

Lympholiposuction for the Management of Lower Limb Chronic Lymphoedema

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ABSTRACT. Chronic lymphoedema of the lower limb might be congenital or acquired, long standing lymphoedema is one of the difficult problems to treat. Several methods have been described to treat this problem, none of them was found to fulfill the criteria of success. In this study, lympholiposuction of the subcutaneous lymph and fat was used for the treatment of 6 patients with chronic lower limb lymphoedema. The management of these six patients will be discussed indicating the simplicity and effectiveness of this modality of treatment with the satisfactory outcome.

Keywords: Lymphosuction, Lymphoedema, Managment, Lower limb

Introduction

A lymphoedema is a difficult problem to control whether it is primary or secondary. It is progressive disease which needs extensive effort by the patient and physician to minimize the progress of the disease. In the neglected cases with advanced enlargement of the limb and the associated cutaneous changes, the matter is more complicated to control. Several measures were tried to improve the condition; this included physical, pharmacological, and surgical measures. Unfortunately, none of these methods were curable but some were associated with a success in regressing the stage of the disease to be amenable for control with conservative measures^[1-12].

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Accepted for publication: 16 July 2003. Received: 5 January 2003.

In this study, we presented our 16 years experience with a lympholiposuction of the subcutaneous tissue in the lymphoedema of the lower limb in 6 patients managed at King Abdulaziz University Hospital (KAUH).

Patients and Methods

Six patients with lower limb lymphoedema were treated in King Abdulaziz University Hospital, Jeddah from 1987 till 2002. Three were females and three were males. Five patients were having unilateral lymphoedema while 1 patient was bilateral. All of them presented with established advanced non-pitting lymphoedema (elephantiac limb). The longest period of follow-up was sixteen years and the shortest was two years.

All the patients treated by suction assisted extraction of the subcutaneous tissue of the lymphoedematous limb. 50% of the circumference of the limb at a time, including the two limbs in the bilateral case with crossing of the junction between the normal and the lymphoedematous part of the limb with the cannula to open channel between them. This procedure was done under general anaesthesia and under pressure tourniquet. Initially, the procedure was repeated several times with a short interval of 8 - 12 weeks until the reasonable size of the limb was reached (an average of 3 - 4 sessions were needed to reach the reasonable size), repeating the procedure was needed to control the major increase in the size of the limb in an average of 1 - 2 years. This major increase in the size was related to the failure of the patient to follow the conservative measures or due to severe episode of infection. (See Tables 1, 2, and 3; and Figs. 1, 2, 3, and 4.)

TABLE 1. The 6 patients who were treated with lympholiposuction.

Patients	1	2	3*	4	5	6		
Sex	F	M	M	M	F	F		
Age (Years)	35.0	20.0	31.0	13.0	25.0	27.0		
Side	Bilt.	Rt.	Rt.	Lt.	Lt.	Lt.		
Level	B.N.	B.N.	B.N.	A.N.	B.N.	A.N.		
Mid Leg Circ.	Right Leg	Initial	49.0	55.0	65.0	40.0	34.0 N	
		Post (LLS)	38.5	38.0	48.0	36.0	0.0	0.0
	Left Leg	Initial	50.0	37.0 N	40.0 N*	32.0 N	42.0	48.0
		Post (LLS)	41.5	-	-	-	36.5	39.0
No. of (LLS) to reach the reasonable size	4.0	2.0	3.0	3.0	2.0	3.0		
Period of follow-up (years)	16.0	2.5	3.0	4.0	2.0	4.0		
Further (LLS)	6.0	1.0	0.0	0.0	0.0	0.0		
Reason for repeat (LLS)	Cellulitis	F.C.T*	-	-	-	-		

*F.C.T. Failure of the patient to use the conservative measure.

BN = below knee

AN = above knee.

TABLE 2. Detailed follow-up of Patient No. 1* with bilateral lower limb lymphoedema.

Date	Comment	R. Lower Mid Limb Leg (cm)	Right Foot (cm)	L. Lower Mid Limb Leg (cm)	Left Foot (cm)
Jan-87	First Visit Maintainon Conservative Treatment One Year	49.0	34.5	50.0	35.5
Feb-88		48.0	34.0	49.5	35.0
Mar-88	1st Lympholiposuction	46.0	33.5	47.0	34.0
Apr-88	With Conservative Measures, First Post-Operative Visit	46.5	33.5	47.0	34.0
Jun-88	2nd Lympholiposuction	45.0	33.0	46.0	34.0
Jul-88	First Visit 1	45.0	33.0	46.0	34.0
Aug-88	3rd Lympholiposuction	43.0	32.0	44.0	33.0
Sep-88	1st Visit after Lympholiposuction	42.0	32.0	43.0	32.5
Dec-88	2nd Visit	43.0	32.5	44.0	33.0
Feb-89	4th Lympholiposuction	42.0	32.0	43.0	33.0
Apr-89	Post Lympholiposuction	42.0	32.0	43.0	33.0
Aug-89	Post Cellulitis Rt. Limb	43.0	33.0	43.0	33.0
Nov-89	Right Limb	43.0	33.0	43.0	33.0
Dec-89	5th Lympholiposuction - Immediate Post-Operative	40.0	32.0	43.0	33.0
Feb-90	Post Lympholiposuction	31.0	31.0	43.0	33.0
Jun-90	On Conservative	38.0	30.5	42.0	32.5
Aug-90	On Conservative	38.0	30.0	39.0	31.0
Dec-90	Left Limb Cellulitis	38.0	30.0	43.0	32.0
Jul-90	6th Lympholiposuction	36.0	29.0	40.0	31.0
Dec-90	Left Limb Cellulitis	38.0	30.0	43.0	32.0
Jul-91	7th Lympholiposuction	36.0	29.0	40.0	31.0
Sep-91	On Conservative	34.0	29.0	38.0	31.0
Dec-91	On Conservative	39.0	30.0	40.0	31.0
Feb-92	On Conservative	38.5	30.0	39.0	31.0
Apr-92	On Conservative	40.0	30.5	39.0	31.0
Aug-92	8th Lympholiposuction	39.0	30.0	39.0	31.0
Dec-92	Left Limb Cellulitis	37.0	29.5	43.0	31.5
Mar-93	On Conservative	37.0	29.5	42.5	31.0
Jul-93	On Conservative	36.5	29.0	43.0	31.5
Nov-93	Left Limb Cellulitis	39.0	30.0	44.0	32.5
Apr-94	On Conservative	38.0	30.0	43.0	31.5
Nov-94	Left Cellulitis	40.0	30.0	44.0	32.5
Jan-95	On Conservative	38.0	30.0	43.0	31.5
Jul-95	9th Lympholiposuction	36.5	29.0	37.0	30.5
Sep-95	On Conservative	38.0	29.5	39.0	30.0
Jan-96	On Conservative	38.5	29.5	40.0	30.0
Jun-96	On Conservative	39.0	30.0	41.0	32.0
Jun-97	Left Limb Cellulitis	39.0	30.0	43.0	32.5
Aug-97	10th Lympholiposuction	38.0	29.0	41.0	32.0
Sep-97	1st Visit after Lympholiposuction	38.0	29.0	41.0	32.0
Nov-97 to Jul-02	On Conservative	38.0	29.0	39.0	30.0

*Patient No. 1 was a 30-yr old female with bilateral below knee lymphoedema (Right limb-started 1984; Left Limb-started 1987). All Lympholiposuction done Bilateral.

TABLE 3. Detailed follow-up of Patient No. 2* with unilateral lower limb lymphoedema.

Date	Comment	R. Lower Mid Limb Leg (cm)	Right Foot (cm)	Normal Left Limb (cm)	Left Limb (cm)
Mar-95		55.0	34.0	37.0	28.0
Apr-95	1st Lympholiposuction	50.0	33.0	N O R M A L	N O R M A L
May-95	2st Lympholiposuction	46.0	32.0		
Jun-95	Patient did not use consevative therapy	54.0	34.0		
Jul-95	3rd Lympholiposuction	48.0	33.0		
Aug-95	1st visit after the 3rd Lympholiposuciton + conservative therapy	45.0	31.5		
Sep-95	On Conservative	40.0	30.0	L I M B	L I M B
Dec-95	On Conservative	39.0	29.0		
Apr-96	On Conservative	38.0	28.5		
Dec-88	On Conservative	38.0	28.5		
Jul-97	On Conservative	38.0	28.5		
Oct-97	On Conservative	38.0	28.5		

*Patient No. 2 was a 20-yrns old male with unilateral below the right knee lymphoedema.



Fig. 1. Patient No. 1. Bilat. below knee lymphoedema.
(A) After failure of conservative treatment and before the lympholipsuction (LLS).
(B) After the (LLS), patient was on conservative treatment.



Fig. 2. Patient No. 2. Right below knee lymphoedema.
(A) Before the lympholiposuction (LLS).
(B) After antromedial, (LLS)including the dorum of the foot.



Fig. 2. Patient No. 2. Right below knee lymphoedema.
(C) After the antolateral and post (LLS) including the dorum of the foot.
(D) The maintenance results on conservative measure, skincare was provided with olive oil painting of the limb.



Fig. 3. Patient No. 3. Right below knee lymphoedema.
 (A) Before the lympholysis (LLS).
 (B) After the first (LLS), post, med. including
 (C) After antromedial (LLS)
 (D) After postromedial (LLS)
 (E & F) Maintained results on the conservative.



Fig. 4. Patient No. 4. Right Lower lymphoedema (above knee)
 (A) Before the (LLS) involving the whole limb including the dorsum of the foot.
 (B) After Post (LLS), patient maintained on conservative measures.

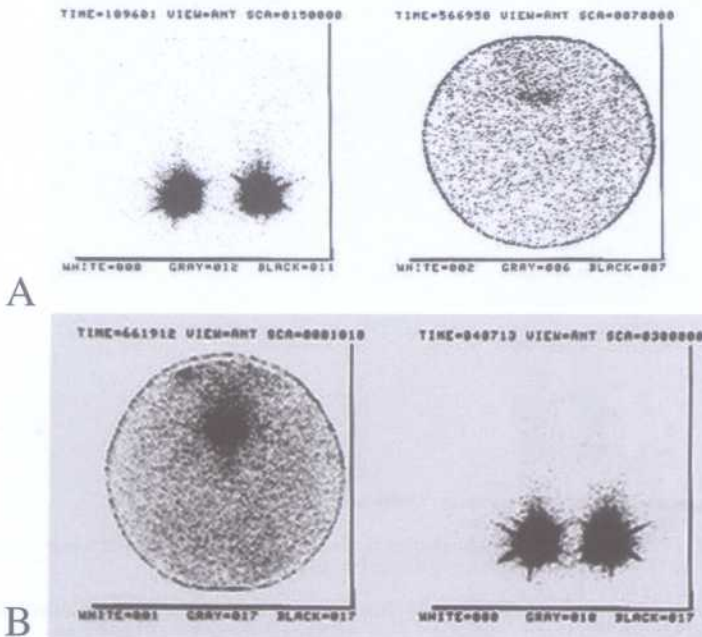


Fig. 5. The radionuclide lymphangiogram which was done in 1987 for patient No. 1.
 (A) Early phase: 15 min after bilateral pedal injection of Tc 99 m solid.
 (B) Late phase 5 h after the injection
 A and B showed no apparent movement of the tracer in both limbs with gradual concentration of the tracer in the urinary bladder.

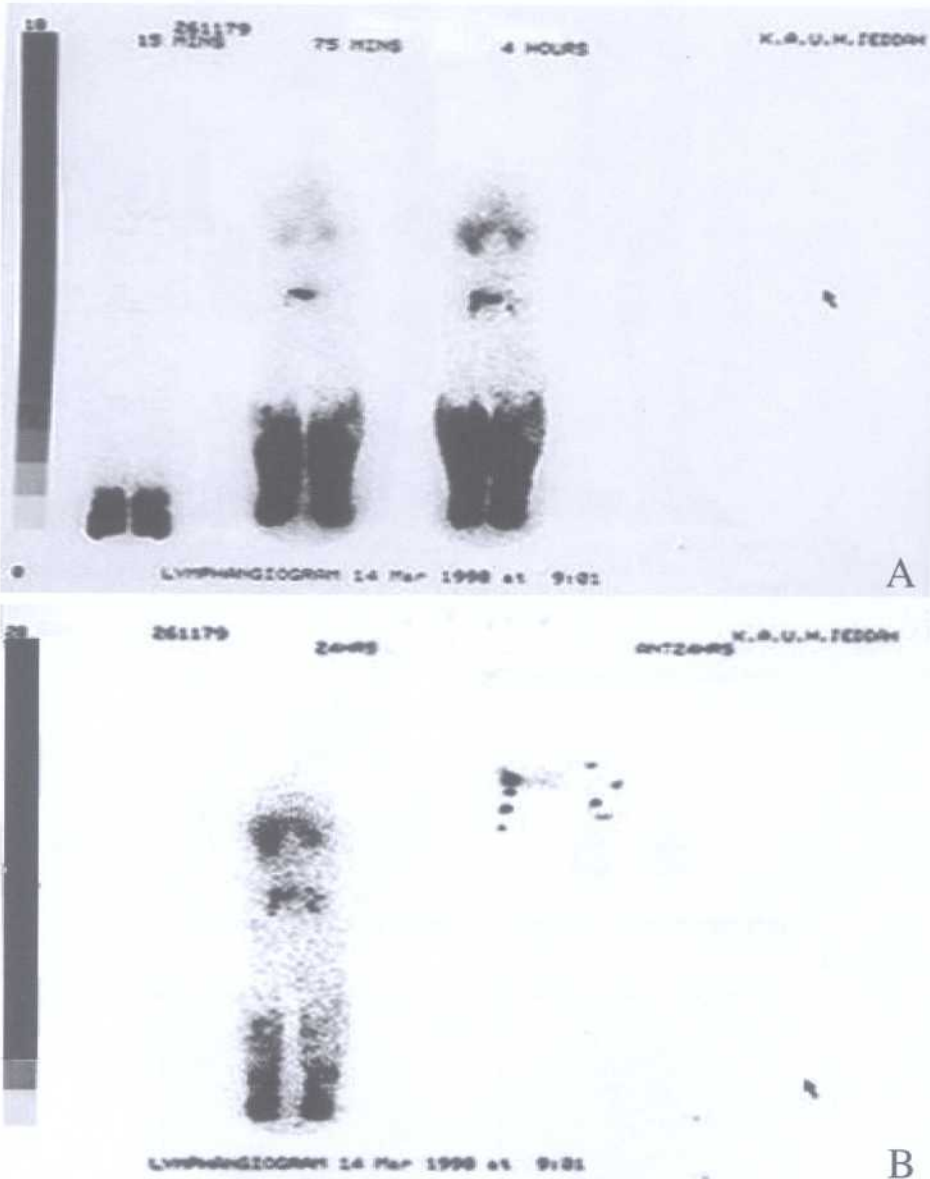


Fig. 6. The radionuclide lymphangiogram of the same patient on Fig 5. which was done in 1998.
 (A) 15 minutes, 75 minutes and 4 hours post injection
 (B) 24 hours post injection
 A and B showed clearly improved lymphatic circulation in both limbs with visualizations of the inguino-iliac lymph nodes with gradual concentration of the tracer in the urinary bladder.

The conservative measures were followed strictly post operatively (firm elastic stocking, which were changed regularly whenever it became loose, and elevation of the limb).

Results

All the patients showed dramatic improvement in the reduction of the size of the limb as the circumference decreased to near normal with slight pitting oedema (see Figs. 1, 2, 3, and 4).

Initial and final mid leg circumference of the 6 patients shown on Table 1 detailed follow-up of two patients, one with bilateral and the other with unilateral lower limb lymphoedema is shown on Tables 2 and 3. The skin did not show marked redundancy and it was not necessary to exercise any skin after the lympholiposuction.

It was striking that the cutaneous changes (hyperkeratosis ferrocus and condylomatous changes) disappeared as the skin became soft and the hyperkeratosis disappeared.

Discussion

The chronic lymphoedema of the lower extremities is a challenging problem to treating physicians as indicated by increasing number of the modalities and procedures and the frequent modification or combination of these procedures, in trial to reach to the ideal management with identification of the criteria of success. But unfortunately, no single procedure could fulfill the ideal criteria which can be described as the simple, safe, reliable, and most importantly reproducible procedure with long term improvement in size, lymphatic drainage of the limb and prevention of the cutaneous manifestations. The frustration in the outcome of the various procedures can be controlled by proper understanding of the non-curability nature of the condition and acceptance of the reasonable control in the progress of the limb swelling and the associated cutaneous complications. This can be achieved by early application of the conservative measures in the majority of the cases and with additional surgical procedure in the remaining cases^[1].

The various surgical procedures reported in the literature included physiological and excisional procedures or combination of both^[1]. The excisional procedure is a limb contouring procedure which is similar to dermatolipectomy which was the body contouring surgical procedure until 1970s with the disadvantages of non-cosmetic surgical wounds with its irregular ends. Since then several new operative approaches were tried to minimize the surgical access such as collapsing or subcutaneous surgery using sharp curettes or blunt cannulas. The blunt cannula has the advantage of preserving the neurovascular elements^[13]. Similarly, the excisional procedure in management of lymphoedema of the extremities passed through the same trials aiming at reducing the sub-

cutaneous lymphodematous tissue without damaging the skin and other neurovascular subcutaneous elements^[14-16].

All the different trials of the suction assisted lympholiposuction^[14-16] including our trial started in the late 1980s with some early or late reporting but all showed encouraging results. Our 16-years experience with this procedure can be summarized as the following:

1. Lympholiposuction is simple, safe, reliable procedure as it does not require high technology and it is less time consuming and not associated with any major incision or excision or any skin necrosis or redundancy. No major bleeding or blood loss as it is done under the pressure tourniquet and preserve the neurovascular tissue preventing any circulatory compromise.
2. The procedure can down stage the limb swelling to normal or near normal size. This achieved result can be maintained by the conservative measures and the results can be reproduced by repeating the procedure in case of the major increase of the limb size after infection episode of failure of the patients to follow the conservative measures.
3. It is associated with dramatic improvement of the cutaneous changes, limitation of mobility of the affected limb and psychological disturbances with the social acceptance of the patient.
4. The procedure can be applied to the swelling of the foot.
5. The result in our patients indicate improvement of the lymphatic physiology of the limb which can be explained by reduction of the lymph-forming subcutaneous tissue and the improvement of lymphatic flow by the neovascularization along the cannula tracts in the affected lymphoedemitous tissue and the tract crossing the lymphoedemitous to the normal area, and due to the close coaptation of the skin to the underlying fascia which might provide wide area of improved circulation of the lower extremity and re-establishing lymphatic connections.
6. It is mandatory to maintain the achieved results of this procedure by strict application of conservative measures and prompt control of infections.
7. We believe that it is of great help in the cases of the lymphatic hypoplasia and the cases with long standing lymphoedema which is associated with the subcutaneous sclerosis which preclude the feasibility of the lymphatic anastomosis.

In our experience, the lympholiposuction is the near ideal procedures in the management of chronic lower limb lymphoedema as it is simple, safe, reliable, and reproducible.

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شفط الدهون والأنسجة اللمفاوية في علاج الاستسقاء اللمفاوي المزمن بالطرف السفلي

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المستخلص. الاستسقاء اللمفاوي المزمن بالطرف السفلي قد يكون خلقياً أو مكتسباً ويعتبر علاج الحالات المزمنة لفترة طويلة من المشاكل الصعبة ورغم تعدد طرق العلاج إلا أنه لا توجد طريقة واحدة تحقق جميع محاور العلاج الناجح ، وفي هذه الدراسة استخدمنا أسلوب شفط الدهون والأنسجة اللمفاوية كعلاج في ست حالات تعاني من الاستسقاء اللمفاوي المزمن في الطرف السفلي لعلاج هذه الحالات موضحين بساطة ونجاح هذا الأسلوب ونتائجه المرضية .