

Surgical Treatment of Chronic Lymphedema -A viable option!-

65ème anniversaire de l'angéiologie - JiFa 2013
1 & 2 Février 2013
Paris, France

B. B. Lee, M.D., Ph.D., F.A.C.S.

Professor of Surgery

George Washington University School of Medicine, Washington DC, USA

Adjunct Professor of Surgery

Uniformed Service University of HS, Bethesda, MD, USA

DISCLOSURE OF CONFLICTS OF INTEREST

BYUNG-BOONG LEE, MD, PhD, FACS

Surgical Treatment of Chronic Lymphedema

I do not have any relevant financial relationships
with any commercial interests.

Surgical Treatment of Chronic Lymphedema

- The treatment of the chronic lymphedema has been led mostly by the surgeons through the last century based on the excisional surgery to remove/ debulk the lymphedematous tissue. And this excisional surgery has been indispensable part of chronic lymphedema management for many decades.
- But the majority of the outcome of this mostly debulking procedure (e.g. Charles procedure) was quite disappointing due to various complications and life-time morbidity. Many got very limited benefit at best and failed to improve the quality of life.



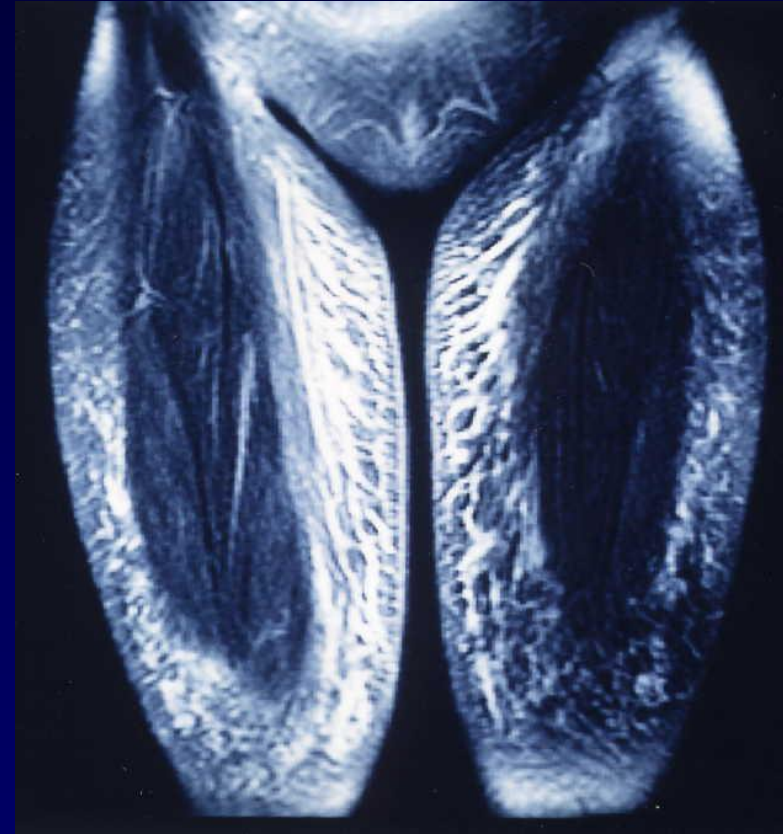
Surgical Treatment of Chronic Lymphedema

- But such poor outcome of surgery-oriented management through the last Century was partly due to limited knowledge on the lymphedema and its indiscriminating use before proper understanding of this unique condition was achieved.



Surgical Treatment of Chronic Lymphedema

- Through the last few decades, whole concept on the chronic lymphedema has been changed drastically.
- Lymphedema is no longer considered as a simple 'static' condition of diffuse soft tissue swelling of the affected limb/region by lymph stasis/lymph fluid accumulation as the outcome of mechanical failure following the blockage of lymph-transporting/collecting system.



Surgical Treatment of Chronic Lymphedema

- Chronic lymphedema is NOW correctly understood as ‘steadily progressing chronic degenerative and inflammatory condition’ of the soft tissue beyond the lymphatic system.
- Through repeated episodes of dermato/lipo/lymphadenitis entire surrounding soft tissue and skin would take steady fibrotic change and results in disabling and distressing condition with;
 - Bacterial and fungal infection
 - Chronic inflammation: dermato-lipo-fibrosis
 - Immunodeficiency and wasting phenomenon
 - Malignancy – Kaposi sarcoma; lymphangiosarcoma



Surgical Treatment of Chronic Lymphedema

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- Naturally, the aim of the management as well as the treatment strategy has been changed to meet its mandate for contemporary concept.
- More aggressive approach is now mandated to improve ‘Quality of Life (QoL)’ in various aspects of adaptations as ultimate goal of the treatment;
 - Social adaptation – socially useful life.
 - Functional adaptation – physically normal activity.
 - Psychological adaptation – psychologically accept physical deformity.



Surgical Treatment of Chronic Lymphedema

- An ideal treatment for the lymphedematous limb should restore both function and cosmetic appearance. But, unfortunately, it is impossible to achieve these goals with currently available treatment modalities.
- MLD (Manual Lymphatic Drainage)-based DLT (Decongestive Lymphatic Therapy) and/or SPC (Sequential Pneumatic Compression)-based compression therapy have become the mainstay of chronic lymphedema management
- DLT is now the treatment of choice regardless of the severity/clinical stage/etiology.





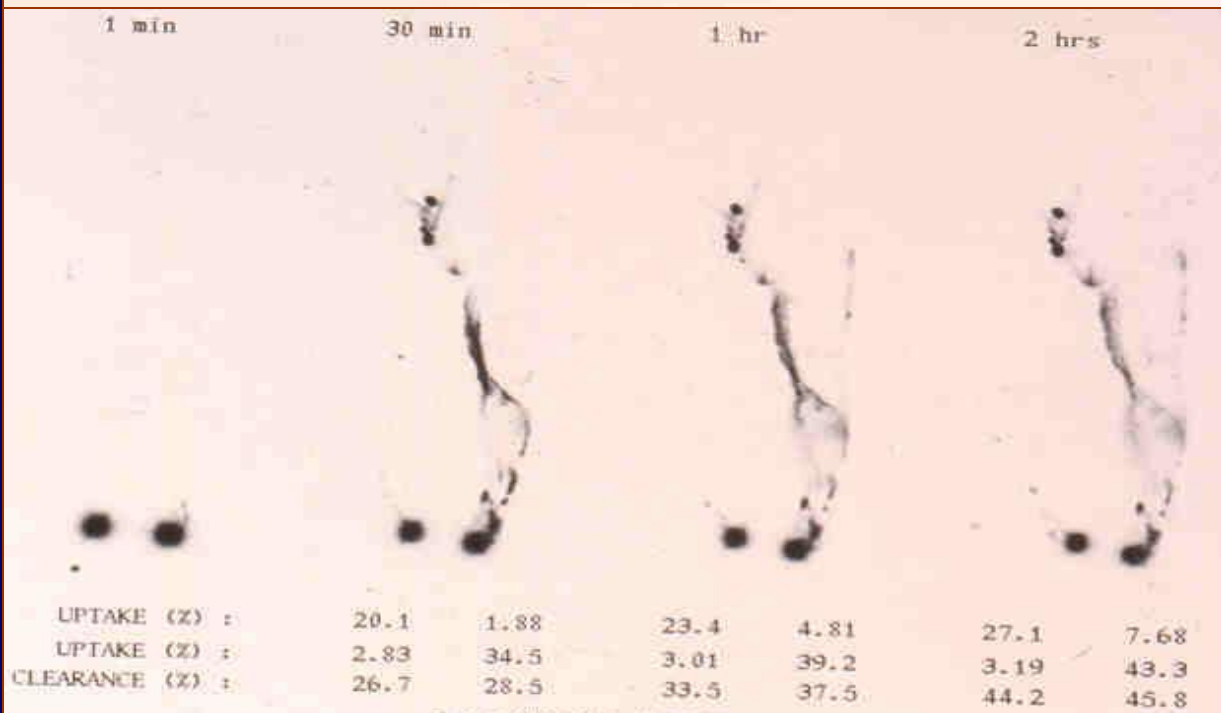
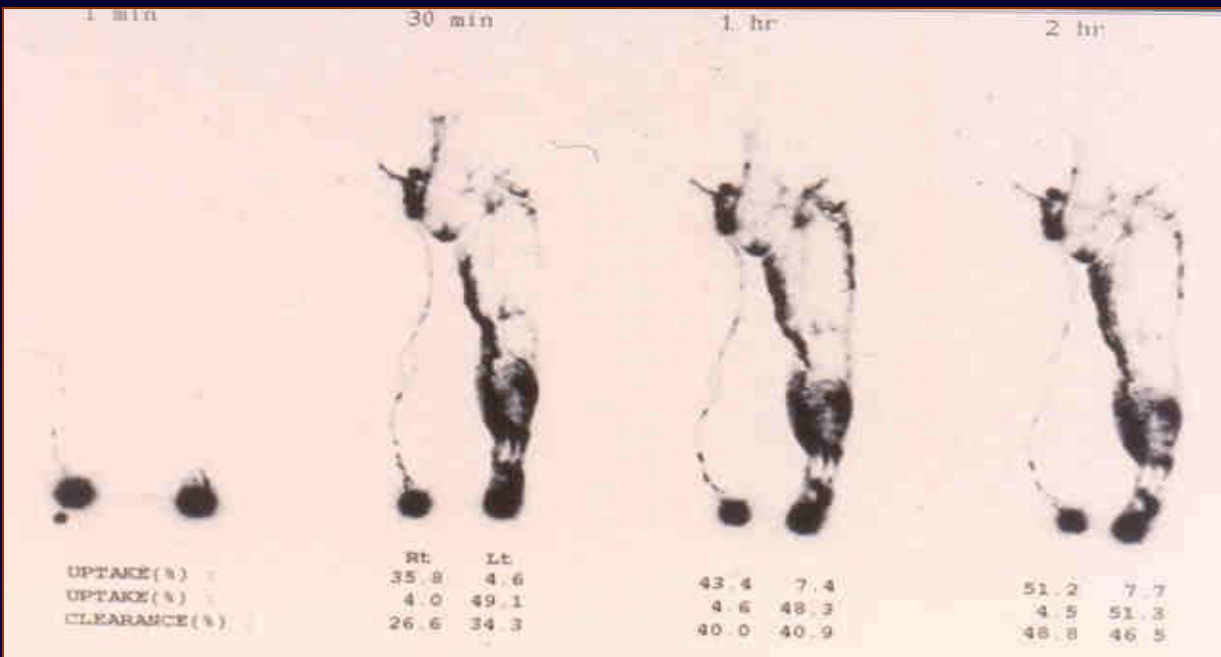
Pre-CDT status



Post-CDT status

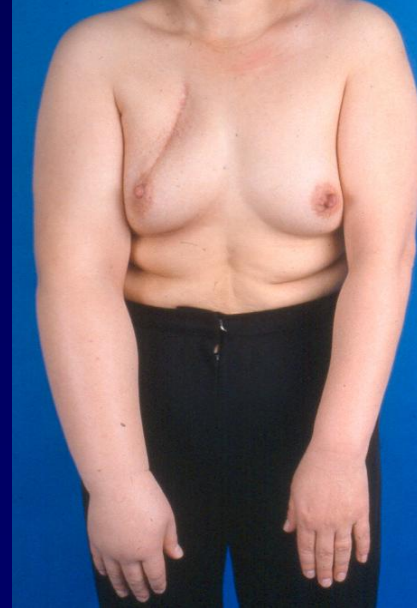
Radionuclide Lymphoscintigraphy

Lymphoscintigraphically improved lymphedema status following CDT-based therapy combined with compression therapy: decreased dermal backflow compatible with clinical improvement (1 year follow-up assessment)



Surgical Treatment of Chronic Lymphedema

- DLT is consists of exercise/movement, manual lymphatic drainage, and compression (bandaging, garments) therapy in addition to basic skin care, education for risk reduction of infections and trauma.
- However, the DLT based management has never been a “panacea” nor curative method, but only effective to delay the progress during the treatment program period.
- To maintain long term control often means continuous patient commitment and requires a lifetime pledge.
- Furthermore, such conservative non-surgical treatment infrequently fails to prevent the progress despite maximum care.



Surgical Treatment of Chronic Lymphedema

- Surgical treatment, either for curative/reconstructive or palliative/excisional purposes, have also been known as effective method to control chronic lymphedema for decades. Reconstructive surgery in particular has been known as the most ideal to restore the normal function with a chance of “cure”.
- Surgical treatment has maintained its unique role for the management of chronic lymphedema although it has never become popular as a practical method for the day-to-day management.



Surgical Treatment of Chronic Lymphedema

- Therefore, an interest to the surgical treatment was rekindled even to once-condemned excisional surgery and also newly developed reconstructive surgery in various modalities.
- And the role of surgical therapy has been recently re-evaluated on the patients who failed to respond to DLT adequately for further improvement of QoL.
- Various curative/reconstructive surgeries have been reaffirmed for their unique role to improve the condition with a chance for a cure when done properly in the early stage of the lymphedema; ablative/excisional surgeries was also reintroduced for its new role in the late stage of the lymphedema to complement failing DLT as a supplemental therapy.

Surgical Treatment of Chronic Lymphedema

Surgical Treatment

- **Reconstructive surgery** to enhance lymph flow
 - Lympho-lymphatic & lympho-venous anastomosis
 - Lymph nodes transplantation
- **Ablative (cytoreductive) surgery**
 - Excisional surgery to reduce fibrosclerotic overgrowth
 - Liposuction to obliterate epifascial compartment



Surgical Treatment of Chronic Lymphedema

- Reconstructive surgery is most effective only when residual lymphatic vessels for the reconstruction remain functionally intact to relieve obstruction/ lymph stasis and restore lymphatic function following the reconstruction.
- Reconstructive surgery warrants a dedicated and experienced microsurgical team for lympho-venous and lympho-lymphatic anastomoses for successful long-term results.
- Therefore, the use of reconstructive surgery has many practical limitations and remains controversial with mixed results and unavailable to most clinicians.



Surgical Treatment of Chronic Lymphedema

- Once chronic lymphedema should reach to its end stage (ISL stage III), the effectiveness and efficiency of DLT is curtailed substantially mainly due to the difficulty to wrap the swollen extremity properly with non-elastic bandage for the exercise therapy.
- Decreased efficacy of DLT allows further deterioration of the local condition with increased risk of sepsis and lower the quality of life (QoL).



Intractable end-stage lymphedema with recurrent local/systemic sepsis, refractory to maximum CDT combined with compression therapy: Excisional surgery relieved sepsis and improved QOL.



Surgical Treatment of Chronic Lymphedema

- Excisional surgery, once condemned due to the severe morbidity, is now resurrected for the limited use along this end stage of chronic lymphedema when there is no more salvageable lymphatic vessels left.
- When the DLT-based conservative therapy should fail with no more chance to control the condition effectively, the excisional surgery has a special role on such deadlocked condition as a supplement to improve overall outcome of the therapy.
- Outcome of excisional surgery, however, heavily depends on the appropriate implementation of DLT-oriented postoperative management.



Surgical Treatment of Chronic Lymphedema

- Surgical therapy has remained controversial as independent therapy especially on its long term results.
- Nonetheless, these various modalities of surgical therapy have recently been found to be more effective when combined with DLT, which is in-line with the new concept of a multidisciplinary approach.
- The outcome of the surgical therapy therefore, would be heavily dependent to the patient compliance to maintain postoperative DLT.



Surgical Treatment of Chronic Lymphedema

Inclusion Criteria for Surgical Therapy

- The steady progress of the disease despite a maximum available treatment for a minimum two years and declared as the “treatment failure” by the multidisciplinary care team: first criteria as the candidate of additional surgical therapy.
- Reconstructive surgery for the lymphedema between the clinical stage I & II and/or II & III.
- Palliative surgery for the lymphedema between the stage III & IV (end stage).



Surgical Treatment of Chronic Lymphedema

Reconstructive Surgery - Indication

- Failure to respond to the proper care at clinical stage I or II.
- Progress of the disease to the advanced stage (e.g. stage I to stage II or stage II to III) in spite of the proper treatment.
- Chylo-reflux combined extremity lymphedema.
- High recurrence of local and systemic infection(?)
- Poor tolerance to DLT - based conservative treatment(?)



Surgical Treatment of Chronic Lymphedema

Ablative (Excisional) Surgery - Indication

- Failure to implement proper care at clinical stage III or IV (end stage).
- Progress of the disease to the end stage in spite of maximum available treatment.
- Increased frequency and/or severity of local and/or systemic sepsis.



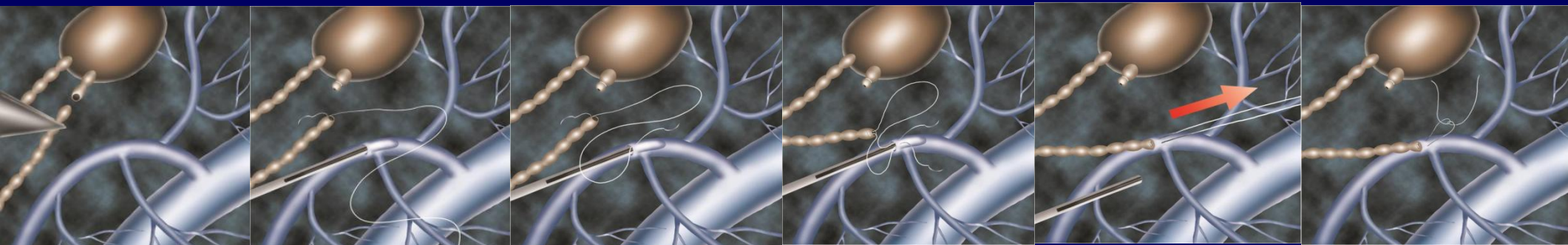
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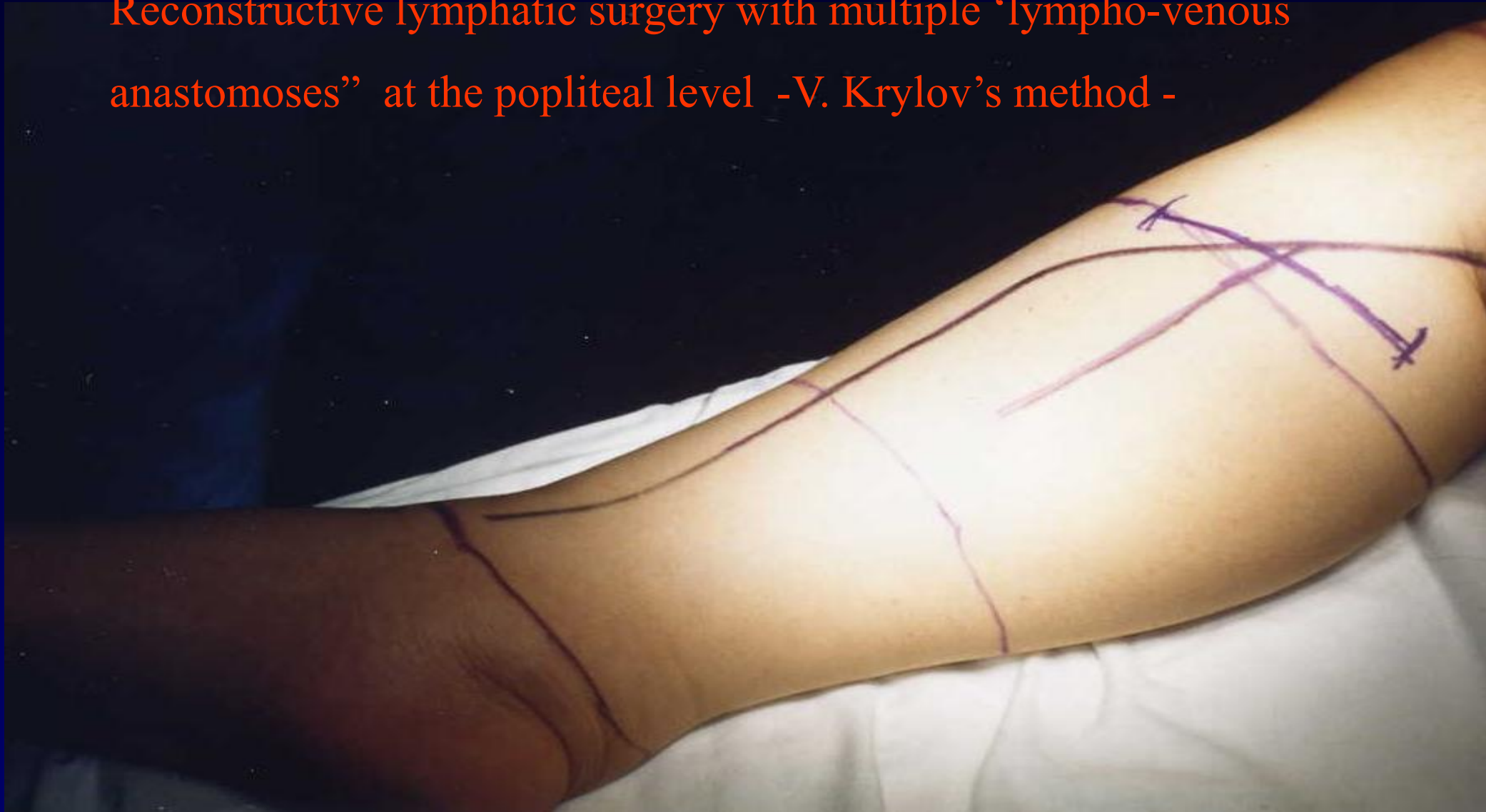
Reconstructive Surgery – Methods

- Lympho-Venous Anastomotic Surgery (LVAS)
 - Candidates were selected once the treatment results were confirmed to be failed or not sufficient to prevent rapid progress of the disease : clinical stage I to II, or early stage II to late stage II.
 - The patient selected, met all the inclusion criteria for this additional treatment measurement particularly among the “secondary” lymphedema.
- Free lymph nodes transplant surgery (FLTS)
 - Candidates were selected based on the same indication for LVAS but preferably for the “primary” lymphedema with progress of clinical stage II to III.

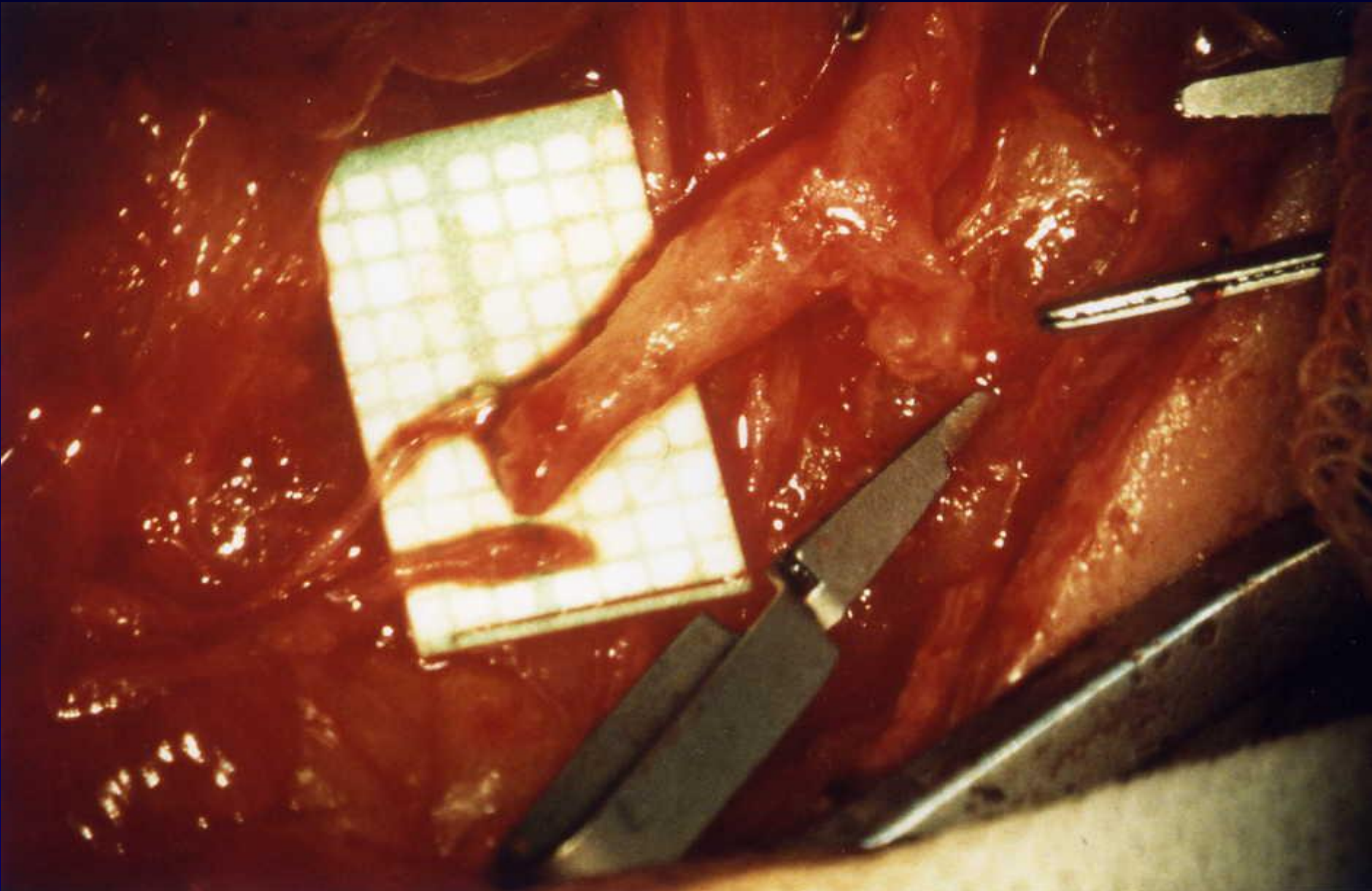
- Courtesy to Prof. O Tijerina -



Reconstructive lymphatic surgery with multiple ‘lympho-venous anastomoses’ at the popliteal level -V. Krylov’s method -



Direct anastomoses between functioning lymph vessels and defunctionalized vein



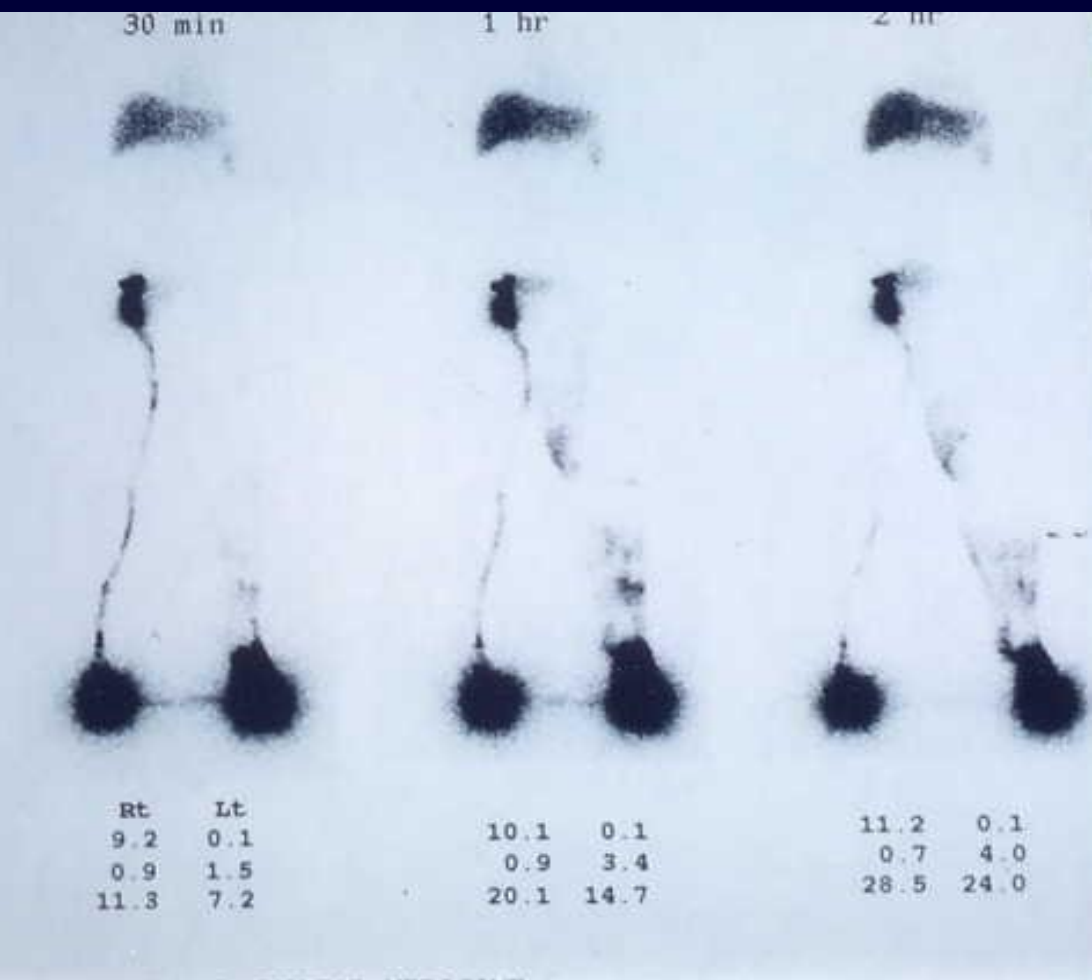
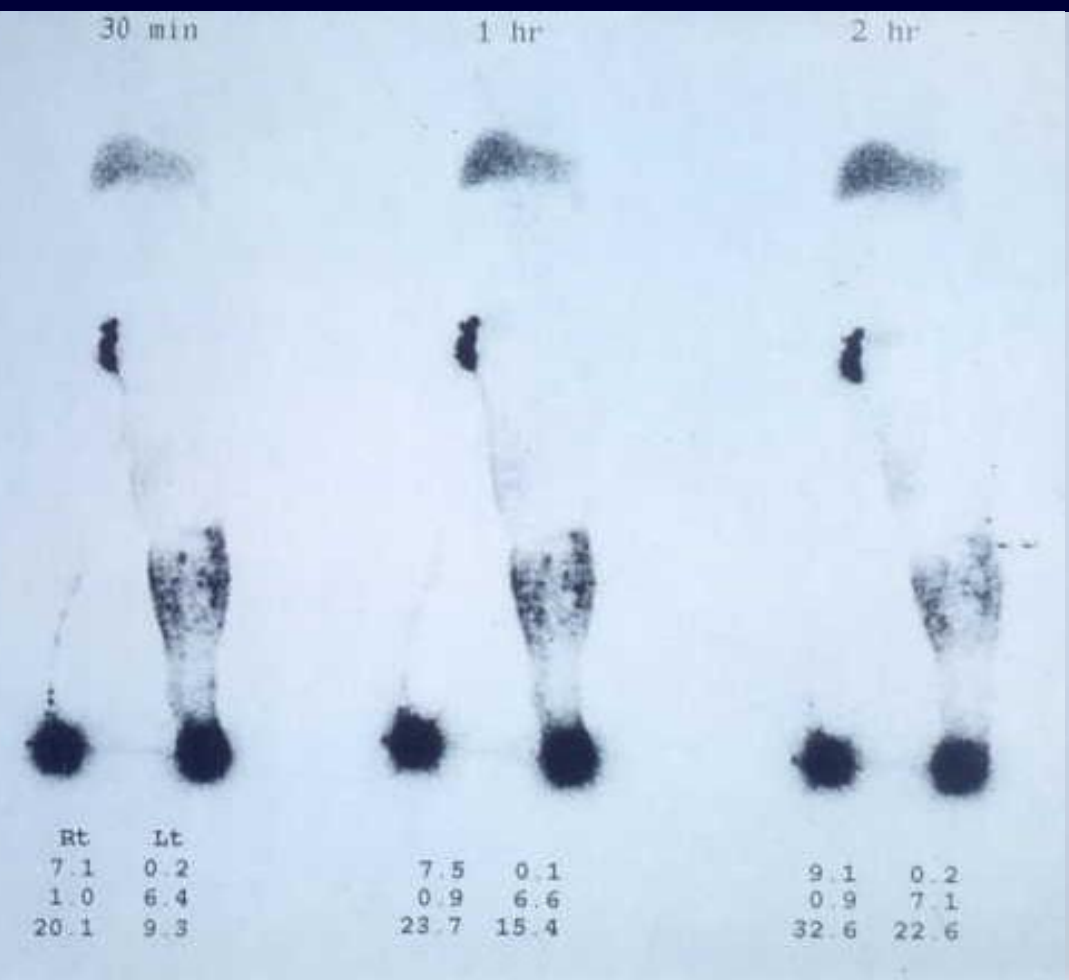


Preoperative status



Postoperative status

Radionuclide Lymphoscintigraphy



Preoperative status

Postoperative status



Preoperative status



Postoperative status



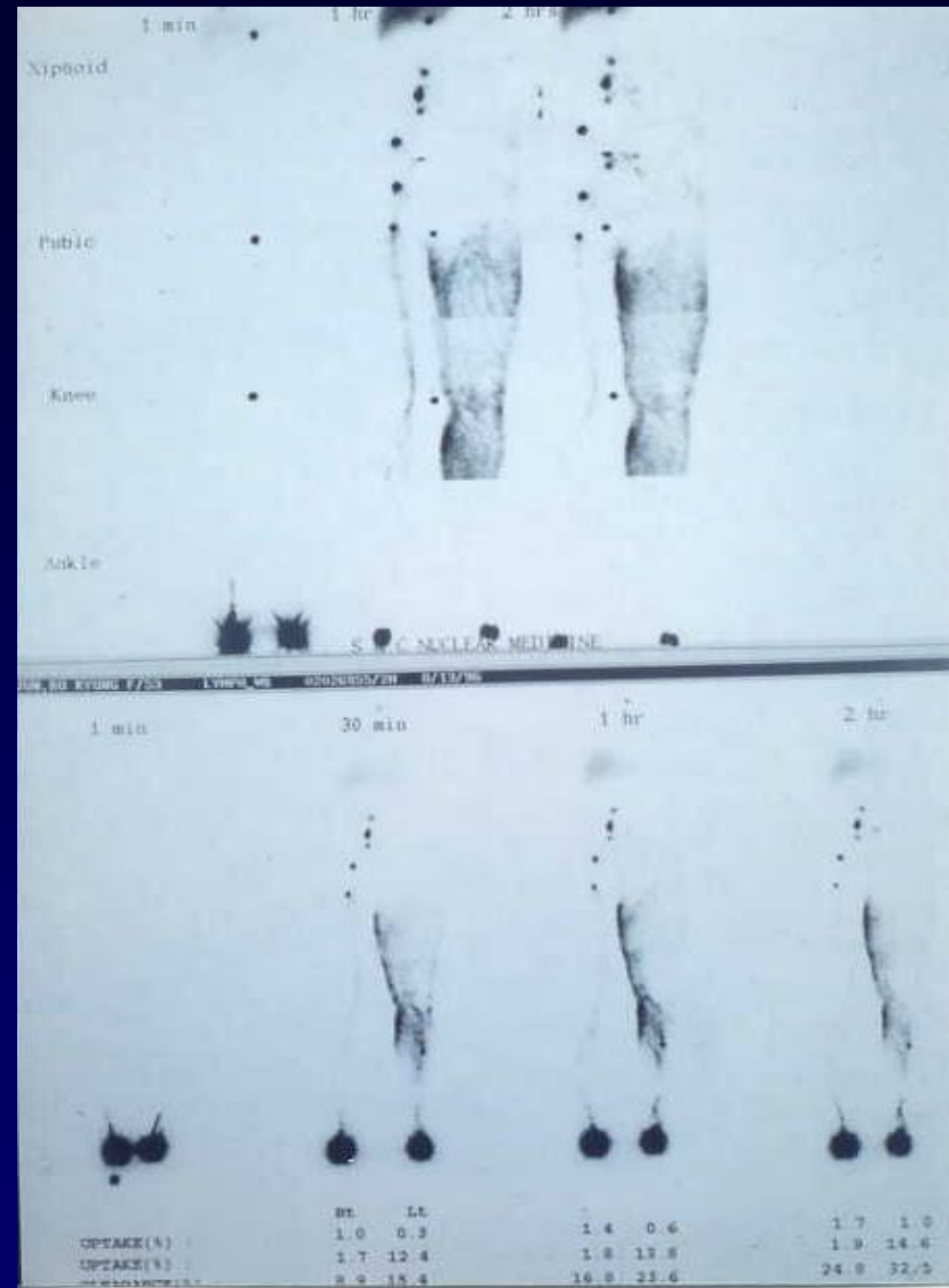
Preoperative status



Postoperative status

Radionuclide Lymphoscintigraphy

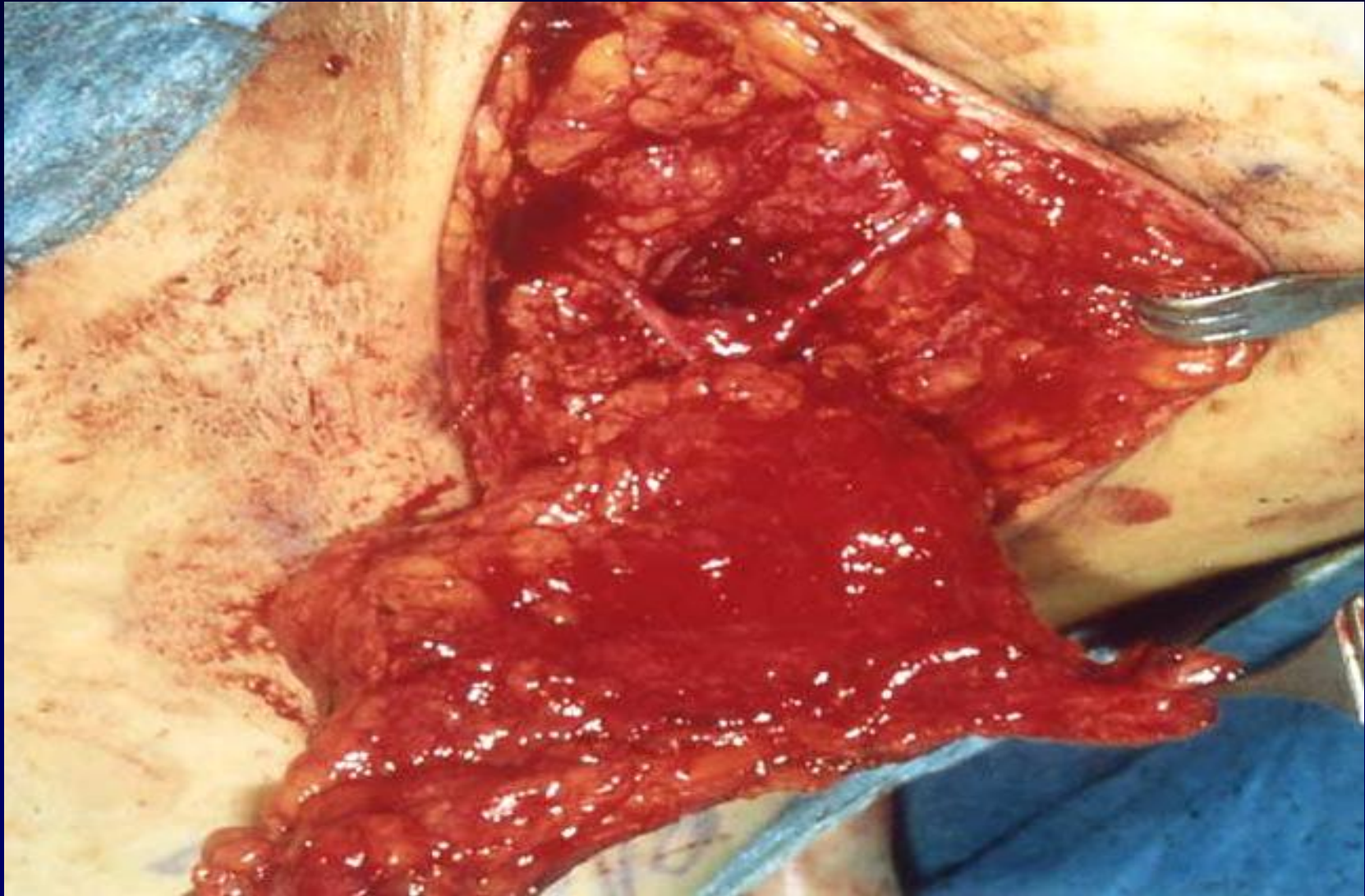
Lymphoscintigraphically
improved lymphedema status
following lymphovenous
anastomotic surgery at the
popliteal level: decreased
dermal backflow compatible
with clinical improvement
(6-months follow-up assessment)



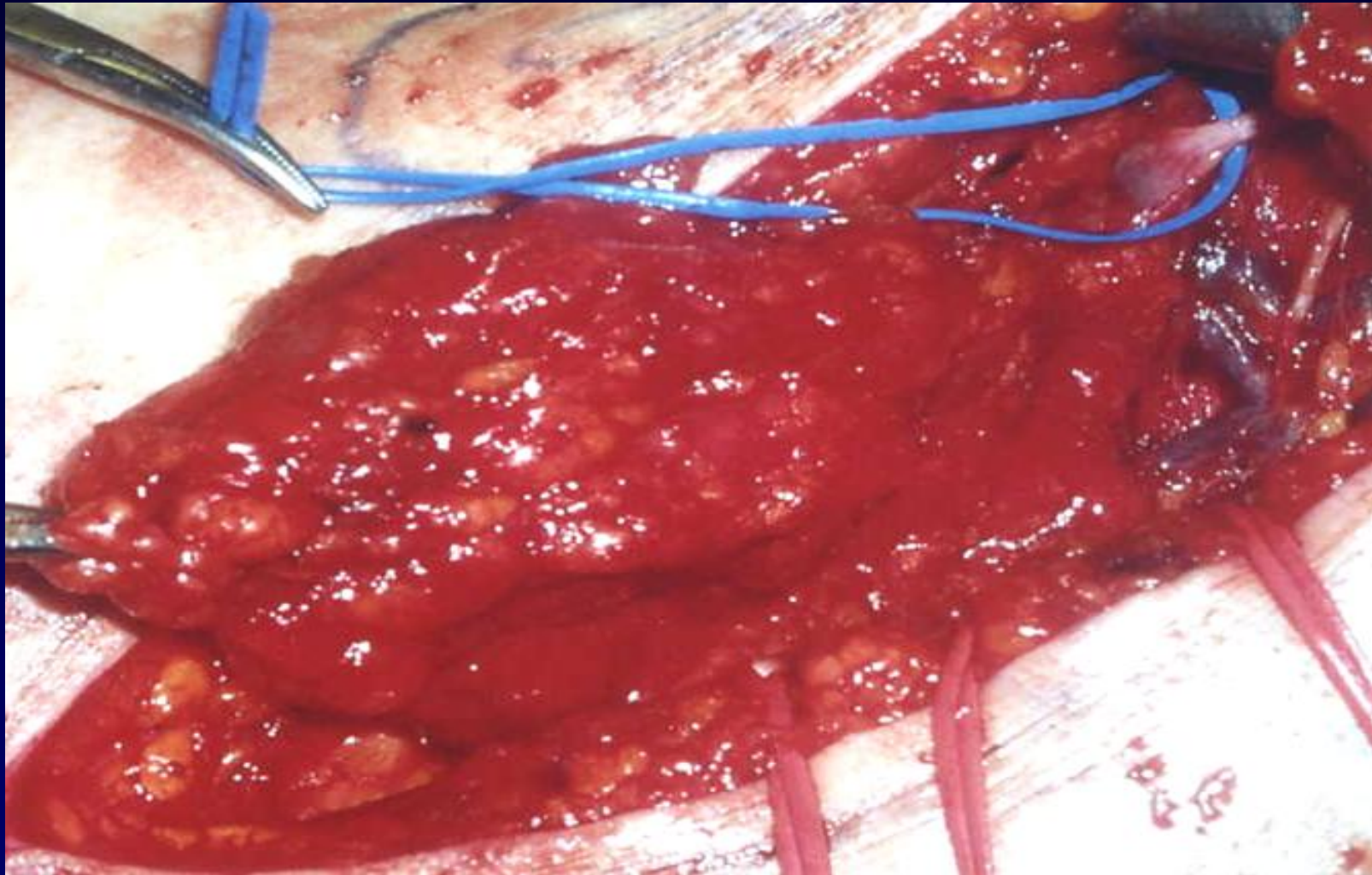
Reconstructive lymphatic surgery with free lymph nodes transplantation



Schematic drawing of lymph nodes harvest from right posterior axillary group with intact artery & veins for free graft



lymph nodes harvest with intact artery & veins for free graft



End-to-end anastomoses of donor and recipient arteries/veins

Clinical improvement of lymphedema status following successful free lymph nodes graft

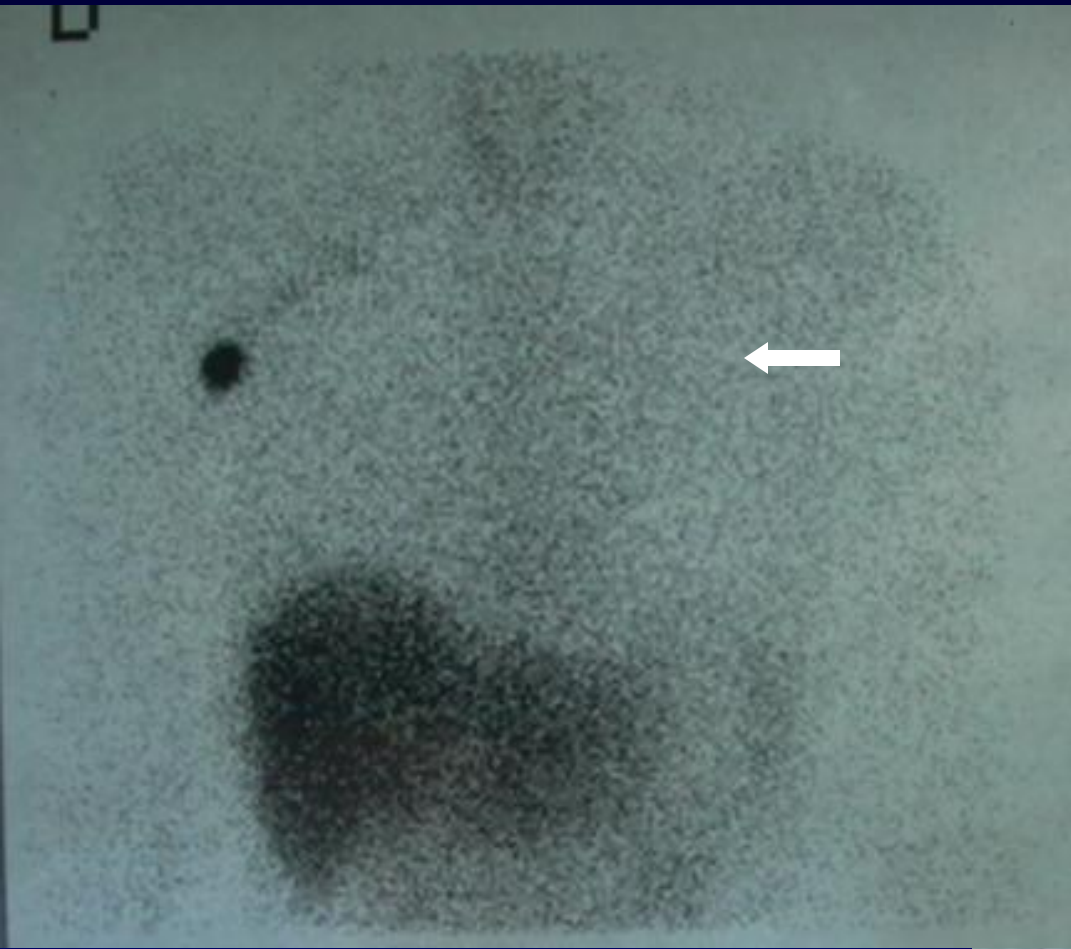


Preoperative Status

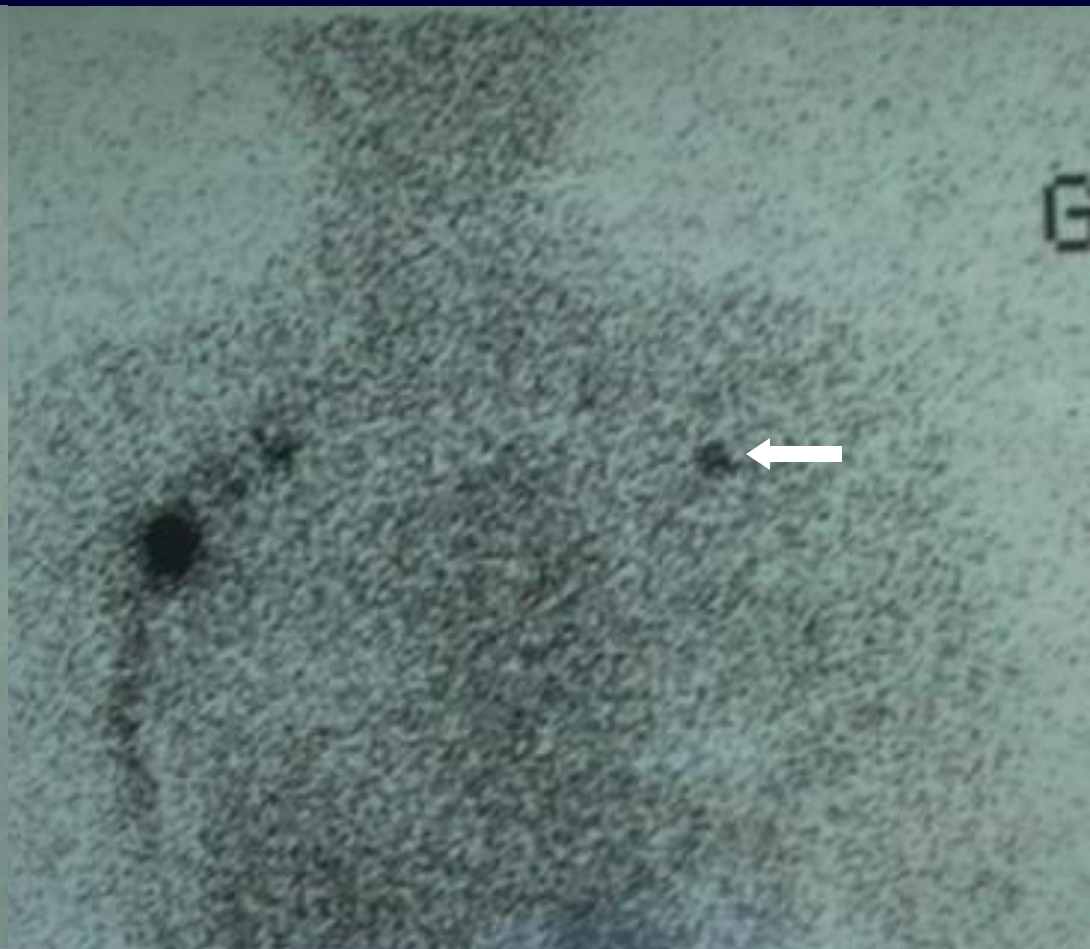


Postoperative status

Radionuclide Lymphoscintigraphy



Preoperative finding with no visible lymph nodes in left axilla



Postoperative finding with newly appeared lymph nodes in left axilla

Surgical Treatment of Chronic Lymphedema

Palliative Excisional Surgery – Methods

Evaluation as candidate was done once the clinical stage of chronic lymphedema, regardless of the etiology (primary or secondary), reaches to the end-stage of chronic lymphedema (stage IV or late stage III) and accompanies with;

- increased difficulty to provide effective DLT due to grotesquely disfigured limb contour to be wrapped adequately with bandage for the exercise therapy.
- increased frequency and severity of local and/or systemic sepsis (3-4 episodes per year) in spite of prophylactic antibiotics measurement

Excisional surgery to bilateral lower extremities



Preoperative status



to improve
the efficacy of CDT
and/or compression
therapy



Postoperative status



Preoperative status



Postoperative status

Surgical Treatment of Chronic Lymphedema

Clinical Experiences- Outcomes

- Either reconstructive surgery or excisional surgery seems to be very effective method to control the progress of lymphedema “initially” but mostly not to be able to maintain its initial success without postoperative DLT and/or compression therapy.
- Satisfactory clinical improvement following the surgery showed that patients’ complying with post-operative DLT is most crucial factor: long-term maintenance of initially successful results is totally depending on the patient’s “compliance” to maintain postoperative DLT/compression therapy.

Surgical Treatment of Chronic Lymphedema

Discussion – Liposuction

- Liposuction is newly proposed method to reduce the morbidity involved to the traditional excisional techniques.
- Instead of removing/resecting the fibrosclerotic overgrowth by conventional open surgical method, the liposuction was designed to obliterate the epifascial compartment by removal of excessive adipose tissue alone by ‘circumferential’ suction-assisted lipectomy.
- Ideally the liposuction to removing excessive adipose tissue alone should NOT cause additional damage to the remaining lymphatic system.

Surgical Treatment of Chronic Lymphedema

Discussion – Liposuction

- But when the liposuction can be justified along the end stage of lymphedema with no more risk of lymphatic tissue damage, entire tissues become fibrosclerotic, hardly amenable to the liposuction, leaving minimum room for the lipectomy.
- This method lacks sufficient scientific merit yet to prove its efficacy other than publications from experiences of single centers on the ‘secondary’ lymphedema following radical mastectomy.
- However, its long term results should prove its safety from the risk of collateral damage to the viable lymph vessels by the suction to worsen the condition.

Surgical Treatment of Chronic Lymphedema

Conclusion-1

- Surgical treatment, either reconstructive or excisional, remains a viable option to chronic lymphedema management to enhance the efficacy of MLD-based DLT especially when the DLT-based conservative management should fail to stop its progress.
- Early commitment to the surgical treatment in optimum condition can prevent systemic/local infection (e.g. cellulitis, erysipelas) and subsequent progress of the lymphedema.

Surgical Treatment of Chronic Lymphedema

Conclusion-2

- Reconstructive surgical therapy to poor responder group to DLT in less ideal/late stage of lymphedema as a supplemental therapy warrants postoperative DLT and/or compression therapy for the long-term maintenance of satisfactory clinical improvement.
- Surgical treatment exerts its maximum role as an auxiliary therapy at best in current status only when the patient is compliant and maintains self-motivated home treatment following the surgical care.

Thank you for the attention!

Surgical Treatment of Chronic Lymphedema

Clinical Experiences - Patients

- 1065 patients (131 males & 934 females : 259 primary & 806 secondary : age range of 2 months to 82 years), registered at the Lymphedema Clinic of Vascular Center, Samsung Medical Center were assessed with various non-invasive tests including lymphoscintigraphy per protocol to assist proper clinical as well as laboratory staging. (January 1995 to December 2002)
- The majority (806/1065) presented secondary lymphedema following cancer surgery and/or radiation therapy: 308 breast cancer and 498 cervical/uterine cancer. CDT-based treatment was implemented as basic therapy.

Surgical Treatment of Chronic Lymphedema

Clinical Experiences : Surgical Candidate

- From a total of 1065 chronic lymphedema, 54 patients/65 limbs (6%), were selected for surgery due to failed/failing treatment with CDT alone to relieve intractable symptoms.
- Various surgical therapies* were added as supplemental therapies to reinforce failing CDT when the disease progressed despite maximum therapy and declared as treatment failure.
- We NEVER initiated surgical therapy as the prime mode of the treatment to replace CDT per recommendation by IRB.

*Lympho-venous anastomotic surgery (LVAS) – 19 patients

*Free lymph nodes transplant surgery (FLTS) – 13 patients

*Excisional surgery – 22 patients (33 limbs)

Surgical Treatment of Chronic Lymphedema

Clinical Experiences : Surgical Candidate

- 65 limbs of 54 patients in various clinical stages of chronic lymphedema, fully declared as treatment failure, were selected for the various surgical therapies as supplemental therapies.
- Lymphovenous anastomotic surgery (LVAS) – 19 patients, advanced from the clinical stage I to stage II or early stage III.
- Free lymph nodes transplant surgery (FLTS) – 13 patients, advanced from the clinical stage I to stage II or III.
- Excisional surgery – 22 patients (33 limbs), advanced from stage II to stage III or IV (end stage).

Surgical Treatment of Chronic Lymphedema

Surgical Candidate - Selection

- Group A: 19 patients (mean age 49 years; F = 18 , M =1 ; primary =4 , secondary =15) submitted to LVAS when indicated by the progression of disease from clinical stage I to stage II, or stage II to III, despite proper application of MLD-based CDT. A minimum of 3-4 anastomoses between healthy, well-functioning collecting lymph vessels and competent branches of the saphenous vein were established.
- Group B: 13 patients(mean age 34 yrs, F= 10 , M= 3; primary =6 , secondary =7) in clinical stage II or III had FLTS using microsurgical free grafting technique, when LVAS cannot be implemented with same indication.

Surgical Treatment of Chronic Lymphedema

Surgical Candidate – Selection

- Group C: 22 patients (mean age 46 years; M= 3, F=19; primary =5, secondary=17) at stage IV or with advancing stage III submitted to excisional surgery on 33 limbs (unilateral N=11; bilateral N=22), purely for palliative purpose to improve the local condition in order to facilitate proper CDT and/or compression therapy and subsequently to reduce the incidence of sepsis.
- Postoperative MLD and compression therapy were mandatory in all patients. Pre and postoperative evaluation were based on clinical improvement (patient satisfaction index), 4 level limb circumference measurements, infrared optical limb volume determination and lymphoscintigraphy.
- Follow -up assessment was made every 6 months for a mean of 4 years in Groups A and C, and 2 years in Group B.

Surgical Treatment of Chronic Lymphedema

Results – Group A (LVAS)

- At 6 months, 16 out of 19 LVAS patients with good compliance to maintain postoperative MLD/compression therapy had clinically satisfactory improvement, while other non-compliant 3 failed.
- At 24 months, 8 out of 16 were compliant and 8 were not. The non-compliant patients showed progressive deterioration while the compliant maintained their improvement.
- At 48 months, 2 out of 8 compliant patients dropped out. Three out of the remaining 6, maintained satisfactory clinical and lymphoscintigraphic improvement.

Surgical Treatment of Chronic Lymphedema

Results – Group B (FLTS)

- At 12 months, 10 of 13 FLTS patients with good compliance to MLD showed clinical improvement by successful graft but remaining 2 with poor compliance to the MLD failed.
- At 24 months, 8 patients were compliant and 5 were not. Compliant patients maintained clinical improvement while the remaining non-compliant patients had progressive deterioration.

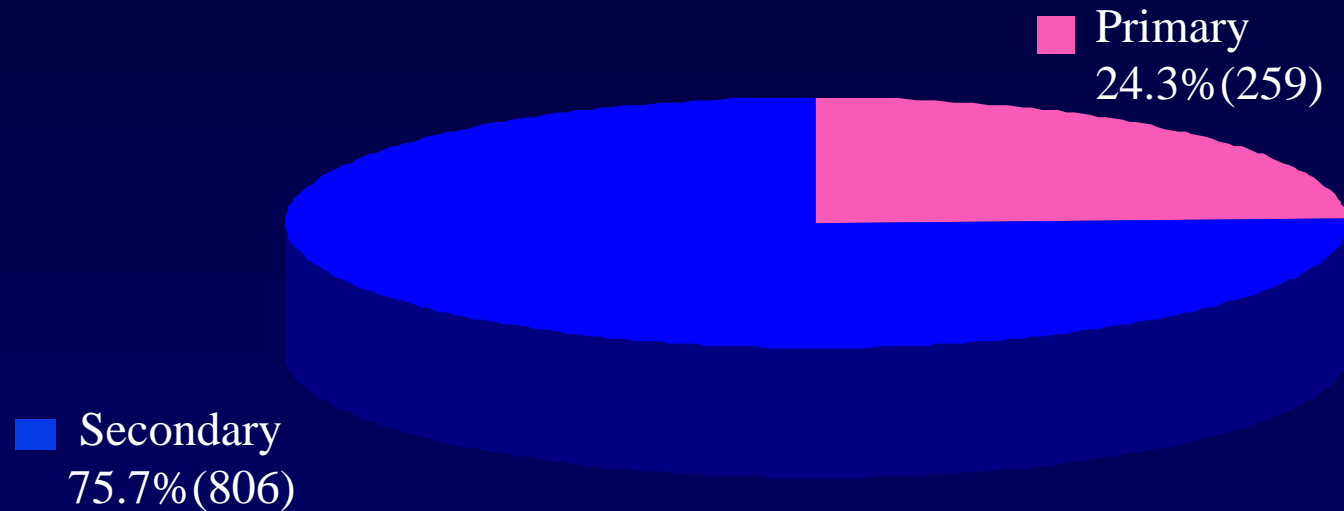
Surgical Treatment of Chronic Lymphedema

Results – Group C (Excision)

- At 12 months, 28 out of the 33 limbs of 22 patients with good compliance to maintain postoperative compression therapy, kept satisfactory improvement.
- At 24 months, 18 out of 28 with good compliance were able to maintain successful results while 10 with poor compliance failed.
- At 48 months, 6 out of 22 patients (8 limbs out of 33), were compliant and maintained satisfactory improvement. Among the remaining 25 limbs, there were 9 drop-outs and 16 non-compliant that showed further deterioration.

Chronic Lymphedema

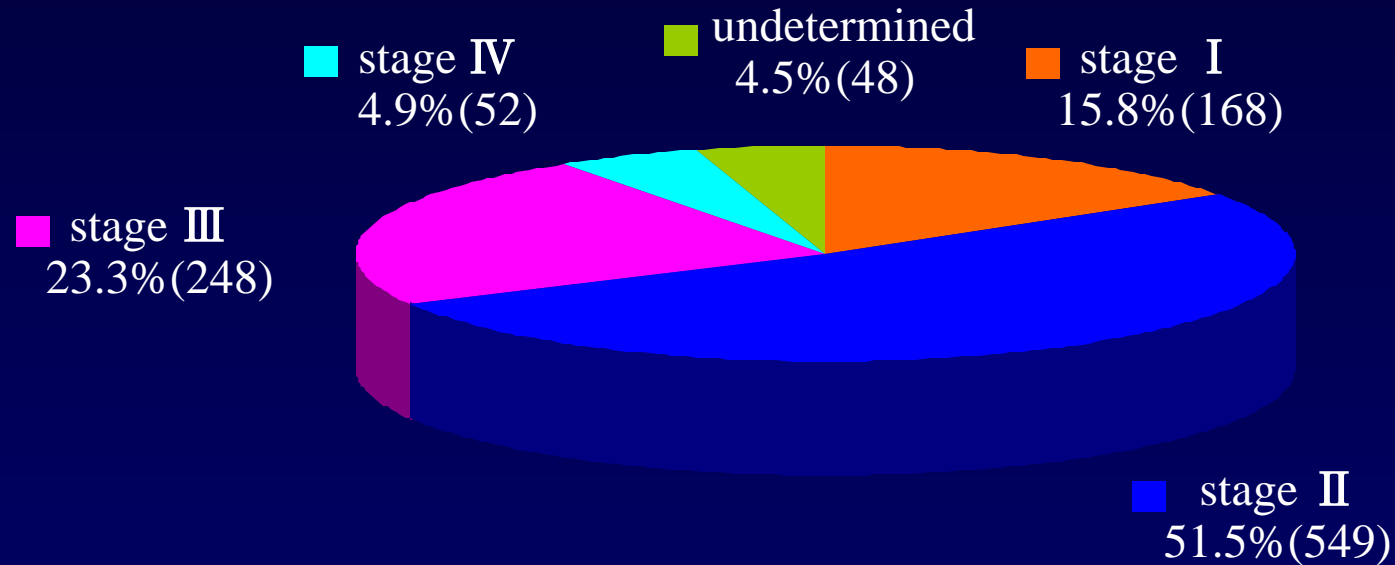
Epidemiologic Data*: Classification of Lymphedema



*Lymphedema Clinic, Vascular Center, Samsung Medical Center(1995.Jan.~2002.Dec.)

Chronic Lymphedema

Epidemiologic Data* : Clinical Staging of Lymphedema



*Lymphedema Clinic, Vascular Center, Samsung Medical Center(1995.Jan.~2002.Dec.)

Chronic Lymphedema

Discussion – Treatment in general

- Present CDT-oriented treatment regimen is not curative, but rather it effectively prevents disease progress and produces a satisfactory outcome in the majority when the patient is compliant and maintains self-motivated home treatment following hospital-initiated care.
- The patient compliance to the maintenance CDT is the first and the prevention/treatment of systemic/local infection (e.g. cellulitis, erysipelas) is the next most important factor to the successful management.

Surgical Treatment of Chronic Lymphedema

Discussion – Surgical Therapy

- Initial as well as long term outcome/success of reconstructive surgery depends heavily on the proper selection of the candidate in earlier stage of chronic lymphedema before residual lymphatic vessels get damaged by prolonged lymphatic hypertension: “Earlier, the better”
- Our candidates for the reconstruction, however, presented much progressed condition with prolonged lymphatic hypertension due to the selection policy. But partly damaged vessels were also effectively rejuvenated to regain normal function by continuous MLD-based CDT postoperatively.

Surgical Treatment of Chronic Lymphedema

Discussion – Surgical Therapy

- Compliance of the patient to commit to the life-time CDT is therefore, most crucial to achieve satisfactory long-term results of surgical therapy among our candidates; full integration with CDT-based therapy as a part of multidisciplinary team management following surgical therapy can only achieve the most effective control of the condition.
- Surgical therapy therefore, can have a supplemental role to the non- to poor- response group of CDT as adjunct therapy yet to most, and can keep its critical role to improve total care management of chronic lymphedema together with CDT through their mutually complimentary effects.