



## Case Report: Ultrasound Pattern Recognition to Diagnose and Evaluate Pediatric Lymphangioma of Neck

**Rajesh C Kamble<sup>1\*</sup>, Alpana N Joshi<sup>2</sup>, Pravin Mestry<sup>1</sup>, Vipul Jethwa<sup>3</sup> and Amol Nage<sup>4</sup>**

<sup>1</sup>MBBS, MD Radiodiagnosis, Shobha Diagnostic Centre, Dhiraj Apartments, Mumbai, India

<sup>2</sup>MBBS, MD Radiodiagnosis, DNB, Shobha Diagnostic Centre, Dhiraj Apartments, Mumbai, India

<sup>3</sup>MBBS, DMRD DNB Radiodiagnosis, Shobha Diagnostic Centre, Dhiraj Apartments, Mumbai, India

<sup>4</sup>MBBS, MS MCH Pediatric Surgery, Shobha Diagnostic Centre, Dhiraj Apartments, Mumbai, India

**\*Corresponding Author:** Rajesh C Kamble, MBBS, MD Radiodiagnosis, Shobha Diagnostic Centre, Dhiraj Apartments, Mumbai, India.

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### Abstract

Lymphangiomas are most common lesions seen in the pediatric age group.

They are exclusively seen in the head neck and axillary region. Infact they are exclusively also picked as part of prenatal sonography (50 - 65% detection rate) and followed up in post-natal for confirmation. (90% detection rate) High frequency ultrasound with linear transducers have revolutionized the imaging of these lesions. They can be diagnosed with great accuracy due to its specific appearance on ultrasound.

Hypochoic cystic lesion with classic thin walled septations within them and avascular on colour Doppler studies seen in a pediatric age group is signature finding to diagnose lymphangioma on ultrasound and best modality to evaluate pediatric patients in day-to-day clinical practice.

**Keywords:** Lymphangioma; Neck Ultrasound; Pediatric Lymphangiomas; Complicated Lymphangiomas

### Introduction

Lymphangiomas are most common lesions seen in the pediatric age group [1]. Infact, these are now called as the benign dysembryoplasias of the lympho- ganglionic system [2] and now included in the new ISSVA classification of vascular malformations adopted in 2014 under the category of low flow lymphatic malformations [1,3,4]. The incidence rate is 1.2-2.8

per 1000 individuals [2,3]. They can be classified as microcystic lymphangioma, macrocystic lymphangioma and cystic hygroma depending on the size of the lymphatic cavities [4-6].

They are exclusively seen in the head neck and axillary region. Infact they are exclusively also picked as part of prenatal sonography (50 - 65% detection rate) and followed up in post-natal for confirmation. (90% detection rate) [6,7].

High frequency ultrasound with linear transducers have revolutionized the imaging of these lesions. They can be diagnosed with great accuracy due to its specific appearance on ultrasound [7,8].

Hypoechoic cystic lesion with classic thin walled septations within them and avascular on colour Doppler studies seen in a pediatric age group is signature finding to diagnose lymphangioma on ultrasound and best modality to evaluate pediatric patients in day to day clinical practice [6-8].

They are prone to complications like hemorrhage and infection making its appearance different on ultrasound. Internal echoes seen within a lymphangioma is a definite sign of haemorrhage or infection [5-8].

### Case History

A six-year-old child presented with pain and swelling over the right posterior aspect of the nape of neck. The child was evaluated with physician and sent for ultrasound evaluation. The child had this swelling since birth. It was small in size, soft and painless. There was trivial history of trauma following which there was sudden pain and increase in the size of the swelling for two days.

Clinical examination showed a firm to soft swelling along the nape of neck on the right.

The patient was evaluated with high frequency linear transducer (L12-3) using Samsung Ultrasound machine – V8.

### The USG findings revealed

The visualized bilateral thyroid, submandibular and parotid glands were completely normal and showed no focal lesion within them.

On B- mode sonography, there was a hypoechoic multiseptated cystic lesion seen within the superficial subcutaneous soft tissues of the right aspect of the neck region – nape of the neck. The lesion shows multiple thin walled septations within it. The septal thickness was 01 mm. The lesion measured 3.6 x 2.8 x 3.6 cms (volume 20 cc) in dimensions. It was avascular on Colour Doppler studies. It showed internal echoes within it. There was surrounding inflammatory reaction seen surrounding the lesion.

Infact, the neonatal ultrasound of this child (30 days old) was performed by me six years back and a ultrasound diagnosis of lymphangioma was given. Correlating with this report from our centre and patient current history of pain and sudden enlargement in a known case of lymphangioma, the ultrasound diagnosis of bleed/infection within a lymphangioma was proposed with perilesional inflammatory changes.

The pediatrician following our ultrasound report referred the case to a pediatric surgeon who after clinically evaluating the lesion asked for MRI neck and gave an empirical course of antibiotics Pre and post contrast multiplanar MRI of the neck was performed with 3D multiplanar reconstruction.

The MRI reported a small to moderate size thick irregular walled soft tissue lesion, measuring approximately 4.0 x 3.9 x 3.8 cms in dimensions in posterior triangle of the neck in the deep subcutaneous plane with mild to moderate edematous changes involving the adjacent posterior paraspinal and trapezius muscles on the right side with post contrast enhancement suggestive of a necrotic lymph node and secondary cold abscess formation.

The ultrasound report and the MRI neck report were contradictory which confused the surgeon. The entire biochemical work of CBC, ESR and Mantoux tests were normal. The surgeon aspirated the collection and was surprised to see a hemorrhagic collection within and sent for TB work up but surprisingly the gene expert for TB came completely negative ruling out a possibility of Koch's and thus strengthening our ultrasound diagnosis.

The surgeon went ahead and resected the above-described lesion due to diagnostic dilemma and intraoperatively saw a cystic lesion with hemorrhage within and did complete resection of the cyst wall and sent the specimen for histopathology.

On histopathologic examination, the macroscopic appearance was white fragmented tissue. Microscopy shows necrotic tissue fragments infiltrated by neutrophils and lymphocytes. Few fragments of skeletal muscle showed surrounding inflammation. No caseated granulomas or malignancy seen. These features were suggestive of inflammation/infection within lymphangioma.

## Review of Literature and Discussion

Lymphangiomas are the rare benign tumours seen in the pediatric age group and most commonly located in the head, neck and axillary region [1,2].

The incidence rate is 1.2 - 2.8 per 1000 individuals. They can be classified as microcystic lymphangioma, macrocystic lymphangioma and cystic hygroma depending on the size of the lymphatic cavities [4-6].

Three theories have been proposed for origin of these lesions – blockage/arrest of the normal growth of primitive lymphatic channels during embryogenesis, primitive lymphatic sacs not reaching the venous system and lymphatic sacs laying in the wrong area [4,5].

Clinically they are soft fluctuant lesions and painless in nature [3].

Ultrasound with high frequency linear transducers is the best tool to evaluate these lesions in pediatric age group. Ultrasound being widely easily available, real time, not expensive, no ionizing radiation, fast and quick to interpret- scores very high as compared to any other modalities to evaluate these superficial lesions [4-6].

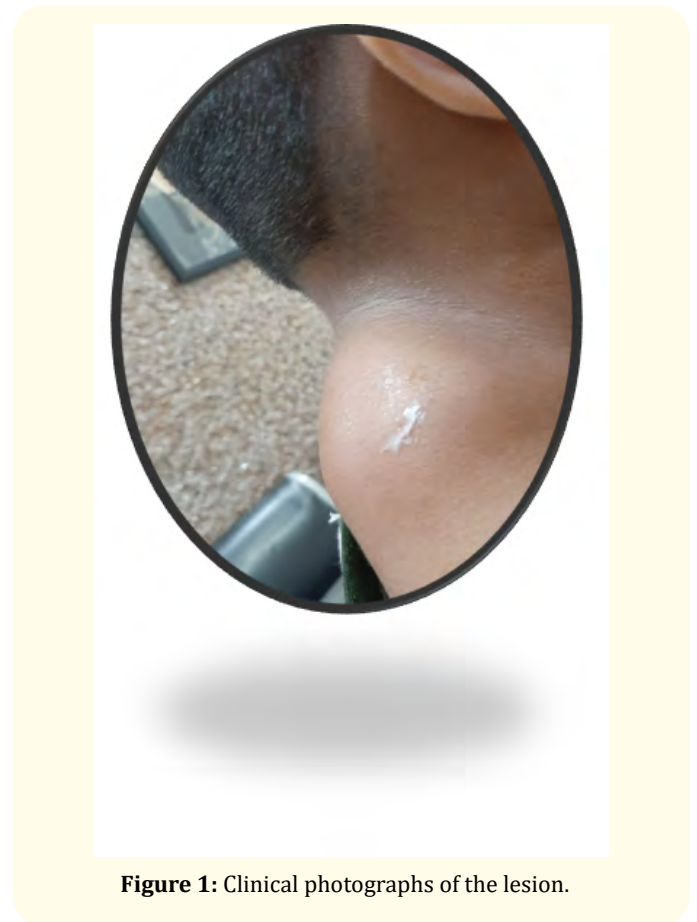
Best part of ultrasound is real time imaging wherein a sonologist gets huge clues to his case by getting clinical details from the patient in terms of history, duration of the lesion and biochemical work up done. This strongly helps in clinico – radiological accurate diagnosis and improving patient outcomes.

Surgical resection still remains the best treatment for lymphangiomas. The other treatment options, such as sclerotherapy have been proposed as an alternative to reduce the impact and complications of surgery. Sodium morrhuate, dextrose, tetracycline, doxycycline, bleomycin, ethibloc have been used as sclerotherapeutic agents. Today, sonologist can also do this procedure like sclerotherapy in their clinical practice to reduce and treat the lesion [6-8].

These lymphangiomas are prone to complications like hemorrhage and infections and lead to an asymptomatic child to become symptomatic with pain, discomfort and fever. The intracystic haemorrhage leads to simple normal clear lymphangioma to show internal echoes within and perilesional inflammatory changes.

Today with advent of MRI and multiplanar capability, all pediatric tumours can be evaluated in a thorough manner for better delineation of its anatomy helping the surgeon to plan the management of focal lesions. As MRI has no ionizing radiation, it is a great tool for all complicated cases of Lymphangiomas and other tumours evaluation. It has its own disadvantages- sedation required, poor patient compliance, expensive and time consuming [9,10].

From our personal experience of last 23 years, we have developed pattern recognition in evaluation of superficial lesions in small part imaging and pediatric cases and confidently evaluate, diagnose them with precision using ultrasound with high frequency linear transducer [4-6].



**Figure 1:** Clinical photographs of the lesion.



Figure 2: Clinical photographs of the lesion.



Figure 4: B mode sonography of the lesion over the nape of the neck on the right side showing a hypoechoic cystic lesion with thin walled septations and internal echoes within it.

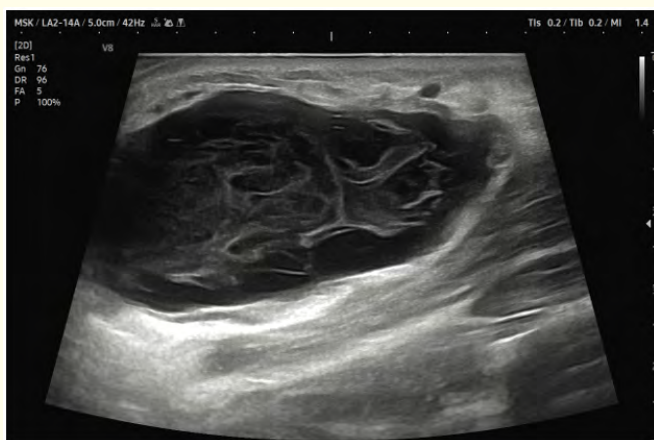


Figure 3: B mode sonography of the lesion over the nape of the neck on the right side showing a hypoechoic cystic lesion with thin walled septations and internal echoes within it.

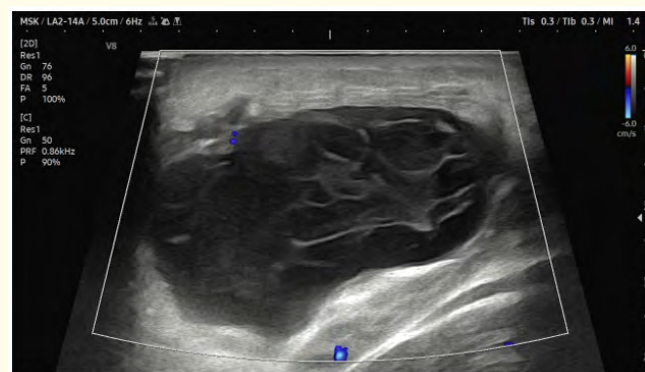


Figure 5: Colour Doppler of the lesion confirming its avascular nature.

Figure 6 and 7 Coronal T2 and T1 weighted MRI images of the neck showing the lesion.

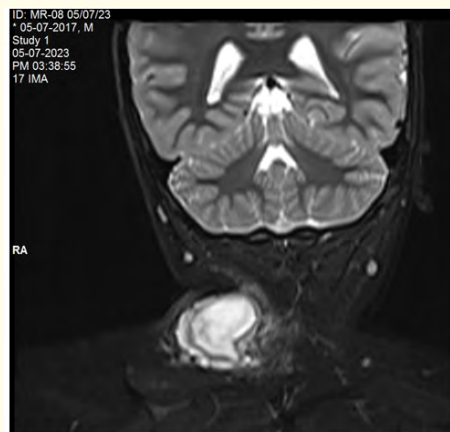


Figure 6: STIR weighted image CORONAL.

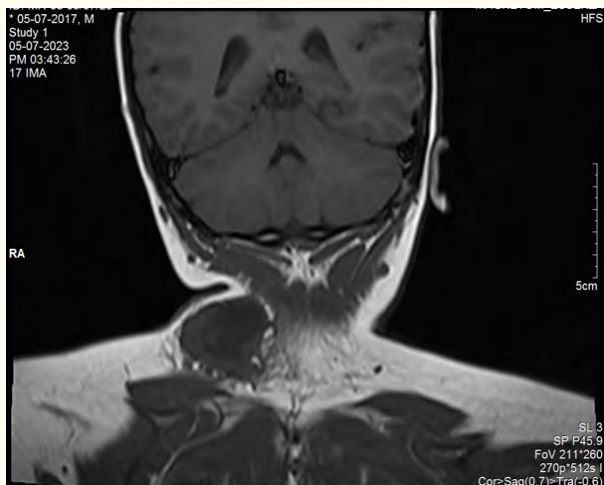


Figure 7: T1 weighted image CORONAL.

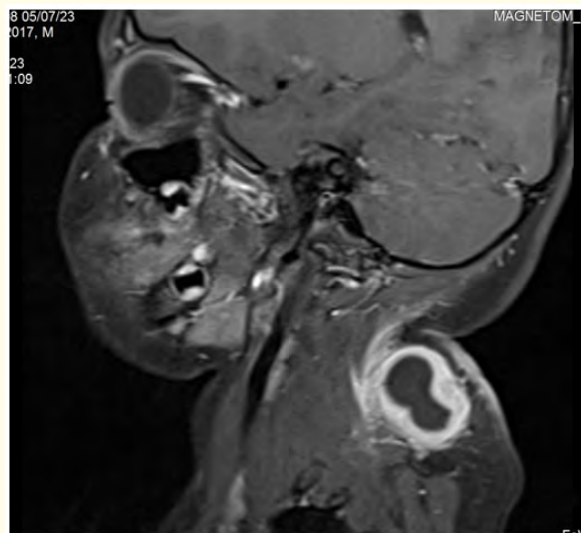


Figure 9: Post contrast T1 FS SAGITTAL.

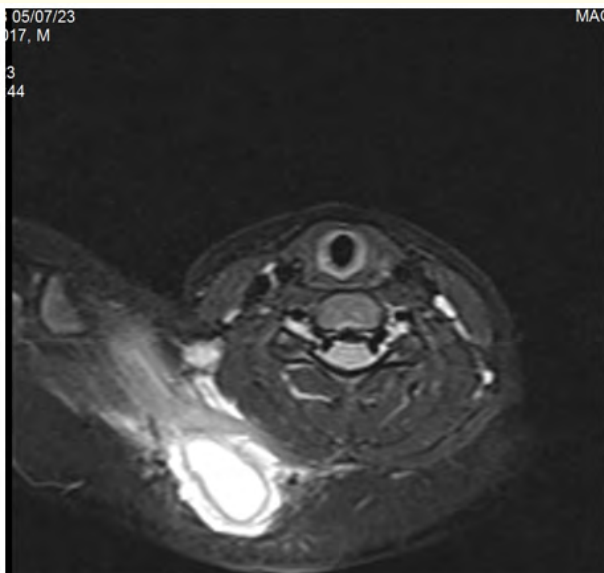


Figure 8: STIR weighted image AXIAL.



Figure 10: Post contrast T1 FS CORONAL.

Figure 9 and Figure 10 – Post contrast sagittal and coronal MRI images.

### Conclusion

Ultrasound with high frequency linear transducer is an excellent tool in evaluation of superficial lesions in the neck – both in the

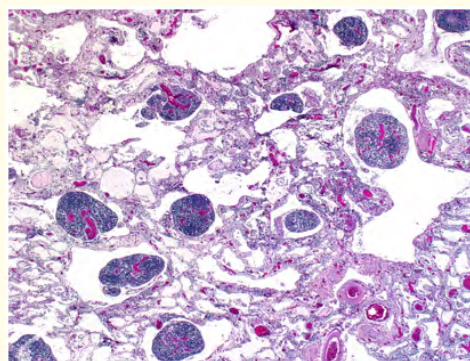


Figure 11: Histopathology of infected lymphangioma.

pediatric and adult age group. In day to day clinical practice, we have developed “pattern recognition” in the evaluation of these superficial lesions and gave confident histopathological diagnosis in many cases.

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