Original Article

Head and Neck Lymphatic Malformation Management Algorithm: An Experience from a Tertiary Centre in Tanzania

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ABSTRACT

Background: Lymphatic malformations are localized areas of malformed lymphatic system that can either be congenital or acquired which commonly occur in the head and neck region. Several treatment options for lymphatic malformations have been proposed, despite this, there is no consensus as to optimal management.

Objective: To determine the pattern and management of head and neck lymphatic malformations in a tertiary health facility in Tanzania.

Material and Methods: This was a one-year cross-sectional study that involved patients with head and neck lymphatic malformations treated in Muhimbili National Hospital. A structured questionnaire was used to collect information including age and sex of the patient, chief complaint and, duration, size and site of the lesion. The treatment modalities were surgery and/or intralesional bleomycin injection (IL-Bleo) using a locally developed algorithm. A standard dose of bleomycin was 0.3 to 0.6 mg/kg per injection not exceeding 15 units per cycle with a maximum of 6 cycles.

Results: a total of 33 patients were included in the study. Males were 21 (63.6%) and the male to female ratio was 1.8:1. The age of patients ranged from 5 months to 28 years with a median age of 6 years. In 29 (87.9%) patients, the lesions were evident during birth. The median area covered by the lesion in patients was 12.00 cm^2. Nine (27.3%) patients were managed by surgery alone, while majority (24, 72.7%) were given intralesional bleomycin (IL-Bleo), of whom majority (20, 83.3%) required surgical intervention subsequently. The overall outcome of management of patients was considered successful in 87% of patients.

Conclusion: Head and neck lymphatic malformations are more common in males. Most of the lymphangiomas are of congenital type. Combining IL-Bleo and surgery an effective way of managing head and neck lymphatic malformations.

INTRODUCTION

Lymphatic malformations (LM) are localized areas of malformed lymphatic system that can either be congenital or acquired [1]. They are rare benign lesions with incidence of 1.2–2.8 per 1000 births and mainly affect children less than 1 year of age with an incidence of 1/20 000 in children admitted to

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hospital compared with 1/100 000 in adults . These lesions commonly occur in the head and neck region with estimation of about 75% of the reported cases of LM . Intraorally, they are most commonly seen in the tongue and buccal mucosa .

The congenital LM are thought to originate from the sequestration of lymphatic tissue during the development of lymphaticovenous sacs, which then fail to communicate with the remainder of the lymphatic or venous system, and later on the sequestered lymphatic tissues dilate causing the cystic morphology of the lesions . It has been also suggested that the upregulation of the PI3K/Akt/mTOR pathway may be a causal factor in the development of these abnormal lymphatic vessels . Acquired lesions, mainly seen in adulthood, generally arise from obstruction of the lymphatic system secondary to trauma or infection (especially of upper aerodigestive track) .

There are a several treatment options for lymphatic malformations including observation, medical (mTOR inhibitors, such as sirolimus), lasers, sclerotherapy and advanced surgery . Despite this, there is no consensus as to optimal management, and no superiority has been demonstrated between surgery and sclerosis .

Currently there is paucity of information regarding the pattern and treatment modality of lymphatic malformation in Tanzania. Therefore, there was a need to conduct a study to address the existing knowledge gap in order to have a clear idea on management approaches for these lesions. The aim of this study hence was to determine the pattern and management of head and neck lymphatic malformations in a tertiary health facility in Tanzania.

MATERIAL AND METHODS

This was a one-year cross-sectional study that involved all consecutive patients with head and neck lymphatic malformations treated at the oral and maxillofacial department of the Muhimbili National Hospital (MNH) between March 2018 and February 2019.

The inclusion criteria were all patients with head and neck lymphatic malformations who had never been treated for their condition before presenting to MNH. All patients who consented to be included in the study were interviewed using a structured questionnaire. The collected information included age and sex of the patient, chief complaint, duration of the lesion, size (in square centimeters) of the lesion and site of the lesion. The response to treatment was recorded by series of photographs and measurements. The size of lesion was ascertained using clinical examination and by different imaging modalities including, CT scan, MRI and/or ultrasound.

The treatment modality was either surgery and/or intralesional bleomycin (IL-Bleo). The decision on treatment modality was made by a panel of oral and maxillofacial surgeons basing on several factors including but not limited to age of the patient, location and size of the lesion, clinical course (i.e. bleeding, ulceration etc.), and impairment of function. The algorithm used to decide management is depicted in Figure 1.

A standard dose of bleomycin was 0.3 to 0.6 mg/kg per injection not exceeding 15 units per cycle. A mixture of bleomycin, sterile water for injection and 2% lignocaine was used at a ratio of 1:10:5 respectively. The injections were administered under general anesthesia by ultrasound guidance. During injecting, the needle was introduced through normal mucosa/skin and, under ultrasound guidance, advanced into the lesion, and then the bleomycin injected radially. The needle was then withdrawn and the lesion compressed for about 2 minutes.

Regular follow-ups of the patients were done and injected at 4 to 6 weeks interval, and a maximum of 4 doses were given after which the therapy was discontinued. Post therapy, patients were followed up for a minimum duration of 6 months. The

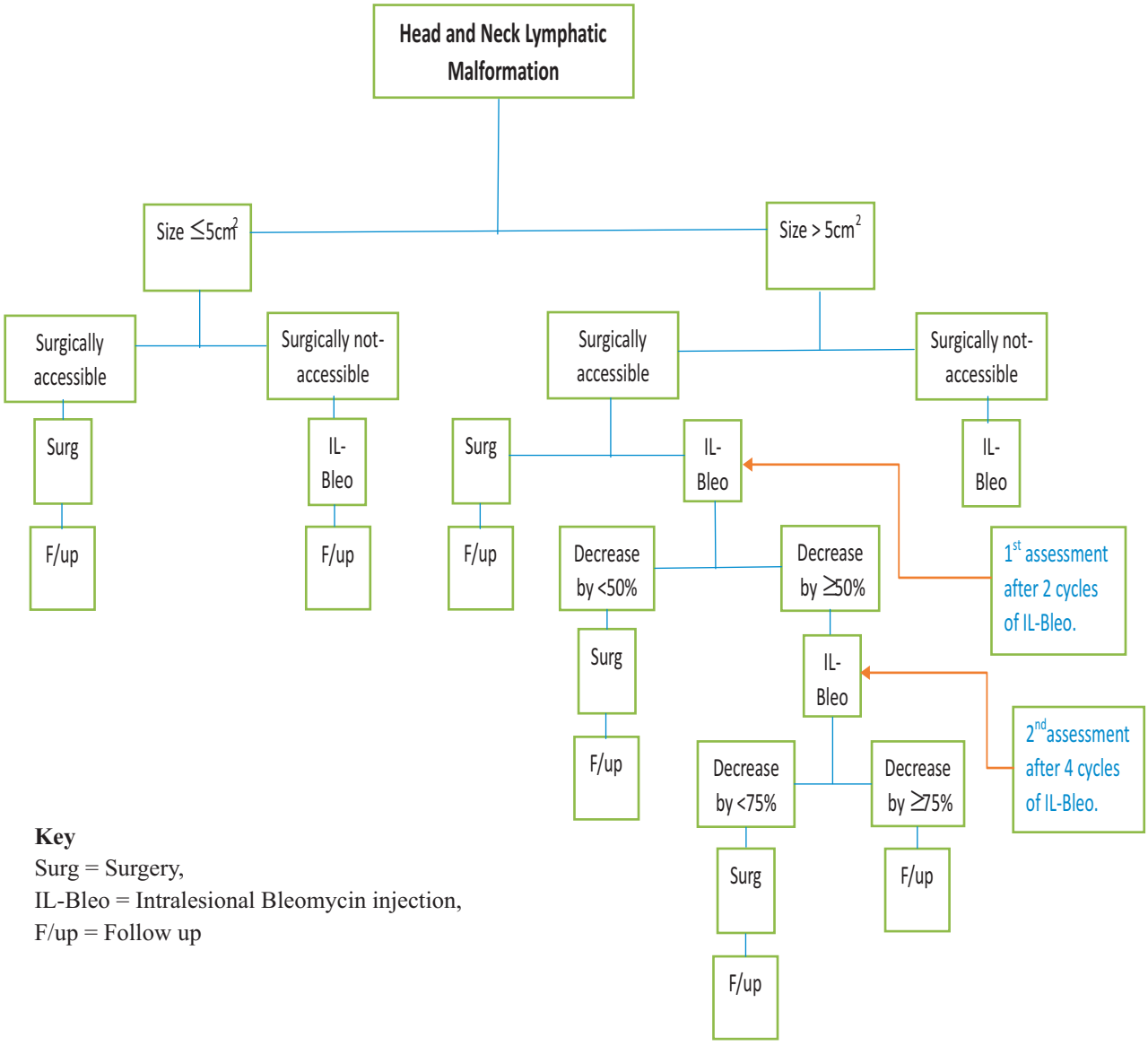

Figure 1: The algorithm of treatment protocol used in management of head and neck lymphangioma

outcome of IL-Bleo was assessed by a panel of surgeons after every 2 cycles of IL-Bleo. The response rate was graded depending on percentage of reduction in area of the lesion as follows: excellent (reduction by ≥ 75%), good (50-74% reduction), satisfactory (25-49%) and poor (< 25%). The algorithm used to decide management is depicted in Figure 1.

Data were analyzed using Statistical Package for Social Sciences software (SPSS) for Windows (version 23, IBM Corporation Chicago, IL, USA) whereby frequency distribution was done.

Ethical clearance for this study was provided by the Institutional Review Board of the Muhimbili University of Health and Allied Sciences (MUHAS) and permission to conduct the study was granted by

the MNH. Participation was voluntary and for each participant, a signed informed consent form was obtained before data collection. The participants were assured of confidentiality and their right to participate or withdraw without any conditions.

RESULTS

This study included a total of 33 patients diagnosed with head and neck lymphatic malformation. Males were 21 (63.6%) and the male to female ratio was 1.8:1. The age of patients ranged from 5 months to 28 years with a median age of 6 years. In 29 (87.9%) patients, the lesions were evident during birth, whereas in the remaining 4 (12.1%) patients, the duration for the lesion to be clinically apparent was ranging from 1 week to 5 years. The most common presenting complaint of patients/guardian of the patients was disfigurement (32, 97%) followed by difficulty in swallowing (11, 33.3%) Figure 2.

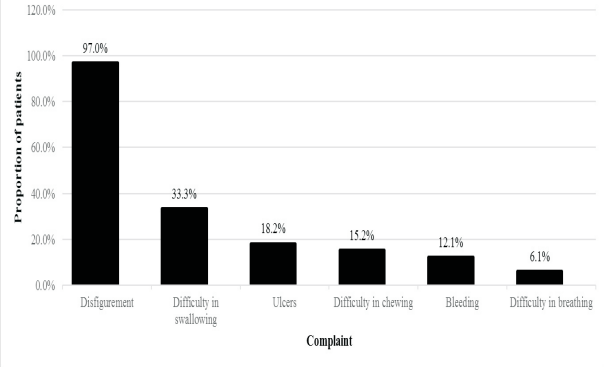

Figure 2: Distribution of patients according to chief complaint

About one-third (11, 33.3%) of the patients had lesions that involved both intra- and extra-oral sites. Those with only intraoral lesions were 12 (36.4%) and 10 (30.3%) patients had only extra-oral involvement. Of the 21 patients with extra-oral involvement, the most frequently involved sites were the cheeks (21, 100%) followed by the submandibular region (18, 85.7%). In the case of 23 patients with LM in the intraoral sites, the tongue (14, 60.9%) and the buccal mucosa (10, 43.5%) were mostly affected (Figure 3).

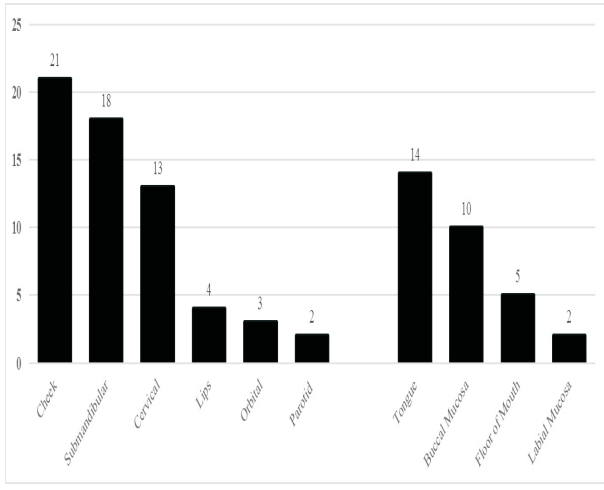

Figure 3: Distribution of patients according to affected extra-oral and intra-oral sites.

The total area covered by the lesion in patients ranged from 3.04 cm^2 to 49.32 cm^2, with the median area of 12.00 cm^2. Nine (27.3%) patients were managed by surgery alone, while majority (24, 72.7%) were given intralesional bleomycin (IL-Bleo), of whom majority (20, 83.3%) required surgical intervention subsequently. Out of the 4 patients who required no further surgical intervention, 3 had excellent outcome and one had satisfactory outcome. The overall outcome of management of patients was excellent in 22 (66.7%), good in 7 (21.2%) and satisfactory 4 (12.1%) patients respectively.

DISCUSSION

This study included patients diagnosed with head and neck lymphatic malformation. The lymphatic malformation is more common in head and neck region, and this may be attributed to the fact that more than half of the lymphnodes found in the body are located in this part . Due to a higher concentration of lymphnodes and therefore the lymphatic vessels, the probability of occurrence of lymphatic malformation is thus almost doubled in this region of the body compared to any other part of the body.

In the current study it was noted that lymphatic malformation is slightly more prevalent in males

when compared to females. These results are similar to findings of a systematic review of lymphatic malformation by Adams et al. and findings of Tu et al. , though others reported equal predilection in gender . With regards to age of occurrence and age at diagnosis, the results of this study accords to reports that lymphangiomas are noticed in pediatric patients but seldom in adults , and the age of diagnosis can range from few weeks after birth to the second decade of life .

In this study, we followed a treatment algorithm for managing head and neck lymphatic malformations (Figure 1) that was developed locally by the members of the department of oral and maxillofacial surgery from Muhimbili University of Health and Allied Sciences and those from Muhimbili National Hospital. Since there is no consensus on the best treatment modality of these lesions, we have adopted both the surgical approach and ultra sound guided IL-Bleo. The developed management algorithm is supplemented by other factors that include but not limited to patient's age, lesion size, functional symptoms (respiration, swallowing, bleeding, phonation), and therapeutic objective (definitive, sequential, palliative) .

We opted for Bleomycin as drug of choice for sclerotherapy because it has been shown to have sclerosing effect on the vessel endothelium , and it is easily available in our settings at a relatively affordable cost. Bleomycin, which is an antiviral, antibacterial, and antitumor glycopeptide causes irritation of the endothelial lining of the lymphangioma, which leads to inflammation, fibrosis and subsequent involution of the lesion .

Some studies using bleomycin as sclerosants, have shown that this method of treatment produces favorable results , however, in the current study majority of the patients who had IL-Bleo required surgical intervention subsequently. There may be several explanations to this observed difference, including definition of successful. We considered the IL-Bleo was successful option when the lesion size had reduction of more than 74% after 4 cycles of bleomycin injection. We do not believe IL-Bleo is totally ineffective in the management of LM, since it did cause range of degree in reduction of the size of the lesion. With reduced lesion size, surgery became easier and there was less morbidity to the patients in general. With the management algorithm used in this study, the overall outcome was successful in more than 87% of the patients.

A limitations of this study is based on the fact that we did not classify lymphatic malformations according to the size of the lymphatic cavities incorporated into microcystic (capillary lymphangiomas), macrocystic (cavernous lymphangiomas) and cystic hygromas . By not classifying them, we could not assess the effect of IL-Bleo on different classification of these malformations. Despite the limitation, the algorithm which we have developed has shown promising clinical results and can be adopted by other centres as well.

CONCLUSION

Head and neck lymphatic malformations are more common in males. Most of the lymphangiomas are of congenital type. Combining IL-Bleo and surgery an effective way of managing head and neck lymphatic malformations.

Statement of ethics

Ethical clearance for this study was provided by the Institutional Review Board of the Muhimbili University of Health and Allied Sciences (MUHAS) and permission to conduct the study was granted by the MNH.

Conflict of Interest

The authors have no conflicts of interest to declare.

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None.

Author's contribution

Conception and design:, A.M. Mungia, S.S. Owibingire and K.S. Sohal; (II) Administrative support: J.R. Moshy, A.A Mtenga, and G.Z. Berege; (III) Provision of study materials: : A.M. Mungia, K.S.Sohal, S.S. Owibingire, J.R. Moshy, A.A Mtenga, and G.Z. Berege; (IV) Collection and assembly of data: A.M. Mungia, K.S.Sohal, J.R. Moshy and S.S. Owibingire; (V) Data analysis and interpretation: K.S.Sohal, S.S. Owibingire; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors

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