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Original Research Article

Demographic examination of lymphedema seen in the lower extremities

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ABSTRACT

Background: We aimed to indicate the frequency of this disease according to blood groups, other disease types, age, weight and other demographic characteristics.
Methods: We examined total of 236 patients who applied to our clinic because of lower extremity edema within 5 years. All patients had a diagnosis of lymphedema. Patients with a diagnosis of congenital lymphedema or a diagnosis secondary to cancer were excluded. Obesity, presence of venous disease, diabetes mellitus and hypertension which are considered as causes of secondary lymphedema were included in the study. Also the relationship between lymphedema patients and blood groups were evaluated.
Results: 81% (n:193) of patients were women. The mean age of the patients was 50.71 (±10.28). All patients had diagnosis of lymphedema. Most of patients (n:189) had bilateral lower extremity edema. Body mass index was above 25 in 149 (63.1%) patients. Deep venous insufficiency accompanied in 75 (31.8%) patients. Perforator vein incompetance was observed with lymphedema in 96 (40.7%) patients. The number of diabetic and hypertensive patients was 64 (27.1%) and 67 (28.4%), respectively. Patients with B type blood group constituted the largest patient profile with a rate of 41.9% (n:99).
Conclusions: In our study, demographic characteristics were not statistically corolated to lymphedema development, however, the rate of lymphedema in patients with perforating vein insufficiency was statistically significant ($p<0.05$, $P=0.002$). The most important point to be considered here is whether lymphedema plays a role in the development of additional pathology or do additional pathologies trigger the development of lymphedema?

Keywords: Lymphedema, Venous insufficiency, Blood types

INTRODUCTION

Chronic edema is defined as edema that lasts longer than 3 months and affects a part of the body regardless of the underlying cause.[1] Lymphatic capillaries and lymphatic vessels are in close relationship with the tissue cells and act in a coordinated way in extracellular fluid transfer. Therefore, in the presence of any chronic edema, malfunctions in the lymphatic system should definitely be considered. Edema developing on the basis of the lymphatic system, which is not sufficiently recognized and ignored worldwide, can be treated well. In this context, many new treatment methods are being tried and developed.[2,3] Lymphedema can be primary or secondary.

Primary lymphedema is a genetic disease that results in impaired lymphatic system development. Secondary lymphedema can be caused by any inflammation, trauma, iatrogenic changes (i.e. surgery or radiation) or cancer treatment that may cause lymphatic obstruction or lymphatic interruption. Secondary lymphedema is predominantly caused by parasites in developing countries, whereas in developed countries it is most commonly caused by malignancies or treatments associated with malignancy.[4]

Lymphedema, especially in the upper extremity, is mostly seen after cancer treatment or due to cancer. Breast cancer, which is the third most common cancer (10.9%) type worldwide, is the most common cause.[5]

Lymphedema development in the lower extremities may be caused by tumor, trauma, previous pelvic surgery, inguinal lymphadenectomy and previous radiation therapy.[6]

Although not emphasized, other metabolic diseases and various demographic differences may cause secondary lymphedema. We examined the incidance of hypertension, diabetes mellitus, body mass index, venous insufficiency and blood type in a group of lymphedema patients.

METHODS

Statistical analysis

Statistical analysis was performed with the Statistical package for social sciences (SPSS) version 24.0 program (SPSS Inc. Chicago IL, USA). The normal distribution of the variables was examined by histogram graphs and the Kolmogorov-Smirnov test. Mean ± standard deviation values were used to present descriptive analyzes. Pearson Chi-Square and Fishers Exact Tests were compared with 2x2 tables. P-values below 0.05 were evaluated as statistically significant results.

Ethical Approval

Informed consent was obtained from the relatives of each patient before the procedures after explaining the interventions, risks and benefits as a policy of the health system in the country.

Patients

We examined a total of 236 patients who had edema, orange peel like skin changes, loss of ankle contours, subcutaneous tissue thickening, limitation of movement and swelling in lower extremities applied to our clinic within 5 years (2015-2020). There was a significant increase (min. 2 cm from normal ekstremity) in the lower extremity diameters of the patients. All patients had a diagnosis of lymphedema which is revealed by lymphoscintigraphy or magnetic resonance imaging. We did not include patients with subclinical lymphedema (Stage 0) who took part in the staging made according to the severity of lymphedema. We examined the patients in spontaneous reversible (Stage 1: increase in upper extremity diameter, heaviness and pitting edema), spontaneous irreversible (Stage 2: non-pitting edema, hardening of the soft tissue, fibrosis) and lymphostatic elephantiasis (stage 3: advanced lymphedema and advanced changes in the skin) stages. Patients with a diagnosis of congenital lymphedema or a diagnosis secondary to cancer were excluded from the study. Obesity, presence of venous disease, diabetes mellitus and hypertension were considered as secondary lymphedema causes. In addition, the relationship between lymphedema patients and blood groups was evaluated.

RESULTS

81.8% (n:193) of 236 lymphedema patients were women. The mean age of the patients was 50.71 (± 10.28). All patients had diagnosis of lymphedema. Most of patients (n:189) had bilateral lower extremity edema. Since all patients were diagnosed, patients with lower extremity wounds were not specifically selected and specified.

Table 1: Demographic characteristics of patients.

Age		**50.71 (±10.28)**
Sex	Female	%81.8 (193)
	Male	%18.2 (n:43)
BMI	>25	%63.1 (n:149)
	<25	%36.9 (n:87)
DVI		%68.2 (n:161)
	Var	%31.8 (n:75)
PVI	Yok	%59.3 (n:140)
	Var	%40.7 (n:96)
DM	Yok	%72.9 (n:172)
	Var	%27.1 (n:64)
HT	Yok	%71.6 (n:169)
	Var	%28.4 (n:67)
Type of Blood	0	%16.9 (n:40)
	A	%35.6 (n:84)
	B	%41.9 (n:99)
	AB	%5.5 (n:13)
Rh Antigen	(-)	%12.7 (n:30)
	(+)	%87.3 (n:206)

(DVI: Deep Venous Insufficiency, PVI: Perforating Vein Insufficiency, DM: Diabetes Mellitus, HT: Hypertension)

According to the Centers for Disease Control and Prevention (CDC), a definition of obesity was defined for patients with a body mass index (BMI) above 30 and divided into 3 classes. Patients with a BMI between 25 and 30 were defined as overweight. Considering that edema in the legs is more common in sedentary people and the importance of exercise, we also included overweight patients with a BMI above 25 in our study. Body mass index was above 25 for 149 (63.1%) patients.

According to the simple definition of the world health organization, in cases where the HbA1c level is higher than 48 mmol/mol (6.5%), diabetes mellitus (type 2 diabetes) should be considered as the differential diagnosis in patients. Accordingly, we evaluated patients with HbA1c level greater than 6.5% who had also controlled or uncontrolled type 2 diabetes. In accordance with most major guidelines it is recommended that hypertension be diagnosed when a person's systolic blood pressure (SBP) in the office or clinic is ≥140 mmHg and/or their diastolic blood pressure (DBP) is ≥90

mmHg following repeated examination. All of the patients we considered to be hypertensive had a diagnosis of hypertension and were using at least one antihypertensive drug. The mean HbA1c level in diabetic patients was 6.08% (±0.27). The number of diabetic and hypertensive patients was 64 (27.1%) and 67 (28.4%), respectively. The reasons mentioned above could be seen separately or together.

Further examinations were performed in patients who were evaluated according to Clinical, Etiology, Anatomy, and Pathophysiology (CEAP) classification at inspection and suspected of venous insufficiency. We performed diagnostic color Doppler ultrasound, which is the gold standard, to all patients to diagnose venous insufficiency. We acted according to the last guideline to classify the patients evaluated separately to detect superficial, deep and perforating vein insufficiency. In order to evaluate the presence of reflux, we considered 500 ms as the limits for evaluating superficial and deep veins, 1000 ms for femoropopliteal veins and 500 ms for perforating veins. We considered perforator veins greater than 3.5 mm as insufficiency.[7] Deep venous insufficiency accompanied in 75 (31.8%) patients. Perforating vein insufficiency was observed in 40.7% (n:96) of lymphedema patients. On the other hand, the rate of lymphedema in patients with perforating vein insufficiency was statistically significant ($p<0.05$, $p=0.002$).

There are various studies on lymphedema and blood groups, and differences are still detected in studies. Especially blood group studies have been studied in parasitic-based diseases causing secondary lymphedema.[8,9] Patients with B type blood group constituted the largest patient profile with a rate of 41.9% (n:99). For A, O and AB blood groups, the results were 35.6% (n:84), 16.9% (n:40) and 5.5% (n:13), respectively. These results are consistent with the distribution prevalence of ABO blood group in the world population, but statistically it is meaningless with the incidence of lymphedema ($p>0.05$, $P=0.190$). When Rhesus D antigen groups were considered, Rh(D) positivity was found in 87.3% (n:206) of the patients ($p>0.05$, $P=0.805$). The observations are similar to other studies.

DISCUSSION

Lymphedema is not yet fully understood. Patients face many difficulties in the process of getting a diagnosis and being treated. However, patients diagnosed and treated in the early period get more effective results in terms of both financial and labor loss.[10] For this reason, in order to understand the disease well, transitional studies should be conducted by evaluating larger patient groups.

Our patient group was relatively small. However, we obtained valuable information about the incidence of comorbid factors that we examined, which were consistent with or differed from previous studies. First of all, it has been demonstrated and accepted in previous studies that lymphedema is more common in women.[11] 81.8% of our patients were also women.

According to the CDC, the obesity limit for patients is defined as 30 for BMI. In several studies, obesity-related lymphedema has been defined and it has been stated that lymphedema can seen secondary to obesity.[12,13] In a study conducted in Turkey, overweight prevalence was determined as 26.9% and 25.7%, obesity prevalence was determined as 12.4% and 9.5% in girls and boys, respectively.[14] The frequency of overweight in the patient group in our study was 63.1%. Development of secondary lymphedema can be prevented, especially in overweight patients, if weight control is achieved. We think that this will reduce both financial and labor loss and increase the quality of life of overweight patients whose quality of life is below normal.

There are no studies specifically looking at the incidence of metabolic diseases such as hypertension or diabetes mellitus. In our patient group, the rates of hypertensive and diabetic patients were found to be relatively low. However, these diseases, which constitute the other two components of metabolic syndrome together with waist circumference measurement, should be considered in terms of the development of obesity.[15] In our opinion, patients should first be protected from metabolic syndrome that triggers the development of obesity in order to avoid obesity-related lymphedema.

Although chronic deep venous insufficiency and lymphedema are two different diseases, they can be seen together. At the same time, although the mechanisms of edema are completely different, the coexistence of the two diseases seriously reduces the quality of life of the patients. Deep venous insufficiency was detected in 31.8% of our patients, and perforating vein insufficiency was found in 40.7%. When we look at the prevalence of lymphedema in patients with deep venous insufficiency, there was no significant result, but the remarkable point was that the frequency of lymphedema was significantly higher in patients with perforating vein insufficiency ($p<0.05$, $P=0.002$). Although venous problems have a positive contribution to existing edema, examination and imaging findings of the patients (pitting, hard, giving an orange peel appearance on the skin) suggested edema due to lymphatic system damage. What needs to be considered here is whether lymphedema plays a role in the development of venous insufficiency or whether venous insufficiency triggers the development of lymphedema. We think that further studies should be done on this detail.

The most common blood groups in a study done in newborns have been identified as type A, O, B and AB, respectively. Rheseus D antigen positivity is more common in girls than boys.[16] Since lymphedema was observed more frequently in women, Rhesus D antigen positivity rate was also found higher in our patient group.

However, while people with A type blood group was more common in the population, patients with lymphedema had mostly B type blood group in our study.

Limitations

The relatively small number of patients in the study and the fact that it only includes a patient group from a single geographic region limits the study. In this context, new and more comprehensive studies are required.

CONCLUSION

Many new techniques for the treatment of lymphedema have been developed and continue to improve. We think that more comprehensive studies should be done to help understand and diagnose this disease. In this way, we think that the quality of life of patients will be restored in a shorter time, and the money and effort spent on treatment will be minimized.

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REFERENCES

1. Moffatt CJ, Franks PJ, Doherty DC, Williams AF, Badger C, Jeffs E et al. Lymphedema: An underestimated health problem. Q J Med. 2003;96:731-8.
2. Mortimer PS. ABC of arterial and venous disease: Swollen lower limb—2: Lymphedema. Br Med J. 2000;320:1527-9.
3. Keast DH, Moffatt C, Janmohammad A. Lymphedema Impact and Prevalence International Study: The Canadian Data. Lymphatic Research and Biology. 2019;17(2):178-86.
4. Stolldorf DP, Dietrich MS, Ridner SH. Symptom Frequency, Intensity, and Distress in Patients with Lower Limb Lymphedema. Lymphatic Research and Biology. 2016;14(2):78-87.
5. Ferlay J, Shin HR, Bray F, Foreman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. Int J Cancer. 2010;127:2893-917.
6. Trayes KP, Studdiford JS, Pickle S, Tully AS. Edema: diagnosis and management. Am Fam Physician. 2013;88(2):102-10.
7. Eberhardt RT, Raffetto JD. Chronic Venous Insufficiency. Circulation. 2014;130(4):333-46.
8. Kumar H, Santhanam S. Blood groups and filariasis. Folia Parasitol (Praha). 1989;36(2):163-7.
9. Srividya A, Pani SP. Filariasis and blood groups. Natl Med J India. 1993;6(5):207-9.
10. Grabb and Smith's Plastic Surgery. Thorne CH, editor. Lymphedema: Diagnosis and treatment. Wolters Kluwer Health. (7th edition) 2013; Chapter 97:980-988.
11. Helgenberger K, Wagner S, Lehmann S, Aeschlimann A, Amann-Vesti B, Angst F. Health and quality of life in patients with primary and secondary lymphedema of the lower extremity. Vasa. 2015;44(2):129-37.
12. Greene AK, Grant FD, Slavin SA. Lower-extremity lymphedema and elevated body-mass index. N Engl J Med. 2012;366:2136-7.
13. Greene AK, Grant F, Slavin SA, Maclellan RA. Obesity-induced lymphedema: Clinical and lymphoscintigraphic features. Plast Reconstr Surg. 2015;135:1715-9.
14. Yilmaz S, Calikoglu EO, Kosan Z. Prevalence of obesity among adolescents in Eastern Turkey: A cross-sectional study with a review of the local literature. Niger J Clin Pract. 2019;22(8):1070-7.
15. Sherling DH, Perumareddi P, Hennekens CH. Metabolic Syndrome. J Cardiovasc Pharmacol Ther. 2017;22(4):365-7.
16. Kayiran SM, Oktem O, Kayiran PG, Paloglu E, Gurakan B. Frequency of ABO and rhesus blood groups among neonates born at a private hospital in Istanbul. Southeast Asian J Trop Med Public Health. 2012;43(2):467-70.

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