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Radiodiagnosis

A STUDY OF NECK MASSES BASED ON ETIOLOGY ON CECT

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ABSTRACT Introduction of cross-sectional imaging provides a new dimension in evaluation of structural anatomy of the tissue. This study was designed to assess the role of contrast enhanced computed tomography (CT) in the evaluation of neck masses. These comprises of neck lesions based on etiology and are divided into congenital, vascular, inflammatory or tumors (benign and malignant)[1].
Aim : To categorise the neck masses based on etiology on CECT.
Materials and methods : The study was carried out in the Department of Radio-diagnosis, Alluri Sitarama Raju Academy of Medical Sciences, Eluru during the period of september 2015 to september 2017 on 60 patients who has complaints of neck swelling.

KEYWORDS : CECT - Contrast enhanced computed tomography, PMS- Pharyngeal mucosal space, PPS- Parapharyngeal space, PS- Parotid space, PVS - Perivertebral space

INTRODUCTION

The spaces of the neck include the sublingual space, submandibular space, parapharyngeal space, pharyngeal mucosal space, masticator space, parotid space, carotid space, visceral space, posterior cervical space, retropharyngeal space, and perivertebral space.

The lesions of parapharyngeal space include

Congenital lesions - atypical second brachial cyst

Inflammatory lesions - abscess

Benign tumors pleomorphic adenoma

Malignant tumors salivary gland tumors, liposarcomas as well as direct invasion of PPS by malignancies from adjacent spaces via direct transfascial extension.

The lesions of masticator space include
Inflammatory lesions Odontogenic infection, Mandibular osteomyelitis

Benign lesions Venous malformations, AVMs and lymphatic malformations

Malignant Tumors Rhabdomyosarcoma, leiomyosarcoma, malignant fibrous histiocytoma, chondrosarcoma, mandibular osteosarcoma and metastasis

The lesions of parotid space include
Cystic lesions developmental (eg, branchial cleft cysts), or acquired cysts (eg, ductal sialocyst).[2]

Inflammatory lesions Acute parotitis

Benign tumors Warthins tumour, lipomas, hemangiomas, lymphangiomas and neurogenic tumors.

Malignant tumors Mucoepidermoid carcinoma, Adenoid cystic carcinoma Metastases

The lesions of carotid space include
Vascular lesions jugular vein thrombophlebitis, venous and arterial thrombosis, arterial dissection, and arterial aneurysms.

Benign tumors Carotid body tumors, Schwannomas, Neurofibromas

Malignant tumors metastases that originate from primary sites in the upper aerodigestive tract.[3]

The lesions of Retropharyngeal space include

Inflammatory lesions retropharyngeal abscess.[4]

Benign tumors Lipoma [5]

Malignant tumors nasopharyngeal carcinoma[6]

The lesions of parapharyngeal space include

Congenital lesions Thornwaldts cyst

Inflammatory lesions Hypertrophied adenoids, Tonsillitis.[7]

Benign tumors Juvenile nasopharyngeal angiofibroma

Malignant tumors Squamous cell carcinoma, oropharyngeal carcinoma, Non- Hodgkins lymphoma, and nasopharyngeal rhabdomyosarcoma.

The lesions of perivertebral space include
Inflammatory lesions tubercular spondylitis, pyogenic osteomyelitis and postoperative infections.

Malignant lesions invasion from adjacent nasopharyngeal carcinoma and metastases to vertebral body, chordomas, benign giant cell tumor, osteoblastoma, aneurysmal bone cyst and osteochondroma.

The lesions of cervical space include
Congenital lesions cystic hygroma, lymphangioma, 3rd branchial cleft cyst.

Inflammatory lesions Inflammatory lymphadenopathy

Benign tumors lipoma ,neurofibroma and hemangioma.[8]

Malignant lesions metastatic squamous cell carcinoma, Lymphoma, both Hodgkin and non-Hodgkin types

The lesions of visceral space include

Content	Pathology
Larynx	Laryngocele, SCC, chondrosarcoma
Hypopharynx/esophagus	Zenkers diverticulum, SCC
Trachea	Ca, benign stenosis
Thyroid gland	Goiter, colloid cyst, carcinoma
Parathyroid gland	Adenoma, hyperplasia
Embryological remnants	Thyroglossal duct, 3rd branchial cyst
Paratracheal lymph nodes	Metastasis, lymphoma.

The lesions of buccal space include
Congenital lesions Accessory parotid tissue, congenital fistula of the parotid duct, dermoid cyst

vascular lesions hemangiomas and vascular malformation

Malignant lesions pleomorphic adenoma, adenoid cystic carcinoma, acinic cell carcinoma and mucoepidermoid carcinoma.[9]

The lesions of Sublingual and Submandibular space include
Congenital lesions Ranula epidermoid and dermoid cysts

Inflammatory lesions Ludwigs angina

Benign tumors hemangiomas, lymphangiomas, lipomas and neurogenic tumors.

MATERIALS AND METHODS

The study was carried out in the Department of Radio-diagnosis, Alluri Sitarama Raju Academy of Medical Sciences, Eluru during the period of September 2015 to September 2017

Study design non-randomised, prospective, observational study.

Study period and duration This two years study was carried out during the period of September 2015 to September 2017

Place The present study was conducted at Department of Radio-diagnosis, Alluri Sitarama Raju Academy of Medical Sciences, Eluru.

Source of data Patients with clinical suspicion of neck masses, advised to undergo computed tomography at Department of Radio-diagnosis, over a period of two years were included in the study.

Sample size and procedure All the patients who fulfill the inclusion criteria advised to undertake computed tomography (CT) at Alluri Sitarama Raju Academy of Medical Sciences, Eluru over a period of two years with a minimum target of 60 patients.

Selection criteria
Inclusion criteria

- All patients of different age groups clinically suspected for neck masses.
- Patients with neck masses resulting from congenital, inflammatory, neoplastic and metabolic lesions.

Exclusion criteria

- Post operative patients.
- Patients with contraindications to intravenous administration to contrast medium.
- Pregnant females

RESULTS

In the present study, majority of the patients are between 51 to 70 years and the mean age of presentation is found to be 47.82 years. 53.33% of the patients are males and 46.67% are females with male to female ratio of 1.1:1 The male preponderance observed in the present study may be attributed to the higher rate of smoking and alcohol habits. Risk factors for upper aerodigestive tract cancers include male sex and use of alcohol, tobacco, or betel nut. Additional risk factors for oropharyngeal cancer include a family history of squamous cell carcinoma of the head and neck and poor oral hygiene. In the study done by Mehrotra R, Singh M[10] (2005) on prevalence of head and neck cancers also reported male preponderance.

In the present study, 35% are of malignant etiology, 35% are of benign etiology, 25% inflammatory and autoimmune etiology, 5% are congenital etiology. Lymphangioma is the most common congenital lesion, abscess is common in inflammatory lesions, colloid nodule of thyroid is common in benign lesions and papillary thyroid carcinoma and squamous cell carcinoma in equal incidence are common in malignant etiology. In consistent with study done by Dhaval K Thakkar, Sanjay Khaladkar, Mansi Jantre, Dolly K Thakkar, Amarjit Singh, Vilas M. Kulkarni[11] (2015) on evaluation of neck lesions with MDCT in 100 cases, 34% were of malignant aetiology, 24% were of benign aetiology, 33% inflammatory aetiology, 6% were congenital and 3% were of vascular aetiology. Cystic hygroma (3/6=50%) was most common congenital lesion, IJV thrombosis (2/3=66.67%) in vascular lesions, retropharyngeal abscess (6/33=18.18%) in inflammatory lesions. Goitre (5/24=20.83%) predominated followed by parathyroid adenoma (4/24=16.67%) in benign lesions. In malignant etiology, metastatic lymph nodes were seen in 7/34 (20.58%), primary malignancy was detected in 24/34 (70.58%) cases.

Age distribution

Age	Frequency	Percent
<10	2	3.3
11-20	3	5
21-30	5	8.3
31-40	10	16.7
41-50	6	10
51-60	14	23.3
61-70	19	31.7
71-80	1	1.7
Total	60	100

Gender distribution

Sex	Freqency	Percent
Female	28	46.67
Male	32	53.33
Total	60	100.0

Distribution of neck masses based on etiology and neck space involved

Spaces	Congenital	Inflammatory & autoimmune	Benign	Malignant
Carotid space	0	3	6	1
	0.00%	20.00%	28.57%	33.33%
PCS	2	1	0	0
	66.67%	6.67%	0.00%	0.00%
PPS	0	3	0	0
	0.00%	20.00%	0.00%	0.00%
Parotid space	0	3	5	0
	0.00%	20.00%	23.81%	0.00%
RPS	0	1	0	0
	0.00%	6.67%	0.00%	0.00%
SLS	0	1	0	0
	0.00%	6.67%	0.00%	0.00%
SMS	0	1	0	1
	0.00%	6.67%	0.00%	4.76%
VS	1	2	10	19
	33.33%	13.33%	47.62%	90.48%
Total	3	15	21	21
	100%	100%	100%	100%

Thyroid carcinoma

Axial contrast CT image shows heterogenously enhancing lesion in the left lobe of thyroid causing displacement of common carotid artery and internal jugular vein.

Abscess

Axial contrast CT image showing subtle peripheral enhancement of the lesion in the right posterior cervical space

CONCLUSION

In the present study, majority of the patients are between 51 to 70 years and the mean age of presentation is found to be 47.82 ± 16.95 years. 53.33% of the patients are males and 46.67% are females with male to female ratio of 1.1:1. The male preponderance observed in the present study may be attributed to the higher rate of smoking and alcohol habits. Visceral space is the most common neck space involved in both benign and malignant lesions. In the present study, multidetector CT evaluation of neck masses revealed 35% malignant lesions, 35% benign lesions, 25% inflammatory and autoimmune lesions, 5% congenital lesions. Lymphangioma is the most common congenital lesion, abscess is common in inflammatory lesions, colloid nodule of thyroid is common in benign lesions and papillary thyroid carcinoma and squamous cell carcinoma in equal incidence are common in malignant etiology.

CT ensures accurate anatomical localization and lesion characterization in benign lesions. In malignant tumors, it is useful for staging and provides essential information about the tumor extent that directly affects the surgical approach necessary for curative resection.

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