Primary Idiopathic Congenital Lymphedema Presenting as Swelling of Dorsum of Both Feet – A Case Report

[1]Tanjida Hasan, [1]Faria Nasreen, [1]Mahbub ur Rahman

[1]National Institute of Nuclear Medicine and Allied Sciences (NINMAS), Dhaka

Correspondence Address: Dr. Tanjida Hasan, Medical officer, National Institute of Nuclear Medicine and Allied Sciences (NINMAS), BAEC, Dhaka, Bangladesh. Email: tanjida.hasan@hotmail.com

ABSTRACT

Lymphedema is a debilitating, progressive disease causing major healthcare problem. This condition is broadly classified as primary and secondary lymphedema. Congenital subtype is a rare form of primary lymphedema. Proper history taking and appropriate investigations can rule out the other differentials of lymphedema. Early diagnosis is essential for early treatment which may halt the progression and alleviate symptoms. Lymphoscintigraphy is an important but simple imaging modality which helps to diagnose and grade lymphedema initially as well as in follow up. An interesting case of primary idiopathic congenital lymphedema presenting with dorsum of feet swellings is reported here highlighting the importance of lymphoscintigraphy.

Key words: **Primary idiopathic congenital lymphedema, Lymphoscintigraphy.**

Bangladesh J. Nucl. Med. Vol. 25 No. 1 January 2022

Doi: https://doi.org/10.3329/bjnm.v25i1.59641

INTRODUCTION

Lymphedema is the accumulation of protein rich fluid in the interstitial spaces resulting from either anatomical or functional causes leading to the obstruction in the lymphatic flow or lymph nodes.It is a debilitating and progressive condition. If left untreated it can cause major healthcare problem. Lymphedema is broadly classified as primary and secondary. Primary lymphedema is uncommon with an estimated prevalence of 1:6000 to 1:10000 live births (1). This condition results from hypoplasia or aplasia of the lymphatic channels (2). If the age of onset is less than one year, it is defined as **congenital lymphedema** but if the age of onset is one to 35 years, it is termed **lymphedema praecox** and **lymphedema tarda** if the age of onset is more than 35 years (3,4). Amongst these three types, lymphedema praecox is the commonest form and 10% of the cases are familial with an autosomal dominant inheritance pattern (5). Congenital lymphedema has two subgroups, heriditary which is genetically inherited with the eponym Milroy's disease and non familial (Idiopathic congenital lymphedema). Secondary lymphedema is usually acquired with a precipitant such as cancer surgery, radiation therapy, chronic venous insufficiency, lipedema, trauma and infection (6). Lymphedema may be present in both extremities, abdomen, trunk, head neck and also in genitalias. This condition is often misdiagnosed and mistreated leading to serious complications because of not doing appropriate & specific investigation which causes degrading quality of life. The proper diagnosis of lymphedema depends on scrupulous history taking, clinical examination and appropriate investigations.There are many imaging modalities available to diagnosis the cause of extremity swelling like dupplex ultrasonography. But lymphoscintigraphy is one of the important investigations that helps in the diagnosis, gradation and follow up of lymphedema. It is 92% sensitive and 100% specific for the diagnosis of lymphedema. Here an interesting rare case of congenital lymphedema is reported highlighting the role of Tc-99m-nanocolloid lymphoscintigraphy.

CASE REPORT

A 10-month old female child presenting with bilateral swelling of feet was referred from Burn and plastic surgery department of Dhaka Medical College Hospital (DMCH) to NINMAS with the advice of lymphoscintigraphy. According to her father's statement, the swelling of feet was limited to dorsal aspect which was evident since birth without increasing in size, cranio caudal extension or involvement of any limbs or any other parts of the body. She was born by normal vaginal delivery at preterm due to her mother's eclampsia with very low birth weight with the complaints of respiratory distress syndrome which suggest underdeveloped lymphatic system.There was no known family history of limb swelling or similar kind of illness. The patient

showed no sign of pain during walking or standing. Affected individual had no history of diuretic administration or any surgical procedure for conditions causing pedal edema. Her physical examination revealed non- pitting, non-tender edema marked at the dorsum of the both feet (Figure 1). There was no clinical evidence of cardiac failure. She had no other dermatological stigmata like dermatitis of the edematous skin, cellulitis, excoriation or any other dysmorphic features. Her nails were normal. There was no evidence of infection.

Different investigations was done by the patient to diagnose the cause of swelling. But no investigation gives specific information about lymphedema except Tc-99m-nanocolloid lymphoscintigraphy. Lymphoscintigraphy shows complete lymphatic obstruction (Grade IV) in this patient who came with swelling of dorsum of both feet only.

Table 1: Diagnostic work up algorithm of lymphedema

S/L	Investigation	Findings	Excluded differential diagnosis/remarks
1.	Biochemical test with urine analysis	All reports are normal	Hepato-renal etiologies and proteinuria
2.	Complement fixation test (CFT) for filariasis	Negative	Filariasis
3.	Ultrasonography of whole abdomen	Normal findings	Any obstructive lesion
4.	Duplex ultrasonography of both lower limbs	Normal triphasic wave pattern in the arteries and no evidence of thrombosis except bilateral subcutaneous thin walled cystic lesions having thick debris within on the dorsum of both feet.	Deep vein thrombosis or arterio-venous fistula
5.	Lymphoscintigraphy with - Tc99m-nanocolloid	Non visualization of lymphatic channels and lymph nodes with no ascent of radiotracer into the lymphatic vessels from injection sites of both lower extremities in early or delayed images up to 2 hours which represented complete lymphatic obstruction (Grade IV) (Figure 2).	Lymphatic obstruction is confirmed by this investigation.

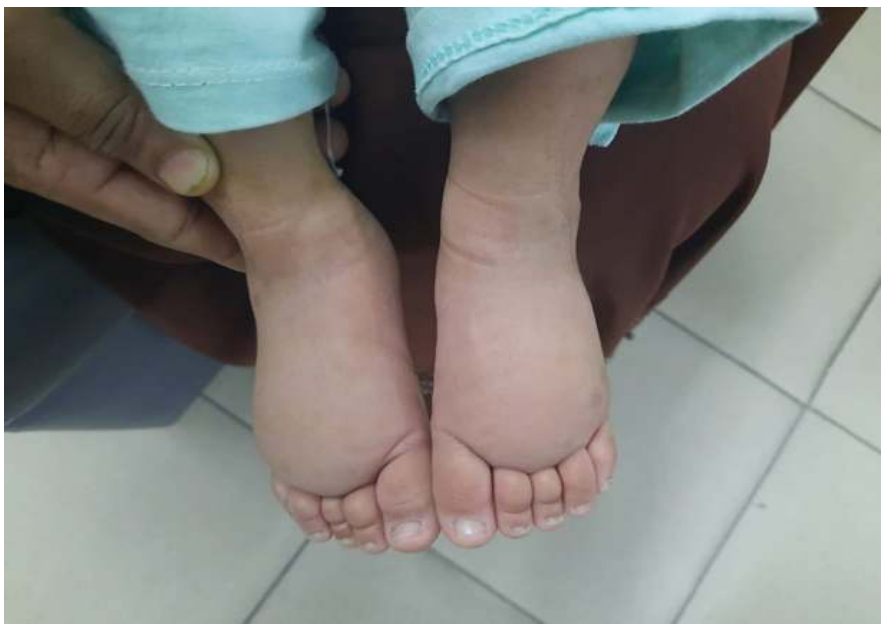

Figure 1: Patient's appearance at 10 months of age showing swelling of dorsum of both feet. There was no extension of swelling and no signs of macrodactyly.

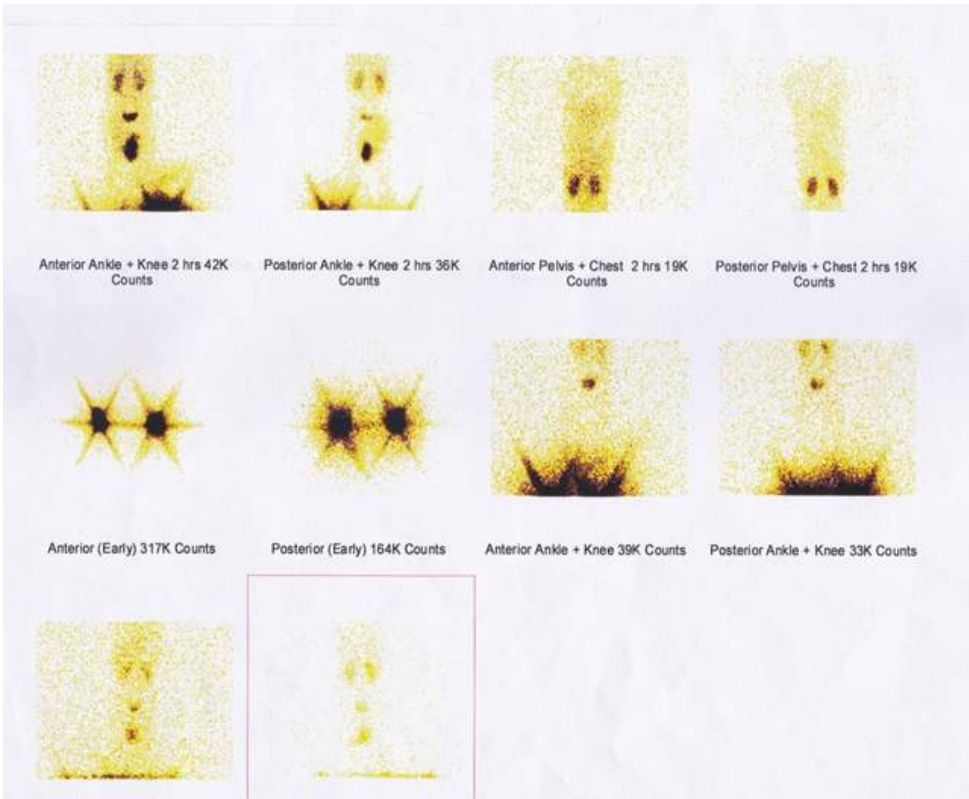

Figure 2: Lymphoscintigraphic images at 2 hours after the injection of ^{99m}Tc-nano-colloid into the interdigital space of feet illustrates the absence of tracer uptake into the both inguinal nodes indicating lymphatic dysfunction. Radiotracer uptake in renal areas, bladder as well as in diaper is also seen in multiple views due to presence of free per technitate.

The patient was managed conservatively and was advised regular follow-up. Conservative management included compression bandage, elevation of lower limbs for some particular time, manual foot massage along with skin care. The parents were advised to avoid prolong standing of the child. The lymphedema did not show any progression in the next three months of follow up.

DISCUSSION

Among the variants of primary lymphedema, congenital lymphedema is quite rare. This was a case of a 10-month old child having no family history of lymphedema which suggested a case of idiopathic congenital lymphedema. However, for further confirmation genetic analysis (genetic mutation study eg. FOXC2, FLT4, VEGFR3) was not possible due to unavailability and cost constraint. In case of primary lymphedema, females are affected two to ten-fold more than males (7) which was concordant with this case. Congenital lymphedema usually involves one or both lower limbs but can also involve upper limbs and even face. Due to relative lack of fibrosis, greater amounts of edema form in comparison to secondary lymphedema. In this case the child presented only with swelling of dorsum of both feet with non-pitting edema. Scrupulous history taking and investigations helped to rule out the differentials of lymphedema. Lipedema is one of the important differentials of primary lymphedema and is frequently misdiagnosed as lymphedema. However, in lipedema the feet are spared from swelling.

As primary lymphedema is quite rare, till now around 200 cases have been reported. In our institute two cases have been reported yet. Begum et al reported a case of idiopathic congenital lymphedema where there was involvement of unilateral lower limb, both hands with swelling of one side of face (8). Parveen et al. did a retrospective study of 51 patients suffering from lymphedema referred to NINMAS, Dhaka and found only one case of primary lymphedema (9). Radionuclide scintigraphy is one of the simple but important imaging modalities to rule out lymphedema as a cause of leg swelling.

Lymphoscintigraphy shows 92% sensitivity and 100% specificity for the diagnosis of lymphedema (10). A normal lymphoscintigraphy will show symmetrical transport of radiotracer with visualization of discrete lymphatic channels and uptake in the lymph nodes within 30 minutes. Liver will be visualized in the delayed images due to systemic circulation of the tracer (11). In this case of primary lymphedema, there was increased accumulation at the injection site with no ascent of the tracer and non-visualization of lymph nodes in the delayed images. Renal and bladder activity was noted which was due to free per-technetate. In case of secondary lymphedema the lymphoscintigraphic findings are more likely to show prominent lymphatic channels, collateral vessels and also disrupted lymph vessels. Delayed transpot of tracer and dermal backflow may be noted also. Duplex Ultrasound is a valuable non-invasive investigation to exclude deep vein thrombosis and arteriovenous fistula and also evaluate the subcutaneous oedema resulting from lymphedema (12). CT and MRI are helpful in detecting causes of obstructive secondary lymphedema but it has a radiation hazard in comparison with lymphoscintigraphy. Effective radiation dose of CT is 3.6-5.4 mSV where only 0.024-0.204 mSV is administered in lymphoscintigraphy(13). For scintigraphic purpose we use only 0.1-0.2 ml radiotracer but in case of contrast CT & MRI we had to administer a large dose about 6-7 ml & 1-2 ml respectively. We could not administer contrast in patients with impaired liver or renal function; it is another limitations of CT and MRI.

The goal of treatment of lymphedema is to restore function and halt the progression of disease. At present conservative, pharmacological and surgical therapies are available. In mild cases limb elevation and compression stockings are useful. In this case conservative treatment was given with close monitoring. Late diagnosis may lead to progression of disease making it complicated and difficult to manage. Treatment of lymphedema should be initiated as early as possible to prevent extensive, irreversible fibrosclerotic changes that may last throughout life. In this respect definite early diagnosis by lymphoscintigraphy is very important to initiate proper treatment.

CONCLUSION

Primary idiopathic congenital lymphedema is a rare and progressive disease. Careful history taking & physical examination findings can distinguish lymphedema from other causes of swollen extrimities but lymphoscintigraphy is a specific investigation among many to confirm the diagnosis of lymphatic dysfunction which is crucial for patient to initiate early treatment and recovery.

REFERENCES

1. Rockson, S.G.,. Diagnosis and management of lymphatic vascular disease. Journal of the American College of Cardiology, 2008;52(10):799-806. doi.10.1016/j.jacc.2008.06.005
2. Scarsbrook, A.F., Ganeshan, A. and Bradley, K.M., Pearls and pitfalls of radionuclide imaging of the lymphatic system. Part 2: evaluation of extremity lymphoedema. The British journal of radiology, 2007;80(951):219-226. doi. 10.1259/bjr/68256780.
3. Kerchner K, Fleischer A, Yosipovitch G. Lower extremity lymphedema update:pathophysiology, diagnosis and treatment guidelines. J Am Acad Dermatol 2008;59:324-31 doi.10.1016/j.jaad.2008.04.013
4. Smeltzer DM, Stickler GB, Schinger A. Primary lymphedema in children and adolscents: a follow up study and review. Pediatrics 1985;76:206-18 doi.10.1542/peds.76.2.206
5. Harel L, Amir J, Nussinovitch M, Straussberg R, Varsano I. Lymphedema praecox seen as isolated unilateral arm involvement: case report and review of the literature. J Pediatr 1997; 130: 492-94 doi: 10.1016/s0022-3476(97)70219-1
6. Borman P. Lymphedema diagnosis,treatment and follow up from the view point of physical medicine and rehabilitation specialists. Turkish J Phys Med Rehab 2018;64(3): 179-97 doi: 10.5606/tftrd.2018.3539
7. Stanley G. Rockson. Diseases of the Lymphatic Circulation. In: Loscalzo J, Beckman JA, Creager MA editors. Vascular Medicine: A Companion to Braunwald's Heart Disease. 2nd ed. Philadelphia, Elsevier,2013:697-708
8. Begum SMF, Sultana N, Parveen R, Chaudhury A, Begum F. Radionuclide lymphoscintigraphy in the diagnosis of Idiopathic Congenital Lymphedema –A case report. Bangladesh J Nucl Med 2015; 18(2): 183-85 doi.10.3329/bjnm.v18i2.35242
9. Parveen R, Begum SMF, Sultana N, Jabin Z, Nath KK. Radionuclide lymphoscintigraphy in the evaluation of lower extremity lympedema-Single Hospital Experience. Bangladesh J Nucl Med 2015;18(1):43-46 doi.10.3329/bjnm.v18i1.34933
10. Schook CC, Mulliken JB, Fisherman SJ, Alomari AI, Grant FD, Greene AK. Differential diagnosis of lower extremity enlargement in pediatric patients referred with a diagnosis of lymphedema. Plastic Reconstr Surg 2011;127:1571-81 doi: 10.1097/PRS.0b013e31820a64f3.
11. Ter SE, Alavi A, Kim CK, Merli G. Lymphoscintigraphy: a reliable test for the diagnosis of lymphedema. Clin Nucl Med 1993;18:646-54 doi: 10.1097/00003072-199308000-00003.
12. Thomas F, O'Donell Jr, John CR, Eva MSM. New diagnostic Modalities in the evaluation of lymphedema. J Vasc Surg Venous Lymphat Disord 2017; 5(2): 261-73 doi.10.1016/j.jvsv.2016.10.083
13. Strauss, Keith J.; Somasundaram, Elanchezhian; Sengupta, Debapriya; Marin, Jennifer R.; Brady, Samuel L. Radiation Dose for Pediatric CT: Comparison of Pediatric versus Adult Imaging Facilities. Radiology, (2019), 181753. doi:10.1148/radiol.2019181753