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Parapharyngeal Lipomas: A Literature Review and Surgical Management

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Abstract

Parapharyngeal space is a potential deep neck space extending between skull base and the hyoid bone. It is considered to be a rare site for neoplasms and it is even unusual to see Lipomas presenting in this space. Due to the proximity to skull base and presence of important structures in this space, surgical intervention can be complicated. An extensive literature review was carried out to comprehend the presenting features and management of this rare entity. Thirty-six reports/series were included presenting 37 patients between 15-83 years of age with a peak in 5th decade having lipoma in the parapharyngeal space/skull base region. The dimensions of these benign entities ranged between 3 cm to 16 cm. We present & discuss our experience with a large lipoma traversing parotid, submandibular and parapharyngeal spaces and its surgical management. We hope that this review and surgical principles presented will be helpful to the trainees and surgeons dealing with these entities.

Keywords: Parapharyngeal Lipomas; Mesenchymal Tumour; Lipoma

Introduction

Lipoma is the most common mesenchymal tumour (16%) in the body with about a quarter of these cases presenting in the head and neck region usually in the posterior neck [1]. Aetio-pathogenesis of this entity is unclear, however up to 80% of solitary lipomas were noted to have cytogenetic chromosomal alterations [2]. In patients presenting with recurrent or multiple lipomas, syndromic conditions such as Madelung disease, Dercum disease, Bannayan-Zonana syndrome, Familial multiple lipomatosis etc. should be excluded. The tissue itself consists of encapsulated adipocytes and connective tissue stroma. Some lipomas may present with atypical features such as thickened and increased septations with nodularity posing difficulties in diagnosis and surgical management [3]. Lipomas are seldom painful, and as such they often present with aesthetic concerns or compressive symptoms, at which time they are large indicating surgical intervention.

The Parapharyngeal space

The anatomical features of this complex inverted pyramidal space are presented below [4] (Figure 1):

- Boundaries
  - Superior: Skull base
  - Inferior: Hyoid bone
  - Anterior: Pterygomandibular raphae
  - Posterior: Vertebral fascia
  - Lateral: Medial pterygoid muscle
  - Medial: Superior constrictor

The space is divided by the styloid process into the pre-styloid and post-styloid compartments.

- Pre-styloid contents:
  - Ascending pharyngeal artery
  - Deep lobe of parotid gland
  - Minor salivary glands
  - Fat
- Post-styloid contents:

- Carotid artery
- Internal jugular vein
- Cranial nerves IX to XII
- Cervical sympathetic chain.

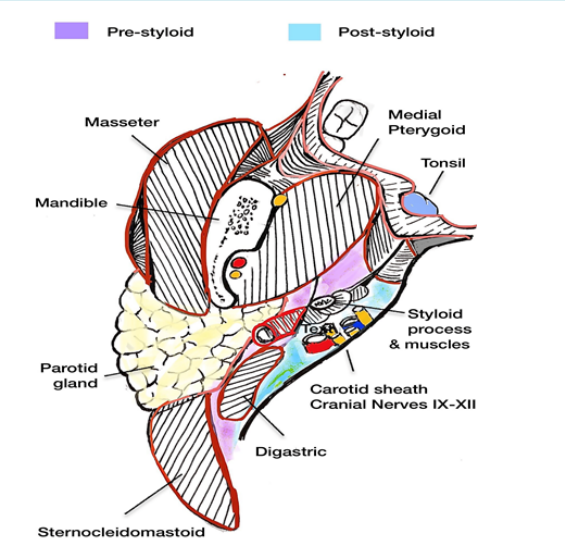

Figure 1: Anatomical representation of parapharyngeal space and its components (axial view).

Literature Review

A comprehensive English literature review was undertaken using PubMed, Medline and EMBASE databases using the term 'parapharyngeal lipoma' in both title and abstract between the periods of 1991-2021 (**Figure 2**). Literature without formal histological and/or cytological diagnosis was excluded to prevent ambiguity. Thirty-seven cases from 36 case reports and series (including the present case) were included in the review (**Table 1**).

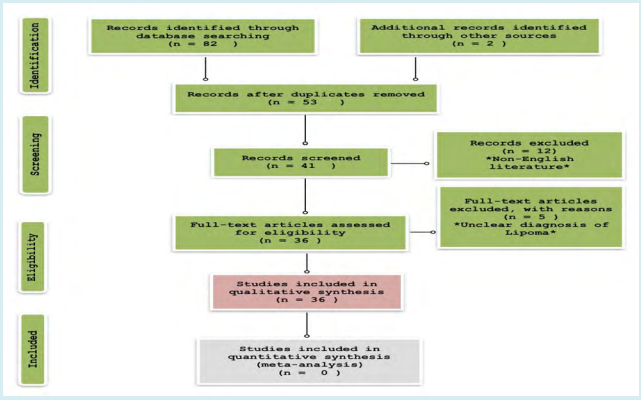

Figure 2: PRISMA flow diagram 2009 [5].

No	Year	Author	Age	Sex	Laterality	Dimensions (cm)	Type	Management	Recurrence
1	2020	Vijaykumar, et al. [6]	15	M	Left	5x4x3	Spindle cell lipoma	Excision	No
2	2020	Aslan, et al. [7]	20	M	Right	6 x 4.5	Simple lipoma	Transoral excision	-
3	2020	Lee, et al. [8]	-	F	Left	3x4x9.2	Simple lipoma	Transcervical excision	-
4	2020	Subramaniam. et al. [9]	54	M	Right	9.5 x 12.5 x 8.5	Sialolipoma	Transcervical excision	No
4	2019	Imai, et al. [10]	73	F	Left	9.5 X 5	Simple lipoma	Transcervical excision	No
5	2019	Azandaryani, et al. [11]	47	M	Left	5.5x4.5x3.2	Simple lipoma	Transcervical excision	No
6	2019	Marion, et al. [12]	69	M	Right	12.5 x 10 x 3.3	Simple lipoma	Transcervical excision	-
7	2018	Hakeem, et al. [13]	50	M	Left	24	Simple lipoma	Transcervical excision	No
8	2018	Maglione, et al. [14]	62	F	Left	5 x 3.5 x 2	Simple lipoma	Transoral robotic	No
9	2015	Pal, et al. [15]	40	F	Right	7x5	Simple lipoma	Transcervical excision	No
10	2015	Garcia-Ortega, et al. [16]	48	M	Right	16 x 12 x 2.5	Simple lipoma	Transcervical excision	-

11	2015	Aydin, et al. [17]	68	M	Right	-	Simple lipoma	Transcervical excision	-
12	2015	Luczak, et al. [18]	75	M	Right	8.5 x 5.8 x 7.2	Simple lipoma	Transcervical excision	No
13	2014	Chen, et al. [19]	45	M	-	6x7	Simple lipoma	Transmandibular	No
14	2013	Topak, et al. [20]	17	M	Left	6 x 5.5 x 3	Angiomyxolipoma	Transcervical/ Tranparotid excision	-
15	2013	Chua, et al. [21]	71	M	Right	9.4 x 6.7	Simple lipoma	Transoral excision	-
16	2012	Casale, et al. [22]	70	M	Left	9 x 6	Simple lipoma	Transcervical excision	-
17	2012	Bulkele, et al. [23]	68	M	Left	4 x 1.5 x 1	Osteolipoma	Transoral excision	-
18	2012	Presutti, et al. [24]	61	F	-	3 X 1.5 X 1.8	Simple lipoma	Transcervical excision	-
19	2011	Crowso, et al. [25]	83	M	Left	-	Simple lipoma	Monitoring	-
20	2011	Crowso, et al. [25]	55	M	Left	13.6	Simple lipoma	Transcervical excision	-
21	2011	Bohm, et al. [26]	15	F	Left	3.8x3.5x2.8	Osteolipoma	Transoral excision	No
22	2009	Derin, et al. [27]	44	M	Right	5.5 x 7 x 2.5	Simple lipoma	Transparotid	No
23	2009	Kim, et al. [28]	75	F	Right	8 X 8	Simple lipoma	Transparotid	No
24	2006	McNeill, et al. [29]	75	M	Left	6 x 3	Simple lipoma	Monitoring	-
25	2006	Chen, et al. [30]	59	M	Left	4 x 2	Simple lipoma	-	-
26	2004	Erkan, et al. [31]	71	F	Right	5.5 x 4.5 x 3.5	Simple lipoma	Transcervical excision	-
27	2004	Ulku, et al. [32]	18	M	Right	-	Simple lipoma	Transcervical excision	No
28	2004	Singh, et al. [33]	38	F	Right	-	Simple lipoma	Transcervical excision	No
29	2003	Pelland, et al. [34]	53	M	Right	9 x 4 x 5	Simple lipoma	-	-
30	2002	Smith, et al. [35]	49	M	Left	-	Simple lipoma	Transcervical excision	No
31	2001	Baumann, et al. [36]	45	M	Right	7.5 x 3 x 6	Spindle cell lipoma	Transparotid	No
32	2001	Hazarika, et al. [37]	17	F	Right	5 x 4	Osteolipoma	Transcervical excision	No
33	1999	Scott, et al. [38]	69	M	Right	16 x 4.5 x 1.5	Simple lipoma	Transcervical excision	-
35	1995	Elanga, et al. [39]	55	F	Right	4.5 x 3.5 x 1	Simple lipoma	-	No
35	1994	Eckel, et al. [40]	54	M	Right	3 cm	Simple lipoma	Laser excision	-
36	1992	Higashi, et al. [41]	61	M	Right	9 x 7.5 x 3.5	Simple lipoma	-	-
37	2020	Present case	52	M	Left	9 x 6 x 2.5	Simple Lipoma	Transparotid/ Submandibular	No

Table1: Literature review of parapharyngeal lipoma

Majority of the patients were males (71%) with average age of 52.46 years (Median 54 years). The smallest size reported was 3 cm and the largest was 9.5 x 12.5 x 8.5 cm in maximum dimensions. Eighty-two percent of patients were histologically and/or cytologically diagnosed as having a simple lipoma. The other subtypes noted were spindle cell

lipoma, osteolipoma, angiomyxolipoma and sialolipoma. Half of the patients underwent transcervical excision (54%) and with transparotid, transoral & submandibular access being the other approaches used. A single patient was operated with Transoral robotic surgery for a lipoma of 5 x 3.5 x 2 cm maximum size [14].

Case Presentation

A 52 year old Nigerian gentleman presented with a progressively growing left neck mass since 18 months. He denied any odynophagia, dysphagia, dysphonia, weight loss or night sweats. His past medical history was significant for well-controlled diabetes mellitus for which he was on Metformin. He was a non-smoker and denied regular alcohol intake. Examination revealed a large swelling of the left sided parotid and submandibular region with smooth & non-erythematous overlying skin. All cranial nerves appeared intact. Intraoral examination noted fullness of the left parapharyngeal region. Magnetic resonance imaging (MRI) revealed a 9 x 6 x 2.5 cm homogeneous hyperintense mass involving left parotid, submandibular and parapharyngeal region abutting the base of skull (**Figure 3**). No other atypical features were noted.

The patient underwent excision with transparotid/ submandibular approach and the histological evaluation diagnosed it as simple lipoma.

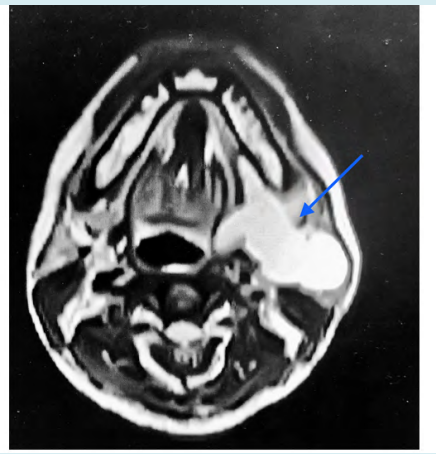

Figure 3: Axial MR image showing a large lipoma involving parotid, submandibular and parapharyngeal spaces.

Surgical Technique

Under general anaesthetic, a modified Blair incision with submandibular extension was made. Blunt and sharp subplatysmal dissection was undertaken. Facial nerve was carefully isolated and preserved with additional intra-operative monitoring (Medtronic™ nerve integrity monitor). The submandibular gland was isolated and pushed medially to dissect part of the lipoma. The rest of the horse-shoe shaped lipomatous tissue was noted to extend to the parotid region with extension into the retromandibular region going towards the skull base. This was carefully excised with blunt meticulous surgical dissection (Figure 4). No intra-oral access was required. Two drains (Size 12 Redivac™) were inserted in parotid and submandibular region for 48 hours.

No immediate complications were noted in the post-operative period. Very minimal weakness of left marginal mandibular nerve was noted which improved after a few weeks (Figure 5). The patient was discharged with appropriate wound care instructions. No recurrence has been noted on 3 months follow-up.

Figure 4: Surgical excision of the lipoma via Transparotid/ Submandibular approach.

Figure 5: Two-weeks follow-up of the patient showing mild left marginal mandibular nerve weakness.

Discussion

Lipomas are the most common soft tissue neoplasms, with an estimated incidence of 2.1 per 100 individuals. They are most commonly seen in the 5th-7th decades of life, and show a general predisposition to the male gender [42]. Despite this, lipomas of the parapharyngeal space (PPS) are a rare entity with only 36 cases being reported in published in the reviewed literature in the past 20 years prior to the case presented. PPS tumours as a subcategory are rare, comprising only 0.5% of head and neck tumours [32]. In the pre-styloid compartment, the tumours are mainly salivary in nature and those of the post-styloid region are commonly neurogenic [43].

PPS lipomas are thought to comprise just 1-2% of all PPS tumours. As slow growing tumours, lipomas in this area tend not to present with symptoms until large, as can be seen in the sizes of the reported cases. Presentation is often due to aesthetic or compressive symptoms due to the size of the lump in the neck and very occasionally picked up incidentally by the dentist and/or surgeons during routine examination. This may occur if the tumour grows medially, where it can bulge and push out the superior constrictor muscle. This would be seen clinically in the oropharynx as an asymmetrical swelling of the affected side [15]. Presentation with pain, or symptoms of cranial nerve deficits, such as hoarseness and tongue deviation, are more suggestive of malignant disease.

There are many histological subtypes of lipomas (**Table 2)**. The most common subtype seen in the reported cases of PPS lipomas is simple/conventional lipoma (n=31), followed by osteolipoma, spindle cell lipoma and angiomyxolipoma.

Type	Tissue
Simple/Conventional	Encapsulated adipose tissue
Adenolipoma	Adipose tissue with entrapped eccrine glands/ducts
Angiolipoma	Adipose tissue with blood vessels
Myelolipoma	Adipose tissue and haematopoietic tissue
Fibrolipoma	Adipose tisse with fibrous connective tissue
Myolipoma	Adipose tissue with smooth muscle cells
Chondrolipoma	Adipose tissue and chondrocytes
Osteolipoma	Adipose tissue with lamellar bone
Myxolipoma	Adipose tissue with mucoid component
Sclerotic lipoma	Adipose tissue with sclerotic collagen
Sialolipoma	Adipose tissue with salivary gland elements
Pleomorphic/Spindle cell lipoma	Adipose tissue with spindle cell and pleomorphic giant cells

Table 2: Lipoma Subtypes.

Diagnosis of PPS lipomas may be reliably predicted through Magnetic resonance imaging (MRI) giving a homogenous signal which is isointense when compared to subcutaneous fat [44]. This differentiates the mass from liposarcomas which may vary from having thick septations, local invasion or even show complete sarcomatous change [42]. However, surgeons should consider getting cytological or histological diagnosis to rule out low-grade liposarcomas which may have similar features compared to the benign variant. Asymptomatic lipomas can be safely monitored as there is no evidence of malignant transformation [42]. Additionally, surgical excision has to be weighed against risk of damaging important neuro-vascular structures of the PPS.

A number of common surgical approaches have been reported to access PPS tumours. The most common are transcervical, transmandibular, transoral, transparotid and preauricular & infratemporal or a combination of multiple approaches [15]. More recently, robotic surgical aids have been combined with a transoral approach [14]. In our literature review, transcervical access was the most common (n=13) due to wide exposure it provides allowing for good access & control of vital neurovascular structures. Larger tumours(>8 cm) may require a combination of approaches for safe and adequate access.

Recurrence of a lipoma anywhere in the body is thought to be around 4-5%. This is thought to be higher in deeper or infiltrative lipomas [45]. As PPS tumours are deeper, and often close to vital structures, meaning they might not be able to be excised completely, the presumption would be that local recurrence rates would be higher for PPS lipomas

which however is not proven in our substantial review.

We have presented a detailed outlook of parapharyngeal space lipomas supplemented with largest review of literature pertaining to this subject available till now. It is hoped that this review will give more insight to the surgical trainees and surgeons in the field of otolaryngology and maxillofacial surgery.

Declarations

Conflict of Interests – none
Funding – none
Ethical approval – n/a

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