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ANNUAL GENERAL MEETING  
&  
SCIENTIFIC SESSIONS  
ON  
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**NEW YORK HILTON AND TOWERS  
1335 Avenue of The Americas New York, NY**

# PRIMARY HYPERHIDROSIS

Disease or Anxiety



N. I. PERINPANAYAGAM M.D, FRCS, FACS

Professor of Neurosurgery

NYU Medical Center

New York, NY

# PRIMARY HYPERHIDROSIS

**Diagnosis of Primary HH - Start in the 1<sup>st</sup> or 2<sup>nd</sup> decades of life & should be Bilaterally Symmetrical**

**Occurs in 2.8% of the US population**

**Typically affects the hands, axillae, feet & less commonly the face (facial flushing)**



# INHERITANCE

- **Primary HH is reported to be inherited as an Autosomal dominant gene, with incomplete penetrance**



# PRIMARY HH

- **Has Psychological, Social, Economic & Occupational implications**
- **Most patients present in their teens and twenties**
- **Majority of pts. are on Anti-Anxiolytic drugs**



# TYPICAL PRESENTATION

- **Palmar, Axillary & plantar HH**
- **Palmar HH only**
- **Axillary HH only, with or without Bromhidrosis**
- **Facial HH / Gustatory sweating with or without facial flushing**
- **Plantar HH**

# DIAGNOSIS

- Primary vs Secondary HH
- Endocrine work-up – Hyperthyroidism, Hyperpituitarism, Dumping syndrome, Alcohol & drug withdrawal, menopause, Diabetes, febrile illnesses, paraplegia, stroke, anxiety etc
- Objectively quantify degree/severity of HH & the impact on ADL
- Family history

# PATIENTS WITH PRIMARY HH

- **Excessive sweating independent of ambient temperature, worse with anxiety!**
- **Excessive hand sweating leaves puddles of sweat, avoid shaking hands**
- **Axillary sweaters change shirts 3-4 times/day, wear only darker clothes**
- **Plantar sweaters cannot wear sandals or slippers, wear thick sox & closed shoes**



# NON-SURGICAL TREATMENTS FOR PRIMARY HH

- **Antiperspirants (Aluminum Chloride – Drysol)**
- **Anticholinergics – (Robinul)**
- **Iontophoresis**
- **Therapies based on Bio-feedback**
- **Botulinum toxin “A” Injection**

# IONTOPHORESIS (Drionic & Fischer)

- Immersing hands or feet in tap water through which a 15-20ma direct current is passed
- Iontophoresis to deliver anticholinergics
- Recom-20mts on days 1,2,4,7,10,15,22 & maintenance sessions every 4
- Side effects burning, tingling, skin irritation, erythema



# BOTULINUM TOXIN INJECTIONS

- Intra-dermal botox blocks the release of Ach
- The area to be treated is outlined using the “starch-iodine test” the area is marked out into 1.5cm squares and 2units of Botox is injected intradermally to each square (max dose 100units)
- Works best for axilla and less well in the hands and feet

# MEDICAL MANAGEMENT

- Antiperspirants – 1<sup>st</sup> line of Rx -Palmar, Plantar, Axillary HH (Drysol- Aluminum based)
- Iontophoresis – non-responsive to above Palmar & Plantar
- Anticholinergics – Robinul (1mg tid) palmar, plantar, axillary ( 1<sup>st</sup> line in whole body HH & facial HH)
- Botox Injections – Axillary HH not responsive to 1 & 2 (not recom. In palmar – muscle wasting & hand weakness)

# STARCH IODINE TEST SHOWING LOCATION OF EXCESSIVE SWEATING





# SURGICAL TREATMENT OF PRIMARY HH

- **Excision of Apocrine glands –Axilla (liposuction)**
- **Radio-frequency lesioning of the Sympathetic ganglia (Imprecise)**
- **Endoscopic Thoracic Sympathectomy**

# THORACIC SYMPATHECTOMY FOR HH

- Isolates the sympathetic supply to the sweat glands
- Immediately stops sweating, hands after sympathectomy slightly warmer & pink
- Approaches –
  - Supra-clavicular; Trans-axillary
  - Postero-lateral thoracic (midline approach)
  - Endoscopic Thoracic Sympathectomy

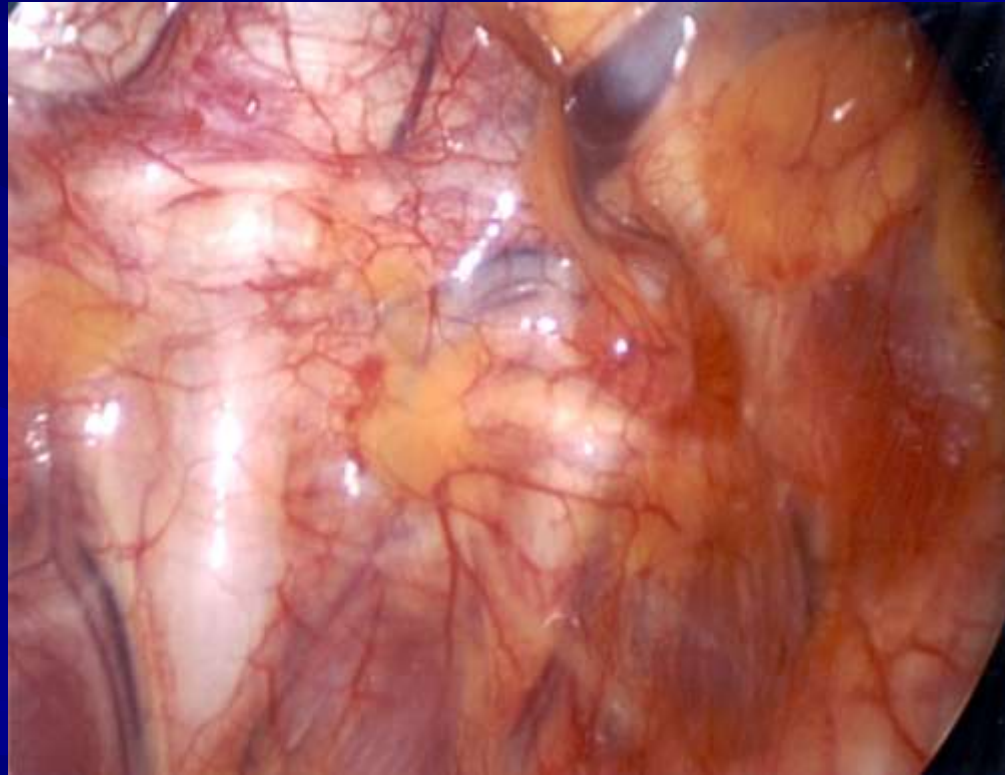
# INTERNATIONAL NOMENCLATURE FOR SYMPATHECTOMY SURGERY (ISSS)

- Notation of level or levels where sympathetic chain isolated
- Rib based - R2, R3, R4, R5
- Ganglion based – G2 (R2-3) G3(R3-4), G4(R4-5), G5(R5-6)
- Old terminology – Sympathicotomy / T2, T3, T4, T5 Sympathectomy.
- T2 – (R2R3/G2), T3 – (R3,R4/G3), T4-(R4,R5/G4), T5 – (R5,R6/G5)

# INDICATIONS FOR ENDOSCOPIC THORACIC SYMPATHECTOMY(ETS)

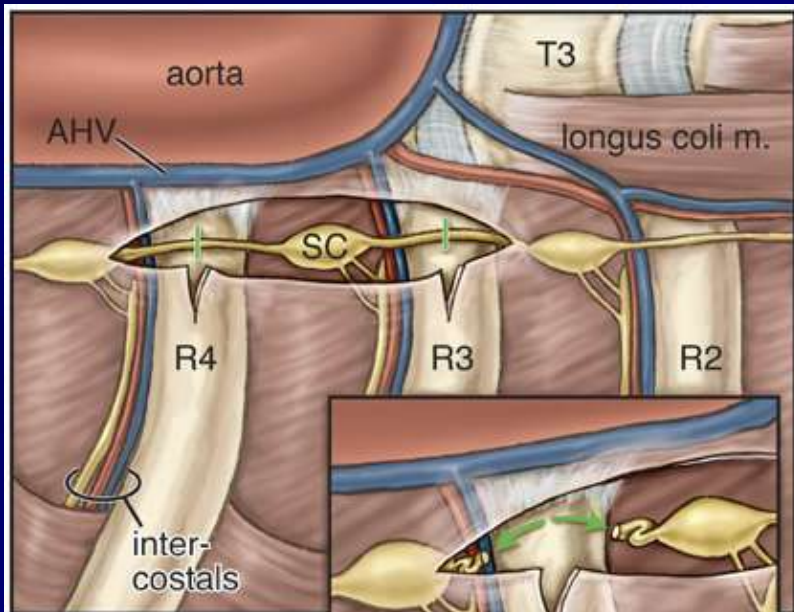
- Severe Palmar with Mod. Axillary, & Plantar Hyperhidrosis (failed medical Rx)
- Isolated Axillary
- Facial Flushing or Redness
- Reflex Sympathetic Dystrophy (CRPS)
- Raynaud's Syndrome
- Idiopathic cardiac arrhythmias-children

# BILATERAL ENDOSCOPIC THORACIC SYMPATHECTOMY-ETS





# DIVISION OF THE TRUNK AT R3,R4 ISOLATES THE 3<sup>rd</sup> GANGLION



J. Gregory 2006



# CLINICAL MATERIALS & METHODS

- **Retrospective review of 185 patients for a total of 370 sympathectomies.**
- **138 patients were available for follow-up**  
**(very mobile young Pt. population)**

Chwajol M, Barrenechea IJ, Chakraborty S, Ichiba T, Lesser JB, Connery CP, Perin NI, **Impact of symptomatic improvement, recurrence and compensatory hyperhidrosis on patient satisfaction after endoscopic thoracic sympathectomy.** *Neurosurgery.* 2008; 64:511-518.

## RESULTS - 1

- ETS for HH - 182pts,
- ETS for facial Flushing - 3pts.
- Avg. time from ETS to questionnaire - 1.3yrs
- Of the 138 patients, 81 females (59%) & 57 males(41%)
- Age range 10 - 67yrs. (mean 28, SD 8.9)

## RESULTS WITH ETS FOR HH

- **98% reduction of sweating in Palmar HH**
- **80% Reduction in Axillary HH**
- **60% Reduction in Plantar HH**
- **Facial Flushing / Facial sweating inconsistent response**
- **Recurrence 1-2% (Higher in patients treated for Axillary HH)**

# COMPENSATORY HYPERHIDROSIS

- Major source of dissatisfaction after ETS for HH
- Occurrence - All Pts. have some degree of compensatory HH following ETS, especially during exercise and hot weather
- However Intractable Compensatory HH, occurs in less than 5% of patients
- Incidence of the severe Intractable CHH has decreased with going to lower levels in the chain (R3,R4-3G,R4,R5-4G)



# OCCURRENCE OF COMPENSATORY HH

- Almost all Pts. experienced some degree of CHH during exercise & hot weather(130 of 138 = 94%)
- CHH occurred mostly in the back, lower chest, abdomen & thighs
- 18 had one body area affected, 41 had two areas, 35 three areas & 36 had four areas affected

# SEVERITY OF COMPENSATORY HH & POSSIBLE PREDISPOSITION

- Age of the patient-Tendency older pts
- Pre-operative BMI-Tends higher with higher BMI
- # of levels of the sympathetic chain /ganglion divided- Tends higher with more levels
- Occurrence of Compensatory HH related to upper versus lower ganglion isolation  
Shown to reduce severe CHH ( T2 to T3 & T4)

# CURRENT PROTOCOL FOR SYMPATHECTOMY IN HH

- Presently all patients with Palmar HH receive a T3 Ganglion isolation (R3,R4/3G)
- Patients with Palmar & Axillary HH – T3G & T4G (R3-R4/3G, R4-R5/4G)
- Patients with facial HH & Facial Flushing – T2G (R2-R3/2G)

# SATISFACTION RATES REPORTED ON THE QUESTIONNAIRE

- Very Satisfied 88 pts (64%)
- Somewhat Satisfied 36 pts (26%)
- Somewhat Unsatisfied 9 pts (7%)
- Regretted having the surgery 5pts (3%)

Satisfaction rates highest in patients with  
severe palmar HH, and lowest in patients  
with isolated severe Axillary HH

Results in Facial flushing & facial sweating  
inconsistent

Some improvement in Plantar HH (60%)

# REVERSIBILITY

## ■ Cutting or Clipping of the Sympathetic chain

Possible to remove the clips in very severe Compensatory HH to revert to original state – Inconclusive evidence of reversal

## □ Nerve Grafting for reversal ( sural vs Intercostal nerve for grafting)-

Latif MJ, Afthinos JN , Connery CP, Perin NI, Bhora FY, Chwajol M, Todd GJ, Belsley SJ,

Robotic intercostal nerve graft for reversal of thoracic sympathectomy: a large animal feasibility model. *Int J MedRobotics Comput Assist Surg.* 2008; 4:258-226.



# ROBOTIC INTERCOSTAL NERVE GRAFT

**IRB to perform - Robotic Intercostal nerve to sympathetic trunk grafts, to reverse Intractable compensatory sweating.**

# CONCLUSION

**Sympathectomy for intractable Palmar HH is a very effective treatment**

**There was a 98% reduction of hand sweating, an 80% reduction of Axillary sweating & a 60% reduction of plantar sweating after upper Thor.ETS**

**94% of patients in our series developed some degree of CHH. There was a statistically significant association between advancing age & CHH( $p=0.02$ ), Higher BMI showed a trend towards increased CHH ( $p=0.14$ )**

# CONCLUSION

Higher satisfaction rates were noted in Pts. treated for Palmar (100%) even with asso. CHH vs. Axillary HH(73%). Overall satisfaction rate in both groups was 92% at one year.

- With sectioning of the Sympathetic trunk from T2G to T3G & T4G for palmar HH &, T4G,T5G for axillary HH has significantly reduced the incidence of severe CHH

\$100 for speeding and  
\$250 for misleading  
the public





Q & A

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