Lymphoedema – pathophysiology and principles of management

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Contents

• Definition and Causes
• Patient Assessment and Investigation exc Lymphography
• Principles of management
• Recent advances in lymphedema Surgery
  • (exc Silastic Tube)
LYMPHOEDEMA - DEFINITION / EXTENT

- Any localized swelling of the limb can be defined as lymphedema
- Generally, due to inadequate lymphatic transport
- Infection and inflammation a common adjunct
- Common causes
  - Filariasis
  - Venous Diseases
  - Surgery for Malignancy
  - Trauma
  - Congenital deficiency
  - Post Inflammatory
  - Others
BASICS

A mismatch of Capacity and Demand causes oedema

Syn – flooding can be caused by

- Excess rain and/or
- Dams

The functioning of the lymphatic system is closely related to that of the circulatory system.

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Source: Merck Manual of Medical Information. Reprinted with permission.
SITES OF LYMPH ACCUMULATION (LAKES) - THE CULTURE MEDIA

- Subepidermal lymphatic plexus
- Artificial spaces between collagen bundles
- Perivascular spaces
- Epi- and subfascial space
LYMPHOEDEMA IS A VICIOUS CYCLE

Initial cause
(Filariasis/ Trauma /Infection/other)

Decreased Flow of Lymph

Heart disease, liver, kidney failure, old age, paralysis

Oedema
- A potent culture media
- Poor access to lymph nodes

Secondary Infection
- Fungal infection/Itching/ Dryness
- Role of Penicillin

Elephantiasis

Fibrosis and actual block
TYPES OF LYMPHOEDEMA

Post-inflammatory (Dermatitis Lymphangitis, Lymphadenitis of various etiologies)

Post-surgical (after Groin and Axillary Dissection also including Radiotherapy; After Arterial Reconstructions and Saphenous Vein Harvesting for Coronary Bypasses)

Post-traumatic (Closed and Open Limb Injuries with Immobilization)

Mixed Lymphatico-Venous type secondary to various Chronic disorders – RA/Paralysis/Others

Congenital (MILROYS/ others syndromes)

Idiopathic (PRIMARY)

Parasitic (FILARIAL)
Lymphoedema - - - Lipoedema*
EARLY DETECTION IS THE KEY AFTER CANCER

- Loss of visualization of veins/tendons
- Cannot pinch finger skin
- Loss of valleys between the MCP
- Joints/ at the wrist (e.g. snuff box)/ Elbow
- Change in skin texture
- Heaviness on dependency or later in the day
- Redness and other inflammatory changes
- Impedance measurements (L-Dex™) for assessment of unilateral lymphedema of the arm
INVESTIGATIONS

Hemogram/ Urine/
   Night blood?
Filaria serology
Photos
Volume
Lympho-scintiscanning
Doppler MRI/CT
Fluoroscent Lymphography

Investigation for other causes
   Neurological /age
   Limited mobility
   Heart
   Kidney
   Liver
SIGNS OF INFECTION (CELLULITIS)

- Swollen part becomes red, hot and painful
- D/D Recurrence of Malignancy, Venous Thrombosis
- High temperature, loss of appetite
- generally unwell,
- Antibiotics to be started immediately.
- Stop all lymphoedema treatment.
- Remove compression garments,
- Rest swollen part in a comfortable position
- Whole limb supported along its length.
HISTORY OF ADLA
TAKING MEASUREMENTS
ANTI FILARIAL DRUGS

• DEC
• Ivermectin (2015 Nobel prize)
• Albendazole

• Shorter courses of therapy
• Single day mass drug administration (MDA) showing results
  • 6 monthly rather than yearly
  • Many states ready to be declared Filaria free

• Understanding that if the drug can reach the worm, it will work
• Need of morbidity control as adjunct
EARLY/MILD LYMPHOEDEMA
ISL STAGE I

- No or minimal shape distortion
- Little or no pitting oedema
- Intact resilient skin
- Able to tolerate application / removal of compression garment

Initial management with compression garments†
MODERATE LYMPHOEDEMA
ISL STAGE II (EARLY AND LATE)

- Fragile skin
- Lymphorrhoea
- Skin ulceration
- Significant shape distortion
- Not contained by compression garment

Initial management with modified MLLB†
MODERATE/SEVERE LYMPHOEDEMA
ISL STAGE II, LATE STAGE II AND STAGE III

- Significant shape distortion and swelling of digits
- Lymphorrhoea/broken skin
- Subcutaneous tissue thickening
- Secondary changes, warts, maggots
- Swelling involving root of limb
- Committed to treatment

Intensive therapy†
SKIN CARE
- NEEDS CLOSE EXAMINATION

- Most infections are through skin penetration
  - Sometimes elsewhere - e.g. carious teeth
- Fungal infection in 80-90% of lower limb cases
- Washing and cleaning is the key
MANAGEMENT SUMMARY PLAN

- **Infection**
  - Always treat
  - Always prevent (penicillin / fungus / Carious tooth)
- **Adverse Lymph flow (test by lymphography)**
  - Functional – Compression Therapy /
  - Physical Block – Bypass by (Flow enhancement) surgery (MLD?)
- **Cosmetic – with functional aspects-debulking**
- **Residual fat – Liposuction?? (test by MRI)**
- **Life long compression therapy and infection control**
- **Skin care and psycho-social rehabilitation**
PENICILLIN - BEST ANTIBIOTIC

WHY
• Cheap
• Narrow spectrum
  • Specific for ADLA
• Safe
  • No anaphylactic shock since disposable syringes!
  • Delayed allergy seen
  • Jarisch Herxheimer reactions
• Only long acting antibiotic
  • Results seen in first dose itself

HOW
• Pencom/ Penidure/ Longacillin
  • 1.2 Mega units every 3 weeks
  • Test dose first time only
• Deep i.m.
  • Dilute well
  • Shake well
  • 1 cc Xylocaine -decrease pain
  • Use luer lock syringe
  • No. 23 needle to fill syringe, 22 to inject
• Continue for 1-2 yrs
  • Maybe longer even life long esp during Monsoon (insect bites)
ADVANCES IN LYMPHOEDEMA CARE

1. Investigations
2. Infection Control
3. Skin Care
4. Compression Therapy
5. Anti-filarial drugs
6. Counselling and other methods of group care
7. Surgery
   1. Node venous and Lymphatico-Venous shunts
   2. Node transplants
   3. Silicone Tume implantation
   4. Liposuction
   5. Debulking Surgery
8. Fluorescent Lymphography


Olszewski WL Lymphovenous microsurgical shunts in treatment of lymphedema of lower limbs: a 45-years experience of one surgeon/one center Eur J Vasc Endovasc Surg 2013;45,282-90
CONTEMPORARY INDICATIONS FOR LYMPHOVENOUS SHUNTS IN LYPHEDEMA OF LOWER LIMBS-2015

- Visualization of a thigh lymphatic and inguinal single lymph node on limb stress lympho-scintigraphy (irrespective of type of lymphedema)
- Early stage of: post-surgical lymphedema (after cancer surgery), hyperplastic lymphedema, post-inflammatory obstructive lymphedema
- Introduction for debulking surgery (if no flow from cut lymph node, remove them)
SUPER MICRO SURGERY

• Japan (Mihara) /Taiwan
  • Direct lymphatico- venous anastomosis
  • Flow enhancement by higher number of shunts
  • 12-0 sutures

• Has to be done earlier rather than later

• Criteria for success - eliminate compression need
  • outcomes not mentioned
VASCULARIZED NODE TRANSPLANTS

- Used largely in Post Mastectomy
- May be a part of distally based (inf Epigastric) Rectus Abdominis M Flap
- Implanted around elbow or forearm for late reconstruction
- 33% Incidence of donor site lymphedema
  - Concept of sentinel node harvest??
STEM CELL THERAPY?

- In Lower limb
  - Young Shim (Korea)
  - Implanted Abdominal Fat to thigh for post Gynaecological Cancer

- In Upper Limb
  - Belgium
  - Filled the empty axilla after Breast Cancer Surgery with fat
LIPOSUCTION

- Harak Brorson (Sweden)
- Short term results are maintained over a long term only if compression is continued
DEBULKING SURGERY
PREPARATION THROUGH COMPRESSION/ NODOVENOUS SHUNT IS A MUST

REMOVED SKIN, SUBCUTIS AND FASCIA

MUSCLES

FASCIA

SUBCUTANEOUS TISSUE