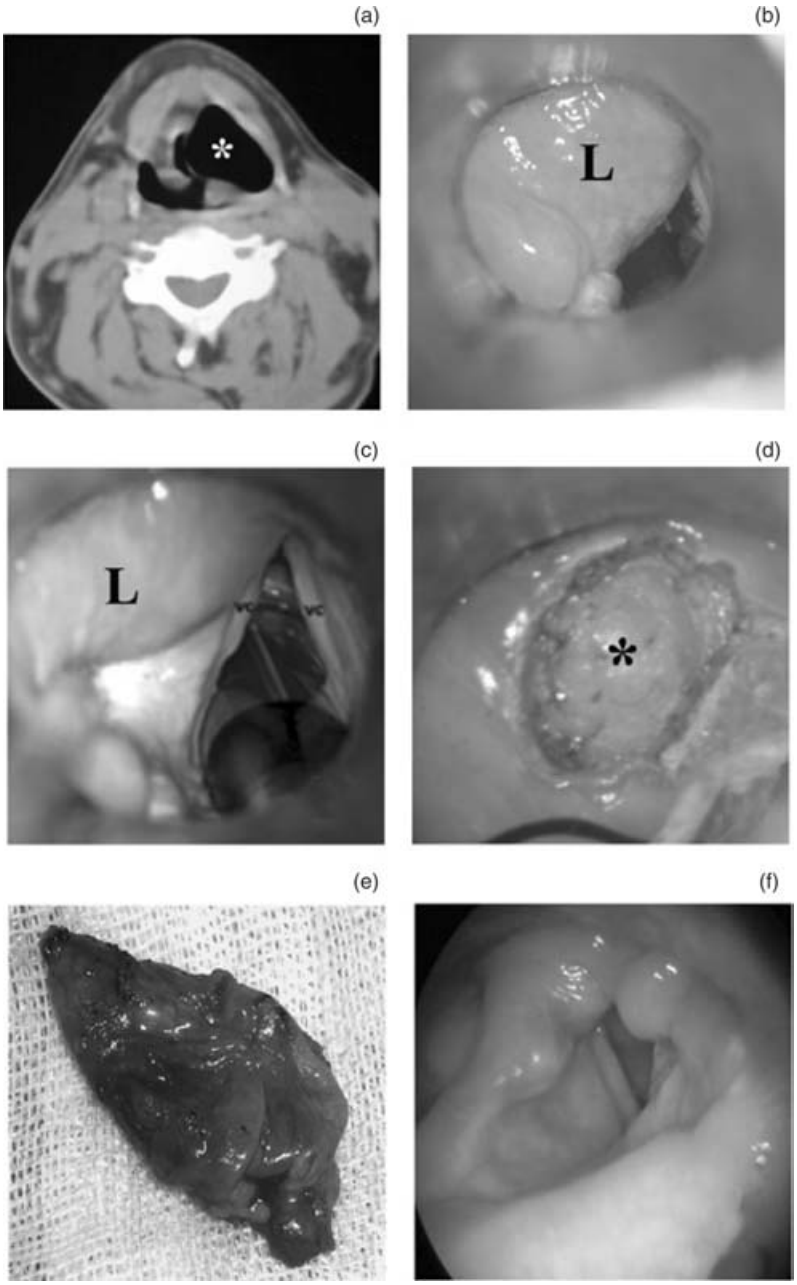

FIG. 3

Laryngeal lipoma. (a) Pre-operative axial computed tomography scan at the level of the supraglottic larynx, demonstrating a well circumscribed, very low density lesion arising from the aryepiglottic fold, highly suggestive of lipoma. (b) Direct laryngoscopy view showing the lesion (L) overlapping the laryngeal inlet. (c) Lateral retraction of the lesion (L) showing both vocal folds (VC). (d) De-roofing by laser, revealing the submucosal lipoma (*). (e) Lipoma resected in one piece. (f) Flexible laryngoscopy view of same patient one year post-operatively, showing no evidence of recurrence.

a well encapsulated, 25 × 16 × 10 mm, homogenous yellow mass within normal parotid tissue. Microscopically, the mass consisted of mature adipocytes with uniform nuclei and had a well demarcated capsule. The patient had an uneventful recovery, with normal facial nerve function. There was no evidence of recurrence 10 months after surgery.

Discussion

Solitary ordinary lipomas have seldom been objects of interest in the literature. These benign lesions are rare in the first two decades of life, usually developing in the fifth and sixth decades when fat begins to accumulate in inactive, under-exercised individuals. In general, this tumour is more common in obese people and can increase in size during a period of rapid weight gain. Conversely, in cachetic patients or during periods of starvation, the size of the lipoma is rarely affected, which suggests that the fat in these lesions is largely unavailable for general metabolism.[1,2]

Below the clavicles, lipomas are more common in obese female patients over 40 years of age; however, in the head and neck region, men in their seventh

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decade are most often affected.[2] In a series of 25 cases of head and neck lipomas reported by Ahuja *et al.*,[12] 17 cases were in men (68 per cent). Som *et al.*[3] had 11 men out of 21 cases (52 per cent) in their series. Our present series further underlines the male predominance noticed in cases of head and neck lipoma, with males constituting 62.5 per cent of our patients.

Diagnosis of head and neck lipoma starts with good clinical examination. Lipomas are non-painful, usually round, mobile masses with a characteristic soft, doughy feel on palpation, with the skin over them often feeling cool because of the insulating quality of fat. Although most superficial subcutaneous lipomas can be suspected with a high degree of accuracy by clinical examination alone, very large, deep-seated or infiltrating lipomas, as well as lipomas arising from unusual regions within the head and neck, require imaging for further assessment and diagnosis.

Sonography has been used as an initial imaging study in cases suspected to have head and neck lipomas.[12] The characteristic sonographic appearance is that of an elliptical mass parallel to the skin surface, which is usually hyperechoic to adjacent muscle and contains linear, echogenic lines at right angles to the ultrasound beam. However, lipomas may be sometimes isoechoic or even hypoechoic relative to adjacent muscle and therefore sonography features are less pathognomonic than other, more sophisticated imaging modalities.[13]

A CT scan provides a definitive diagnosis of lipoma in virtually all cases by calculating the actual density of the suspected mass (via the CT attenuation number). The CT attenuation number is related to the radiodensity of a lesion. The attenuation number of water is set arbitrarily at zero. Bone, being radiodense, has a high attenuation number (+1000) whereas air has a very low number (−1000). The CT attenuation number of most soft-tissue tumours would be between 0 and 100. Fat, being the only soft tissue with a density less than water, has a negative CT attenuation number. Thus, lipomas have the typical CT characteristics of a homogeneous mass with few septations, a low CT attenuation number (usually measuring between −50 and −150 Hounsfield Units (HU)) and no contrast enhancement.[3,14]

Magnetic resonance imaging can also accurately diagnose lipomas pre-operatively, with typical signal intensity patterns simulating that of subcutaneous fat (i.e. high signal intensity on T1-weighted images and intermediate intensity on T2-weighted images, with a weak signal on fat-suppressed images)[15,16](Figure 4). Moreover, the margin of a lipoma is clearly defined by MRI as a 'black-rim', enabling one to distinguish lipomas from surrounding adipose tissue, a distinction that cannot be made from CT images.[17]

One weakness in the use of current diagnostic imaging techniques in the diagnosis of tumours of fatty tissue is that neither CT nor MRI can differentiate a lipoma from a liposarcoma.[15] This distinction can only be made with certainty by histopathological examination. Some surgeons thereby recommend complete excision of all evidence of a lipoma to exclude a possible liposarcoma, especially in fast-growing lesions.[8]

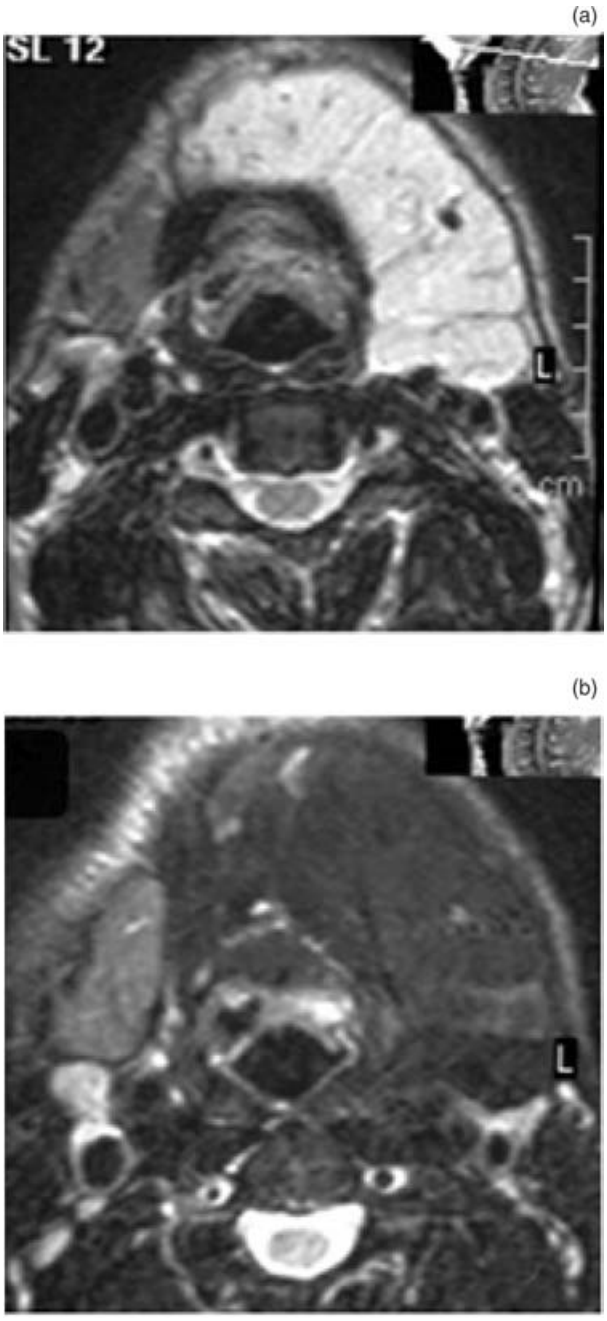

FIG. 4

Magnetic resonance imaging of a large subcutaneous neck lipoma. (a) Tumour shows high signal intensity in T1-weighted images, comparable to subcutaneous fat. (b) Same tumour shows weak signal in fat-suppressed images.

In this study, we found both CT and MRI to be accurate diagnostic modalities for head and neck lipomas. The CT scan was the imaging modality most frequently used (17 out of 24 cases). In all cases CT was able to correctly diagnose a lipoma pre-operatively. Though MRI is a superior soft-tissue imaging technique to CT generally, CT identification of fatty tumours is straightforward by virtue

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of actual tissue density recording. One measurement from CT examination is usually sufficient to characterize fat, while with MRI one reaches the same conclusion by comparing signal intensity on T1- and T2-weighted (as well as fat-suppressed) images. The relatively higher cost of MRI studies is another factor that should considered, together with the cost/benefit ratio, especially in developing countries with limited resources.

The accepted treatment protocols for subcutaneous head and neck lipomas include surgical excision through incisions made in the skin overlying the lipoma, as well as liposuction-assisted removal.[8] Using endoscopes for better vision within the cavity has also been described to further enhance liposuction removal in some anatomic locations.[18] Liposuction techniques are attractive because of the potential for improved cosmetic results. However, this technique is not without associated risks, including skin irregularities such as dimpling, paraesthesias and numbness, pigmentation changes, oedema, and a higher risk of recurrence.[19] All our subcutaneous lipoma cases were surgically resected through appropriate skin incisions, with no complications. Skin incisions were properly placed and meticulously closed, achieving an acceptable cosmetic result.

Anterior neck lipoma

In the head and neck region, subcutaneous lipomas most commonly occur in the posterior neck.[3] Lipomas of the anterior neck are rare lesions, with few cases reported in the world literature.[20,21] Because the anterior cervical area is an unusual place for lipomas, clinicians have often confused it with other, more common conditions during diagnosis. Anterior cervical lipomas can be mistaken for non-functioning thyroid nodules; the mass has even been reported to move upward with swallowing.[22] In such lesions, Butler and Oertel[23] have advocated FNAB as the initial diagnostic test. A high degree of suspicion, especially when the mass is found to be separated from the thyroid gland on sonographic examination, and the use of CT scanning can establish the correct diagnosis pre-operatively.

Being soft in consistency, lipomas have been known to change their shape depending upon adjacent compressive forces. In one report, a large anterior neck lipoma lying in close proximity to the trachea and the lung apex was shown to masquerade as an external laryngocele. Upward displacement of the lung apex and expansion of the trachea during Valsalva manoeuvre compressed the inferior and medial aspects of the lipoma, which, being soft, bulged outward simulating an external laryngocele. A CT scan confirmed the diagnosis of a lipoma.[21]

The current patient series included three cases of anterior neck lipoma (Table I). The rarity of this lesion in this location led to diagnostic confusion in some patients. One patient was a 41-year-old man who presented with a large nodular thyroid swelling that had recently increased in size. He also had bilateral neck masses, one in the left submandibular region just anterior to the sternocleidomastoid muscle and the other in the right posterior triangle of the neck. The probability of a malignant transformation in the thyroid, with bilateral neck nodes, was presented. Although FNAB of the thyroid mass did not detect any neoplastic elements and that of the bilateral neck masses detected only adipose tissue, the possibility of a deep-seated lymph node unreached by the FNAB needle could not be excluded. A CT scan showed focal areas of haemorrhage within the thyroid swelling and confirmed the lipomatous nature of the neck masses. A subtotal thyroidectomy along with surgical resection of the neck masses via separate incisions was performed. Histopathology proved the benign nature of the goitre and confirmed the diagnosis of bilateral neck lipomata (Figure 5).

Hypopharyngeal lipoma

Hypopharyngeal lipomas are uncommon, with fewer than 100 cases reported in the literature. In descending order of occurrence, these lesions are found at the edge of the aryepiglottic folds, in the postcricoid region, in the piriform sinus, in the lateral hypopharyngeal wall and in the arytenoid region.[3] Grossly, these neoplasms are encapsulated, have a smooth mucosal covering and are usually pedunculated, taking the shape of a club or sausage. Symptoms at first are few and variable, making pre-operative diagnosis difficult.[24] Once the pedicle reaches a certain length, these lipomas can be regurgitated, fall into the laryngeal inlet and cause dramatic choking attacks and even suffocation. Up until that point, patients usually have few symptoms apart from a foreign body sensation and slight difficulty in swallowing due to prolapse into the oesophagus. A few lipomas of the hypopharynx reach such a size that the sausage-shaped mass can be regurgitated into the mouth, as reported in our case.[25] Transoral resection of the lipoma using a CO_2 laser is usually simple and effective.[24]

Laryngeal lipoma

Lipomas of the larynx are rare, with fewer than 100 cases reported in the literature.[26] The precise number of cases is difficult to determine because a number of lesions initially classified as laryngeal in origin actually were hypopharyngeal. In a review by Zakrzewski[27] of 70 published laryngeal cases dating back to 1898, 54 lesions were actually extrinsic, or hypopharyngeal, in origin. Generally, reports in the literature indicate that lipomas of the hypopharynx are slightly more common than those of the larynx.[25] Laryngeal lipomas usually arise from the false folds and less commonly from the aryepiglottic folds and epiglottis, with subglottic lipomas being very rare.[27] Occasional cases of laryngeal lipoma have been reported in association with benign symmetric lipomatosis (Madelung's disease).[28] The most common symptom of laryngeal lipoma is airway obstruction. In addition, the sensation of a lump in the throat, voice change, snoring and excessive accumulation of salivary secretions may also be noted. Because lipomas are slow-growing, symptoms

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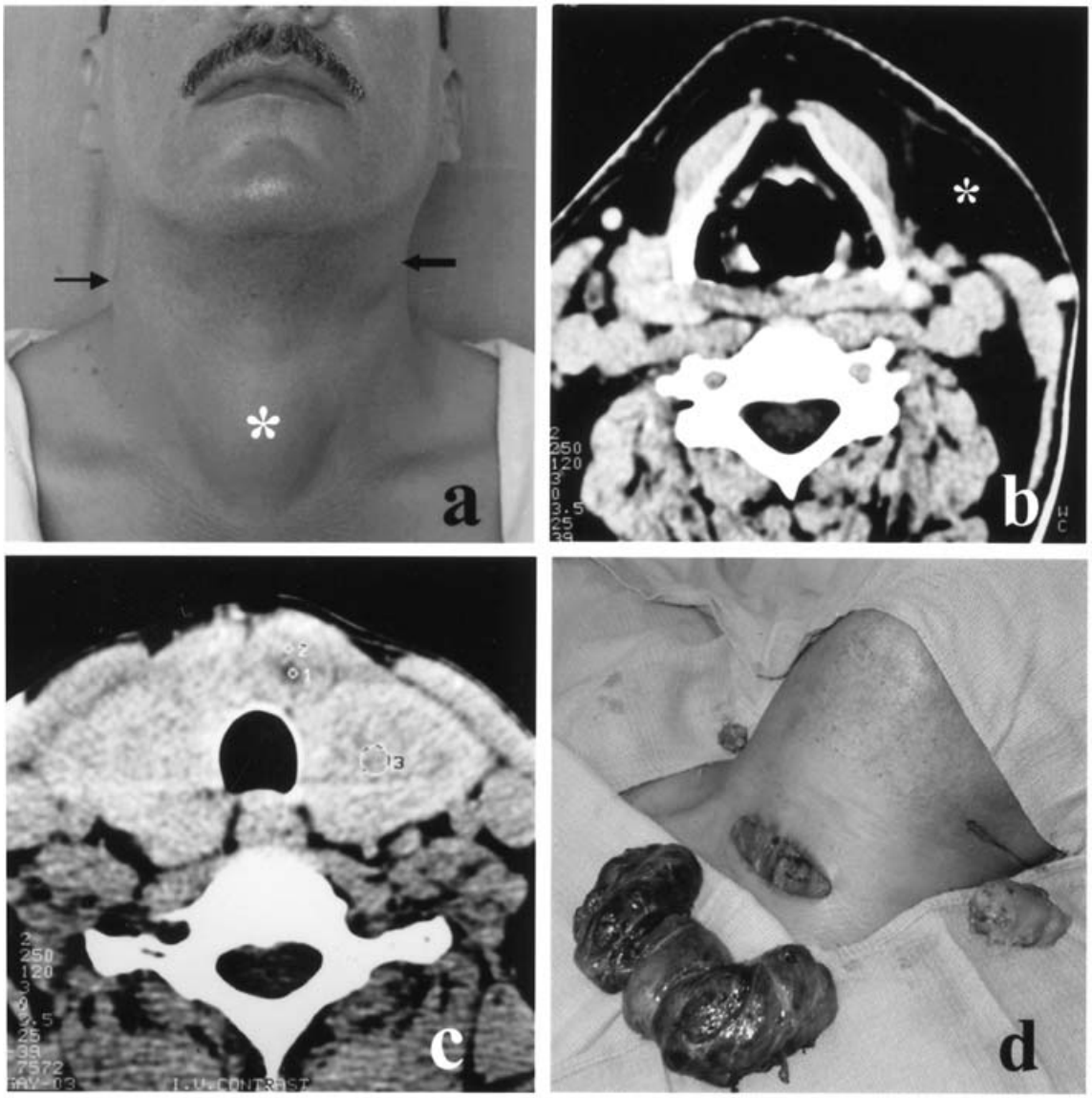

FIG. 5

Bilateral neck lipomas. (a) Patient presenting with a large goitre (*) and bilateral neck masses (arrows). (b) Axial computed tomography (CT) scan showing the left submandibular mass (*) to be of very low density, suggestive of lipoma. (c) Axial CT scan of same patient showing the enlarged thyroid gland with focal areas of haemorrhage. (d) Intra-operative view showing resection of the goitre and bilateral neck lipomas through three separate small incisions.

may span several months to years, with an insidious onset. The endoscopic appearance of laryngeal lipomas is quite varied, ranging from a submucosal mass to a pedunculated, intralumenal projection.[26,29] Treatment varies from conservative total endoscopic removal to external transcervical surgical resection using thyrotomy, transhyoid or lateral pharyngotomy approaches for appropriate exposure, especially in large, non-pedunculated tumours.[26]

Parotid lipoma

Lipomas of the parotid gland region comprise an interesting group of tumours that are seldom considered in the pre-operative differential diagnosis because of their rarity. The incidence of lipoma among parotid tumours ranges from 0.6 to 4.4 per cent, with most series reporting an incidence of approximately 1.0 per cent.[30] Lipomas of the parotid region can be classified into periparotid lipomas (those tumours that are found to be compressing the lateral surface of the parotid gland) and intraparotid lipomas (tumours that are totally surrounded by salivary tissue).[31] Most parotid lipomas are found in relation to the superficial lobe, with deep lobe lipomas being exceedingly rare. Kimura *et al.*,[17] in a recent review, found only five cases of deep lobe parotid lipomas reported in the literature.

Parotid lipomas have a benign clinical presentation and are most often confused with Warthin's tumours or pleomorphic adenomas. The lesions vary in size from 1 to 8 cm and are usually not

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associated with lipomas elsewhere in the body. A FNAB, which is commonly performed in the diagnostic work-up of salivary gland tumours, is not very useful for diagnosing a parotid lipoma. Layfield *et al*.[32] found that FNAB did not provide sufficient information to make a diagnosis in four out of nine benign fatty tumours of the parotid gland. A FNAB was similarly unhelpful in a case of deep lobe parotid lipoma reported by Kimura *et al*.[17] Computed tomography and MRI imaging not only demonstrate the lipomatous nature of the tumour pre-operatively but also accurately determine its exact size, location and extensions. Although complete surgical excision is the mainstay treatment of parotid tumours, the certainty with which these imaging modalities can establish the correct diagnosis has led some authors to justify long-term clinical and imaging observation as a management option for small intraparotid lipomas.[30]

Conclusion

In the head and neck region, lipomas can present in a variety of different ways. Most occur subcutaneously in the posterior neck and, unlike those in other body regions, have a male predominance. Lipomas can rarely occur in the anterior neck or lie deep within head and neck visceral structures such as the pharynx, larynx and parotid gland, thereby creating some diagnostic confusion with other, more common lesions in these locations. Sonography and FNAB are not always useful in achieving a correct diagnosis. Computed tomography and MRI scans allow a specific pre-operative diagnosis in virtually all cases, thus enabling better treatment planning.

- **This paper retrospectively reviews 24 patients with 26 histopathologically proven head and neck lipomas resected over a three-year period**
- **The posterior subcutaneous neck was the most common site (20 out of 26 lipomas, 77 per cent)**
- **Rare sites for head and neck lipomas were encountered, including the anterior neck, hypopharynx, larynx and parotid gland**
- **Diagnostic confusion might arise from lipomas arising in unusual head and neck sites**
- **Both CT and MRI can accurately, pre-operatively diagnose a lipoma, thereby ensuring better treatment planning**
- **CT scanning was the diagnostic method most commonly used in this study**

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