



ORIGINAL RESEARCH PAPER

Plastic Surgery

EFFECTIVENESS OF NODOVENOUS SHUNTS IN FILARIAL LYMPHEDEMA OF LOWER LIMBS-AN EVALUATION

KEY WORDS:

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ABSTRACT

Aim: To prove the effectiveness and lympho nodo venous shunts done in filarial lymphedema in lower limbs.

Setting Around four thousand lower limb filarial lymphedema patients attend our Out Patient Department. For all Grade I and II Patients Nodovenous shunts done in addition to Medical Management. For all Grade III and IV Patients Nodovenous Shunts 1 Week prior to reduction surgery.

Methods A 100 Patients were taken up for study Male and Female 60:40 Grade I and II Patient's grouped according to Inguinal lymph node enlarge. Node positive for study Node Negative as Control. Control group subjected to compression and physical therapy alone. Study group Subjected compression and physical therapy along with Nodovenous shunts. Grade III and IV grouped random as study and control group compression + Reduction Study group Compression + Nodovenous Shunt+ Nodovenous Shunt +Reduction.

Patients were clinically evaluated by measuring different in limb circumference and Reduction in volume.

Statistical Analysis

Results

In Grade I & II Patients there was Reduction size and volume in both control and study group Grade III & IV there was Reduction in Height Circumference in the study Group. In control group increases in thigh Circumference.

Conclusion Lymphonodovenous Shunts has produced Consistent edema reduction in all stages of filarial lymphedema.

Introduction:

Thanjavur in tamilnadu is an endemic area for filariasis.

Department of plastic surgery was started in thanjavur medical college by Professor.Jamal,apioneer in filarial research.

We treat around 2000 patient of lower limb filarial lymphedema every year .

Professor Olswaski performed Nodovenous shunts in the year 1966.

Professor Jamal Performed Nodovenous shunts in the year 1981 .

We perform Nodovenous shunts as a first line of surgical intervention of lower limb filarial lymphedema.

Hence, we decided to evaluate the effectiveness of Nodovenous shunts in filarial lymphedema patients.

Definition:

Filariasis is a name given for a group of diseases caused by nematodes belonging to the family Filaridae which are transmitted by haemophagus mosquito culex fatigans.

In india causative organism are Wucheria Bancrofti and Brugia Malayi.About 250 million people live in the endemic area and about 32 million people are affected by it.

Among these 90% of infected people comprise asymptomatic carriers. The management of the disease,apart from chemotherapy and surgery includes preventive aspect of vector control through vector Research and Control Centre and National Filarial Control programme launched in 1995.

GRADES OF LYMPHEDEMA:

Grade I : Pitting edema

Grade II : Edema of the lower limbs not relieved by rest.

Grade III : Non-Pitting of the lower limbs more than 5cm of difference in circumference from normal limb in any one of the fixed points.

Grade IV : Non-Pitting edema of lower limb withczema, nodule, ulceration, lymph vesicle, lymphoarea.

MANAGEMENT

Preoperative management

1. Grading of the disease – measurements.
2. Removal of foci of infections.
3. Long acting penicillin – once in 15 days.
4. Diethyl carbamazine 100mg thrice daily for two days once in 15 days.
5. Leg elevation and rest.
6. Antifungal and antihistaminics.

Gradewise management schedule

- Grade I** Rest and elastic stockings, elevation of limb
Medical Therapy
Pressure therapy with intermittent Pressure of 30 – 50mm of Hg.
Manual lymphatic drainage.
Nodovenous shunts (+/-).
- Grade II** Elevation of limb, Elastic support.
Medical Therapy
Pressure therapy (cycled pneumatic pumps)
Manual lymphatic drainage.
Nodovenous shunts (+/-).
- Grade III** Medical therapy, manual Drainage.
Nodo – Venous shunt.
Debulking surgery.
Sculpturing of the nodule.
SSG for the raw area.

Medical Therapy:

NON SPECIFIC DRUGS

1. Antibiotics.
2. Anti – inflammatory

3. Antihistaminics.

3. Antiinflammatory

4. Measurements.

SPECIFIC DRUGS

1. Diethyl carbamazepine
Actions: Microfilaricidal and filaricidal Duration of Action 12 – 21 Days Dose 5 to 6 mg/kg Adjuvant anti-inflammatory and antiplatelet action.
2. Benzopyrones (Coumarin) Effective and orally and topically

ACTION: It attracts macrophages to the edema site. The macrophages lyse plasma protein there they [pass back into capillaries. 40% to 25% reduction occur in volume in 2 years and reduce secondary infection and gives symptomatic relief.

Complex Decongestive Manual Physiotherapy (Winiwarter 1892)

- 1st Phase
- a) Hygiene measures.
 - b) manual lymph drainage commencing on normal body quadrant progressing to edema region.
 - c) Elastocrepe bandages.
 - d) Remedial exercises.

Intermittent pneumatic compression(ventipress) (Olari Airakinen)

Sequential and graded pumps are more efficient in increasing venous and lymphatic outflow and reduction in edema and associated symptoms. Heat and Bandage (Zhang et al., 1984).

Warming the limb to 60 to 70 above body temperature for 1 hour/day for 3-4 days followed by elastic bandaging reduces lymphedema.

SURGICAL PROCEDURES IN LYMPH EDEMA

Physiological procedures:

1. To improve lymphatic transport capacity

Reconstruction of new lymph vessels with threads and tubes (handles 1908).

2. To increase drainage

- a) Drainage through strips of fascia or through Tensor fascia Lata (Mortorell 1958)
- b) Drainage through omental flaps (Dicks 1935)
- c) Drainage through skin flaps (Rosanow 1912)
- d) Drainage through Entero mesenteric bridging surgery (Kinmonth 1932)
- e) Drainage through peripheral lymphaticovenous anastomosis:
- i) Lympho-nodo venous anastomosis. (Olsowski 1966, S. Jamal 1981).
- ii) Anastomosis between lymph collectors and veins (Laine Howard 1963, Degni 1974).
- iii) Bridging of localized obstruction of lymphatic drainage by transplantation of lymph collectors (Baumeister 1981) by transplantation of veins (Mandl 1981).

PROCEDURES TO REDUCE LOAD OF LYMPHATIC CLEARANCE

- a) Resection of epifascial lymph edematous tissue.
- i) Successive removal of ellipses of skin and sub-cutaneous tissue and primary closure (Sistrunk 1918).
- ii) Excision and closure with skin grafts (Charles 1912).
- iii) Excision and closure with full thickness skin grafts (Gibson and Tough 1954).

Ligature of Arterial blood supply (Carnochan 1954)

Post Operative Management

IMMEDIATE:

1. Leg elevation and rest.
2. Antibiotics.

LATE:

1. Long acting penicillin once in 15 days.
2. Diethyl carbamazepine 100 mg x 2 days once in 15 days.
3. Elastocrepe / Stockings support while walking or standing.
4. To sleep with leg elevated without bandage.
5. Local care of edematous limb Antifungal ointments.

REVIEW OF LITERATURE

The task of the lymphedema surgeon is to restore the balance quantitatively between the lymphatic load and transport capacity by reducing the lymphatic load and / or by increasing the lymphatic transport capacity.

It would be preferable to operate during the latent phase and not during manifest phase i.e., during grade I and II during which most of the lymphatic system is destroyed.

Surgery should achieve a permanent and stable balance between the lymphatic transport capacity and lymphatic load.

As a rule, increasing the lymphatic transport capacity by lymphovenous shunt does not completely quantitatively balance the lymphatic load.

The reduced transport capacity in primary and secondary lymphedema leads to "Tissue Poisoning" by plasma proteins, further alteration of lymphatic transport and filtration systems, changes in direction of lymph flow and alteration of blood vascular system of the affected part.

During the period of clinical lymphedema, the lymph nodes gradually start to harden and shrink.

Hence lymphovenous shunts should be performed early (grade I and II).

Because of failure to achieve permanent cure for filarial lymphedema very few surgeons recommend surgery.

But in tropical climate the lymphedema load increases making the lymphedematous skin situation more difficult to control.

Moreover the finesse of conservative therapy unfortunately may not be available to many lymphedematous patients. That is why in addition to conservative therapy, surgical approaches are advocated.

Performing nodovenous in grade III and IV patients prior to surgery make tissue supple for reduction surgery, prevents increases in thigh circumference and reduced adenolymphangitis also.

LYMPHATIC VEIN ANASTOMOSIS

When Edward and Kimmoth in 1969 performed lymphangiography on a patient with bilateral lymphatic deficiency, but only one limb swollen, they visualized L V shunt in the normal appearing limb.

Besides the formation of a collateral lymphatic circulation, the operating of L V S is one of the nature's method of bypassing a surgical block.

This natural phenomenon has stimulated others to create surgically anastomosis between lymphatics in lymphedematous tissues and suitable veins.

Olsowski first performed NV shunt in lymphedematous patients and showed 70% patency for two years.

PROCEDURE

Nodovenous shunt is done between inguinal lymph node and long saphenous vein (LSV) in an end to end fashion in the affected limb. Procedure is done under local anaesthesia using 1% lignocaine.

A vertical curvilinear incision is made medial to femoral pulse one inch below the inguinal crease.

Long saphenous vein is identified and transected between ligatures.

Enlarged inguinal node is mobilized along with intact afferent lymphatics.

Node is partially shaved and lymph ooze is conformed.

An end to end anastomosis using 6-0 proline is done in between node and vein.

Skin is closed in layers.

Patients are kept in limb elevated position in a filarial cot for 10 days.

Patients are discharged after 10 days following suture removal

MATERIALS AND METHOD

This study was conducted in Thanjavur medical college during the year 2005-2007.

A total of 100 patients were taken up for study which includes 60 females and 40 males.

All patients were screened for caries tooth, inguinal adenitis, hydrocele and skin changes in lower limbs.

All patients were subjected to regular antibiotic prophylaxis, Compression garments and physical therapy for affected limbs. All lymphedematous patients were classified to grades I-IV.

All grade I and II patients were grouped according to the presence or absence of enlarged inguinal node.

Node positive patients were grouped for study.

Node negative patients were taken as control.

Grade I and II control group were subjected to compression and physical therapy and nodovenous shunt.

Clinically leg volume and circumference at standard sites were measured preoperatively (at the time of admission) and at periodic intervals postoperatively.

All grade III and IV patient were grouped randomly into two groups (Study and control group).

BACKGROUND OF STUDY

Since Thanjavur is an edemic filarial area, filarial lymphedema of lower limbs is one of the commonest problems we see in our outpatient department.

We conduct filarial clinic on all Mondays and treat around 4000 patients every year.

	2010	2011	2012	2013	2014
TOTAL CASES	4770	5458	4774	5450	4863
NEW PATIENTS	404	513	456	425	256
OLD PATIENTS	4366	5945	4308	5025	4607
SURGERIES(TOTAL)	162	189	75	142	88
MAJOR	102	109	64	115	79
MINOR	60	80	11	27	9

TABLE.1 CENSUS FOR FILARIAL PATIENTS TREATED AT OUR CENTRE FOR THE PAST FIVE YEARS

Grade III and IV study group were subjected to Nodovenous shunt surgery, Reduction surgery and compression therapy.

Remaining Grade II and IV group were subjected to reduction

surgery, compression and physical therapy.

Clinically, thigh measurements at standard site were measured.

Grade I and II:
Study group: Antibiotic + DEC tabs + compression garments + pressure.

Pump + NODOVENOUS SHUNT

Control group: Antibiotic + DEC tabs + compression garments + pressure pump.

Grade III and IV:
Study group: Antibiotic + DEC tabs + NODOVENOUS SHUNT + Reduction surgery.

Control group: Antibiotic + DEC tabs + Reduction surgery.

METHODS

Patients were clinically evaluated using

- a) Limb circumference measurement (size).
- b) Volume measurement.

(A) LIMB CIRCUMFERENCE MEASUREMENT (SIZE):
The lymphedematous limb is measured at standard sites at periodic intervals.

The normal limb measurements at same sites are taken as reference.

SITE-I : 10 cm from tip of great toe proximally over dorsum of foot.
SITE-II: 12 cm proximal to the dorsoplantar skin junction of the foot in the medical aspect.
SITE-III: 20 cm proximal to the dorsoplantar skin junction of the foot in the medical aspect.
SITE-IV: 30 cm proximal to the dorsoplantar skin junction of the foot in the medical aspect.
SITE -V: 60 cm proximal to the dorsoplantar skin junction of the foot in the medical aspect.

Measurements were done preoperatively once and postoperatively in the frequency of 10 days,3 months,6 months and 1 year.

(B) LEG VOLUME MEASUREMENTS:

Volume reduction of the leg is measured by water displacement in a special drum.

The volume of water displaced by normal limb is taken as reference value.

Volume displaced by affected limb is measured.

Difference between two is approximately calculate as lymphedema volume.

Measurements were done once preoperatively and at regular intervals postoperatively in both limbs.

The difference between volume displacement by the diseased limb and normal limb is recorded.

OBSERVATION

General characters of study group

100 patients of various grades of lower limb filarial lymphedema were included in the study.

Among these 60 were grade I & II and another 40 were grade III & IV.

30 patients of grade I & II with enlarged inguinal lymph nodes were taken up for nodovenous shunt in addition to routine non surgical

methods were taken for study.

Another 30 patients of grade I and II without enlarged inguinal nodes managed with non surgical method were kept as control group.

20 patients of grade III & IV were taken up as study group and equal number of 20n patients were taken as control group randomly.

TABLE.2 STUDY GROUP

	Total no patients (50)	Female (30)	Male (20)
GRADE I	13	8	5
GRADE II	17	9	8
GRADE III	12	8	4
GRADE IV	8	5	3

TABLE.3 CONTROL GROUP

	Total no patients (50)	Female (30)	Male (20)
GRADE I	13	9	4
GRADE II	17	10	7
GRADE III	12	7	5
GRADE IV	8	4	4

RESULTS OF THE STUDY

MEASUREMENTS IN GRADE I & II

In grade I & II patients there was reduction in size and volume in both control and study group.

In study group there was volume reduction in 17 patients.

6 patients showed increase in volume measurement.
7 patients showed no change in volume measurement.

In control group there was volume reduction in 7 patients.

19 patients showed increase in volume measurement.
4 patients showed no change in volume measurement.

TABLE.4 DATA OF CHANGES IN VOLUME MEASUREMENTS IN GROUP I AND II PATIENTS

CHANGES IN MEASUREMENT	STUDY GROUP (NO 30)	CONTROL GROUP (NO 30)
Decreased	17	7
Increased	6	19
No change	7	4

TABLE.5 DATA CHANGES IN CIRCUMFERENCE MEASUREMENT AT HIGH MEASUREMENT IN GROUP III AND IV PATIENTS

CHANGES IN MEASUREMENT	STUDY GROUP (NO 30)	CONTROL GROUP (NO 30)
Decreased	13	2
Increased	7	17
No change	2	1

SIZE MEASUREMENT IN GRADE I & II (20 Cms)

In the study group

17 patients showed reduction in circumference
6 patients showed increased in circumference
7 patients showed no change in circumference

In the control group

7 patients showed reduction in circumference
19 patients showed increased in circumference
4 patients showed no change in circumference

SIZE MEASUREMENT IN GRADE III & IV

In the study group

13 patients showed reduction in circumference
7 patients showed increased in circumference
2 patients showed no change in circumference

In the control group

2 patients showed reduction in circumference
17 patients showed increased in circumference
1 patient showed no change in circumference

DISCUSSION

The study group patients who have undergone nodovenous shunt in grade I & II has shown reduction in volume and leg circumference when compared to the non nodovenous shunt (control group) patients.

The reductions in study group patients were significant when compared to control group reduction.

Similarly significant no of patients in study group have volume reduction when compare to the control group.

All those patients who had reduction in circumference in effect had reduction in volume also.

Significant no of patients under study group in grade III & IV lymphedema had thigh circumference reduction.

Significant no of patients under control group in grade III & IV lymphedema had increased in thigh circumference.

CONCLUSION

The evaluation of results in control and study group shows volume reduction in the study group who underwent nodovenous shunt in addition to all other measures followed in control groups in very significant.

The primary pathology in filarial lymphedema being in lymph nodes (regional inguinal) and the stasis in distal level is more a secondary effect.

By passing the lymph to the venous blood by nodovenous shunt which done without microscope and which has produced consistant reduction all stages of filarial lymphedema. Nodovenous seems to be most appropriate surgical procedure suited for the magnitude of the problem and resources available.

The initial reduction in thigh circumference of in grade III and IV is good and the resultant skin laxity is utilized for the excisional procedures followed here.

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