

RECONSTRUCTIVE

Therapy For Unilateral Lower Extremity Lymphedema With Compression Bandage Only Or Compression Bandage Combined With Surgery

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Background: Lymphedema on lower extremity is a disorder which is still hard to manage nowadays. Many therapeutic modalities had been done, but there weren't any satisfying outcome. It is all due to the continuous exudation of the lymph which is rich in protein to extravascular that induce tissue inflammation and soft tissue fibrosis process. In case of constriction band, the lymph trapped in the lower extremity, so it also requires surgical procedure.

Patient and Method : We reported 2 cases, a woman 71 years old with right limb lymphedema with vulva polyp and a man 58 years old with constriction band on chronic left limb lymphedema and right limb poliomyelitis. We conducted circumference measurement of affected limb 5 minutes after application compression bandage in first two weeks. Case one had quiet good result with compression bandage only while in case two continued with surgical procedure consist of mass reduction using suction-assisted lipectomy, z-plasty constriction band release continue with excise skin redundancy. In both patients pressure garment used for daily treatment.

Results : Both patients gave acceptable result on compression bandage in acute case and in chronic case was continued with surgery.

Summary : Management for lymphedema can be done by conservative therapy in acute case when edema is in pitting form or combined with surgery when in chronic case, then pressure

Pendahuluan: Limfedema pada ekstremitas bawah hingga saat ini merupakan kelainan yang sulit untuk ditangani. Banyak modalitas yang dikembangkan namun tidak ada yang memberikan hasil yang memuaskan. Hal ini dikarenakan adanya eksudasi terus menerus dari saluran limfe yang kaya protein ke ruang ekstrasvaskular sehingga menyebabkan inflamasi jaringan dan proses fibrosis. Pada kasus constriction band, cairan limfe terperangkap di ekstremitas bawah sehingga membutuhkan terapi pembedahan.

Pasien dan Metodologi: Dilaporkan dua kasus limfedema ekstremitas bawah, wanita usia 71 tahun dengan limfedema ekstremitas kanan bawah dengan polip vulva dan laki-laki usia 58 tahun dengan constriction band dengan limfedema pada ekstremitas bawah kiri dan poliomyelitis ekstremitas bawah kanan. Dilakukan pengukuran lingkaran kaki yang sakit setelah 5 menit menggunakan terapi balutan kompresi selama 2 minggu. Kasus pertama mendapatkan hasil yang cukup baik hanya dengan terapi balutan kompresi sementara pada kasus kedua terapi dilanjutkan dengan operasi meliputi reduksi massa dengan suction-assisted lipectomy, release constriction band dengan z-plasty kemudian dilanjutkan dengan eksisi kulit berlebih untuk lebih mengurangi diameter kaki. Pada kedua pasien terapi dilanjutkan dengan aplikasi balut tekan.

Hasil: Kedua pasien menunjukkan hasil yang baik dengan balut tekan pada kasus akut dan pada kasus kronis dilanjutkan dengan operasi.

Ringkasan : Manajemen limfedema dapat dilakukan secara konservatif pada kasus akut saat bentuk pitting atau dikombinasi dengan operasi pada kasus kronis, dan menggunakan pressure garment untuk mencegah kekambuhan.

Lymphedema is a disorder with accumulation of protein-rich interstitial liquid on the skin and

subcutaneous tissue, which occur in lymph dysfunction¹. This disorder is limited in subcutaneous compartment

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and not involve the muscle compartment. The pathophysiology of lymphedema is extravasation of protein-rich liquid when liquid production exceeds the lymph transport capacity. Edema with high protein level, induce change in Starling Law, which cause the liquid accumulation worse. In time, oxygen pressure will decrease, macrophage function will be disturbed, and there is increase in protein-rich liquid that induce chronic inflammation and cause fibrosis^{1,2}.

Lymphedema is classified into 2 categories: primary lymphedema and secondary lymphedema. Primary lymphedema is based on genetic factor, classified into 3 types: lymphedema because of sex-linked chromosome disorder which manifest at birth (Milroy disease), lymphedema which manifest on puberty (lymphedema praecox), and lymphedema manifest on middle age (lymphedema tarda). In contrast, secondary lymphedema occurs when there is a trigger, for example infection, operation, lymph obstruction because of malignancy, trauma, and other factors^{1,3}. Other classification is based on lymphangiography, which divided into 2 groups: lymph hypoplasia which lymphangiography will show narrowed and less number of lymph, and lymph hyperplasia which lymphangiography will show dilated and increased number of lymph, as a result of obstruction or incompetent valves¹. Few literatures reported variation of number of cases, between 90 millions to 200 millions cases in the world^{1,2,3}.

In most cases, lymphedema can be diagnosed from anamnesis and physical examination, after exclude other causes such as cardiac, kidney, hepatic, vascular disorder, and other causes like infection and trauma³. In true lymphedema, edema starts from distal and move to proximal in months or years. At first, edema still tender and pitted easily, in time it will be non-pitting edema together with fibrosis process. Skin changes can manifest as

dermatitis, hyperkeratosis, and warty verrucosis, but ulceration is rare¹.

Nowadays, there is no permanent curative therapy for lymphedema^{1,2}. Common therapy is conservative and surgical procedure to reduce swelling and prevent complication, so it is very important to educate the patient to understand their illness. Conservative therapy consists of limb elevation, compressive garment, and oral regiment therapy. Surgical procedure will be performed on patient with significant morbidity (i.e recurrent cellulitis or function disorder), and no respond to the conservative therapy². Surgical procedure can repair lymph connection (physiologic procedure) or remove tissues (excisional procedure, gradual subcutaneous excision, mass reduction). Physiologic procedure gives low success rate, when excisional procedure has high recurrency rate and severe complication such as infection, thromboembolism, skin scar and wound dehiscence². Therefore, gradual subcutaneous excision is still performed regularly. To reduce morbidity of gradual subcutaneous excision, suction-assisted lipectomy is used to reduce extremity lymphedema volume. There was a case of lymphedema tarda which edema was reduced significantly after suction-assisted lipectomy and the patient was free from cellulitis and decubitus ulcer². It was said that this procedure was a safe surgical procedure, and liposuction combined with compression therapy was efficient in reducing edema and did not make the lymph disorder more severe^{5,6}. A research by Brorson and Svensson, 106 lymphedema patients post mastectomy were given only compression therapy compared with combination of liposuction and compression therapy. The result was combination of liposuction and compression therapy was significantly more effective in reducing lymphedema ($p < 0.0001$) compared with only compression therapy⁷.

On patient who has congenital defect such as constriction band need special treatment. Greene said that management of constriction band was dependent on its extension, was it a superficial constriction band or deep constriction band. On superficial constriction band, if there was no severe disfunction clinically, then operative procedure was not required. Operative procedure for deep constriction band is only to excise the band and suture the wound with z-plasty to remove the lymphedema^{8,9,10}.

Further treatment after conservative therapy or surgery is a challenge for doctors and patients, Recurrency is a problem that has not been solved nowadays except with compression treatment for whole life. Brorson said that there was no effective therapy to control the edema other than compression garment. Research by Brorson and friends, 101 women who had unilateral arm lymphedema post mastectomy were treated with liposuction with Power Assisted liposuction, dry technique, and tourniquette application, showed satisfying results cosmetically without significant vascular complication. After operation, they had to wear compression garment for life. In this research, there was also a trial to stop the compression garment, and it was resulted in recurrent edema in less than a year, and the edema dissapeared when the patients used the compression garment routinely. According to Brorson, liposuction is not the first choice, and management of lymphedema need patient's commitment for whole life to prevent recurrency. The key for successful treatment is patient's psychological, compression garment and routine follow-up¹¹.

PATIENT AND METHODS

Treatment to prevent liquid accumulation on distal extremity and reduce edema can be done with Complex Decongestive Therapy (CDT). This therapy is done to drain the distal lymph to the

centre of the body, by emptying the proximal first, then drain the distal lymph. There are 2 phases in this therapy. Phase 1 is treatment for lymphedema, such as nail and skin management, manual drainage with efflurage manouver, compression therapy, and counseling about advence treatment. Phase 2 is a continuation from phase 1 which consists of application of compression garment by day, and bandage with elastic verband during sleeping, and also exercise for extremity for 15 minutes everyday while using the bandage. This phase is continued until the edema is gone. CDT is performed 2-5 times a week for 2 weeks of therapy, and can be performed in both primary or secondary lymphedema.^{12,13}

A 71 years old woman with right

Case 2

inferior extremity lymphedema and vulva polyp since 10 years ago. General status is in normal range. On her right lower limb there was pitting edema from right inguinal to distal. On genitalia examination, we found right major labia is bigger than left major labia with fibrosis sign and excoriation. Patient complained of chronic vaginal discharge. Hematologic laboratory result showed that there was no systemic dysfunction and filariasis was negative. There was fibroepithelial polyp showed by histopathological examination of vulva tissue. Vaginal swab showed there was bacterial vaginosis. This patient was consulted to Obstetric Gynecologic Department, and was diagnosed with fibroepithelial polyp on vulva, and it was not a malignancy.

The patient was given conservative therapy using elastic verband which was wrapped on her lower limb all day with gradual pressure, distal was higher than proximal. Distal limb was elevated with 1 pillow.

A 57 years old man, came with constriction band and lymphedema on left leg since 4 years ago which reccured after

mass reduction operation and poliomyelitis on right limb, consulted by a surgeon to be amputated but the patient refused because before he got limb enlargement, he walked with left leg and used cane on right hand.

From anamnesis, physical examination and laboratory result, there was no hypertension, cardiac, renal, and hepar dysfunction. Vascular examination was on normal range. There was no diabetes.

On local examination, there was left limb lymphedema from middle of femur to left limb digits, pitting edema on some circular rings formed constriction band. On several spots, there were non-pitting edema around talocruralis joint. The skin was hyperkeratosis and there was warty verrucosis on the distal. Right limb looked hypotrophy, motoric 3/5, sensoric still normal

This patient received conservative therapy, total bed rest, and lower extremity elevation for 2 weeks. Compression band which was made from bicycle inner tire that was cut mimicking an elastic bandage was

RESULT

wrapped into left leg for 5 minutes everyday for 2 weeks. Bandage was applied circularly from distal to proximal, made some pressure to the leg which was higher in distal side than proximal side. It was expected that it could significantly reduce the size. Emolient was applied to treat the hardened skin. Evaluation of leg size reduction was done by measuring the biggest leg diameter on 5 locations.

After conservative treatment the patient had undergone operative procedure. Intraoperative, patient underwent liposuction and suctioning of

DISCUSSION

subcutaneous fibrotic tissue with suction unit without wetting, after tourniquette application before the procedure. We obtained seroxanthochromatous aspirat 1000cc. Then, we performed excision for excess tissue. There was excision for constriction band on ankle joint and we made 2 z-plasty. To reduce the diameter

Table 1. Right extremity circumference and reduction (in

centimetre)	No. of marker	Before conservative	H-3 (cm)	H-6 (cm)	H-8 (cm)	H-16 (cm)	Reduction (cm)
	1	28,5	28	21	20	20	8,5
	2	41	41	34	32	32	9
	3	49	46	39	34	34	15
	4	51	51	45	37	37	14
	5	57	57	57	56	56	1

Table 2. Left extremity circumference and reduction (in centimetre) before and after compression bandage application every morning for 5 minutes

No. of marker	Before conservative	H+5(cm)	H-10(cm)	Reduction (cm)
1	55	52	51	4
2	49	48	45	4
3	62,5	55	48	14,5
4	56	50	42	14
5	36	34	32	4



Figure 1. Compression: Right limb of first patient before, black arrow shows points with each number circumferential measurements (left), after 19 days therapy (middle), using pressure garment (right)



Figure 2. (Left) Lymphedema limb and constriction band, noted the right leg with different entity, poliomyelitis. (Middle) Pitting in several site during pressed, (Right) and

Figure 3. Application of compression bandage bicycle inner tire, wrapped from distal to proximal, front view (left),



Figure 4. Suction fibrotic tissue (upper left), Size reduced after suction (bottom left), Release constriction band with Z plasty incision (right)



Figure 5. Patient in a standing position after operation, pressure garment applied to maintain the condition.

further, we applied compression with sterile rubber.

During treatment, there was skin bullae on dorsal pedis area, skin underwent maseration so second surgery must be performed to debride and excise non-vital tissue. Afterward, we performed wound care for the inflammatory wound.

In After 19 days of treatment, right limb diameter in case 1 was reduced especially on cruris area as we can see in Figure 1 and table 1. Patient was discharged with conservative treatment at home using pressure garment all day for daily activity.

In Case 2, After 2 weeks, the conservative therapy just only reduced pitting edema, but failed to reduce extremity diameter due to fibrotic tissue on certain areas (table 2), so it was decided to perform surgical treatment to reduce mass with suction-assisted lipectomy and released constriction band with z-plasty. Post-operative showed acceptable result.

Lymphedema can be treated with only conservative therapy or with additional surgical therapy. Lymphedema with pitting edema without complication, can be treated earlier than non-pitting edema, it is due to tissue fibroting process. If conservative therapy does not give satisfying result, then it should be considered to perform surgical procedure to reduce morbidity, not as a curative therapy. The length period since the patient has complain for the disease until first admission to health care, does not affect the prognosis to be more severe. This is considered that on firstpatient, there is no constriction band so extravasation of protein-rich lymph run smoothly.

Due to high rate of recurrency, the biggest challenge for this disorder is not only treatment in hospital, but also treatment for life, because there is no permanent cure. Good counseling will help

SUMMARY

patients to understand and accept their

disease so they can help themselves in their treatment to achieve optimal outcome. Continuous application of pressure garment is a conservative way to prevent recurrent edema which will occur soon after operative therapy. Often, this

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REFERENCES

therapy is not comfortable for the patients for their whole life.

Skin care, personal hygiene, and complication prevention procedure such as extremity elevation, routine application of pressure garment, and supportive therapy like Complete Lymphedema Therapy (CLT) are very recommended therapy, even they need much effort, time and cost.

The second patient got complication, such as infection and skin maseration post operatively. This was considered due to the infective wound and inflammation took place on folds area, so it was hard to maintain dan susceptible to moist condition and friction.

The main problems are satisfaction standard and indicator for success therapy. In lymphedema, other than extremity diameter size as an indicator, aesthetic factor is also a useful indicator to assess the success of therapy, especially for lymphedema with severe fibrosis. The second patient had severe fibrosis, so it was hard to perform wide excision intraoperative, because it was considered that the remained skin flap would not survive. Also, he had maseration even there was no wide or radical excision. So, there was no significant size reduction. This condition should be anticipated in counseling management, especially over-expecting patient. Therefore, patient's condition should be well documented, moreover, there is a high recurrency rate. After trying many methods, Rudkin and



Millers stated that photograph was the most satisfying way to follow-up patient's condition.¹⁴

Management for lymphedema patient, which succesfully treated using

conservative method or operative method, should be followed-up with pressure garment so the conservative or operative therapy will not be a waste, because the edema will recur in a short time due to the