

# Open Thyroidectomy

8<sup>th</sup> Post Graduate Course in  
Endocrine Surgery  
Crete, Greece

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# Mistakes in Endocrine Surgery

- Confirm correct diagnosis
  - Avoid delay in Diagnosis
    - ◆ Large tumors
    - ◆ Local invasion
    - ◆ Distant metastases
- } poor prognosis

(Mazzaferri E et al/Cady S et al/ Grant E & Hay I et al/Schlumberger M et al/Casara et al)

# Selection for Thyroidectomy & Extent of Surgery

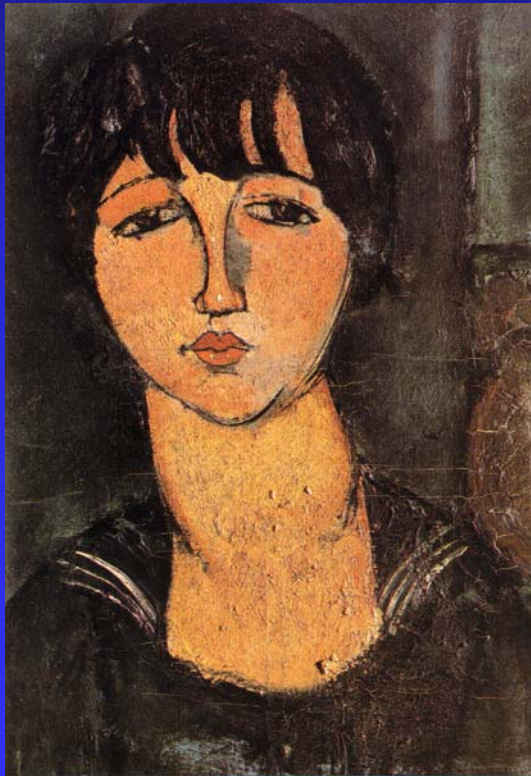
- Based on history/PE/Cytology
- Based on status of patient
- Based on experience of surgeon
- Based on ability to receive thyroid hormone

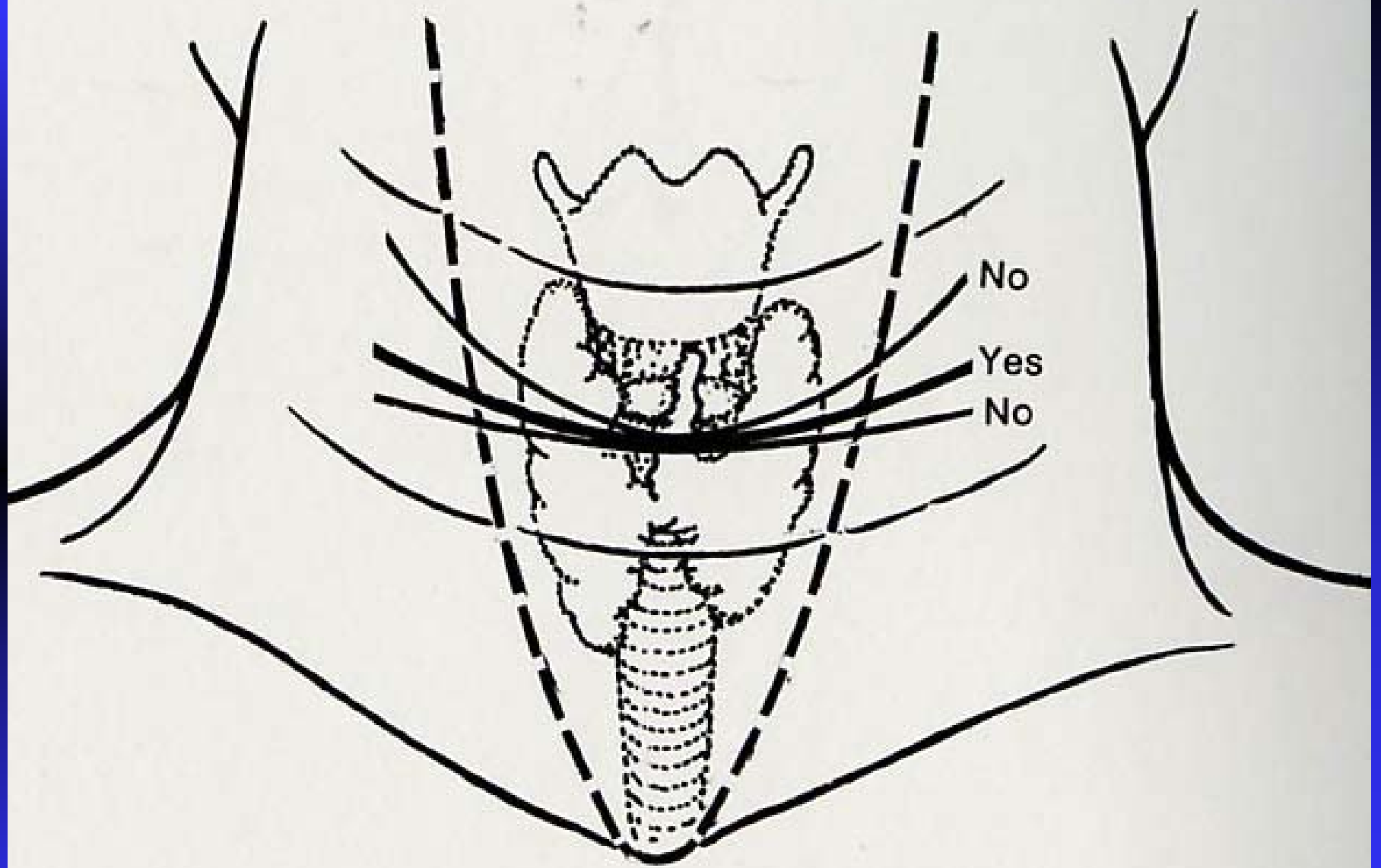
# Evaluation

- History
  - ◆ Genetics (familial)
  - ◆ Environment (radiation exposure)
  - ◆ Symptoms
  - ◆ Rate of growth
- Physical examination
  - ◆ Characteristics of tumor (size, firmness, fixation)
  - ◆ Adjacent lymphadenopathy
- Cytology
- Imaging studies

# Operation

- Positioning (extension without head holding)
- Position of incision
- Length of incision





**Shape and position of incision**

# Operation

- Mobilize tissues cephalad and caudal to isthmus
- Look for abnormal delphian or other lymph nodes
- Look for pyramidal lobe.
- Divide isthmus if plan initial lobectomy
- Mobilize superior pole vessels first laterally then medially and avoid injury to external laryngeal nerve
- Divide superior pole vessels low on thyroid gland
- Divide middle thyroid vein(s)

# Operation

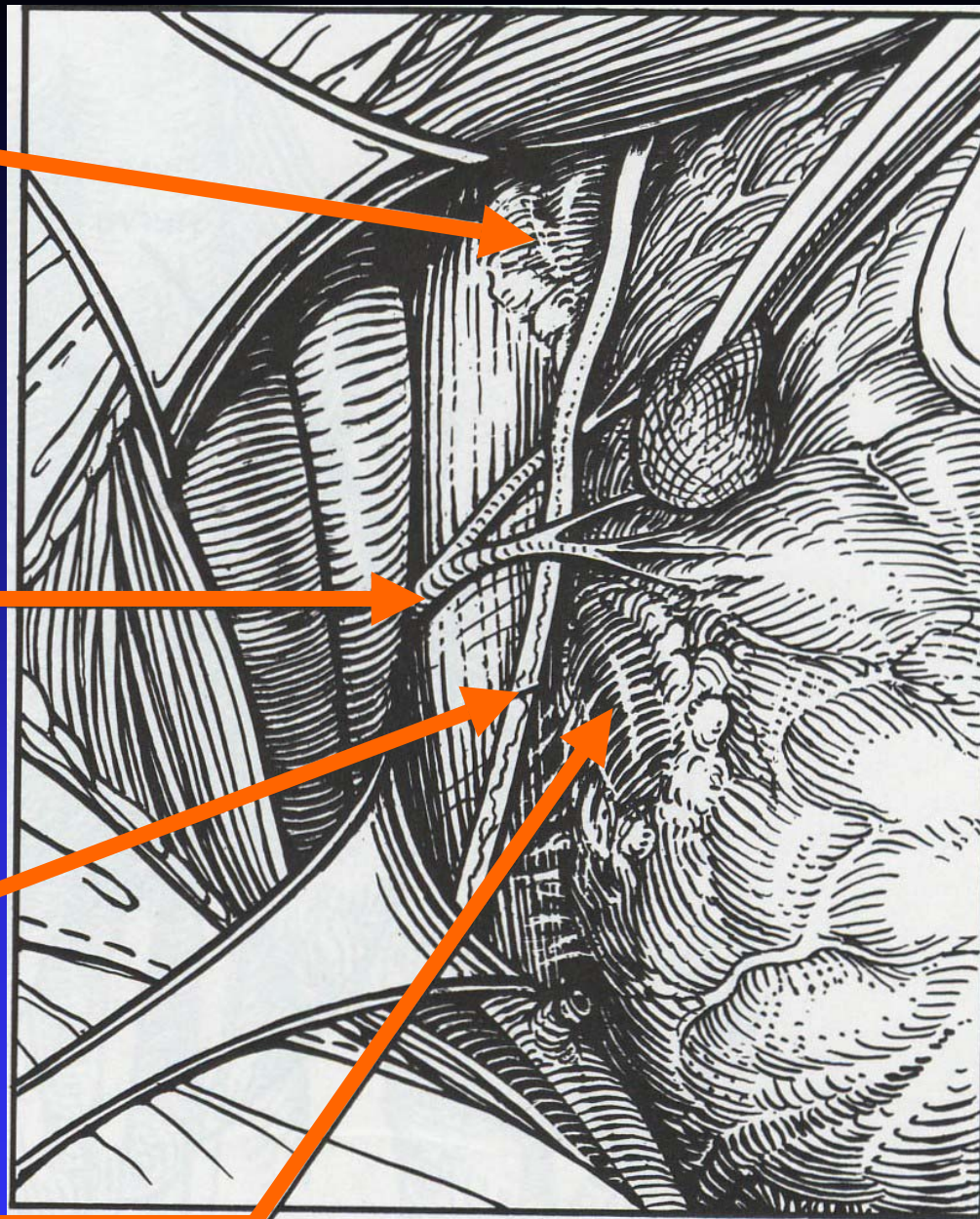
- Bluntly sweep tissues from posterior lateral surface of thyroid lobe
- Identify recurrent nerve
  - ◆ May be branched
  - ◆ More lateral or oblique course on right side, and in tracheo-esophageal groove on left
  - ◆ May be hidden by tubercle of Zukerkandl
  - ◆ Never clamp any tissue until confident that it is not the recurrent laryngeal nerve

**Superior  
parathyroid**

**Inferior  
thyroid  
artery**

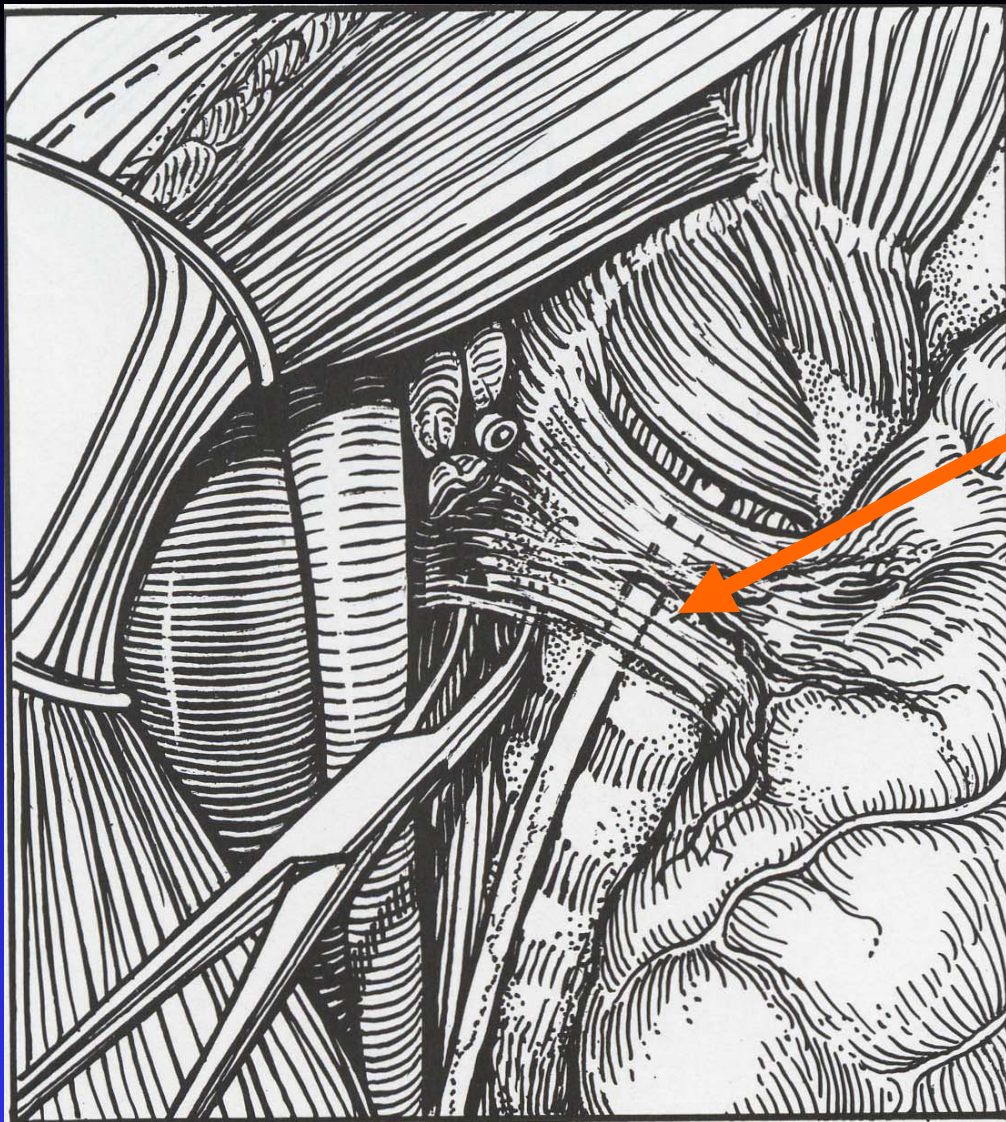
**Recurrent  
nerve**

**Inferior  
parathyroid**



*Koelling*

**Recurrent laryngeal nerve and its relationship to parathyroid gland**



Small  
artery  
and  
vein

*Koelling*

**Ligament of Berry**

# Operation

## Parathyroid glands

- 85% within 1 cm of where recurrent laryngeal nerve and inferior thyroid artery cross
- Treat every parathyroid gland like it is the last parathyroid gland
- Mark with clip to help mobilize from thyroid gland and for subsequent identification
- If devascularized autotransplant into contralateral sternocleidomastoid muscle.

# Operation

## Recurrent laryngeal nerve

- A nerve functioning preoperatively should function postoperatively
- When nerve non functioning preoperatively
  - ◆ Inform patient of possible permanent tracheotomy
  - ◆ Repair nerve at operation
    - ◆ mobilize/align/anastamose
- Non recurrent laryngeal nerve
- Most injuries to RLN occur when clamping "bleeding vessel" at or near ligament of Berry

# Complications of Thyroid Surgery

(Multicenter Study 14,934 Patients during 5 years\*)

- 3130 (20.5%) – Lobectomy
- 9599 (64.3) – Total thyroidectomy
- 1448 (9.7%) – Subtotal thyroidectomy – unilateral remnant
- 757 (5.1%) – Subtotal thyroidectomy – bilateral remnant

\* 6% reoperations

\* Total complications: Transient 17.4%; Definitive 7.1%

(Rosato L et al World J Surg 2004)

# Complications of Thyroid Surgery (14,934 Patients)

- Hypoparathyroidism
    - ◆ Transient 8.3%
    - ◆ Permanent 1.7%
  - Recurrent laryngeal nerve\*
    - ◆ Transient 2.0%
    - ◆ Permanent 1.0%
    - ◆ Bilateral 0.4%
  - Superior laryngeal nerve 3.7%
  - Other Dysphagia 1.4%/Hemorrhage 1.2%/Wound infection 0.3%
- \*All patients laryngoscopy

# Complications of Thyroid Surgery

<b>Total</b>	<b>Subtotal/Unilateral</b>	<b>Subtotal/Bilateral</b>	<b>Lobectomy</b>
Hypocalcemia (14%/2.2%)	(5%/0.7%)	(5%/0.8%)	(0.4%/0.07%)
Recurrent nerve (2.4%/1.3%)	(3%/1.4%)	(2%/1.1%)	(1.4%/0.6%)
Hemorrhage* (1.6%)	(0.5%)	(2.1%)	(0.4%)

\*postoperative in 85% and transfusion required in 1%

(Rosato L et al World J Surg 2004)

# Thyroidectomy for Thyroid Cancer Complication Rates

- National Thyroid Cancer Treatment Cooperative Study
  - ◆ 13 Medical Centers
  - ◆ 3,228 patients with DTC
    - ◆ Hypoparathyroidism\*
      - Total thyroidectomy 6.6% vs. other 1.8% ( $p < 0.001$ ) (range 1-22%) reoperations 7.5%
    - ◆ Recurrent laryngeal nerve palsy\*\*
      - Total thyroidectomy 3.1% vs. other 2.7% ( $p = 0.66$ ) (range 0-7%) reoperation 4.1%

\*Did not correlate with disease stage.

\*\* Did correlate with disease stage

(Mazzaglia P. (AAES 2004))

# Complications of Thyroidectomy (142 Patients)

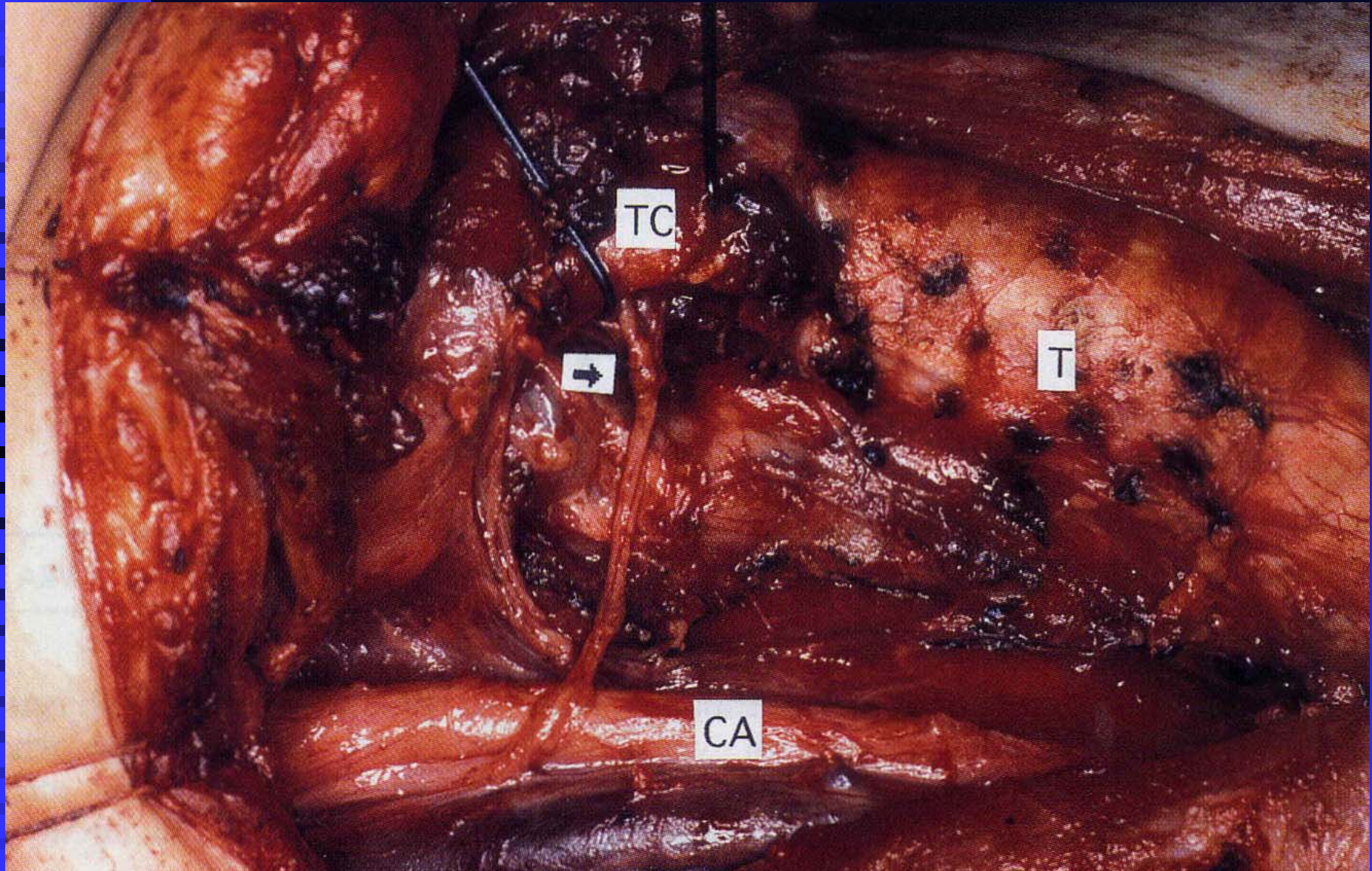
- Thyroidectomy by ENT surgeons may result in a higher risk of permanent post operative hypoparathyroidism (29%) than patients treated by general surgeons (5%) in New Mexico
- Each increase in tumor stage resulted in a doubling of the odds of developing permanent hypoparathyroidism

(Burge MR et al, J Gen Intern Med, 13: 24-31, 1998)

# Mistakes in Endocrine Surgery

- The overall complication rate should be less than 2%
- Experienced thyroid surgeons have fewer complications (Sosa J et al, AnnSurg 228:320-330, 1998)

(Burg MR et al, J Gen Intern Med 13:24-31, 1998)



# Mistakes in Endocrine Surgery

## Immediately Post Operative

- Avoid coughing/vomiting/straining
- Apply counter pressure

# Complications

- Transient and permanent vocal cord paralysis
- Transient or permanent external laryngeal nerve injury
- Transient and permanent hypoparathyroidism
- Bleeding/seroma
- Infection (beware of endogenous infections)
- Keloid formation
- Non thyroid (aspiration/myocardial ischemia/pulmonary embolism etc.)

# Mistakes in Endocrine Surgery

- Higher risk patients
  - ◆ Reoperation
  - ◆ Extensive and/or invasive cancer
  - ◆ Large and substernal goiter
  - ◆ Autoimmune thyroid disease  
(Graves'/Hashimotos thyroiditis)
  - ◆ Short neck
  - ◆ Low lying thyroid gland  
(Cricoid at suprasternal notch)
  - ◆ Bleeding disorder

# Improved technology & the future

1. Good lighting
2. Good vision/magnification
3. Nerve stimulator\*

(\*Not proven and not as good as surgical experience)