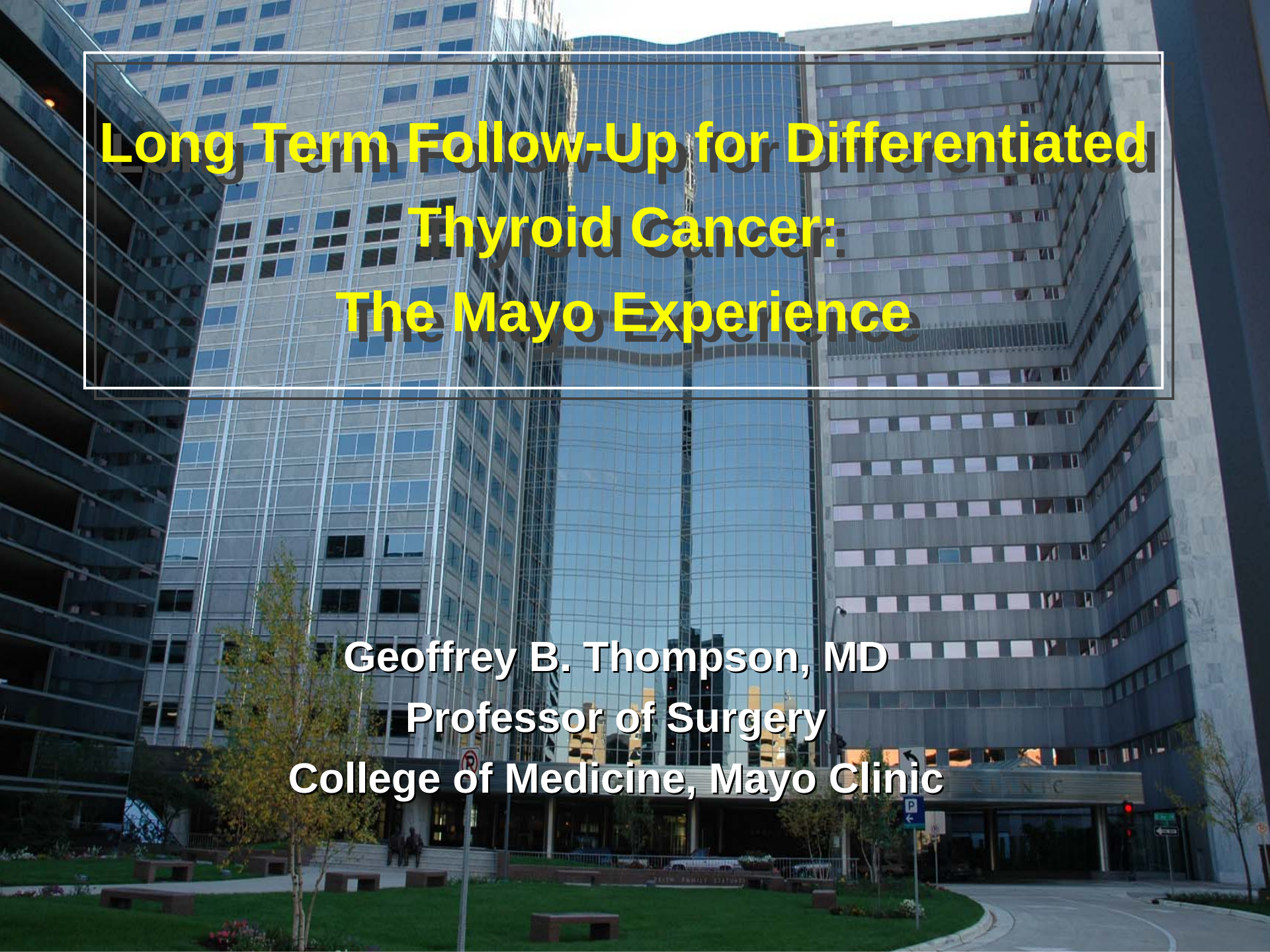




Long Term Follow-Up for Differentiated Thyroid Cancer: The Mayo Experience

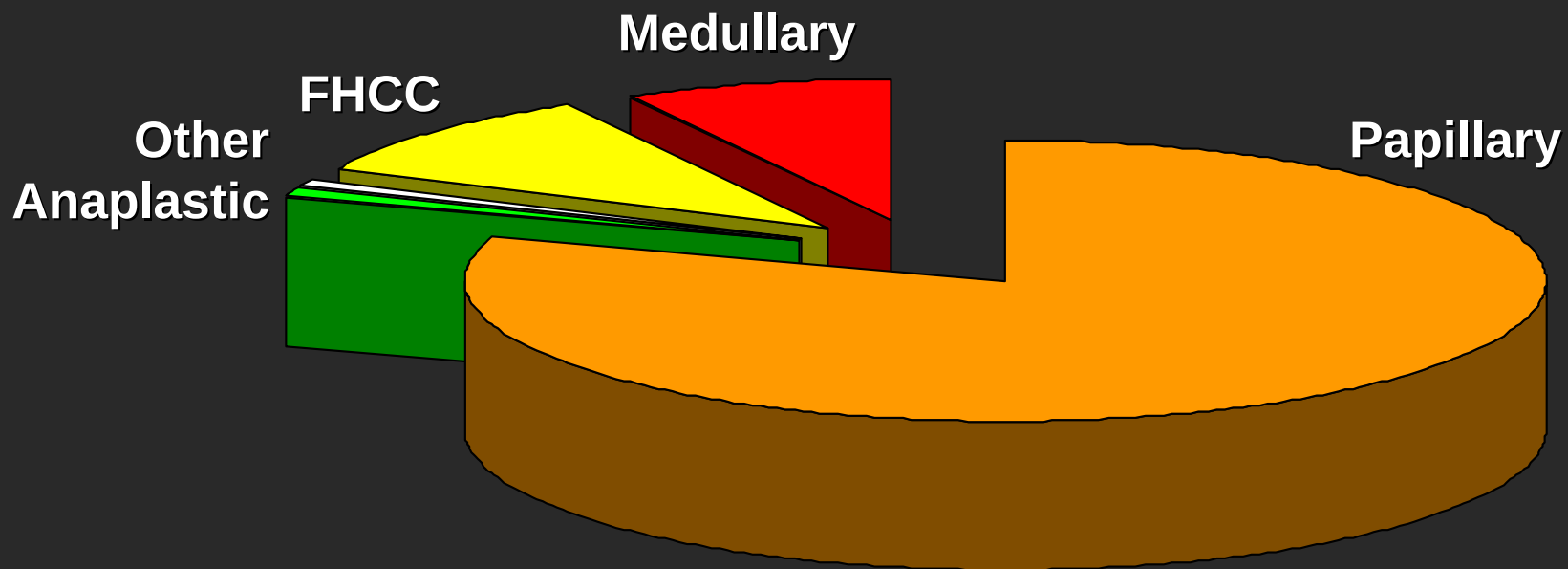
Geoffrey B. Thompson, MD
Professor of Surgery
College of Medicine, Mayo Clinic

Differentiated Thyroid Cancer

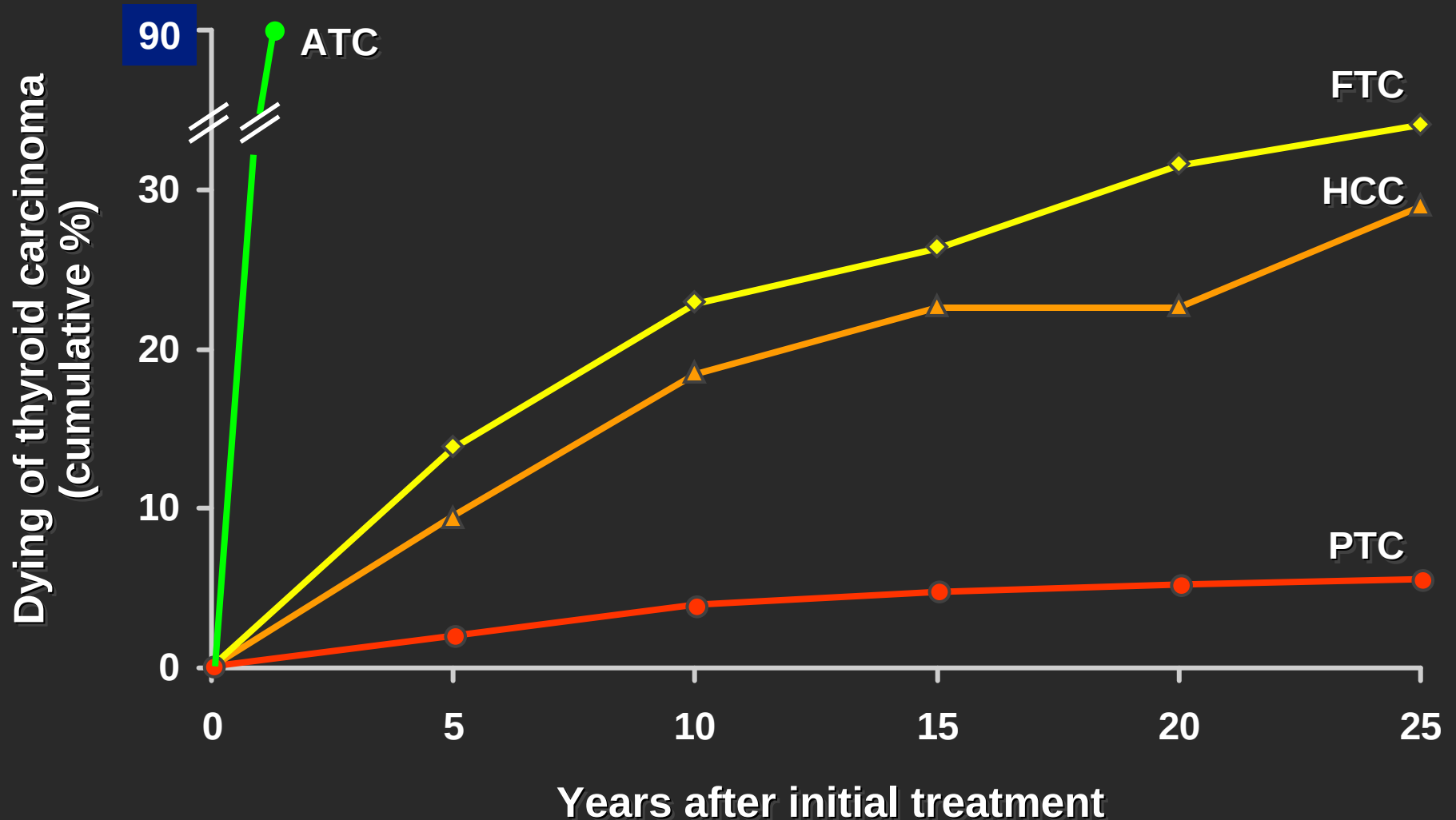
Objectives

- **Overview and When To Suspect**
- **Preoperative Evaluation**
- **Extent of Thyroidectomy**
- **Extent of Lymphadenectomy**
- **RAI**
- **TSH Suppression**
- **Special Cases**

THYROID MALIGNANCIES

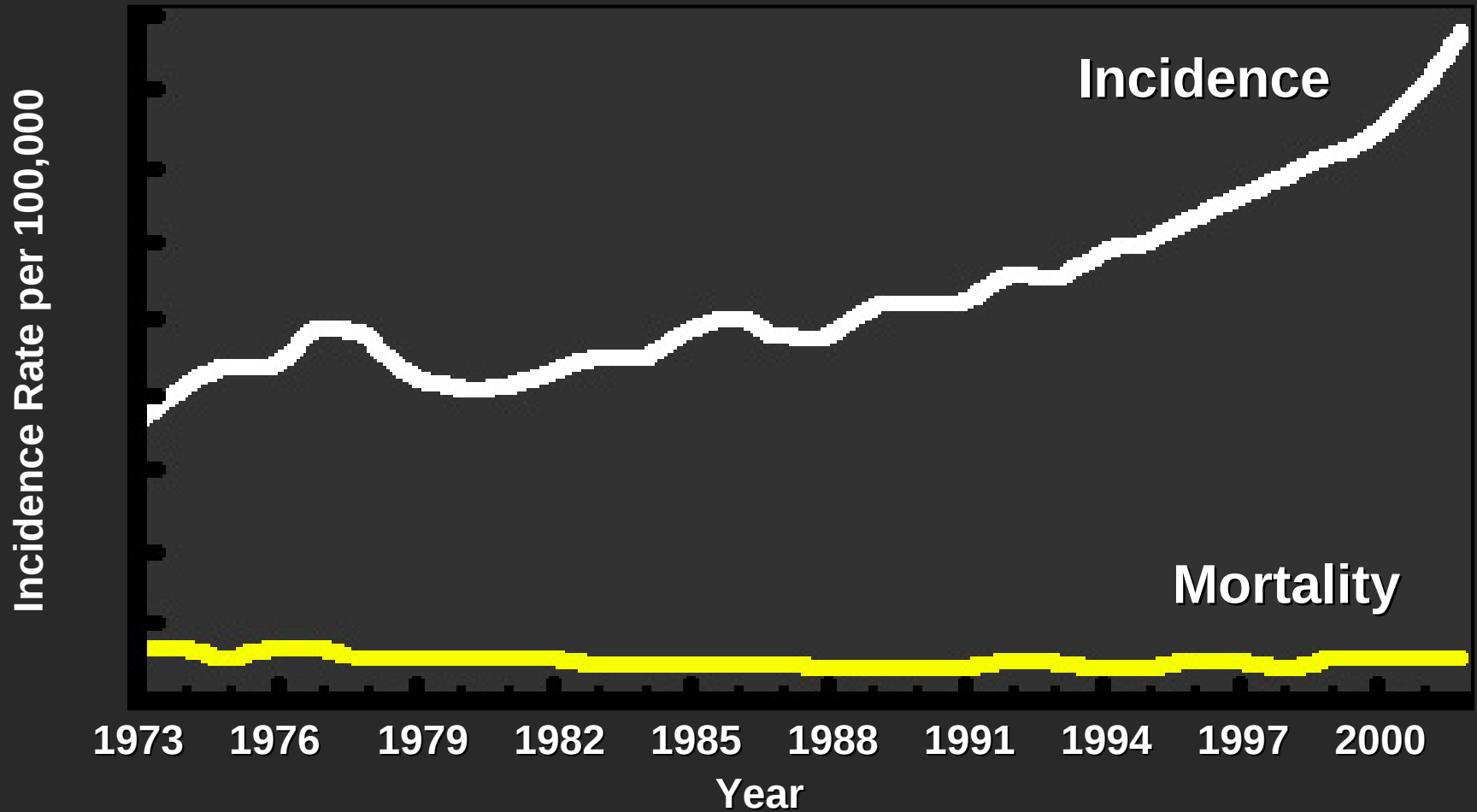


Cause-Specific Mortality Rates in FCDC



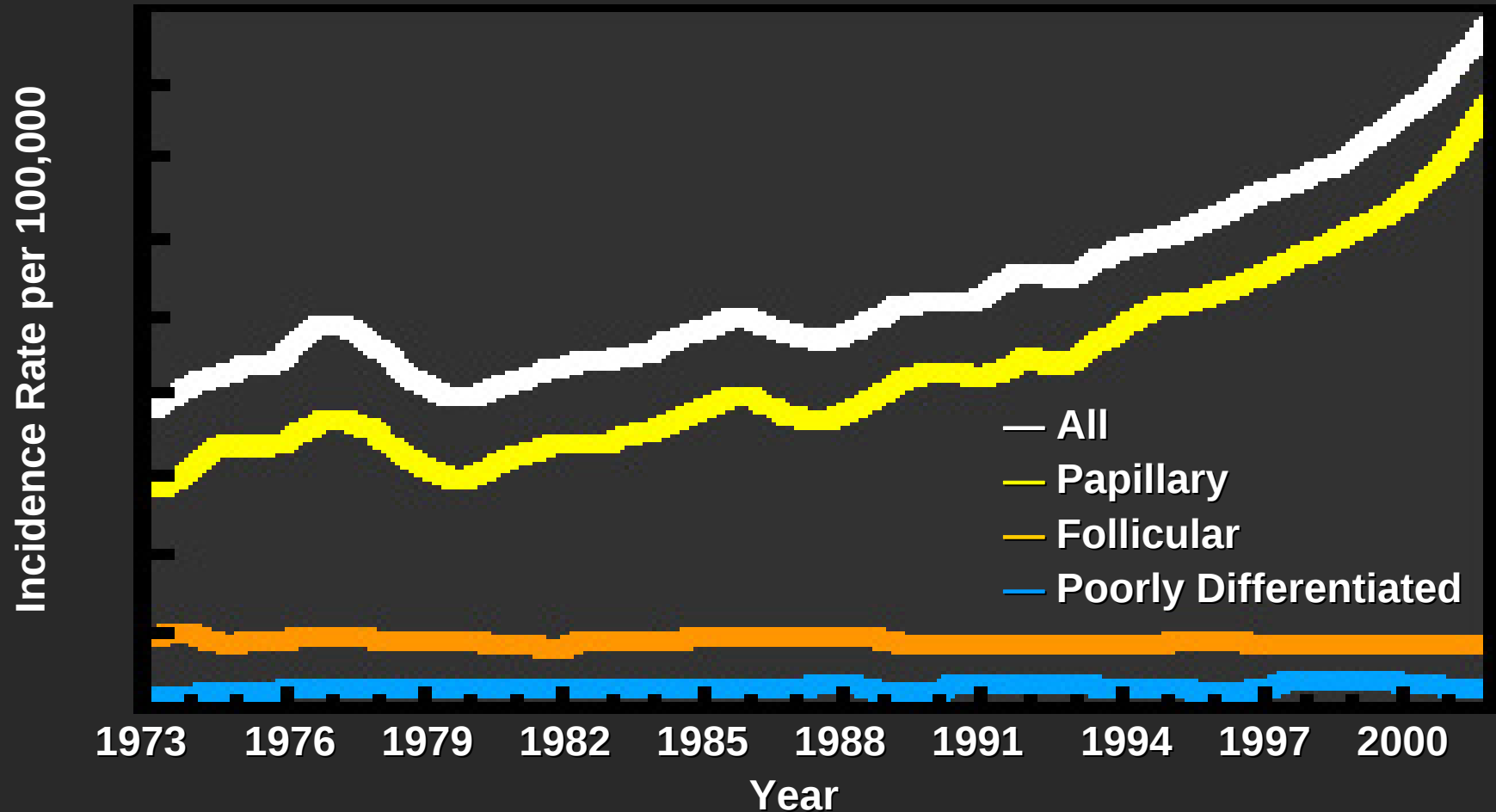
Thyroid Cancer Incidence

1973 - 2002



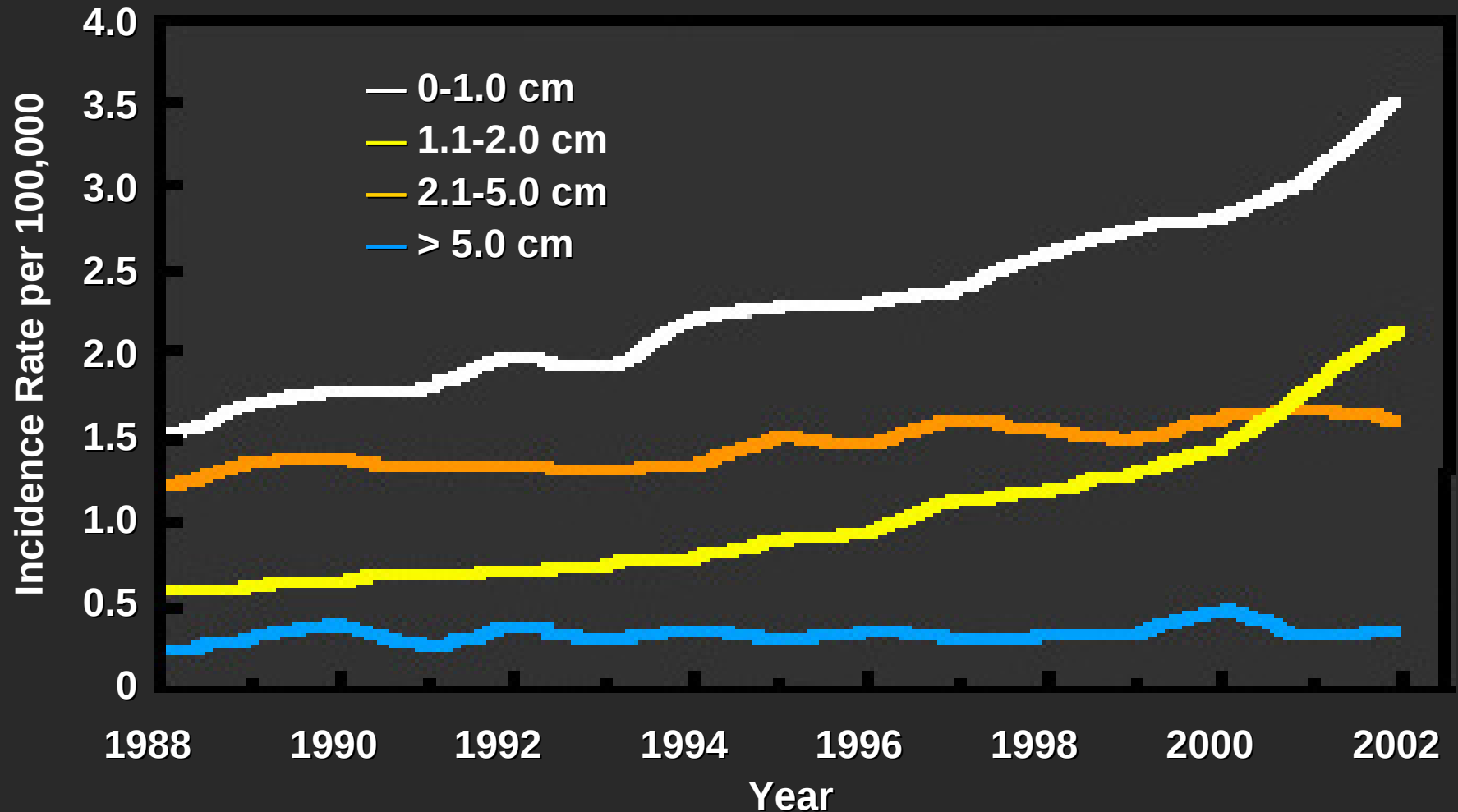
Thyroid Cancer Incidence

1973 - 2002



Thyroid Cancer Incidence

1973 - 2002



The Problem-Or Is It ?

- 15% of Americans harbor thyroid Ca (45,000,000 people)
- 47,000 will be clinically detected this year (80 cases per million)
- 1,500 patients will die

Papillary Thyroid Cancer (PTC)

- Most common endocrine malignancy
- 80% of new cases worldwide
- Extent and type of therapy → **controversial**
- No long-term prospective controlled trials

Surgery for PTC

“...Adjust(ing) the radicalness of therapy to the dangerousness of the cancer”

“The punishment should fit the crime”

Cady -- 1997

Hayes Martin Lecture

Society of Head and Neck Surgeons

Preoperative Evaluation

- **Tier 1:** History, Exam (US), FNA, TSH
- **Tier 2:** Nodal mapping (US), CXR, Vocal Cord Exam
- **Tier 3:** CT with contrast, Triple Endoscopy

Thyroid Nodules

Raised Suspicion

- **Age < 20 years**
- **Male sex**
- **History of head or neck irradiation**
- **Nodule > 4 cm**
- **Compressive symptoms including dysphagia, dysphonia, hoarseness, dyspnea, and cough**

Thyroid Nodules

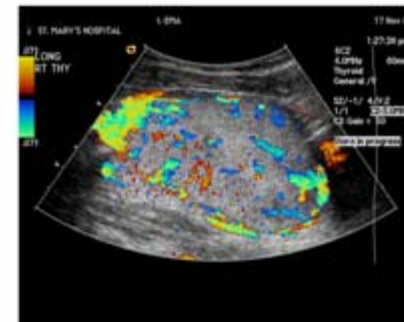
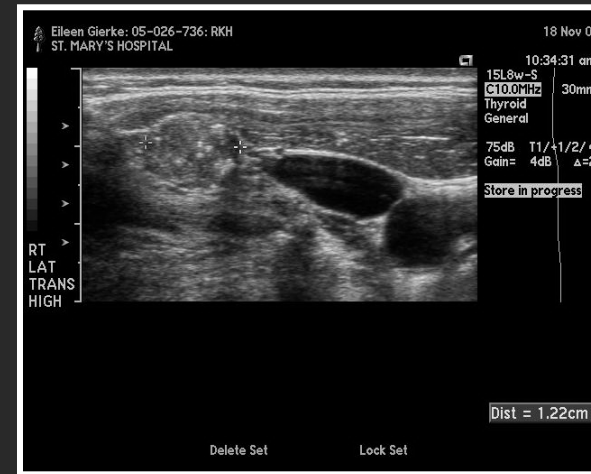
High Suspicion

- **Family history of MTC , MEN 2, PTC, Cowden's, FAP**
- **Rapid tumor growth, esp. on L-T4**
- **Firm or hard nodule**
- **Fixed to adjacent structures**
- **Paralyzed vocal cord**
- **Regional lymphadenopathy**
- **Distant metastasis**

Ultrasound

Suspicious Nodules

- Hypoechoic lesion plus one of the following:
 - Microcalcifications
 - Irregular border
 - Central vascularity
 - **Taller rather than wide**



National Cancer Institute Thyroid Fine-Needle Aspiration State of Science Conference

- Benign
- Malignant
- **NEW** Suspicious for malignancy (risk 50-75%)
- **NEW** Follicular lesion of undetermined significance (risk 5-10%)
- Nondiagnostic (7%) (<6 follicular groups with 10-15 cells x2)

FNA

<u>Nodules</u>	<u>Number</u>
Benign	12,480 (69.0%)
Malignant	654 (3.5%)
Suspicious	1,784 (10.0%)
Non-Diagnostic	3,265 (21.0%)
Total	18,183

Suspicious FNA

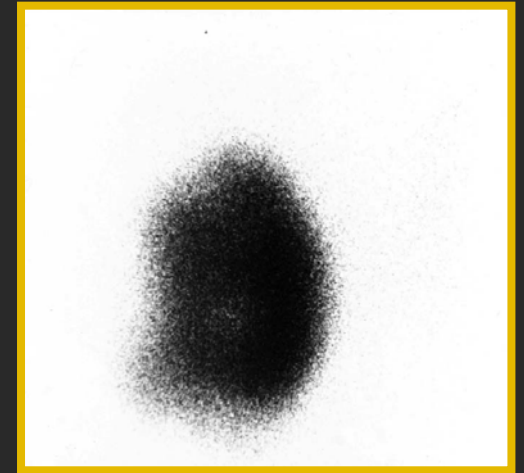
- 10 – 20% of FNA
- 15-75% are malignant

Needle Biopsy or FNA

- Non diagnostic : Repeat with US
- Malignant : Surgery
- Benign : Follow
- Suspicious : Surgery

Hot Nodule

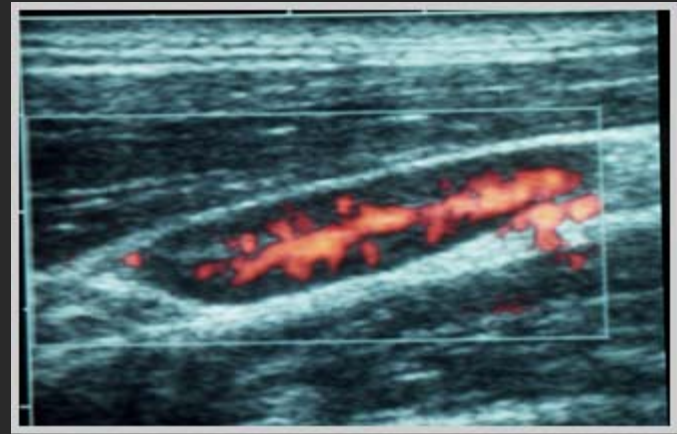
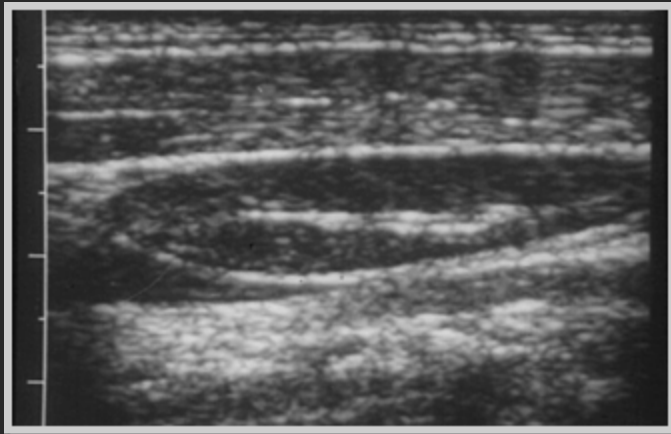
- About 5% of nodules
- Almost always benign !



Preoperative Evaluation

- Tier 1: History, Exam (US), FNA, TSH
- Tier 2: Nodal mapping (US), CXR, Vocal Cord Exam
- Tier 3: CT with contrast, Triple Endoscopy

Benign Cervical Node



- Slender
- Fatty hilum
- Hilar blood flow

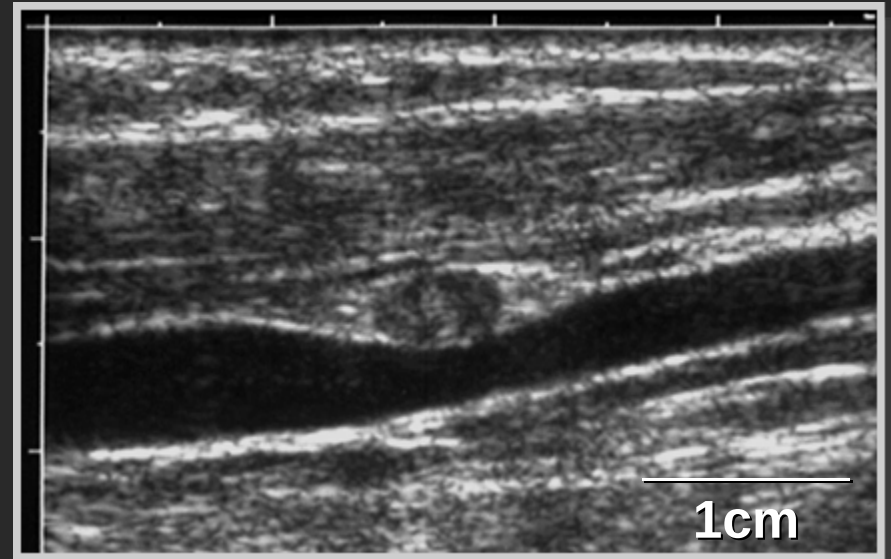
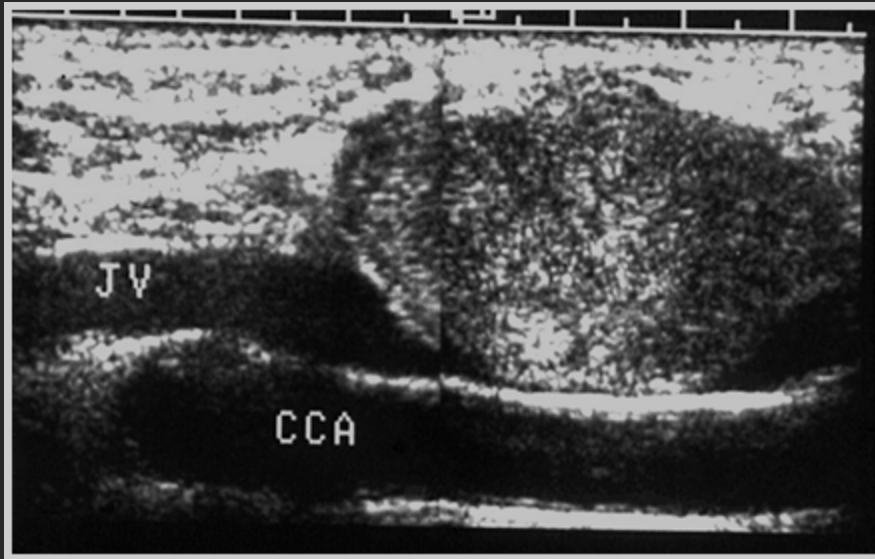
Malignant Lymph Node



- Cystic change



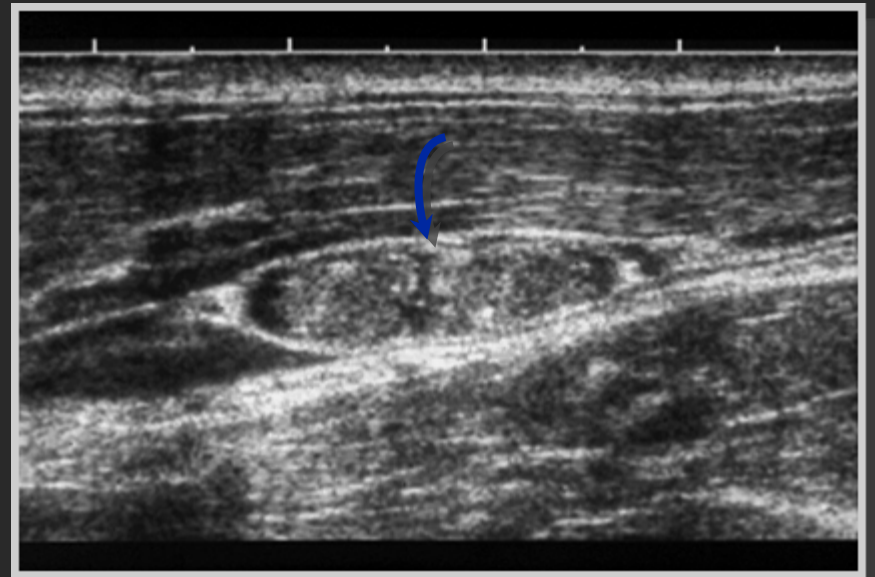
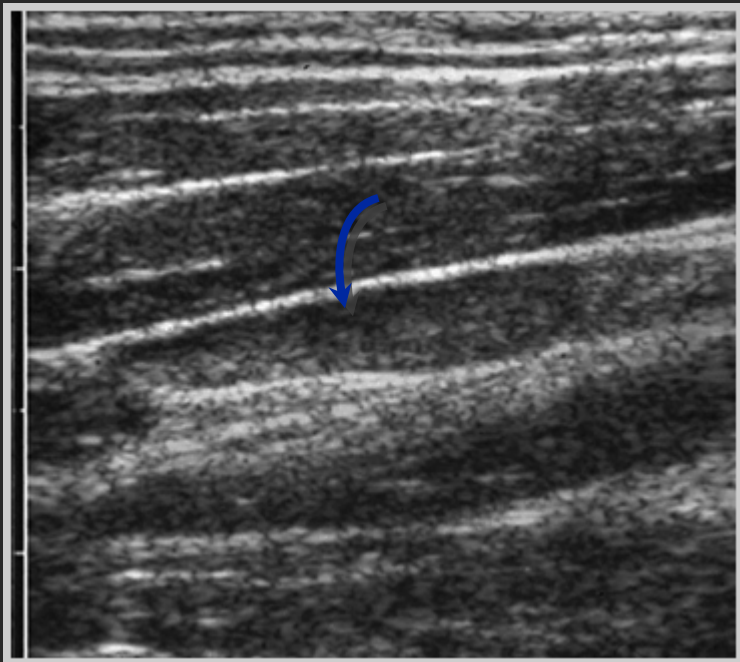
Malignant Neck Node



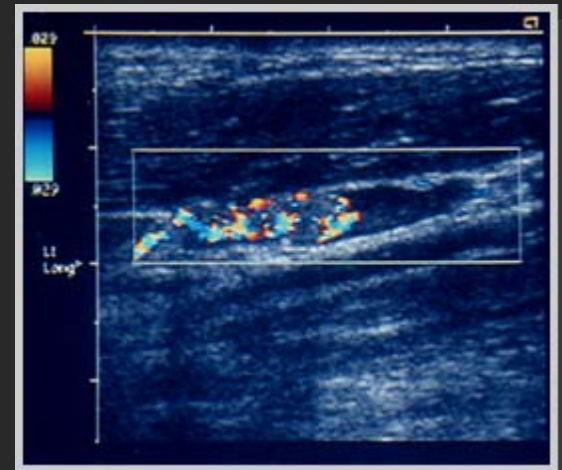
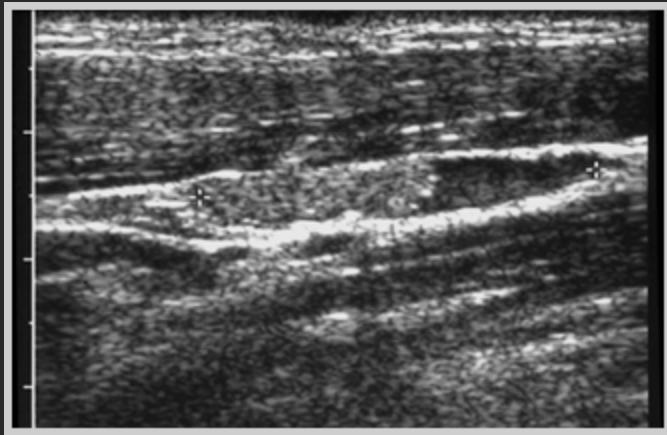
- Vascular indentation

Malignant Neck Node

- **Calcifications**

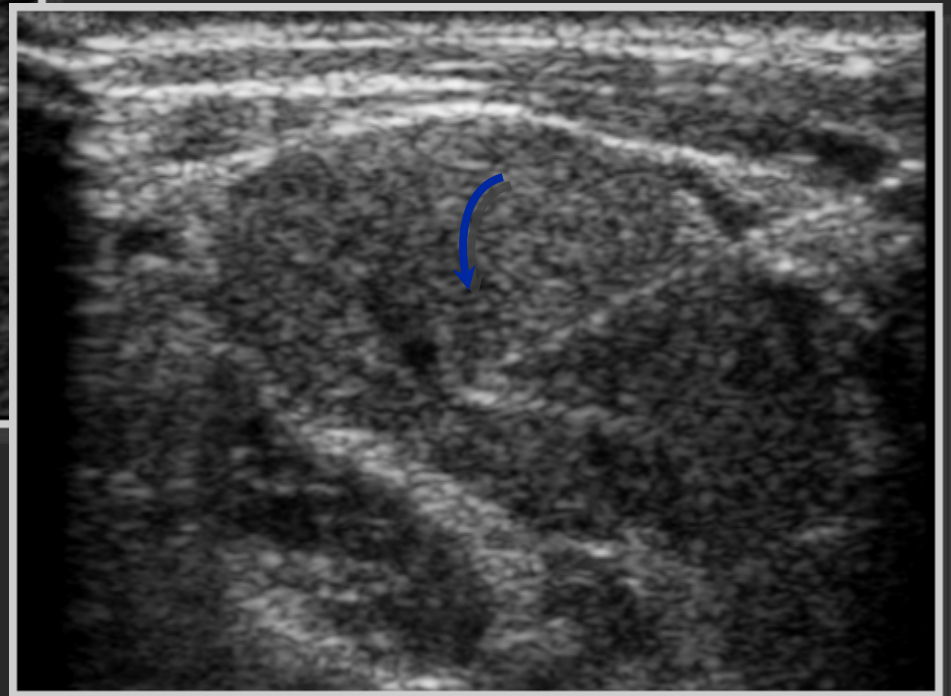
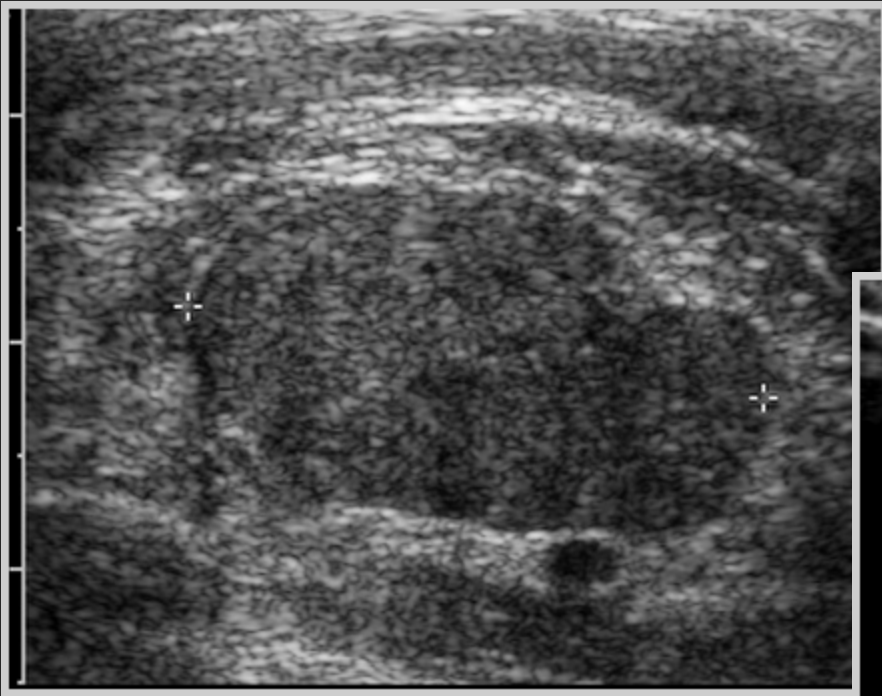


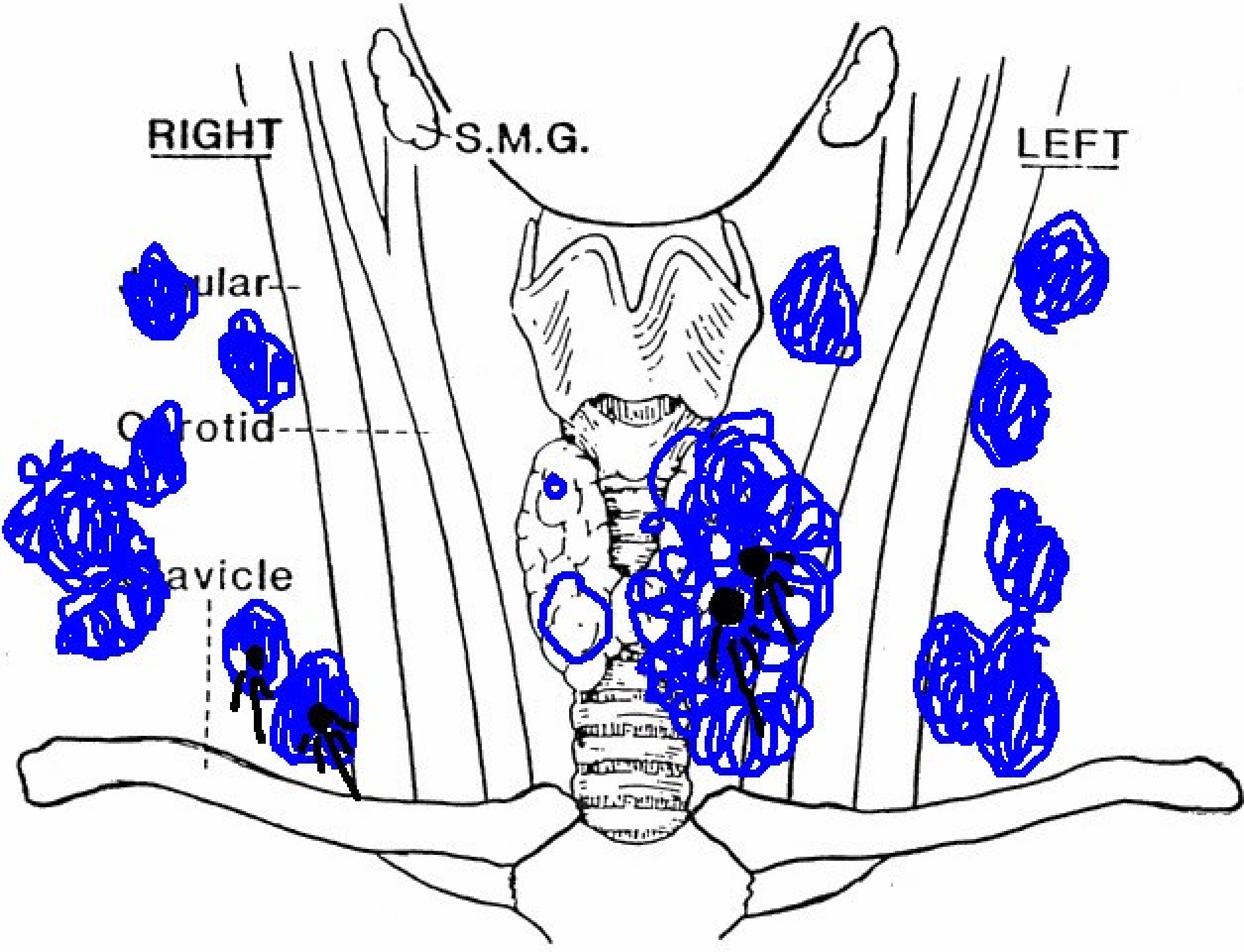
Malignant Neck Node



- **Alteration in architecture and flow**

Lymph Node Biopsy

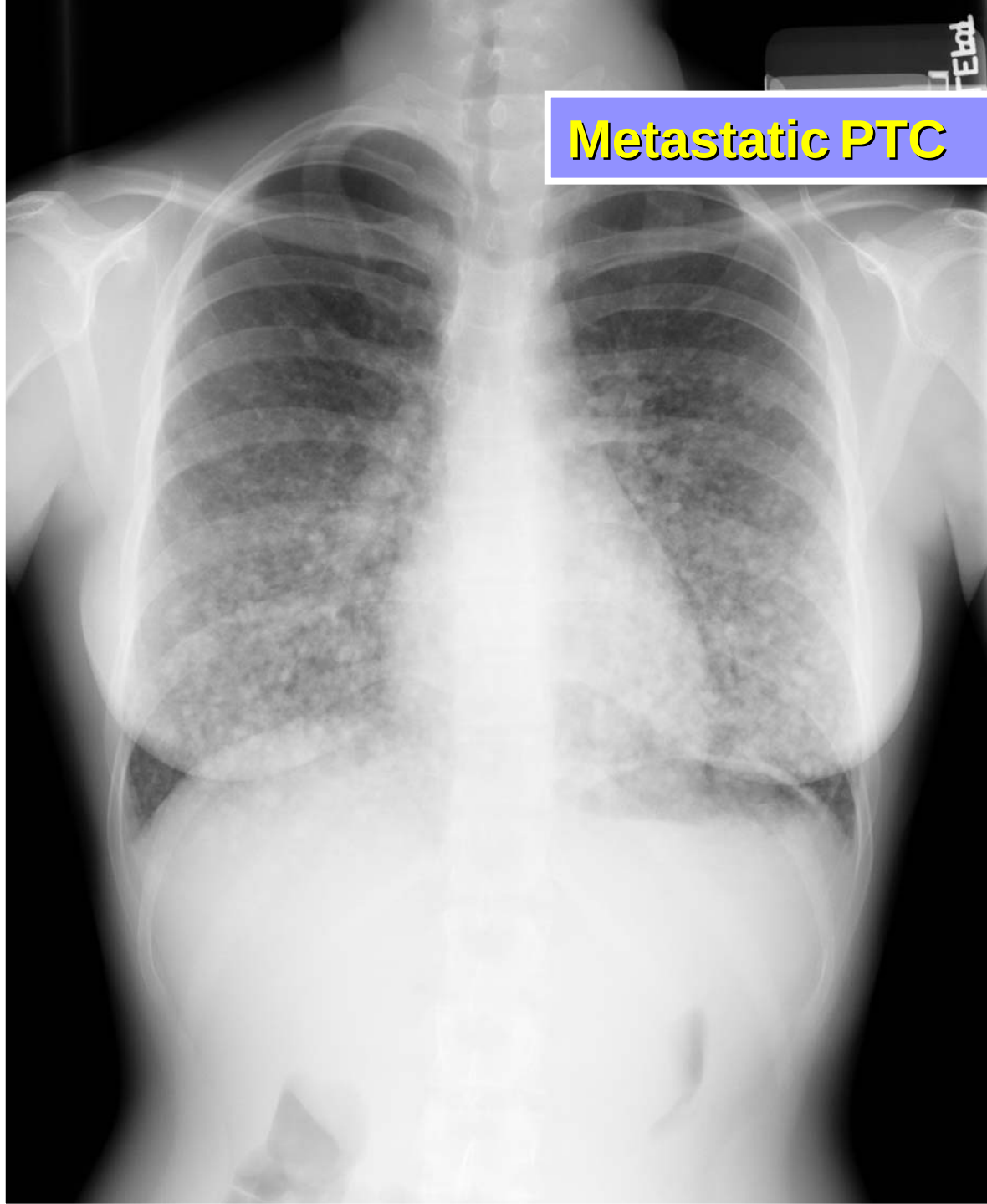




Value of Preoperative Ultrasound in PTC

- Mayo Clinic: **770** pts (1999-2004)
- US identified nonpalpable lateral nodes: **15% in first time operations**
- Reops-NLLN's: **64%** ; NCLN's: **28%**
- US altered extent of operation in **41%** of initial and **43%** of reoperative pts. with palpable nodes

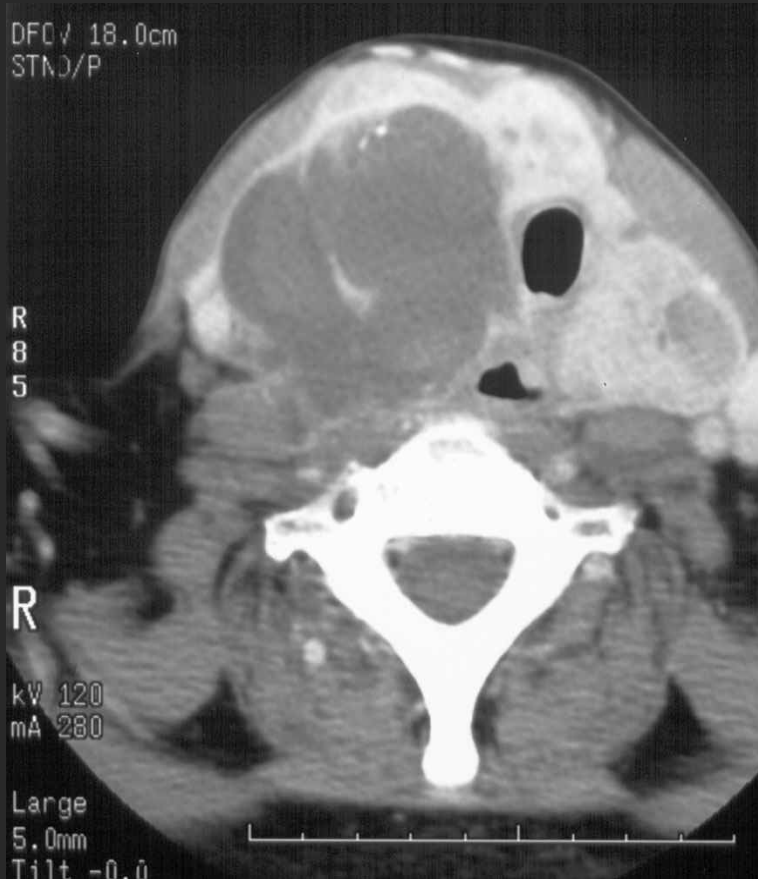
Metastatic PTC



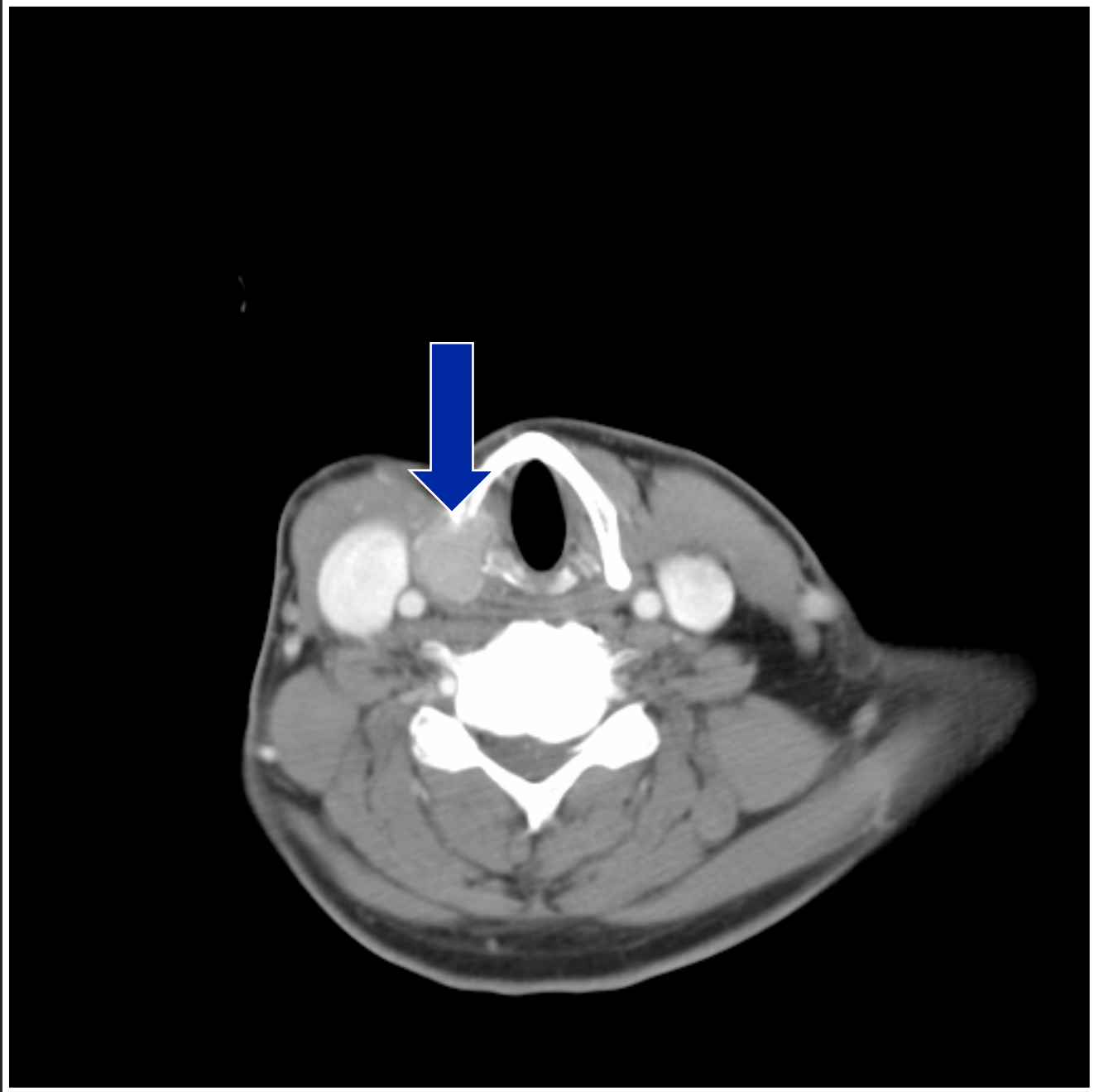
Preoperative Evaluation

- Tier 1: History, Exam (US), FNA, TSH
- Tier 2: Nodal mapping (US), CXR, Vocal Cord Exam
- Tier 3: CT with contrast, Triple Endoscopy

75 year old male with hoarseness

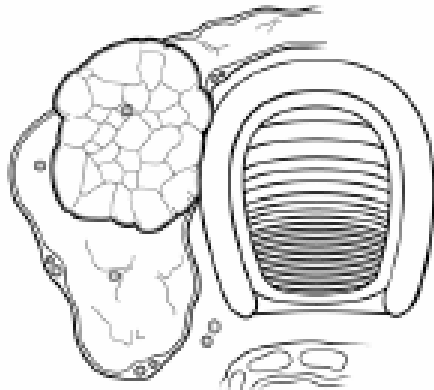


8cm grossly invasive FTC

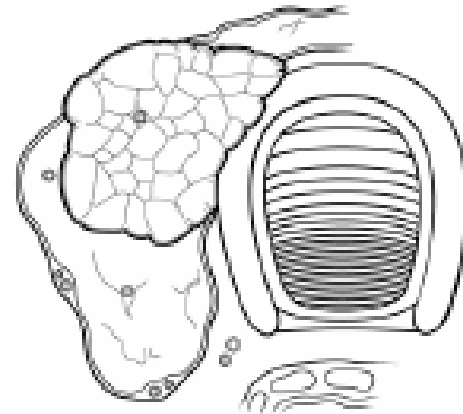


Stages of Tracheal Invasion in Thyroid Cancer

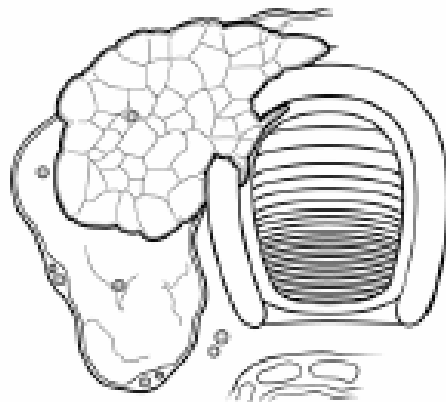
**Invasion of perichondrium
without infiltration of cartilage or
soft tissue between cartilages**



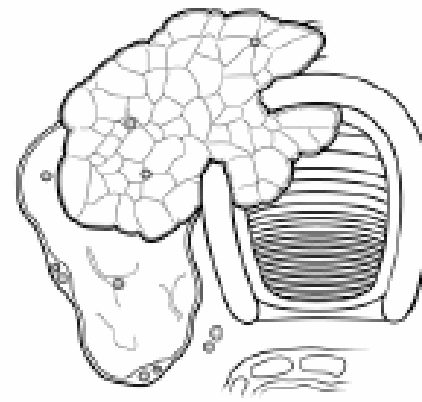
Invasion of cartilage

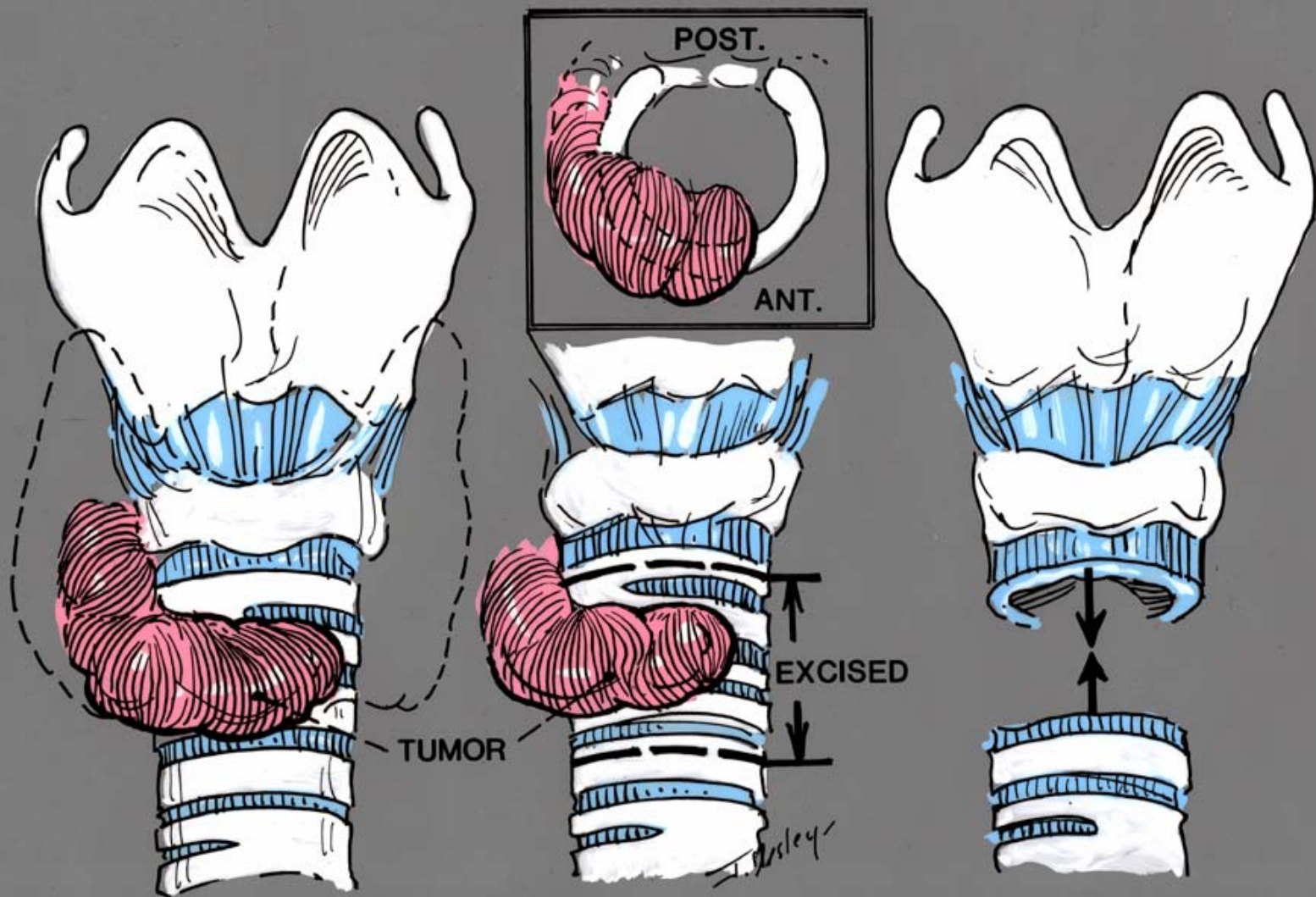


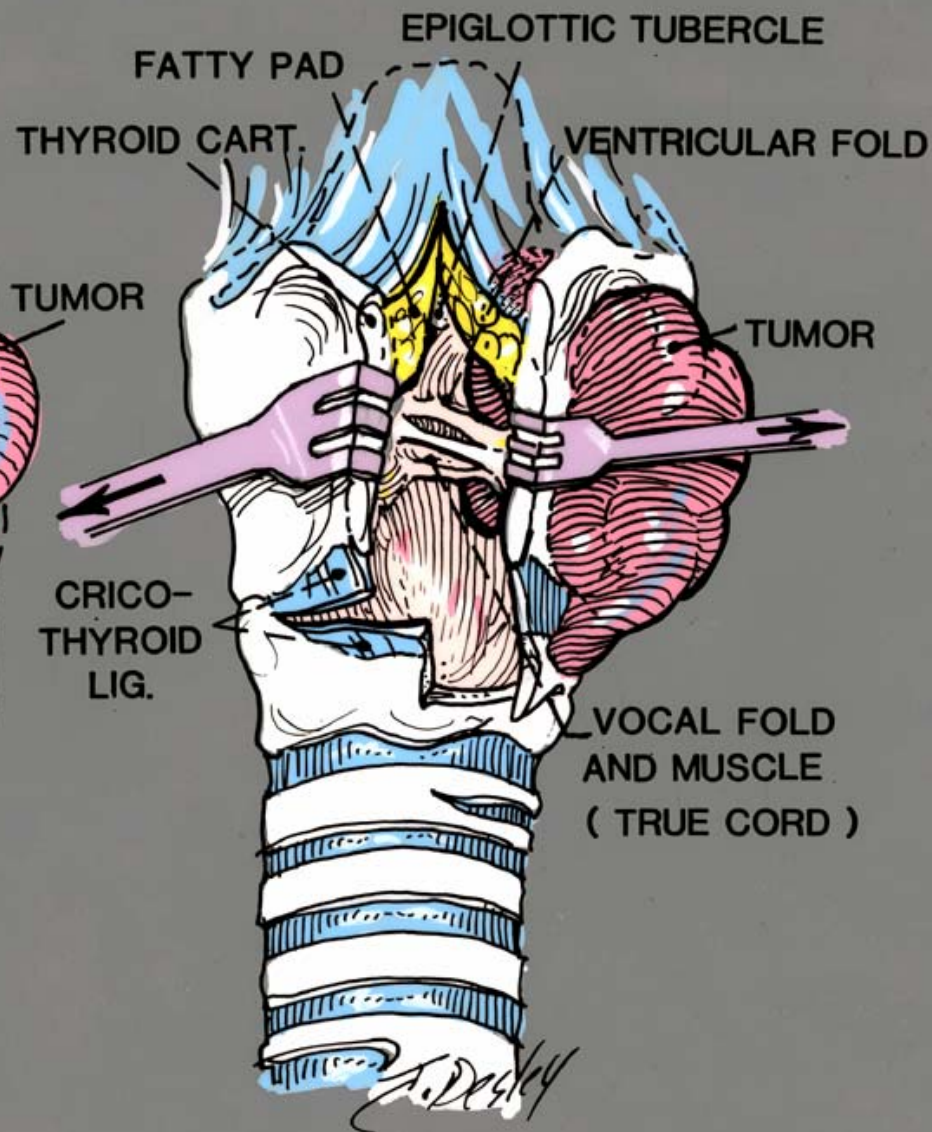
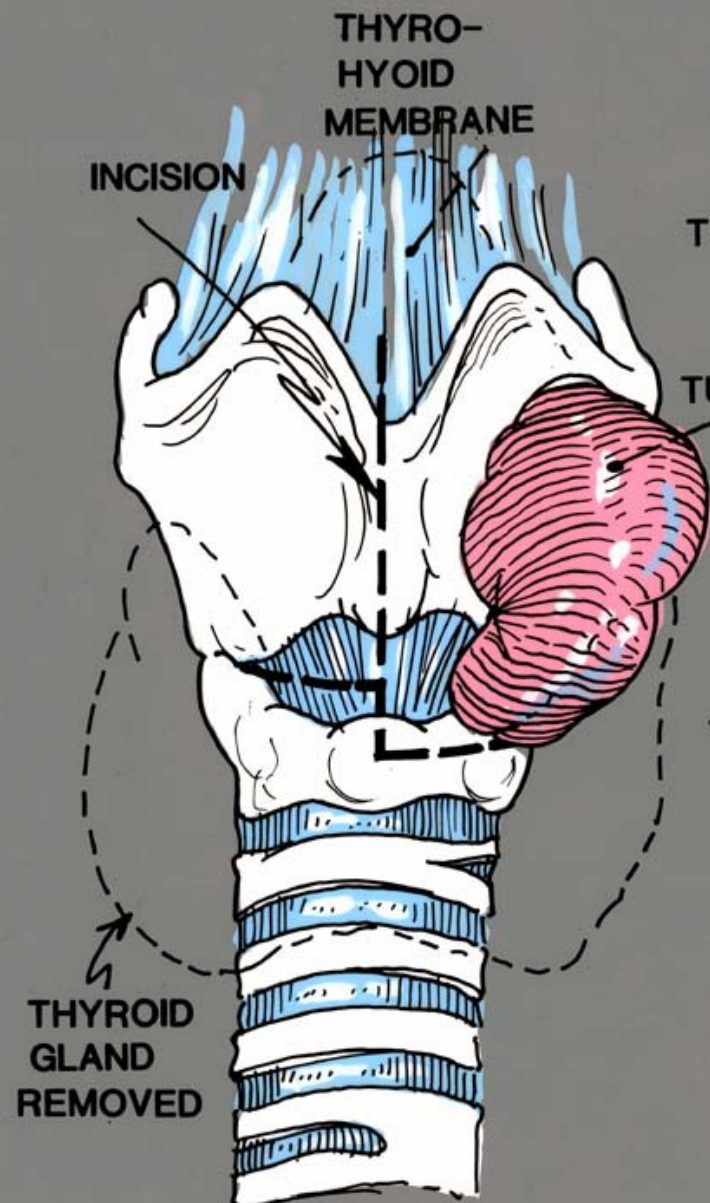
**Invasion of lamina propria of
tracheal mucosa**

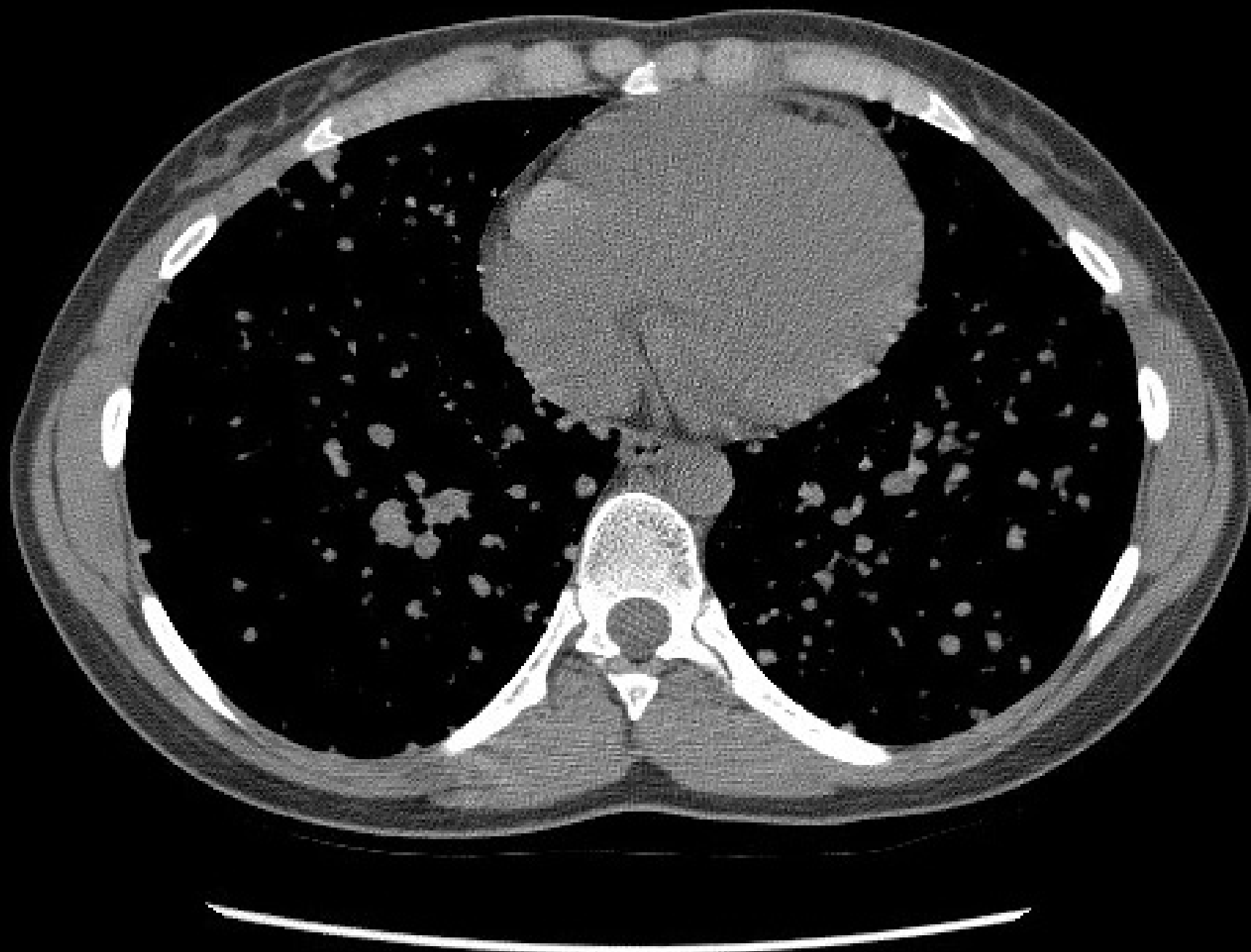


Invasion of mucosa











Thyroid Nodules

Goals

- **Treat thyroid cancer !**
- **Avoid unnecessary surgery !**
- **Select pts for appropriate adjuvant therapies**

Staging and Risk Assessment-

Determine Risk of Death/Recurrence

- Application of **TSH suppression**
- Application of remnant ablation with **I-131**
- Application of **Radioiodine Scanning and/or stimulated Tg testing**

Papillary and Follicular Thyroid Cancer

- 1,355 patients (OSU, US Air Force)
- Median follow-up: 15.7 years
- 30 years:

Survival	76%
Recurrence	30%
CSM	8%

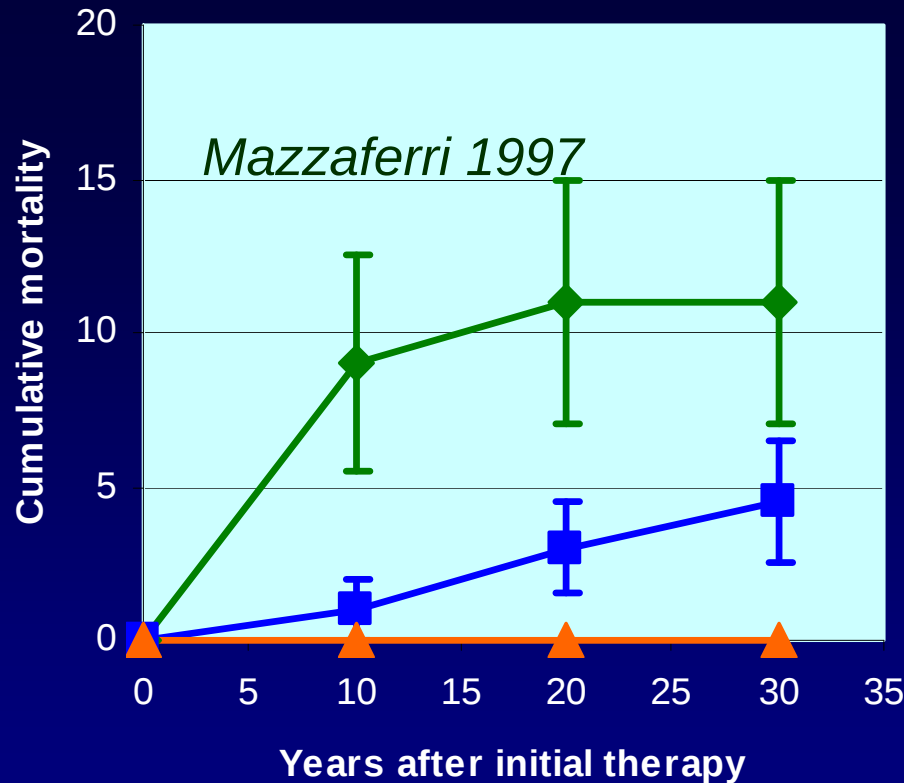
Mazzaferri EL. Am J Med 1994;97:418

Papillary and Follicular Thyroid Cancer

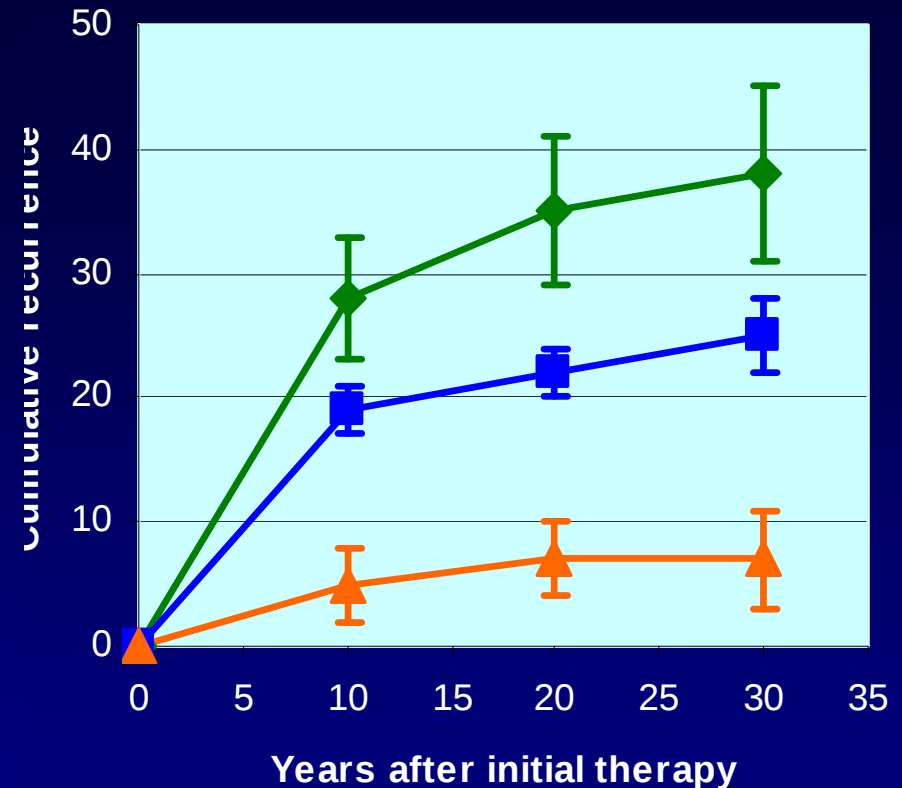
- Cancer death rate reduced by:
 - female sex
 - surgery more extensive than lobectomy
 - ¹³¹I plus thyroid hormone therapy
- Recurrence reduced to less than 1/3 with RRA vs T4 alone

Mazzaferri EL. Am J Med 1994;97:418

Impact of I¹³¹ on DTC Recurrence and Mortality



—◆— No Therapy —■— T4-only —▲— I131 and T4

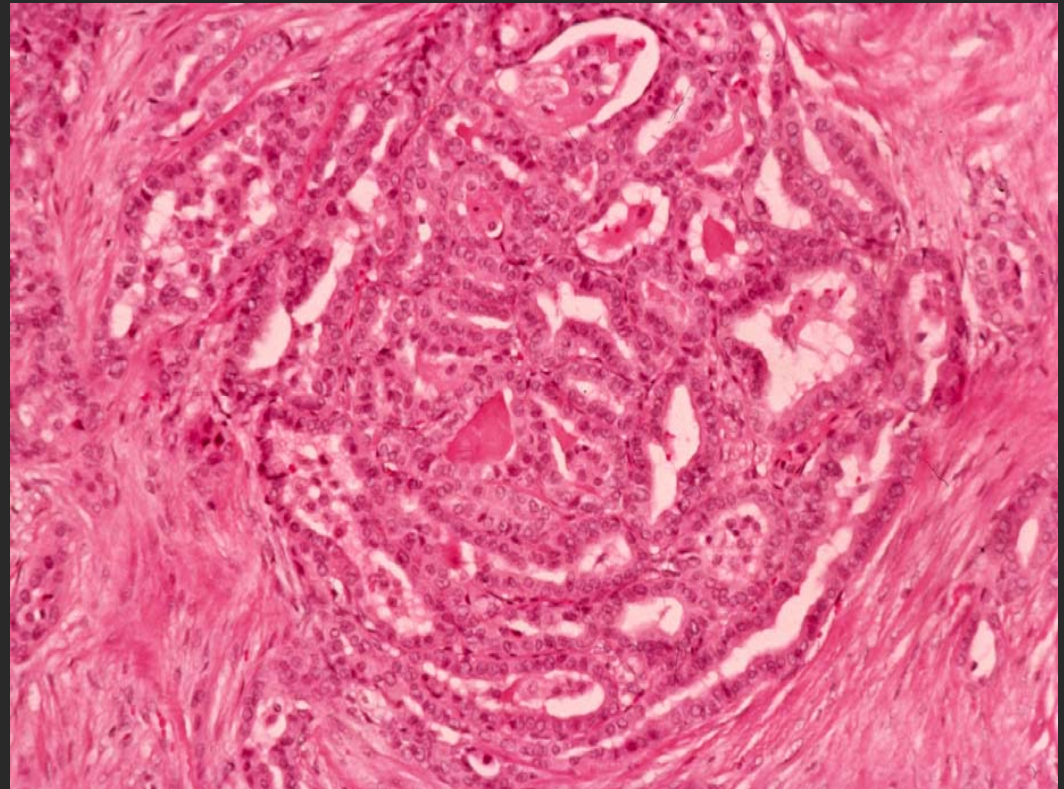


—◆— No Therapy —■— T4-only —▲— I131 and T4

Papillary Thyroid Cancer

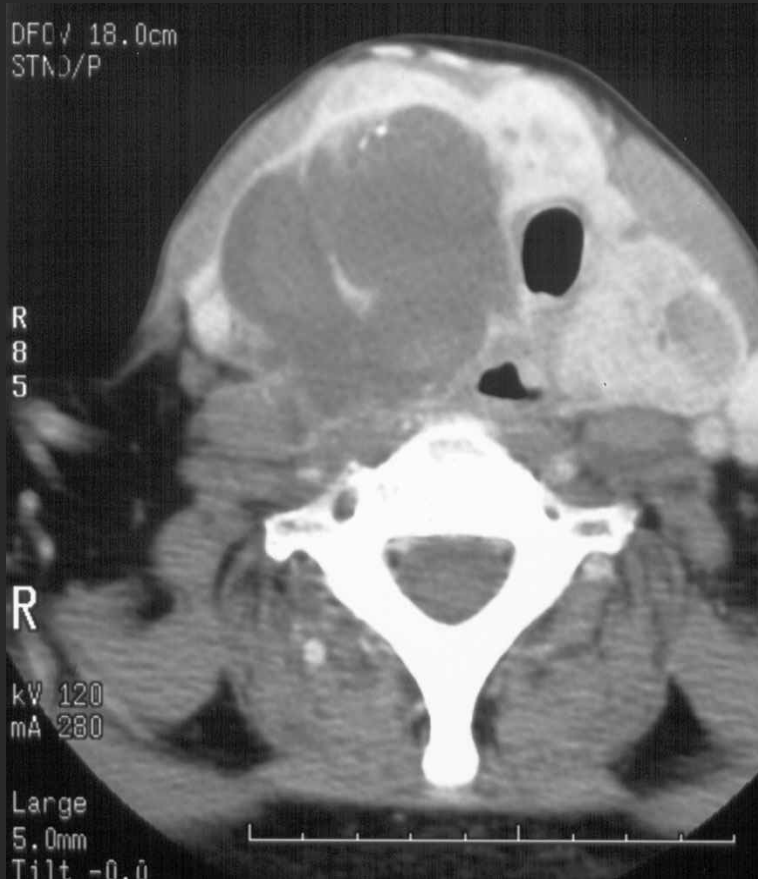
Is all of this true?

Risk Assessment in Thyroid Carcinoma



1.5mm Papillary microcancer

Risk Assessment in Thyroid Carcinoma



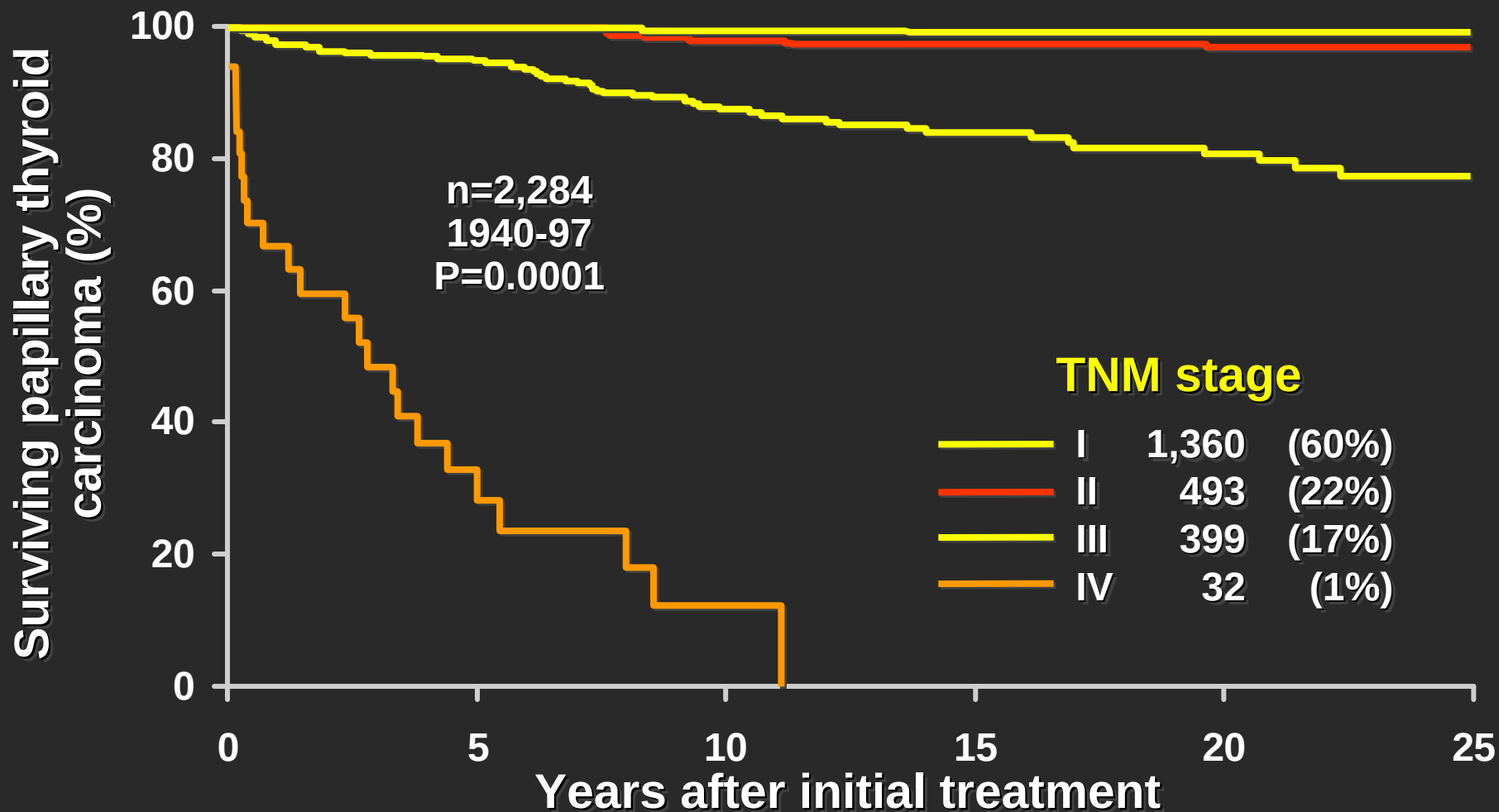
8cm grossly invasive FTC

pTNM Staging for FCDTC

2002 Classification

	<45 years	≥45 years
I	TxNxM0	T1N0M0
II	TxNxM1	T2N0M0
III	-	T3N0M0 / T1-3N1aM0
IVA	-	T4aNxM0 / T1-3N1bM0
IVB	-	T4bNxM0
IVC	-	TxNxM1

PTC Survival by TNM Stage



PTC

Prognostic Factors

Well-Established Independent Prognostic Factors

Age
Extrathyroidal tumor invasion
Primary tumor size
Distant metastases
Incomplete tumor resection

Less Certain Prognostic Factors

Gender
Lymph node metastases
Tumor multicentricity
Vascular invasion
**Morphologic variants of
PTC***

***tall cell , columnar cell, diffuse sclerosing**

Prognostic Schemes for DTC

	EORTC	AGES	AMES	MACIS	OSU	SKMMC
Age	X	X	X	X	--	X
Sex	X	--	X	--	--	--
Size	--	X	X	X	X	X
Multicentricity	--	--	--	--	X	--
Grade	--	X	--	--	--	X
Histology	X	PTC	X	PTC	--	X
Invasion	X	X	X	X	X	X
Nodes	--	--	--	--	X	X
Metastases	X	X	X	X	X	X
Complete excision	--	--	--	X	--	--

Differentiated Thyroid Carcinoma

MACIS (PTC)

Metastasis (distant)

Age (at diagnosis)

Completeness of primary tumor resection

Invasion of extrathyroidal structures

Size (of primary tumor)

MACIS Prognostic Scoring System

Score = **3.1** (if age = 39 yrs) or **0.08 X age** (if age = 40 yrs)
+ **0.3 X tumor size (cm-max diameter)**
+ **1** (if incompletely resected)
+ **1** (if locally invasive)
+ **3** (distant spread)

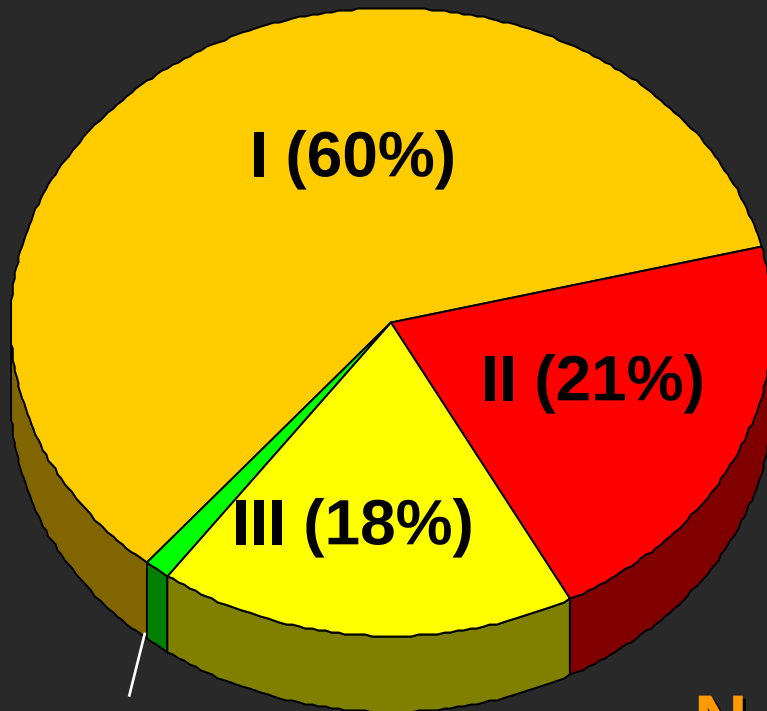
Survival by MACIS Score @ 20 yrs

- **<6** **99%**
- **6.00-6.99** **89%**
- **7.00-7.99** **56%**
- **>8** **24%**

Papillary Thyroid Carcinoma 1940-2000

Presenting Disease

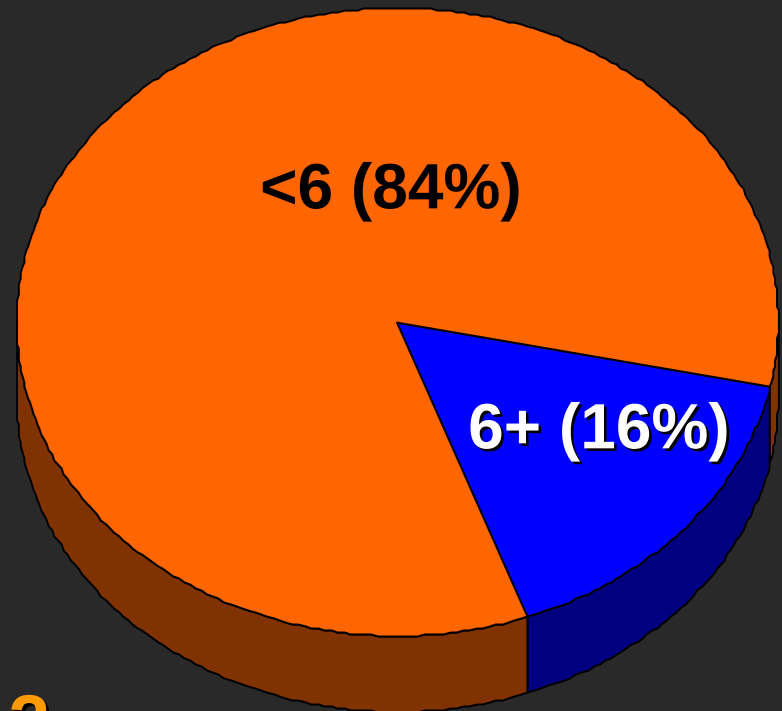
p TNM Stages



IV (1%)

N = 2,512
1940-2000

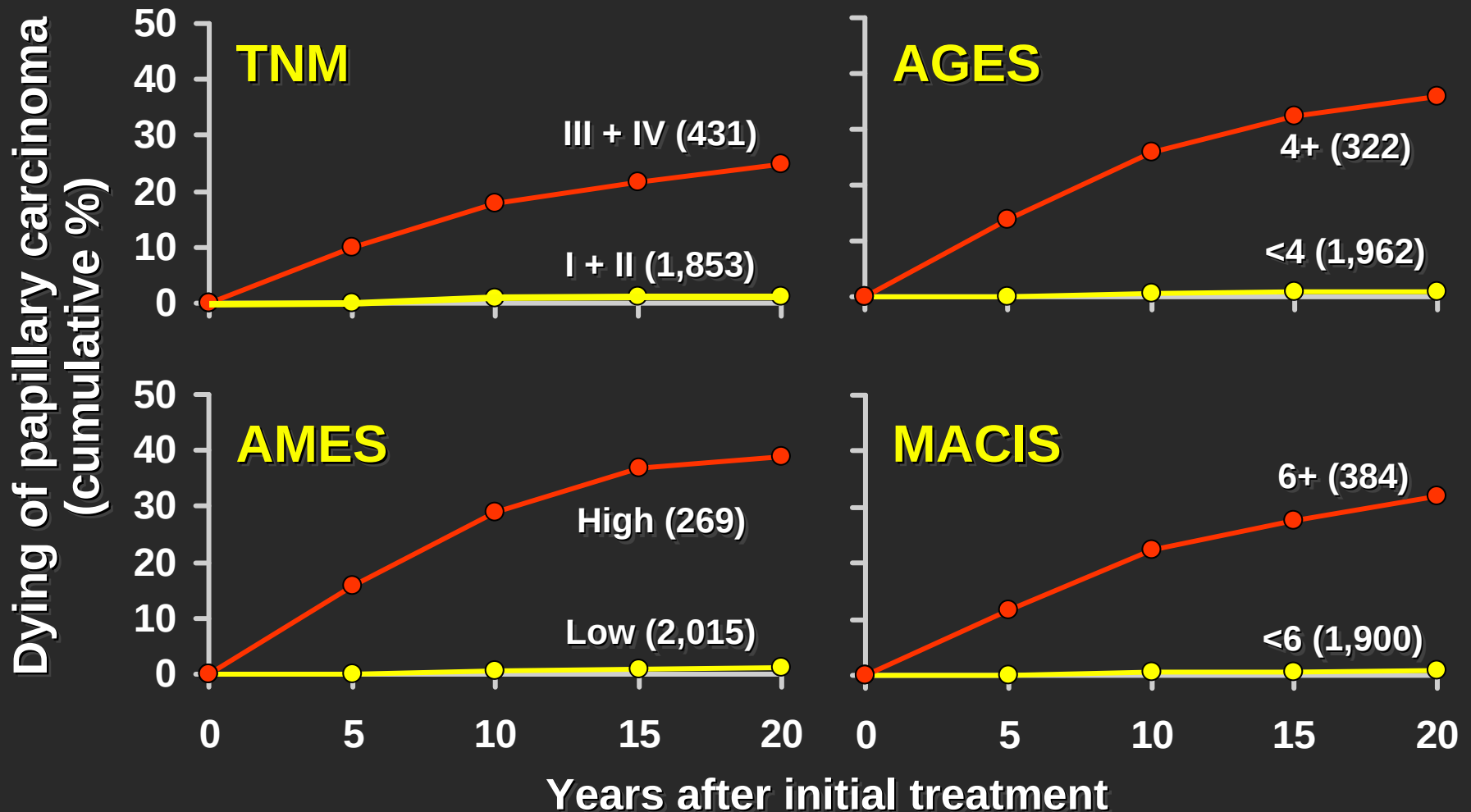
MACIS Scores

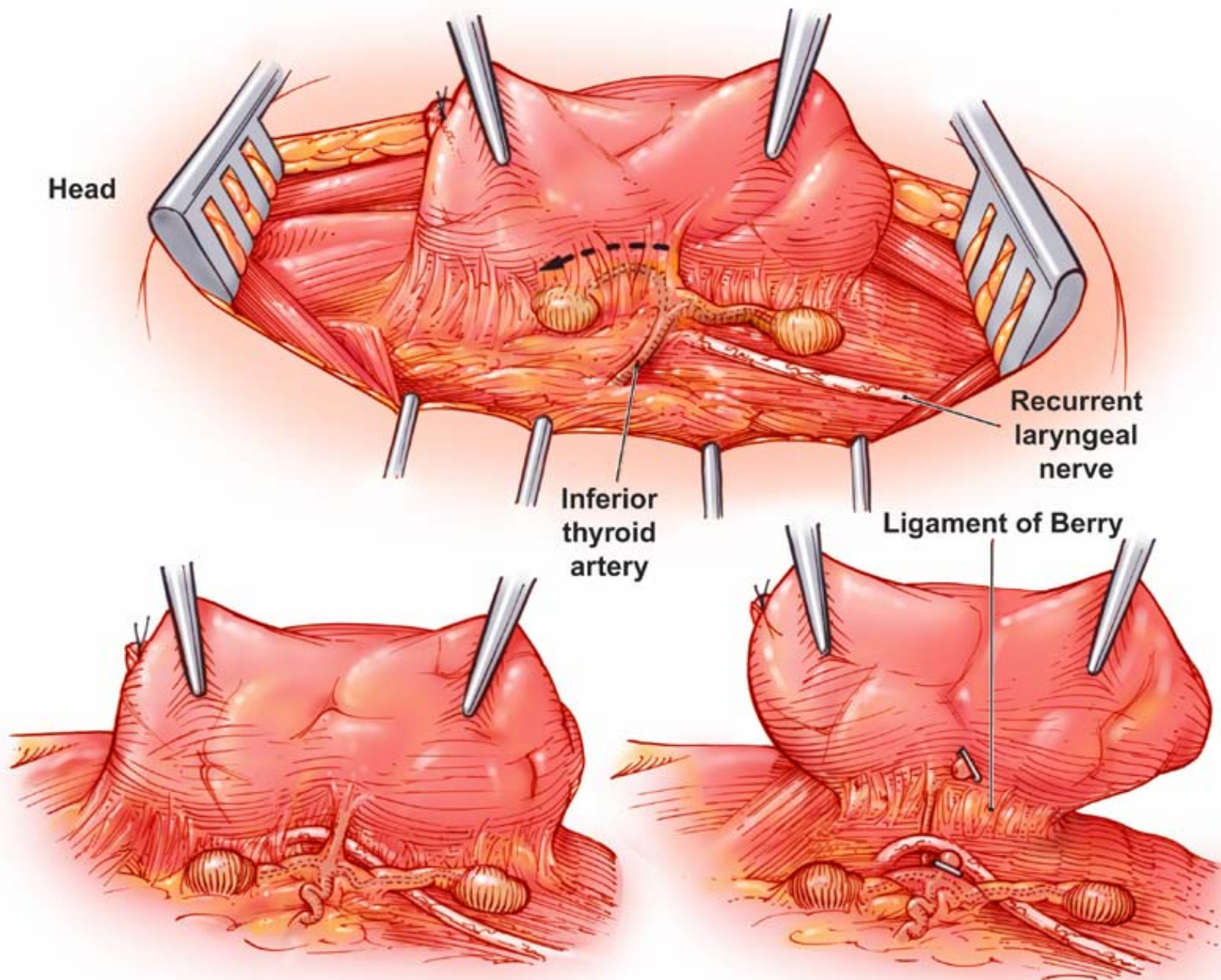


Hay et al, 2002

CSM from PTC in High- and Low-Risk Groups

TNM, AGES, AMES, MACIS

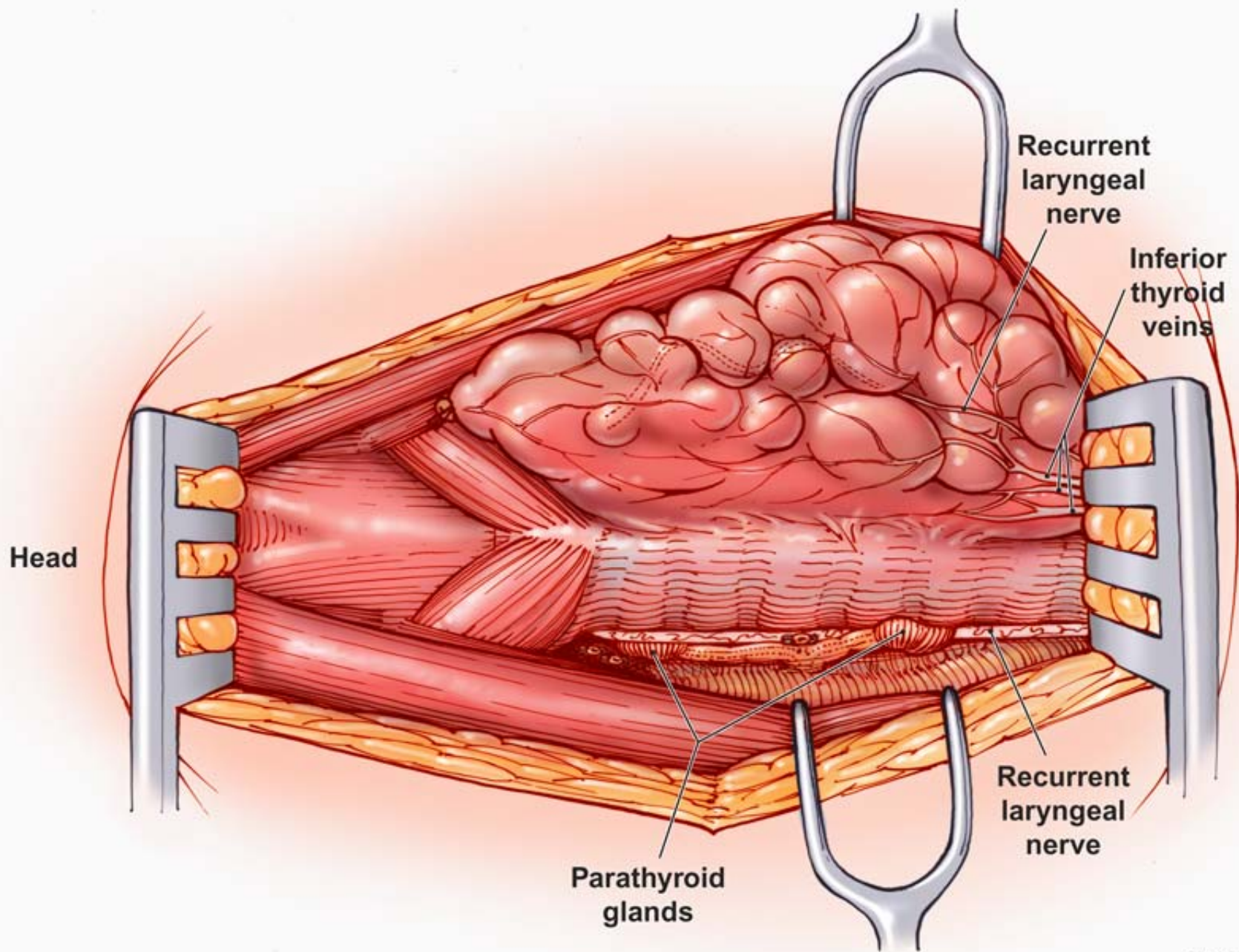




Extent of Thyroidectomy (PTC)

Recommendations

- **American Thyroid Association**
Near-total or Total
- **AACE**
Near-total or Total
- **Society of Surgical Oncology**
Low Risk: Unilateral Lobectomy
High Risk: Total thyroidectomy

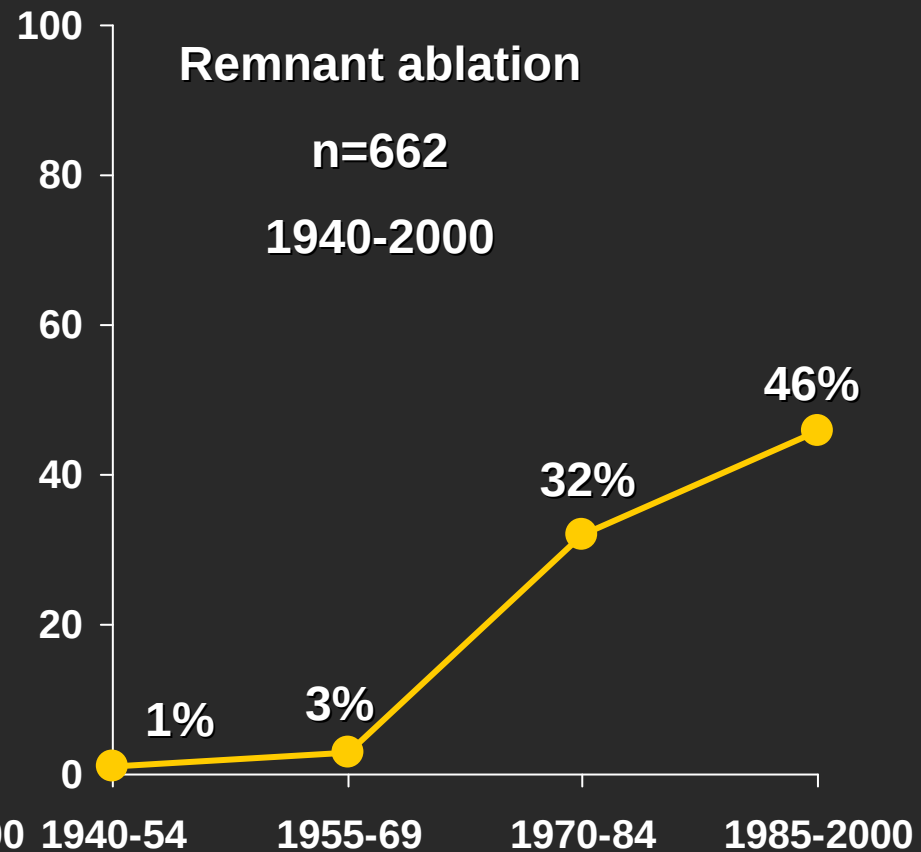
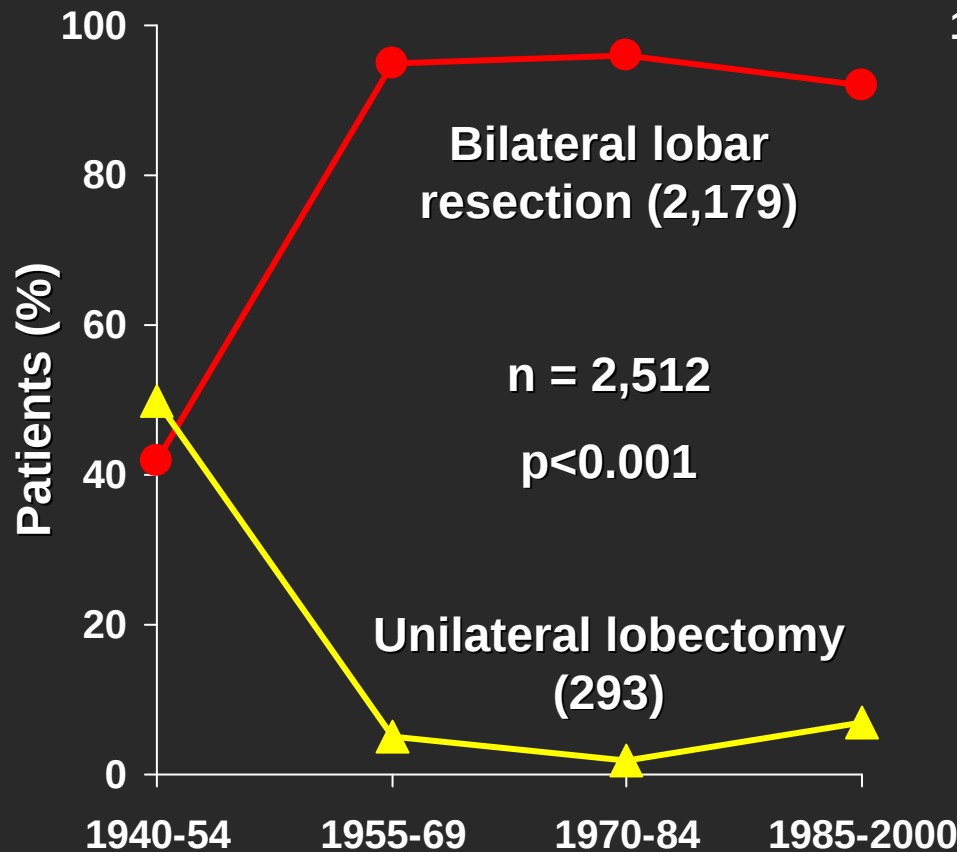


Papillary Thyroid Cancer (PTC)

- Societal recommendations
 - Bilobar resection (BLR) = Near total / Total thyroidectomy
 - Radioiodine remnant ablation (RRA)

Papillary Thyroid Carcinoma 1940-2000

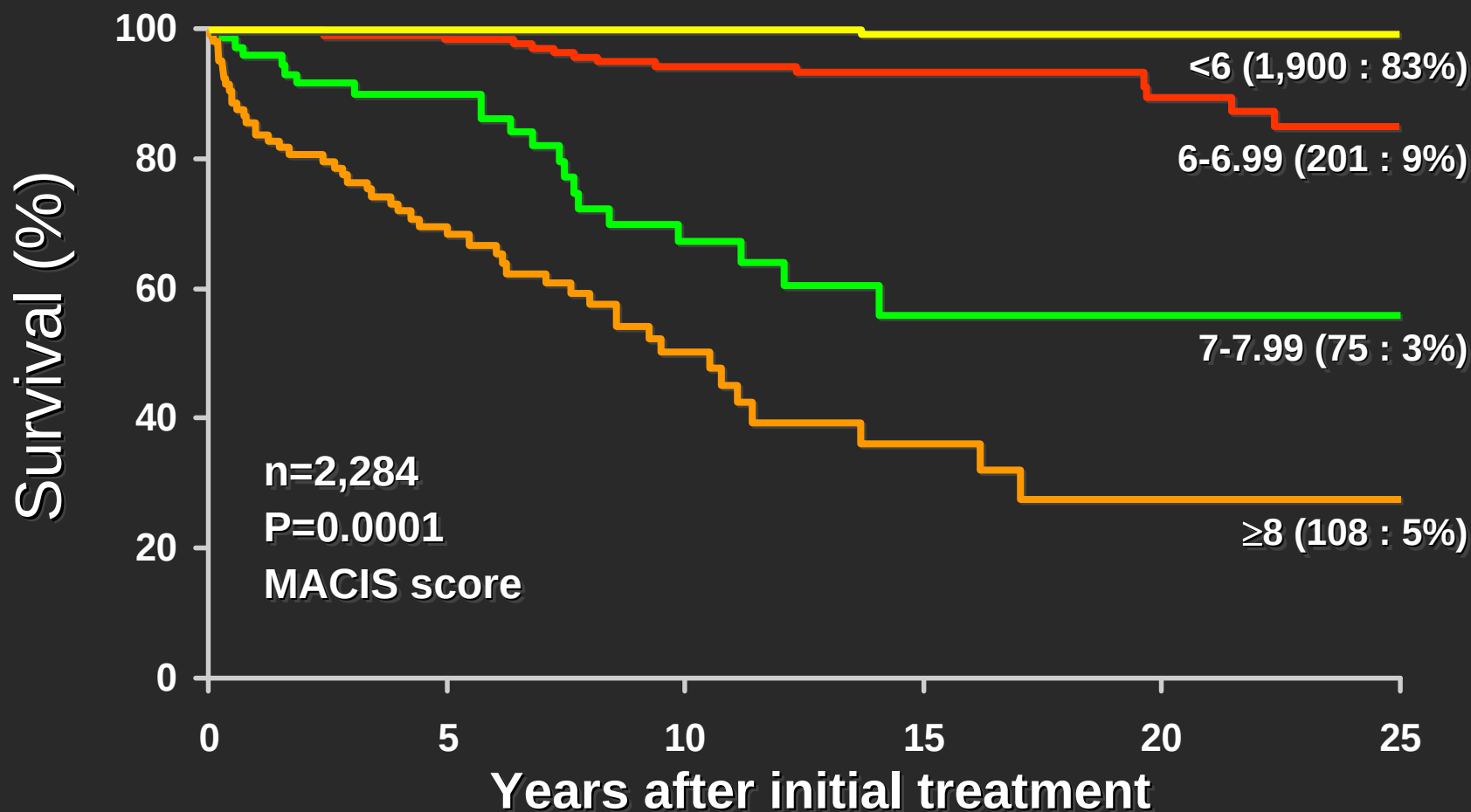
Trends in Extent of Surgery & RRA



Papillary Thyroid Cancer (PTC)

- **Why? (Multicentric Cancer)**
 - Improves cause-specific mortality **(CSM)**
 - Reduces tumor recurrence **(TR)**
 - Facilitates radioiodine scanning and use of therapeutic RAI
 - Improves effectiveness of thyroglobulin **(Tg)** screening

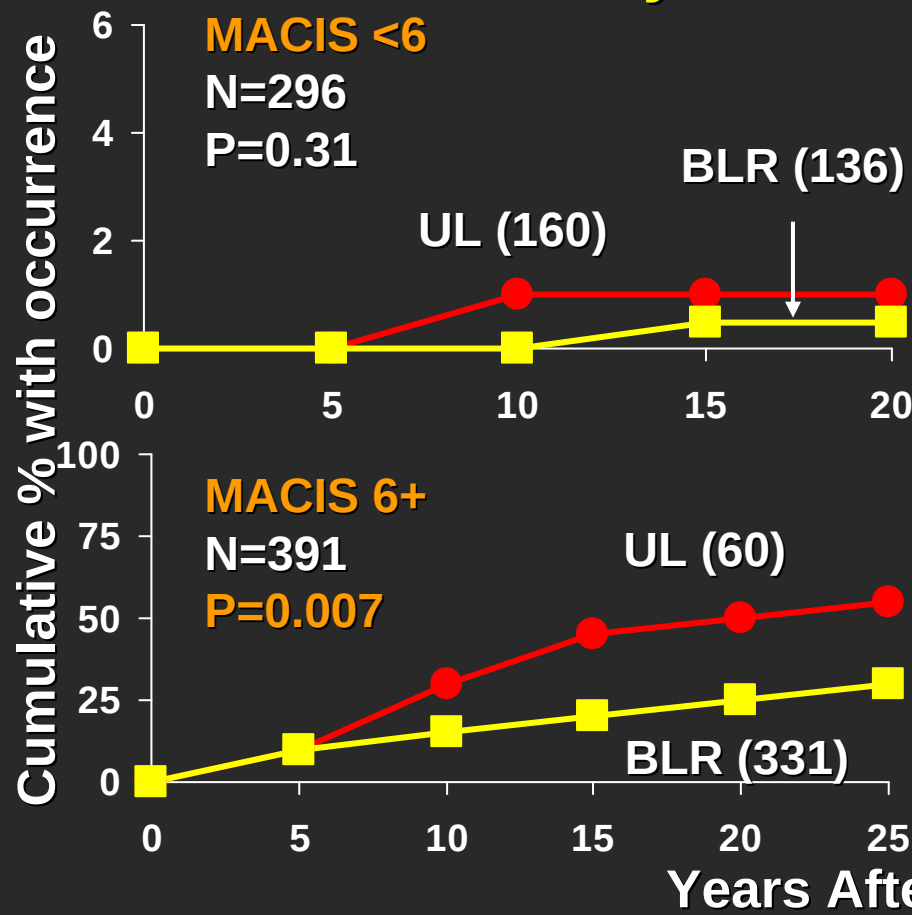
Cause-Specific Survival by MACIS Score 1940-97



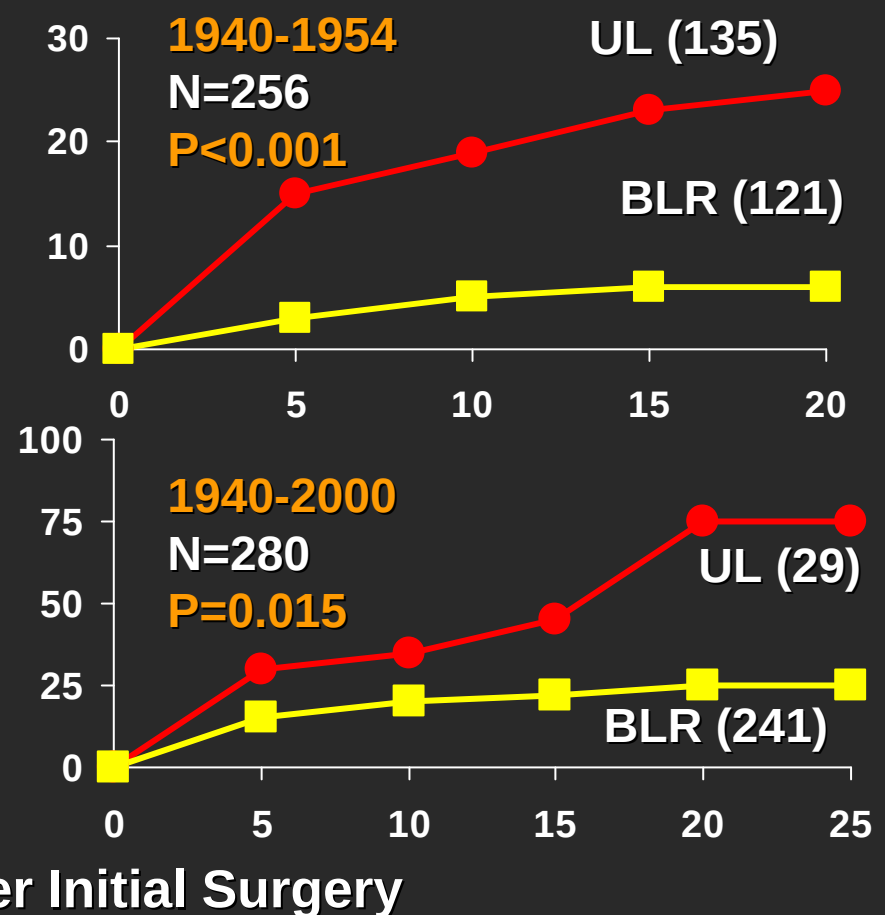
Papillary Thyroid Carcinoma

Comparison of Outcome

Mortality



Recurrence



PTC

In **low-risk** patients:

- **No survival benefit:** unilateral lobectomy vs bilobar resection
 - Hay et al 1987
- **TR higher** with unilateral procedure
 - Grant et al 1988, Hay et al 1988

Risk of Locoregional Recurrence

Unilateral Lobectomy

4x-7x higher compared to
BLR @ 20 years

Low-Risk DTC Patients: Limited Surgery?

Local Recurrence

- ↑↑ Patient anxiety**
- ↑↑ Physician anxiety**
- ↑↑ Surgeon anxiety**
- ↑↑ Need for reoperation**
- ↑↑ Time away**
- ↑↑ Cost**

PTC

In **high-risk** patients

- **CSM and TR rates higher: unilateral lobectomy vs BLR**
 - Hay et al 1987

Low-Risk DTC Patients: Limited Surgery?

Total Thyroidectomy (Morbidity)

- The risk of **permanent hypoparathyroidism** is significantly **greater** than lesser resections in many series
- **3% vs 1.4%** @ Mayo Clinic (Total vs NT)
- Rates as high as **15-20%** have been reported

Hay et al. Surgery 1998; 124:958-966

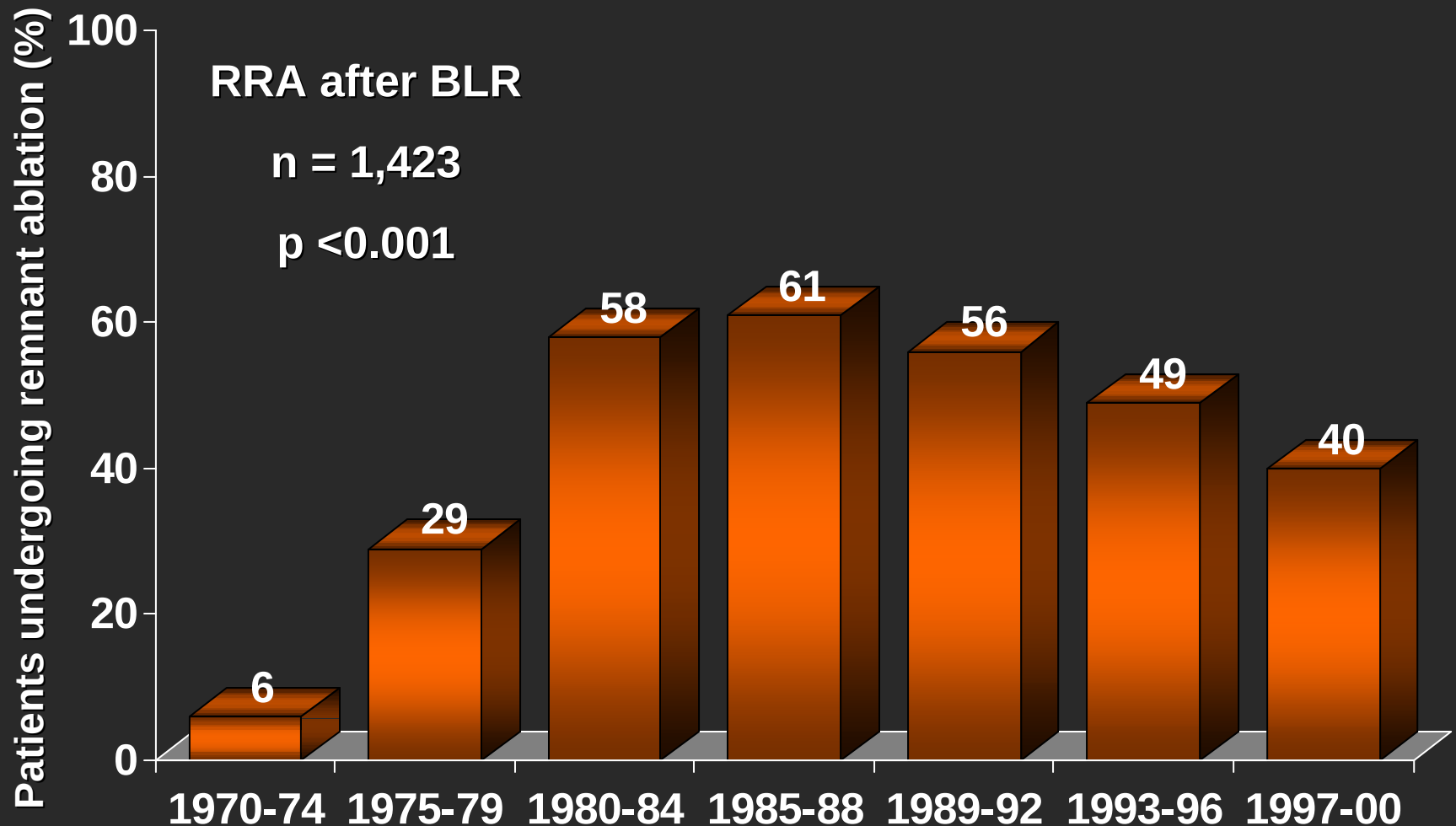
PTC

Near-Total vs Total Thyroidectomy (BLR)

- **No difference in CSM or TR in either low- or high-risk groups**
 - Hay et al 1987

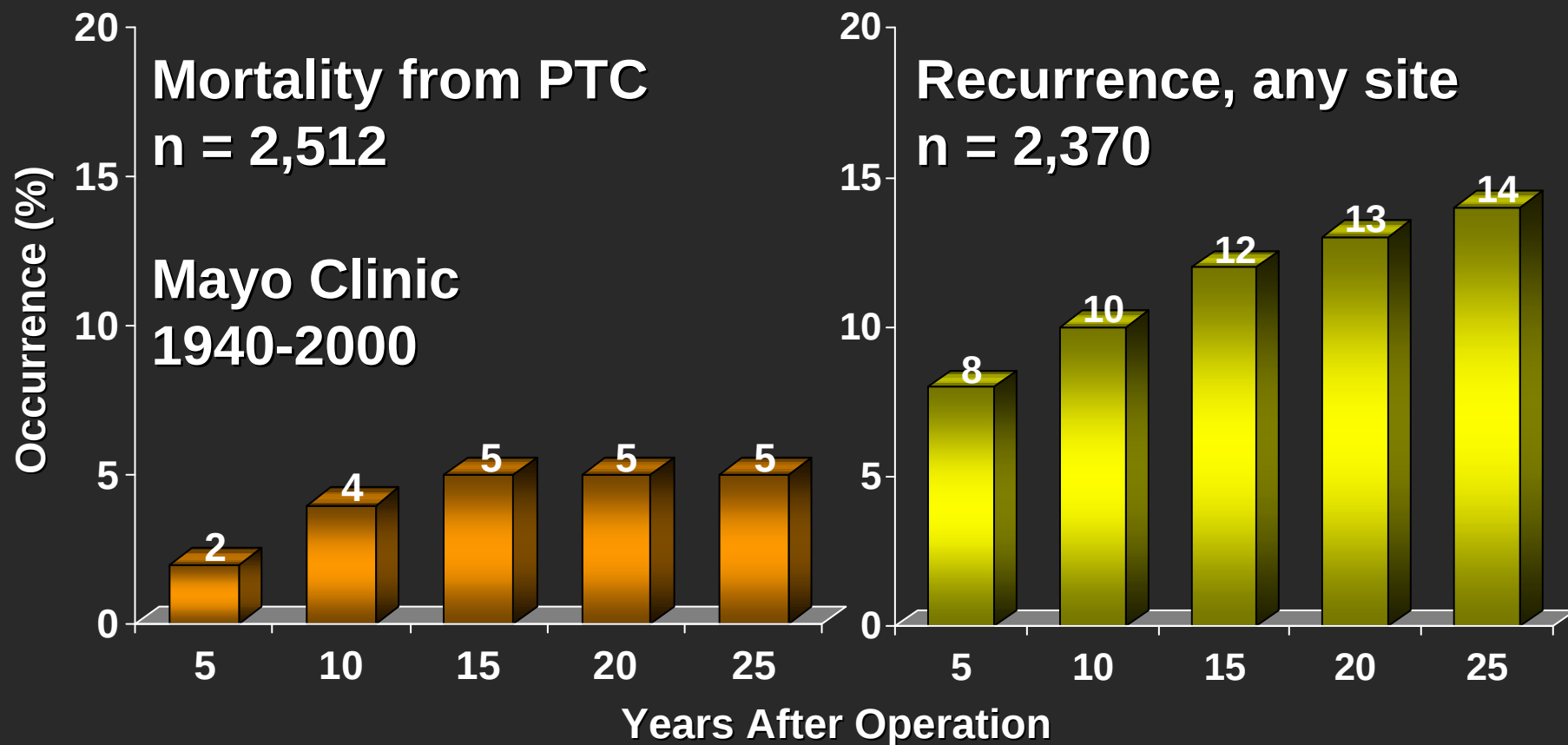
Papillary Thyroid Carcinoma 1970-2000

Changing Frequency of Remnant Ablation



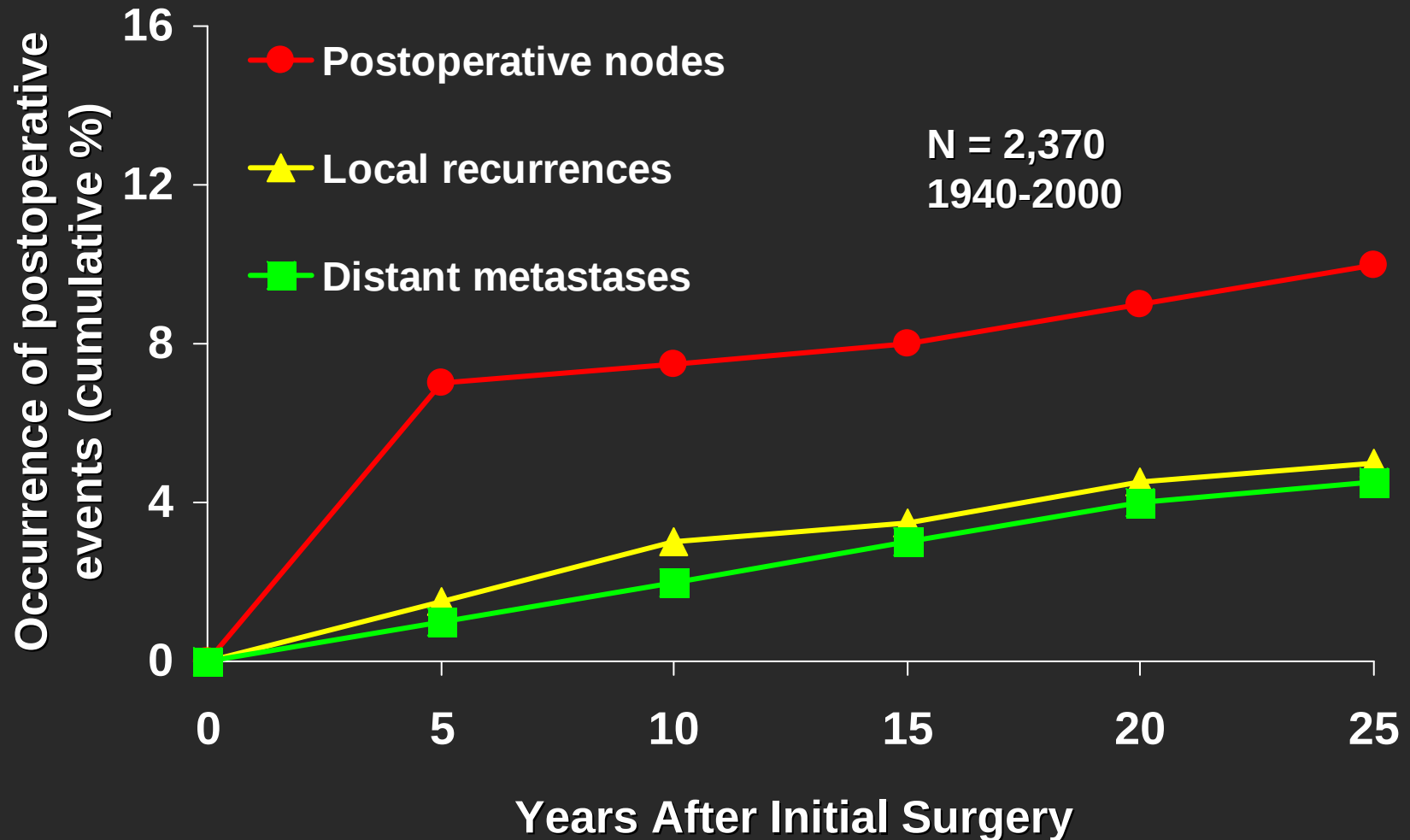
Papillary Thyroid Carcinoma 1940-2000

Overall Outcome



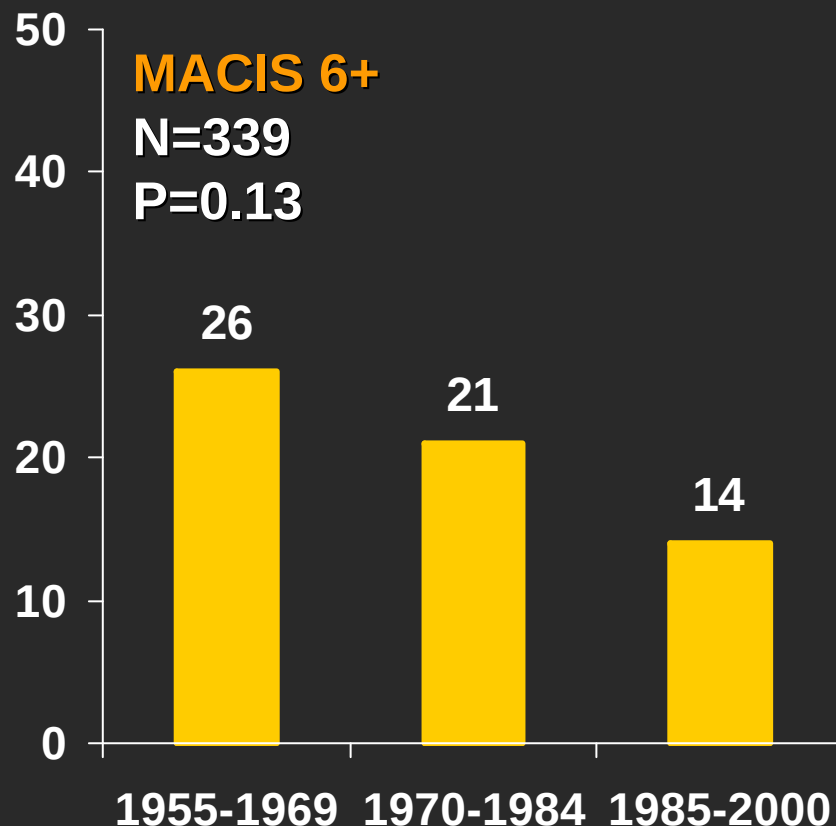
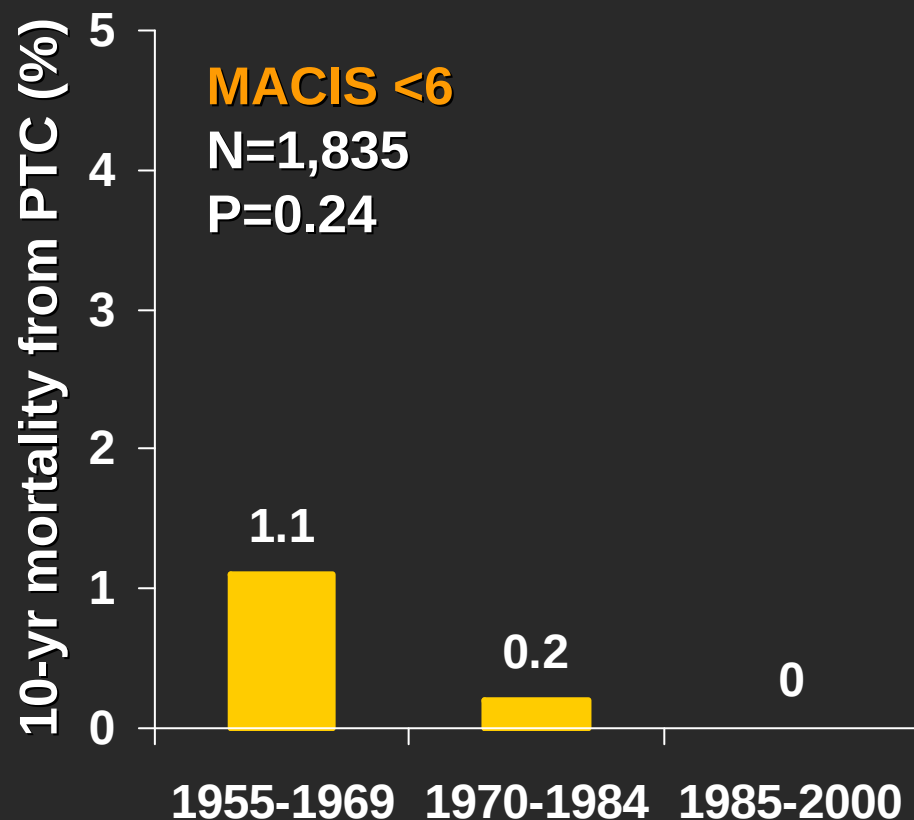
Papillary Thyroid Carcinoma 1940-2000

Overall Outcome



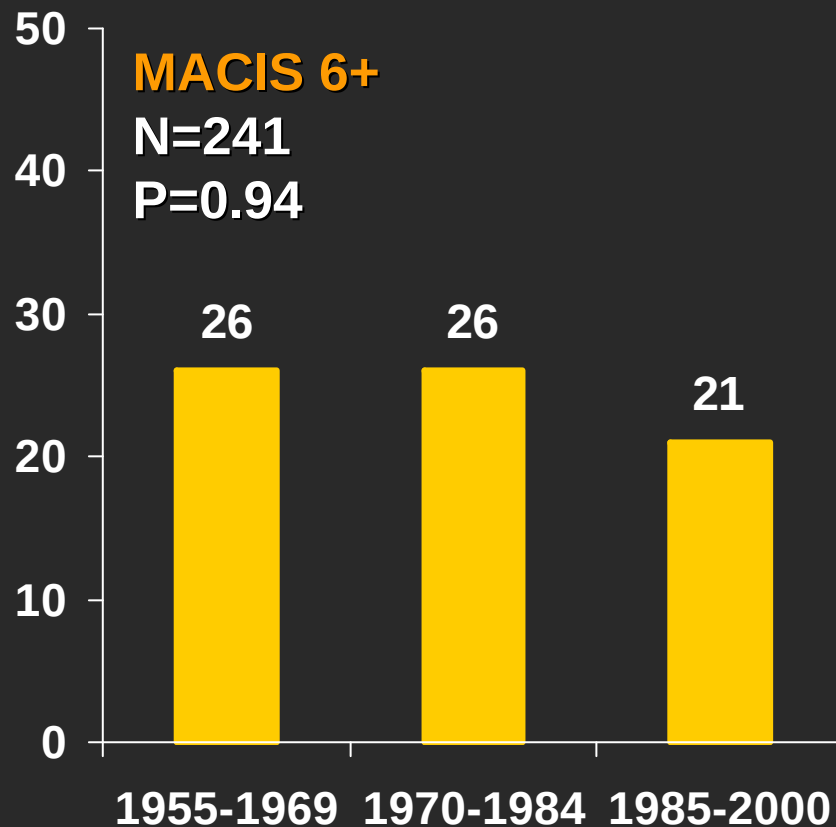
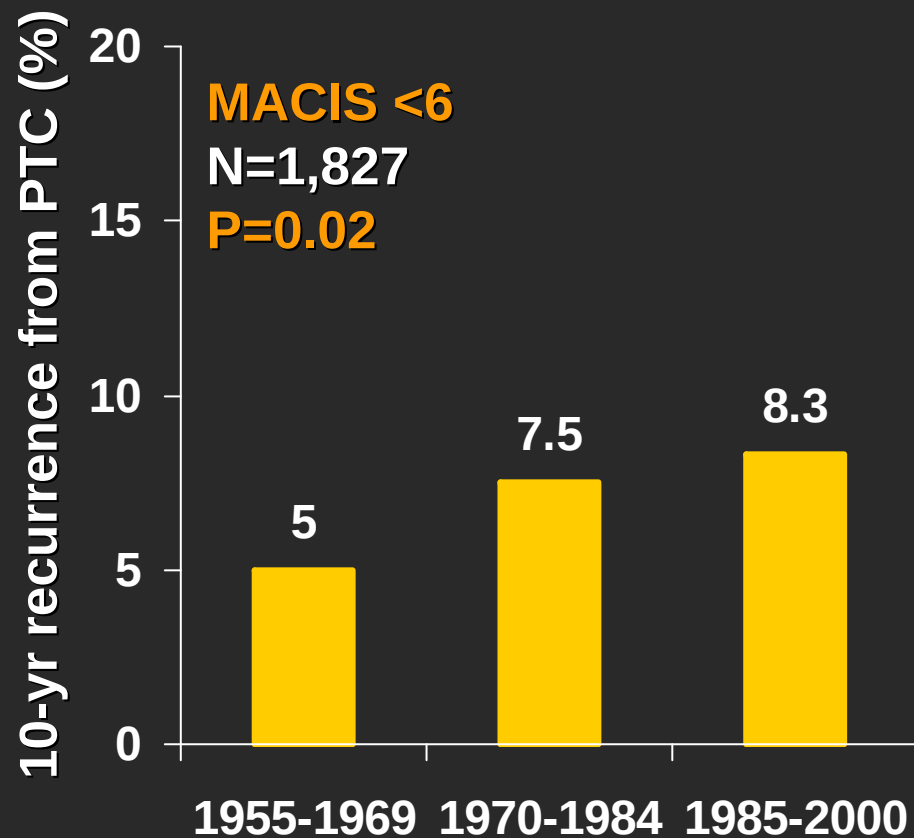
Papillary Thyroid Carcinoma 1955-2000

Cause Specific Mortality



Papillary Thyroid Carcinoma 1955-2000

Tumor Recurrence



Radio-iodine Remnant Ablation

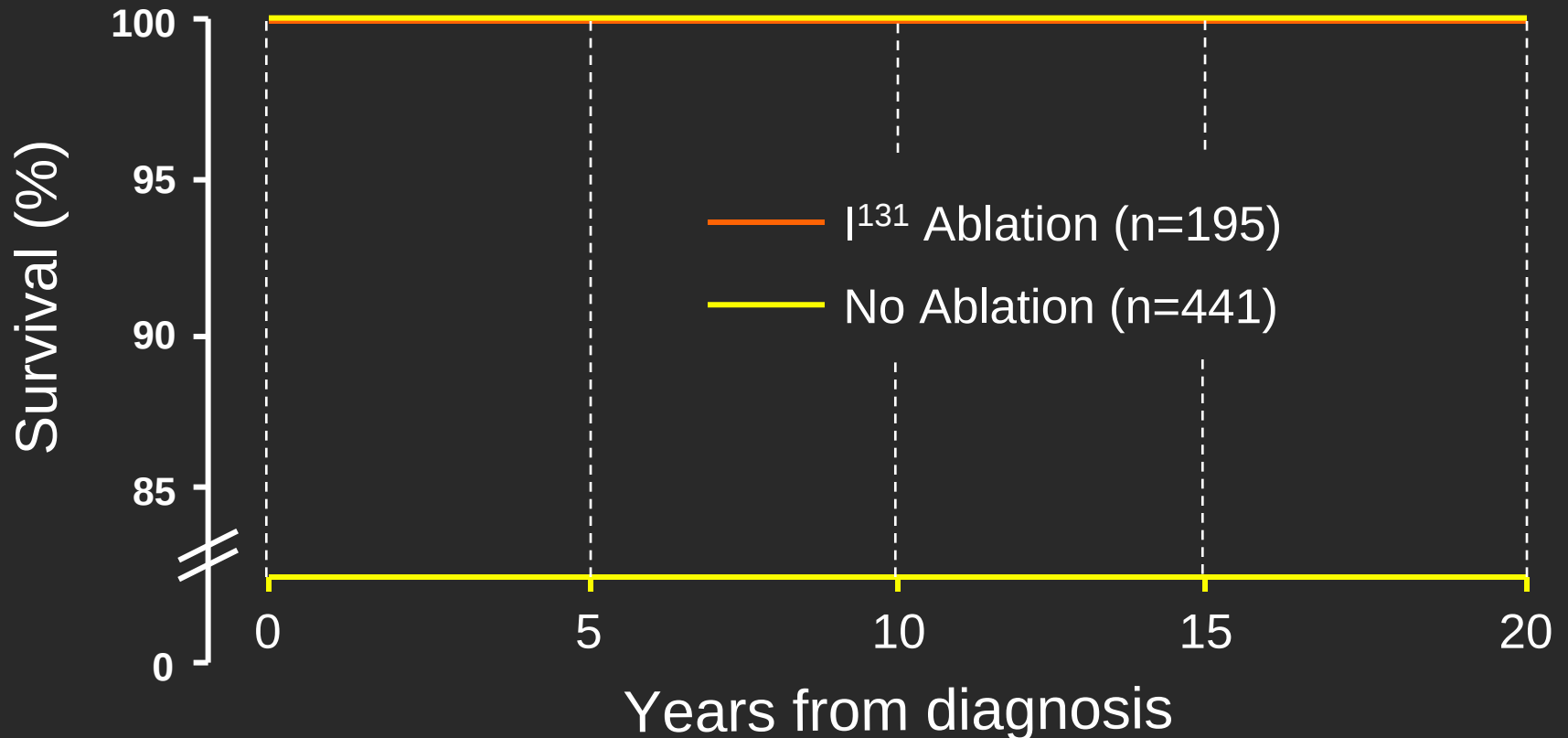
“Routine” Administration

- I-131 in moderate dose is safe
- Ablation of the thyroid remnant decreases the risk of recurrent disease
- All patients should be offered this therapy

“Selective” Administration

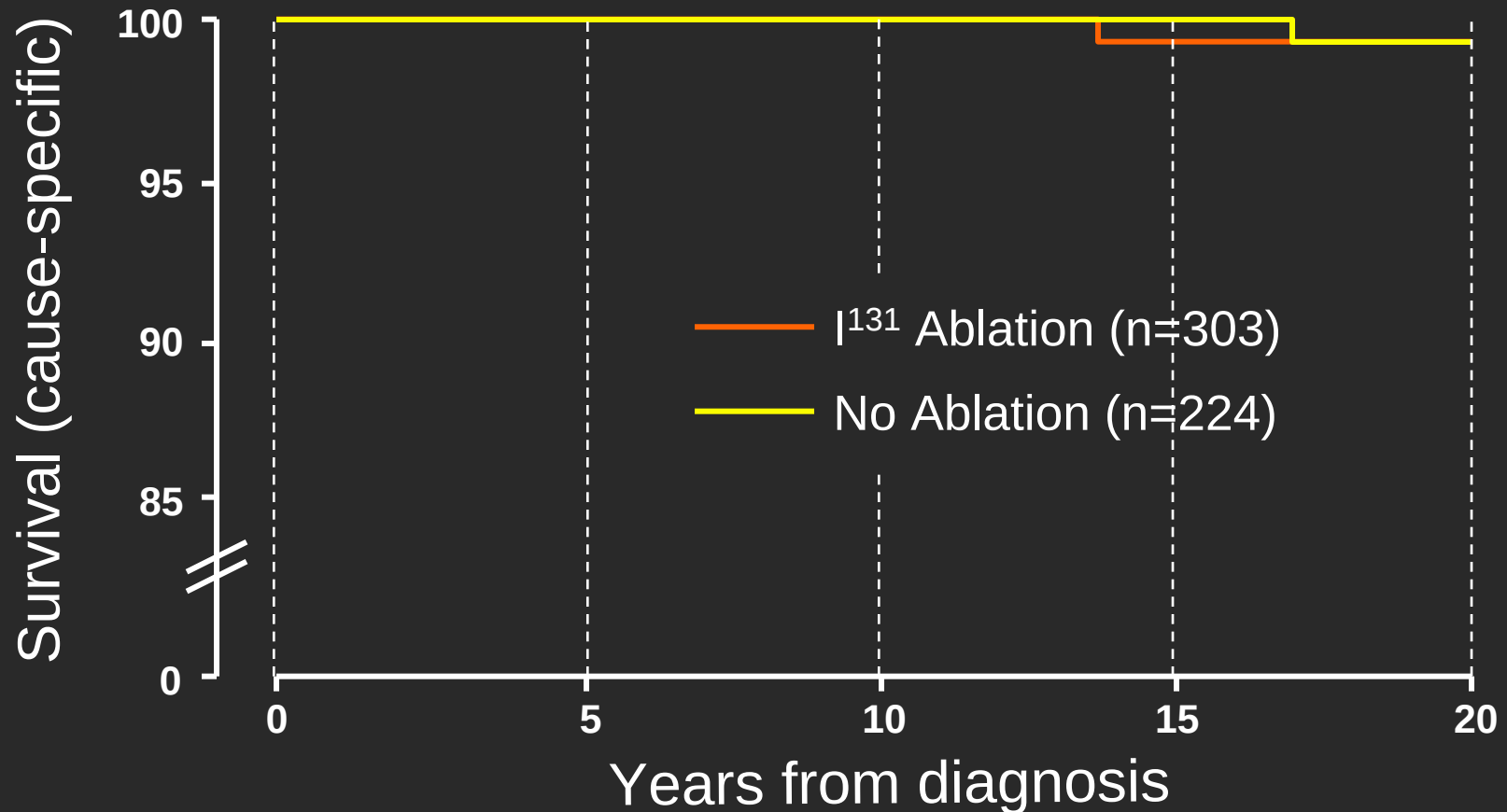
- Morbidity from I-131, while rare, does occur
- Most patients with DTC are at very low risk of death or recurrence
- Treatment should be offered selectively

Survival ($T_xN_0M_0$, MACIS<6)



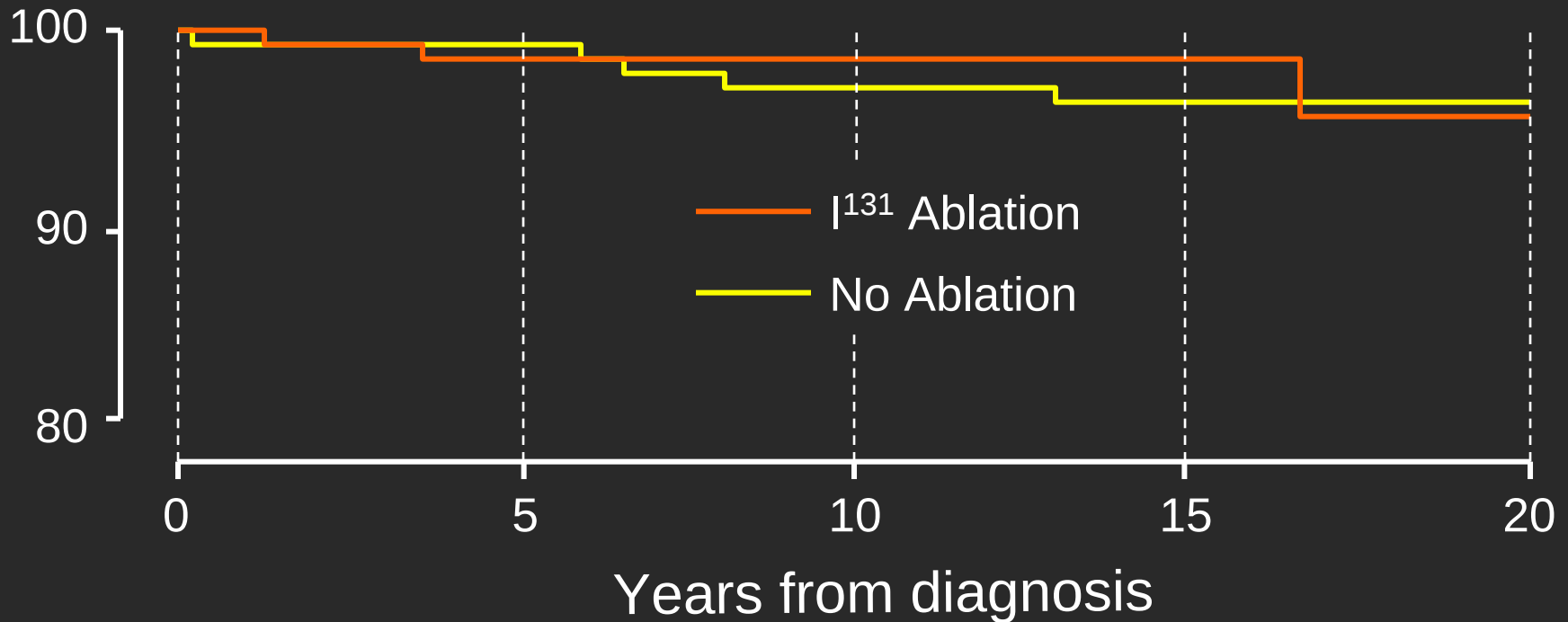
636 node negative patients; total or near-total TTX; 1970 - 2000

Survival ($T_xN_1M_0$, MACIS<6)



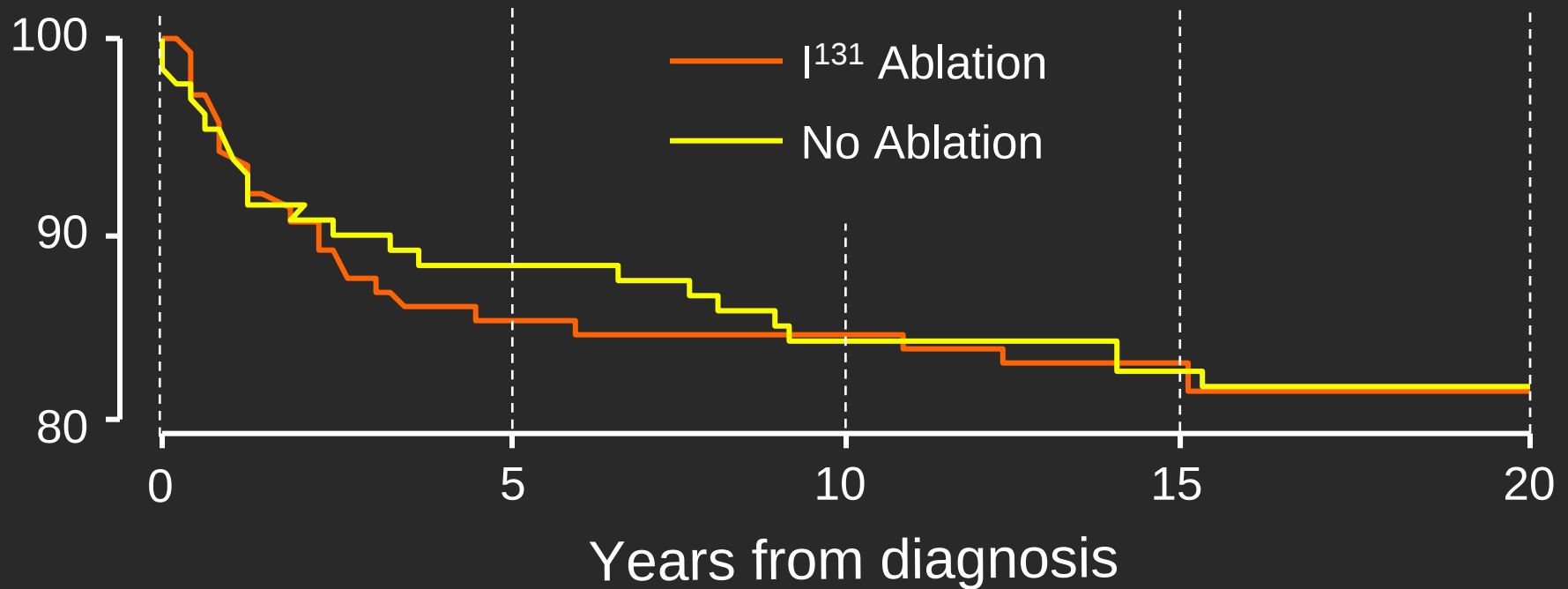
527 **node positive** patients; total or near-total TTX; 1970 - 2000

Recurrence ($T_xN_0M_0$, MACIS<6)



636 **node negative** patients; total or near-total TTX; 1970 - 2000

Recurrence ($T_xN_1M_0$, MACIS<6)



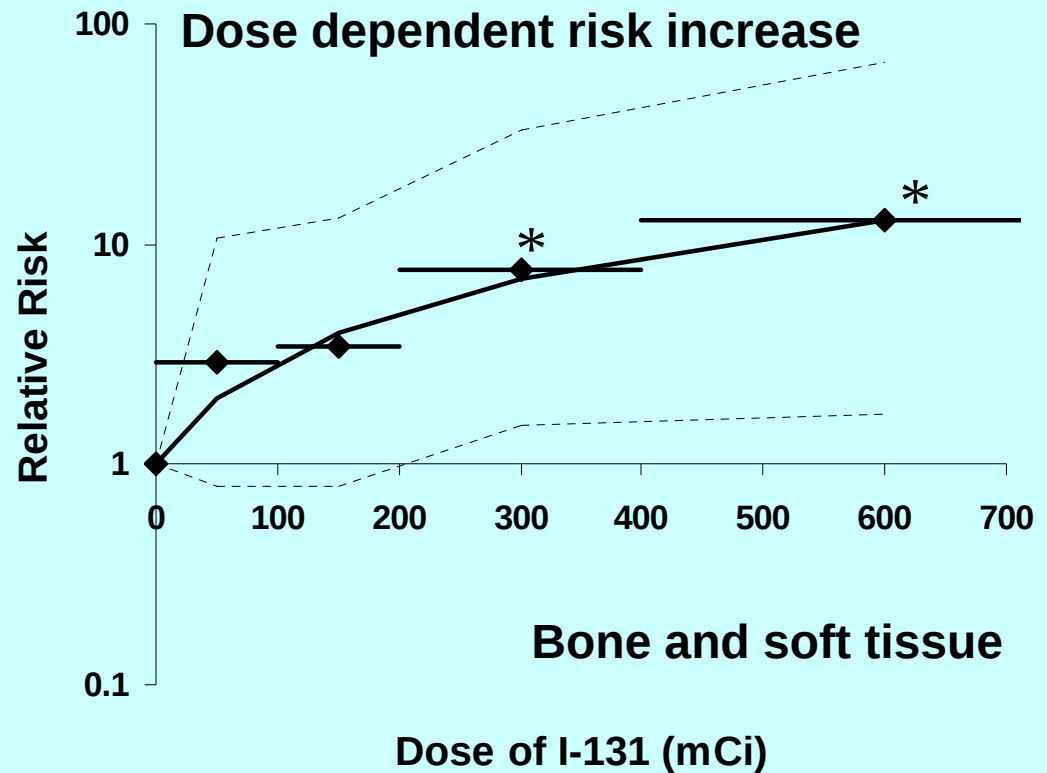
527 node positive patients; total or near-total TTX; 1970 - 2000

Carcinogenesis with I¹³¹

3 populations
(Sweden, Italy, France)
6841 patients
Mean dose I¹³¹ 162 mCi
Mean F/U of 13 years
Incidence of 2nd malignancy

Increased risk for cancer of:

Salivary gland	7.5
Bone & soft tissue	4.0
Uterus / female genital	2.3
Colorectal	1.3



Post-operative Remnant Ablation: ATA Guidelines 2009

- **RRA recommended for**
 - **Patients with Stage III and IV disease**
 - >45 years, node positive, invasive, metastatic
 - **Patients with Stage II disease (<45 years)**
 - <45 years, metastatic
 - **“Most” older patients with Stage II disease**
 - >45 years with larger tumors (> 2 cm)
 - **“Selected” patients with Stage I disease**
 - “multifocal; nodes; invasion; non-PTC”

Recommendation 32

RAI ablation is recommended for all patients with:

Distant metastases, gross extrathyroidal extension and tumor size > 4 cm

Even in the absence of other high risk features

Recommendation 32

Radioiodine ablation may be helpful for tumors 1-4 cm in diameter, in patients with lymph node metastases, or other high risk features including histologic variants that would place the patient in an intermediate or high risk group

Recommendation 32

- **Remnant ablation is not recommended for unifocal or multifocal cancers <1cm in the absence of other high risk features**

Extent of Lymphadenectomy



**Most recurrences in PTC (esp.
low-risk) are nodal**

Regional Lymph Node Metastases

- Influence on prognosis is questionable
 - Effect on survival (rarity)
 - Little if any in most cases

- Older patients
- Bilateral jugular nodes (extensive)
- Extracapsular spread, matted nodes
- Locally advanced primary

Possible exceptions

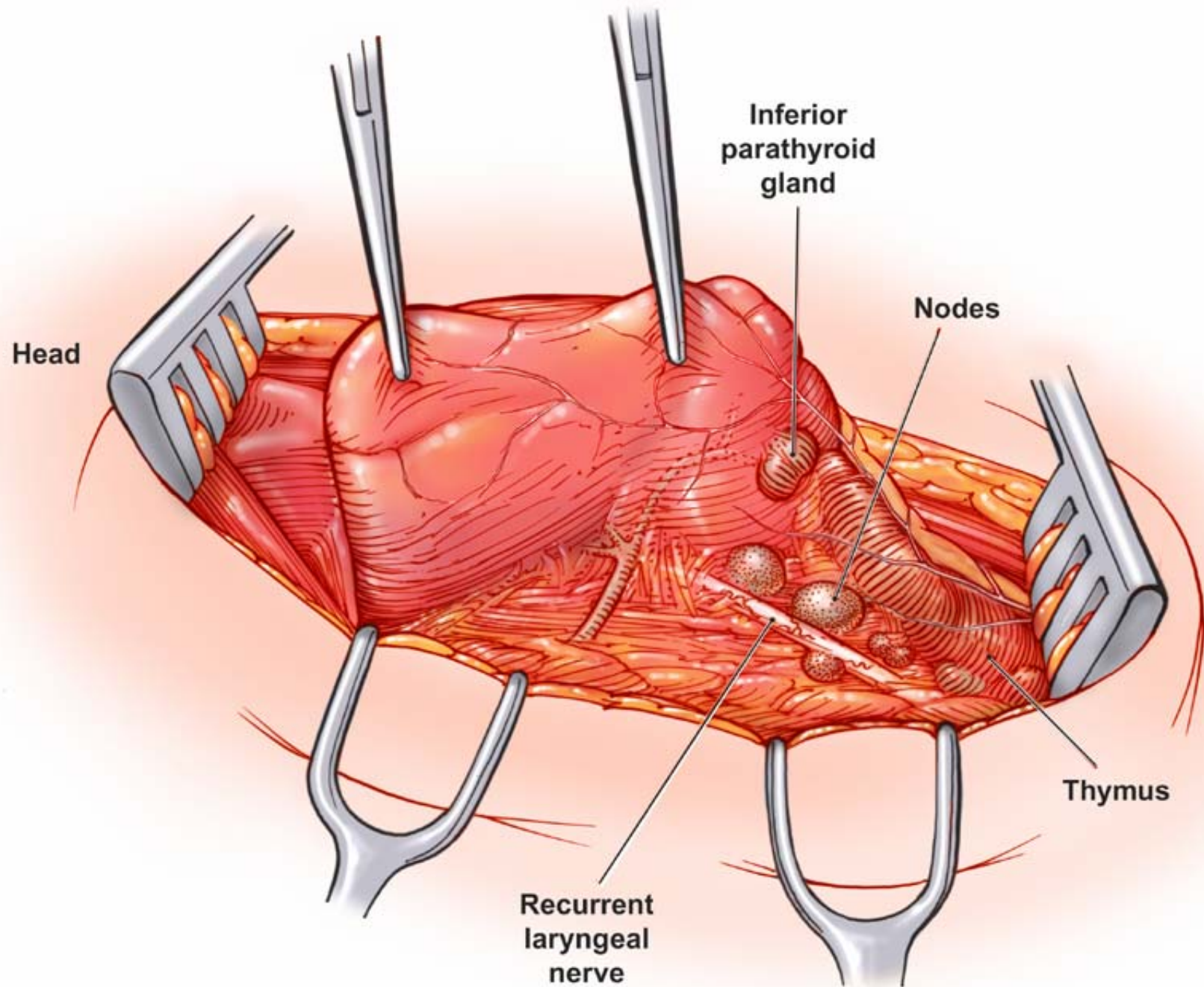
Why Perform Cervical Lymphadenectomies

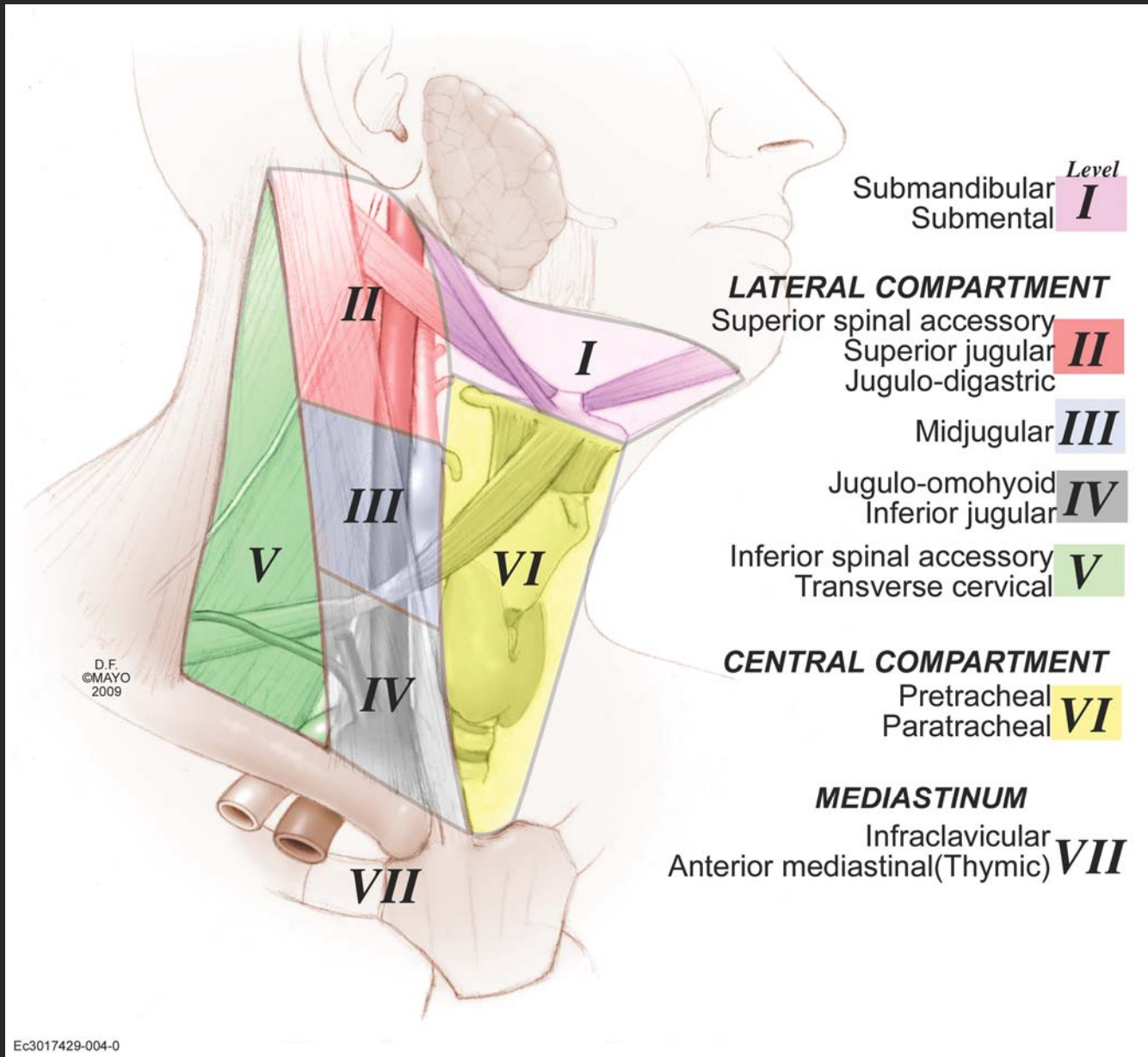
- Positive nodes in select groups worsen prognosis
- Nodes beget nodes → ↑ recurrence
- May become destructive over time (especially older patients)
- Cannot rely upon RAI to fix shoddy surgery

Why Perform Cervical Lymphadenectomies ?

- Thyroglobulin (withdrawal, Thyrogen stimulated)
- High resolution ultrasound
- Radioiodine and PET scans
- Tg mRNA

Endocrinologists





PTC

“Berry-Picking” vs Formal Nodal Dissection

- Nodal recurrences increased in all series
- Reoperations more difficult
 - Increased **morbidity**
- Metastatic carcinoma in lymph nodes **> 3 mm** always associated with disease in smaller lymphatics
 - **Noguchi et al 1970, 1987**

**Best to avoid going back to the
central compartment**

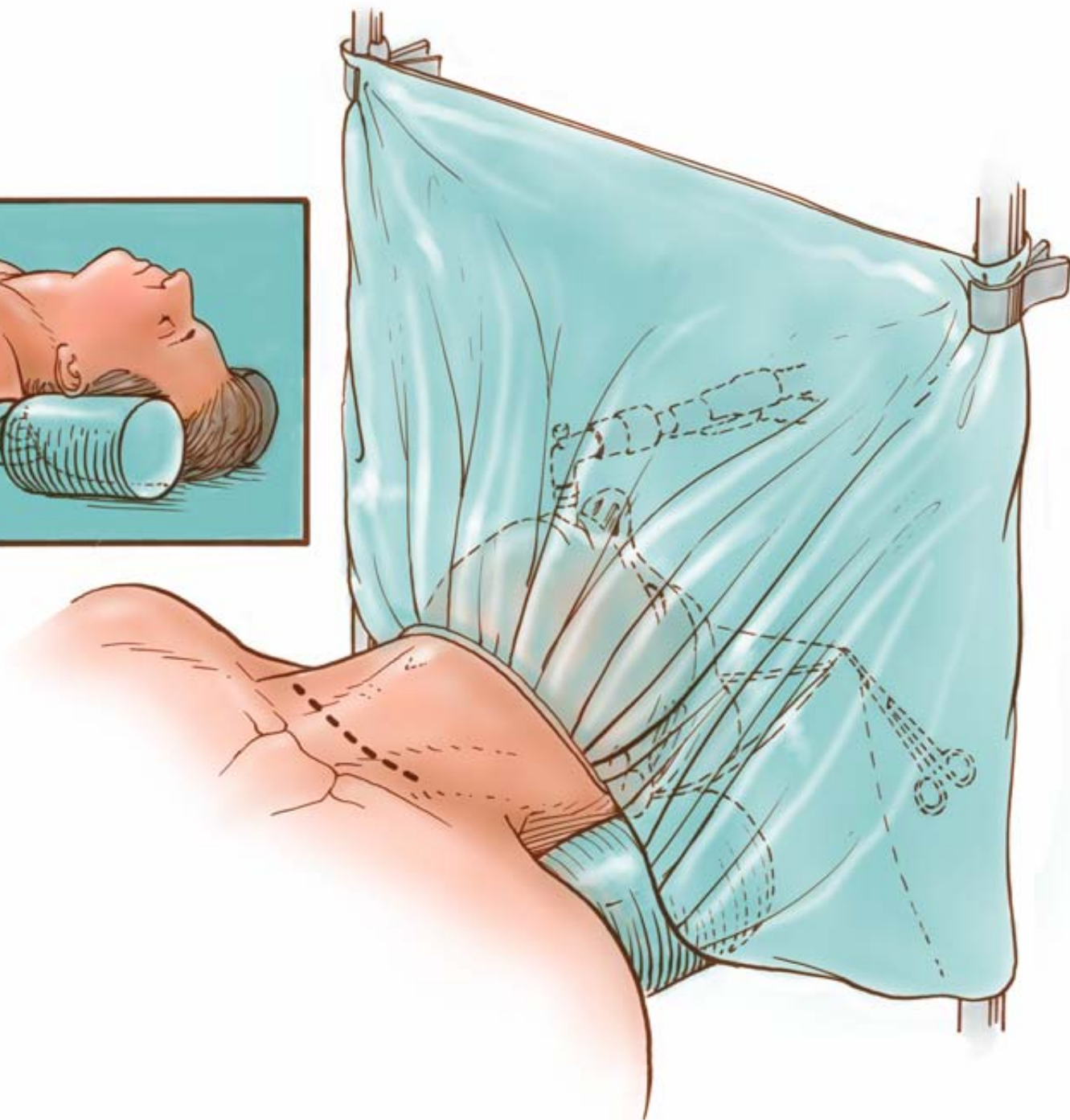
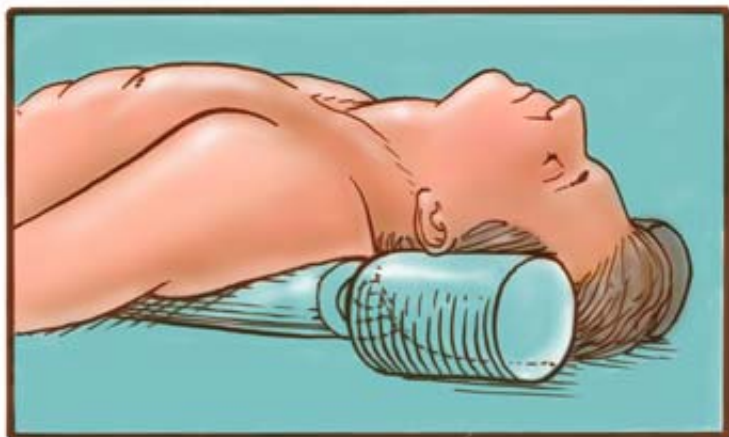
Routine Removal of Central Compartment Nodes

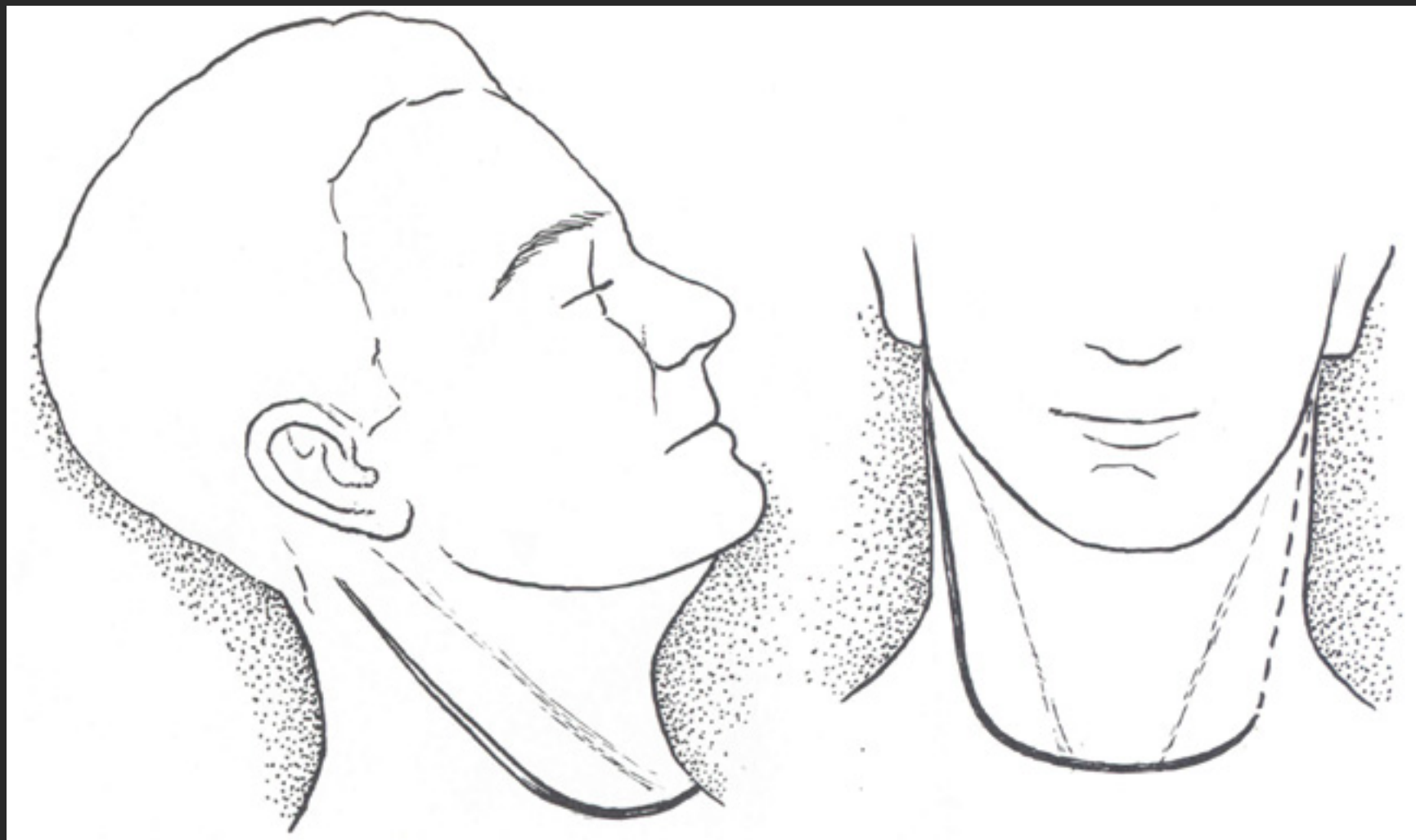
- **Advocated by some groups**
- **Only if FS ⊕**
- **Only for larger 1° tumors (> 1-2 cm)**
- **Only if grossly involved**
- **Increased hypoparathyroidism, neuropraxia**

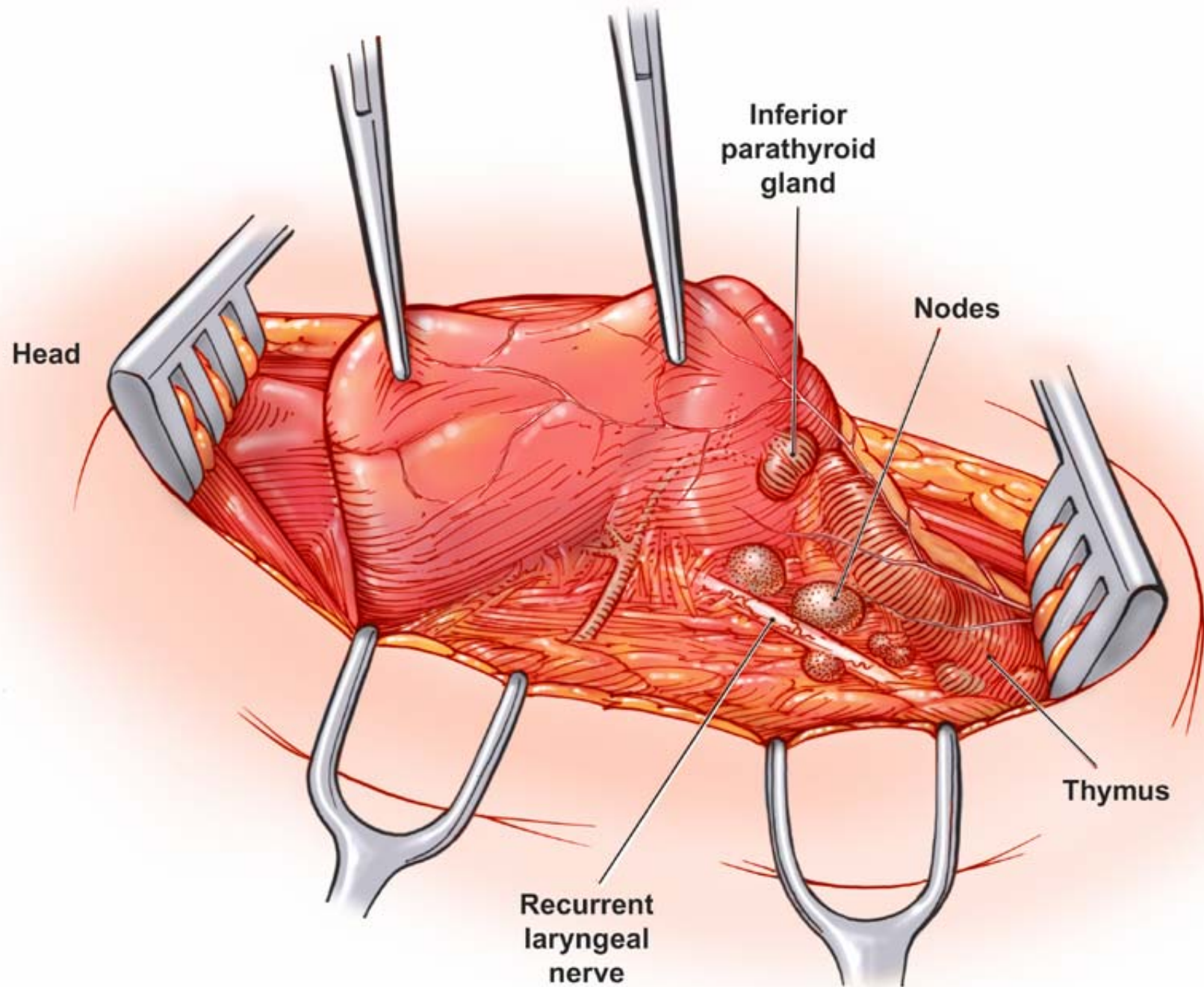
They Will Come Back To Haunt Us and Our
Patients

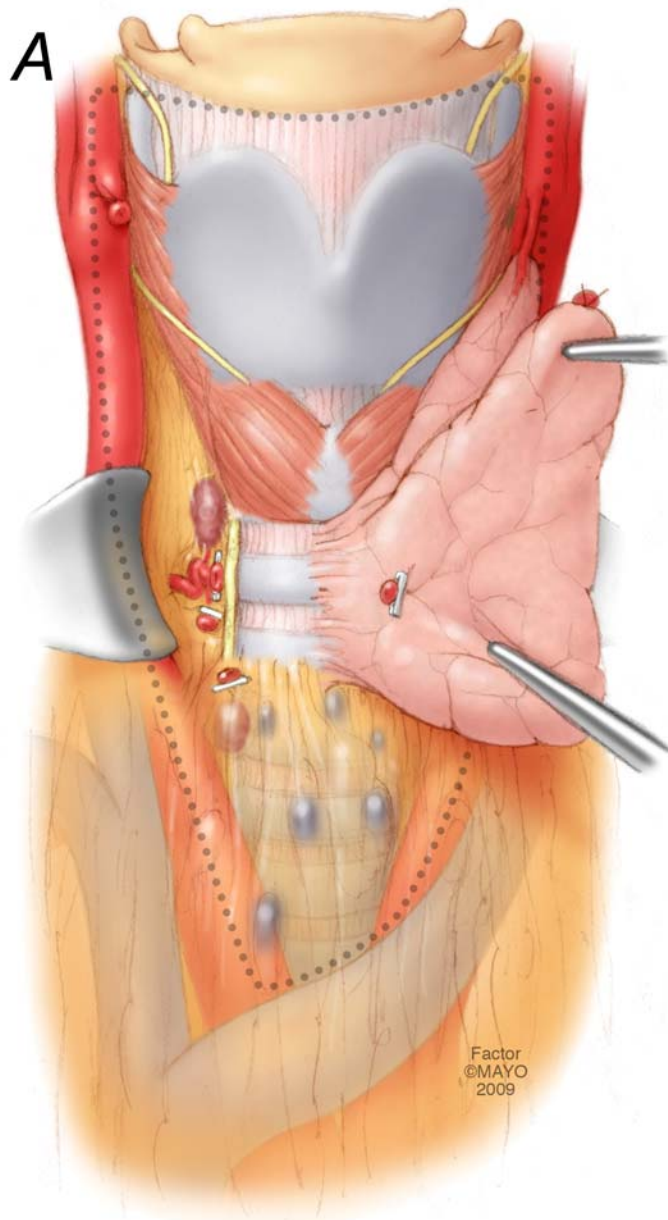
Lateral Neck Dissection

- **Therapeutic**
 - **Biopsy positive**
 - **Ultrasound positive**
 - **Gross involvement**



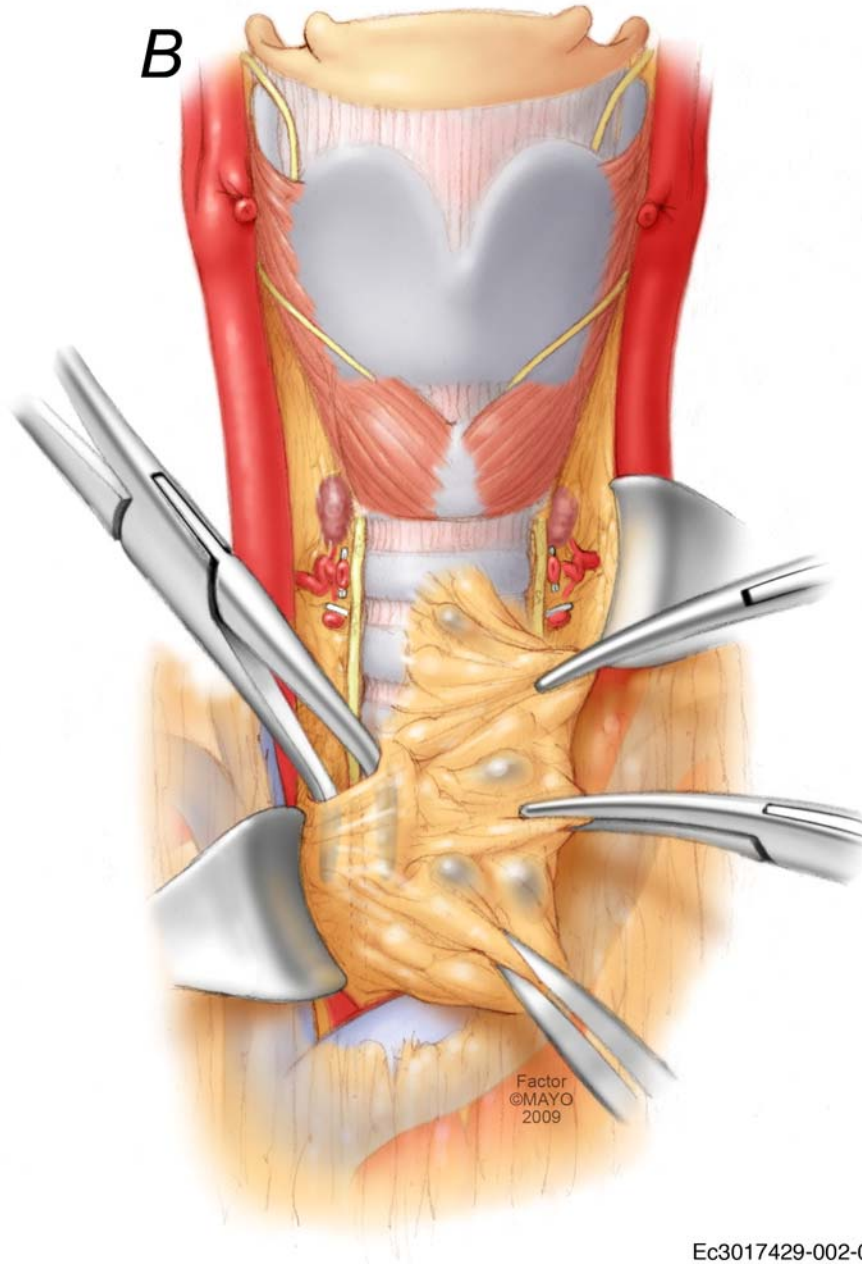




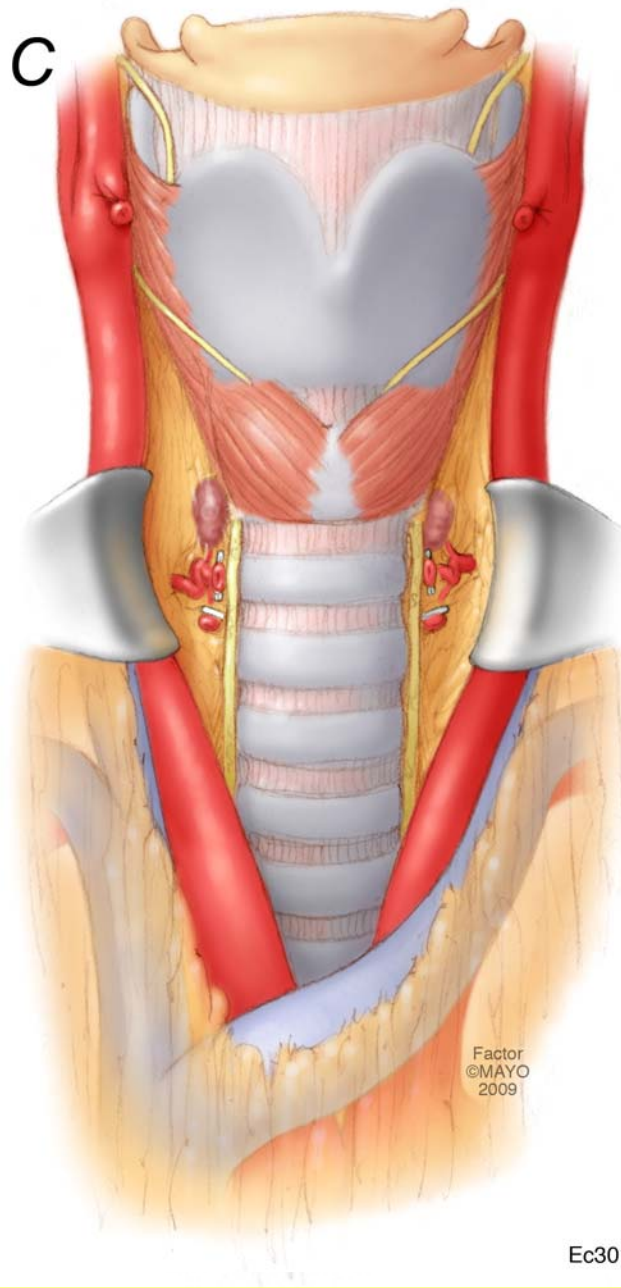


Factor
©MAYO
2009

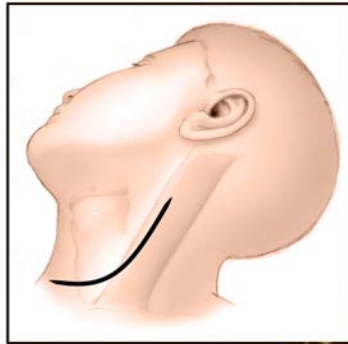
B



Factor
©MAYO
2009



Factor
©MAYO
2009



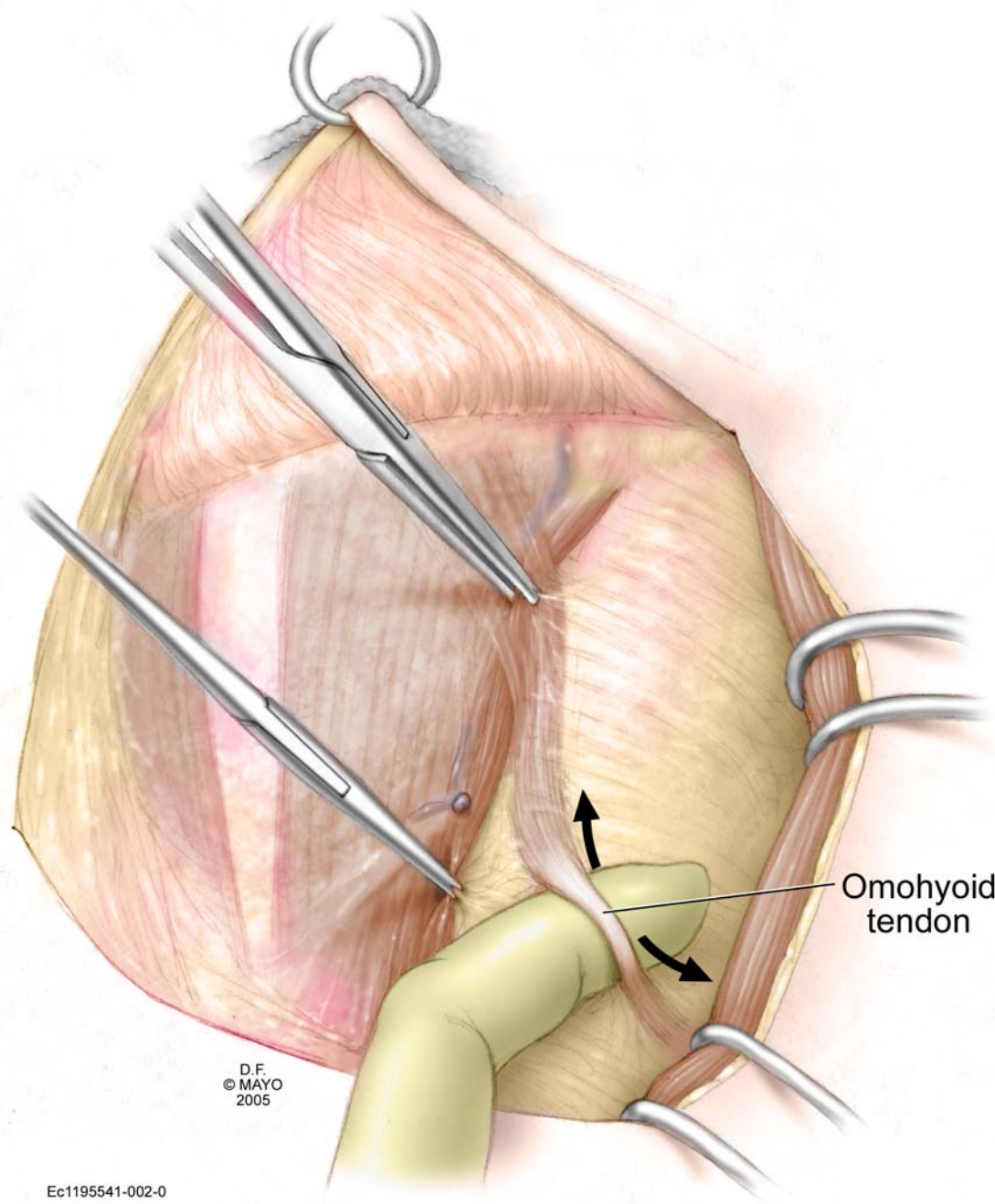
D.F.
© MAYO
2005

Kocher
clamps on
strap muscles

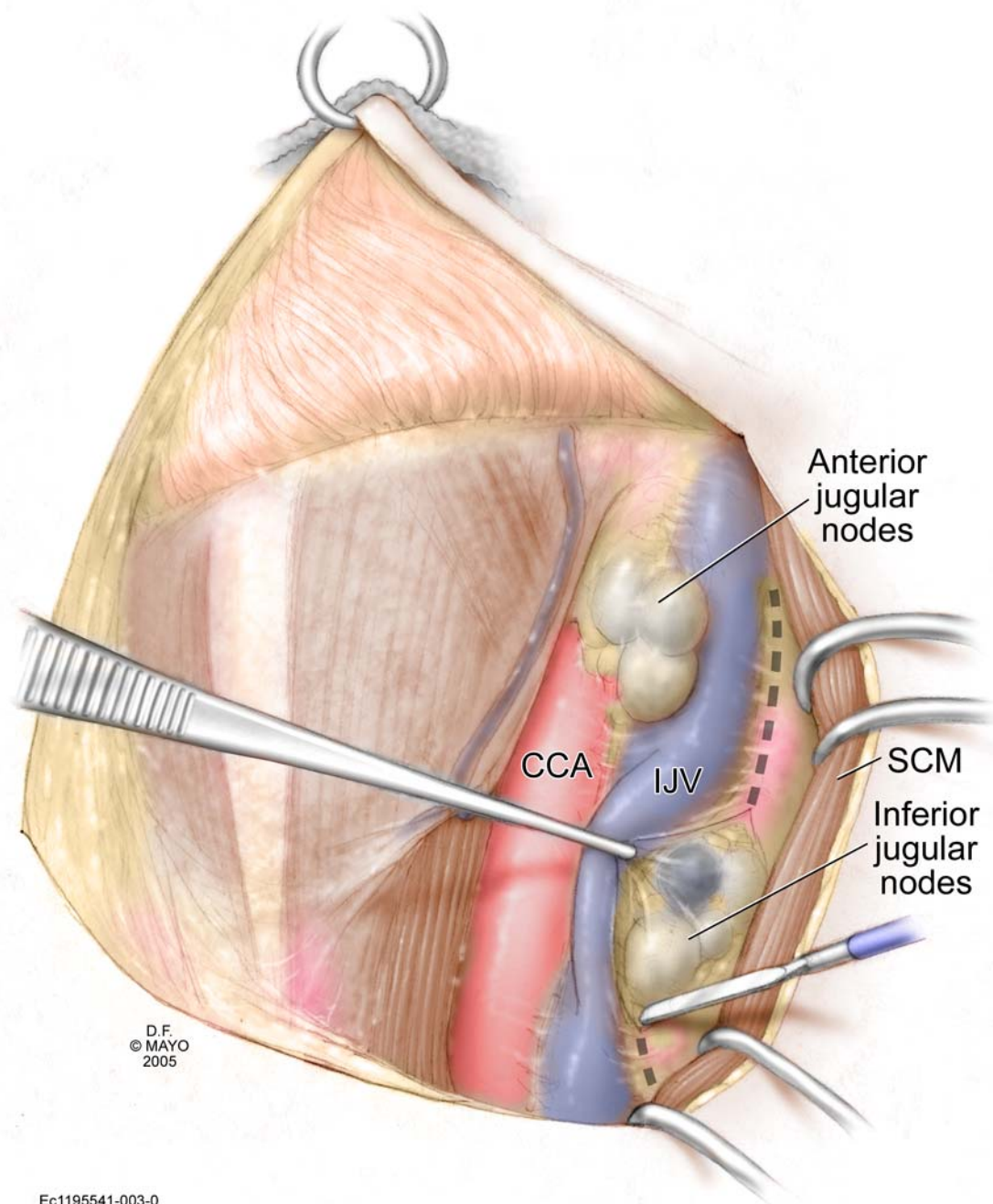
Anterior
cervical
fascia

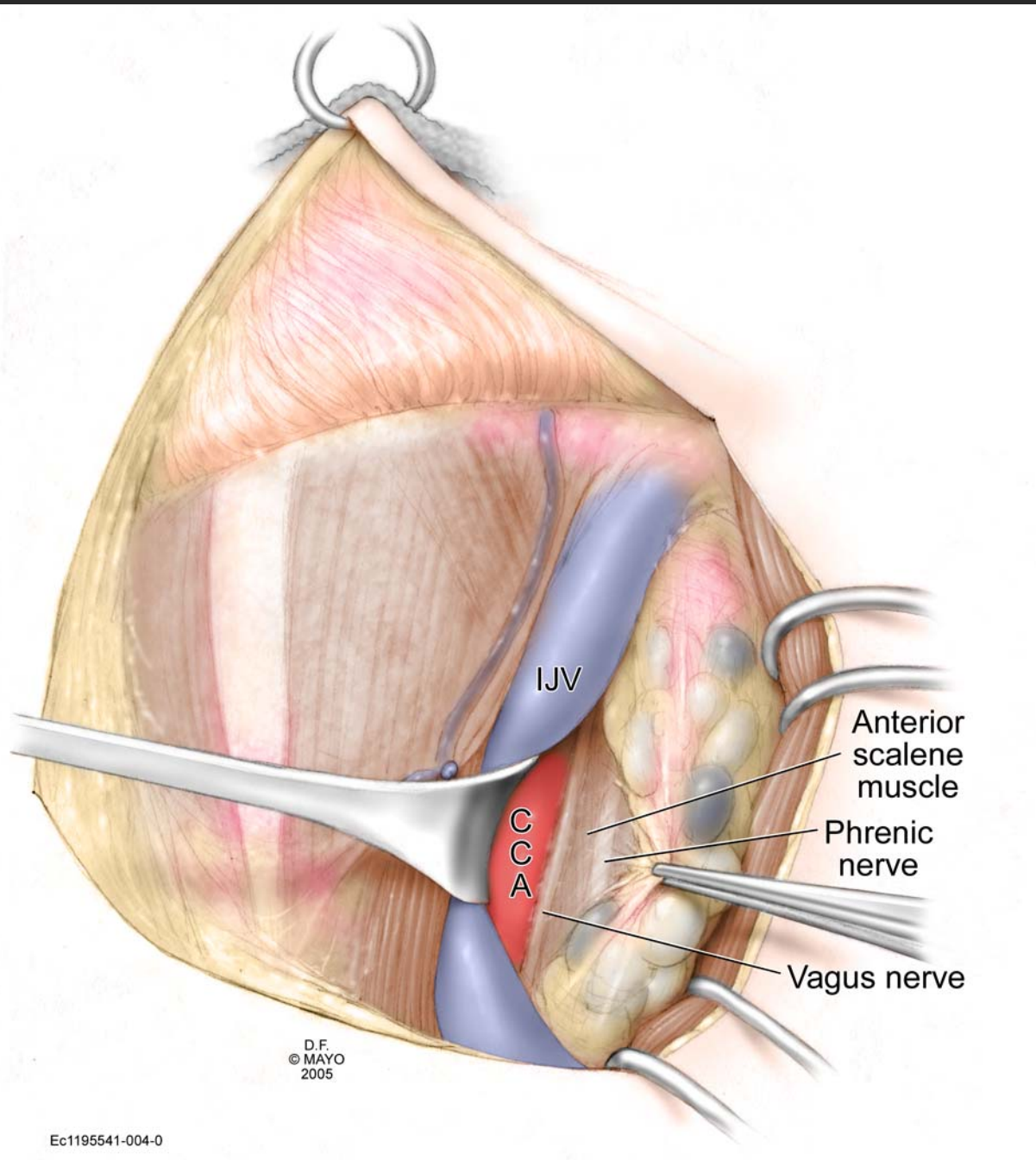
Platysma

SCM

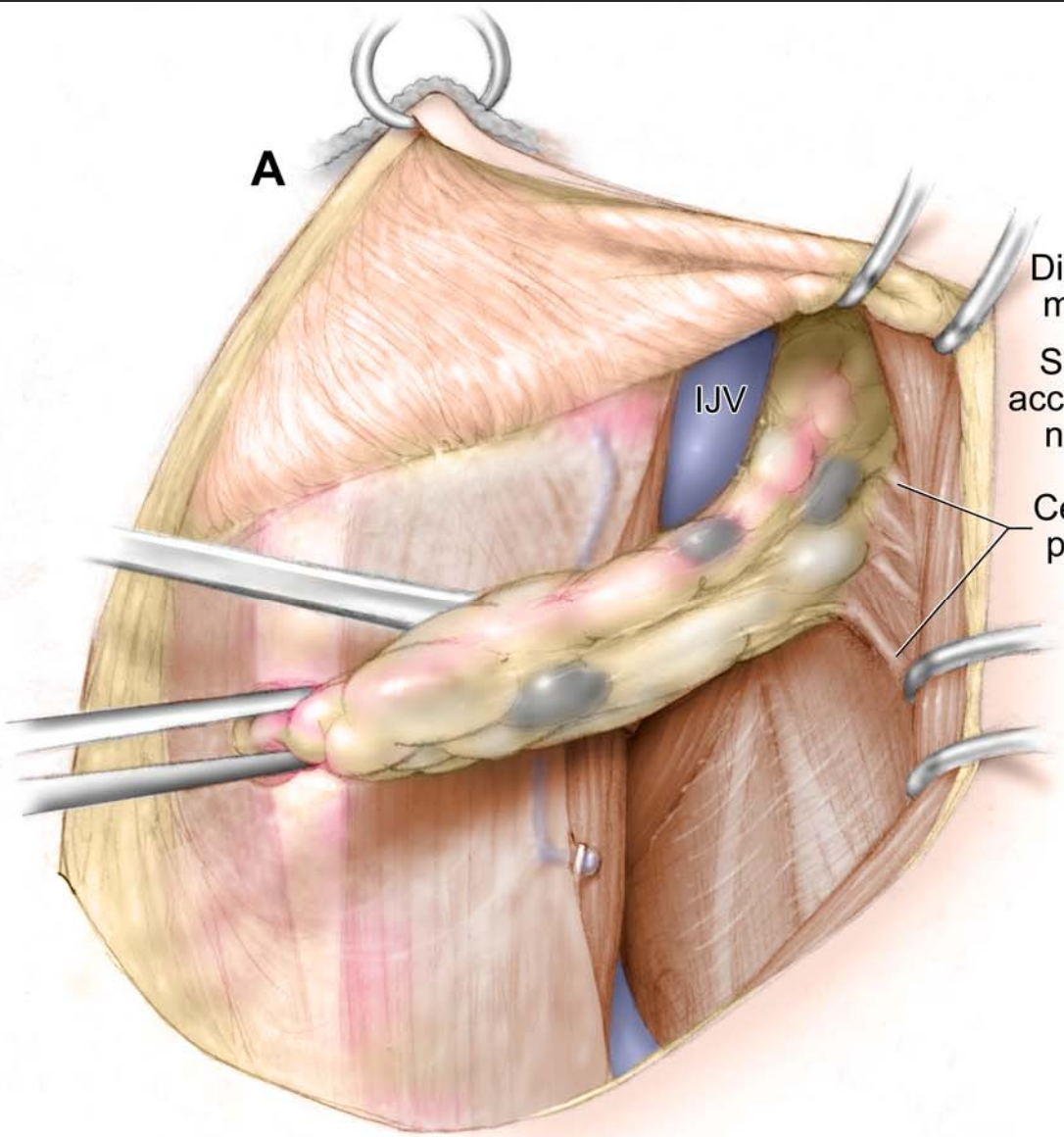


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2005



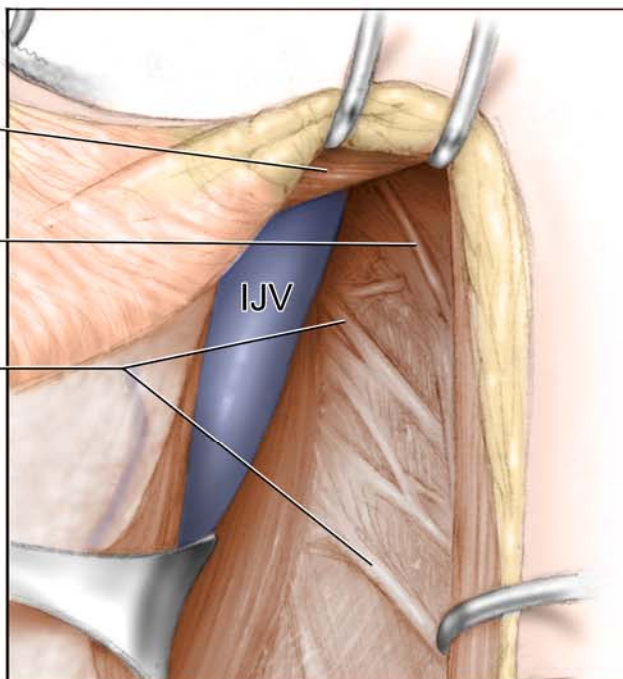


A



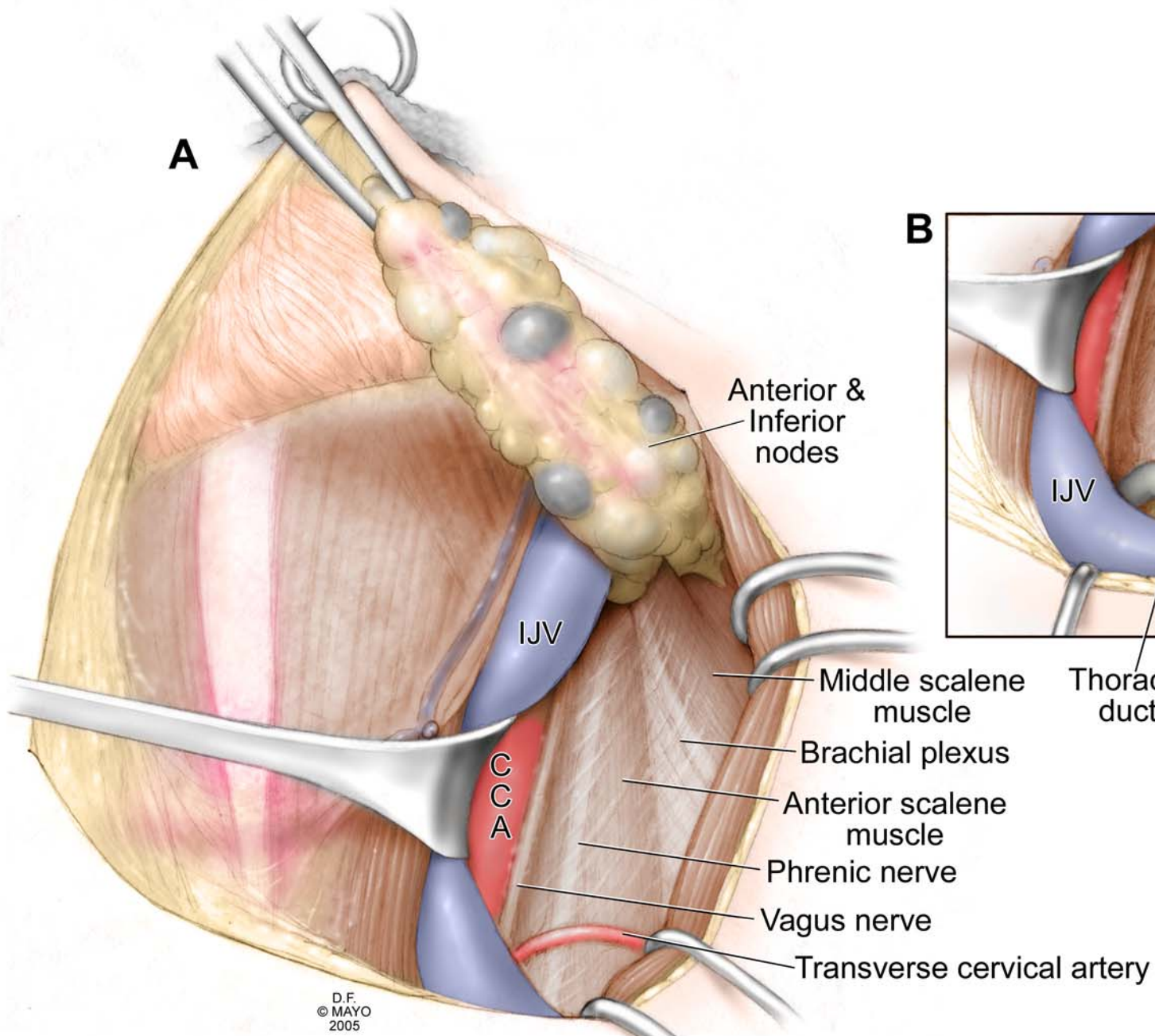
B

Digastric
muscle
Spinal
accessory
nerve
Cervical
plexus

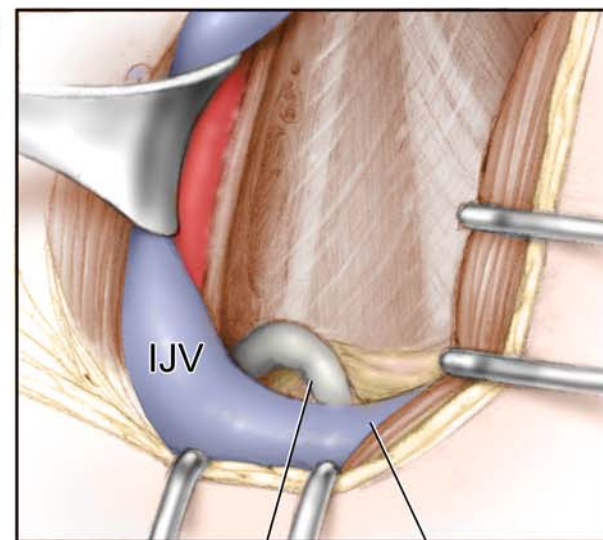


D.F.
© MAYO
2005

A



B



Prophylactic Central Lymph Node Dissection

Should be performed for T3 and T4 tumors. It is optional for T1 and T2 tumors (ATA Recommendations 2009)

Practical Algorithm

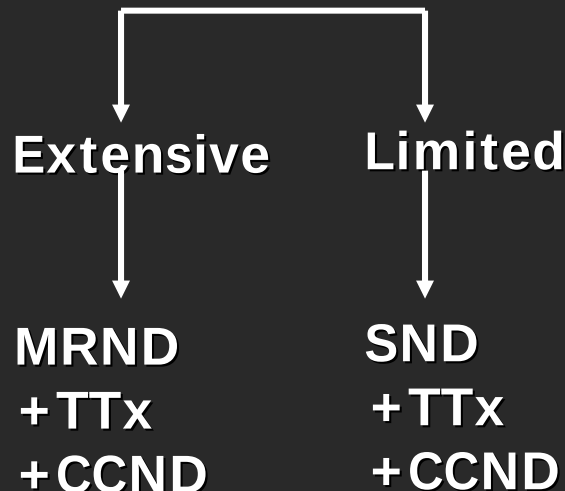
⊕ FNA for PTC (or suspicious)



US Mapping ± FNA

⊕ Lateral Nodes

⊖ Lateral Nodes



Total Thyroidectomy (TTx)

CN's grossly ⊕
Multifocal
Larger tumor
Extrathyroidal

CN's grossly ⊖
Tumor unifocal
< 1 cm
Intrathyroidal

Bilateral level
VI ± VII
Delphian
Pretracheal

Ipsilateral level VI
Delphian
Pretracheal

MRND = modified radical neck dissection
SND = selective (lateral) neck dissection

Recommendations

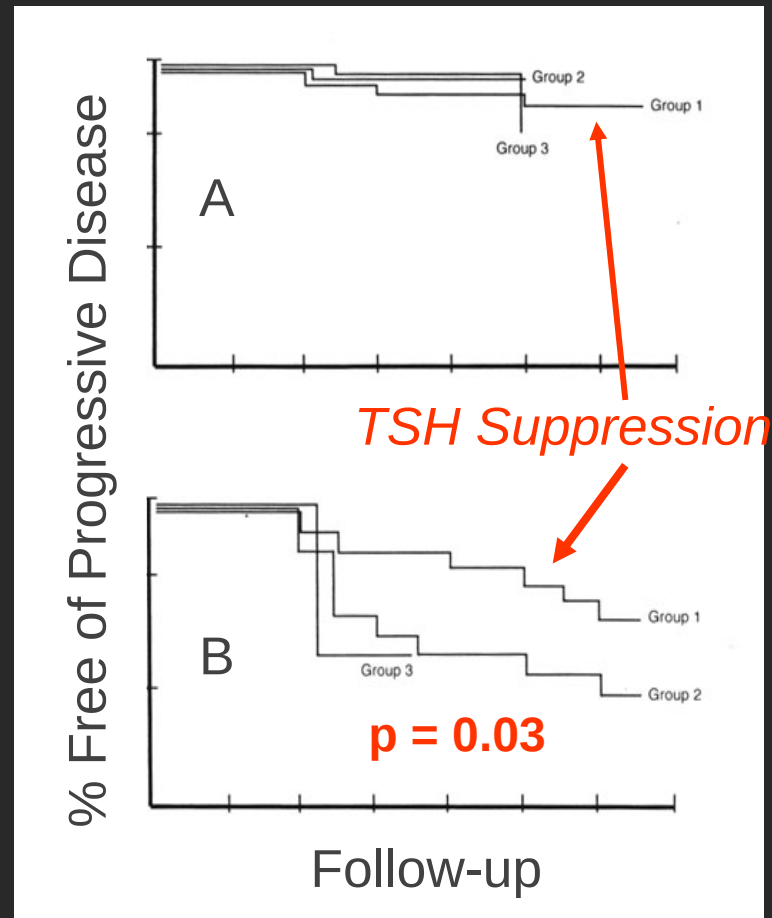
- **BLR** and central node dissection (**CND**) reduces **TR** in **low-risk** patients
- **BLR** and **CND** reduces **TR** and **CSM** in **high-risk** patients
- **RRA** does **not** further **reduce CSM** or **TR** in MACIS **low-risk** patients

TSH Suppression and Outcomes

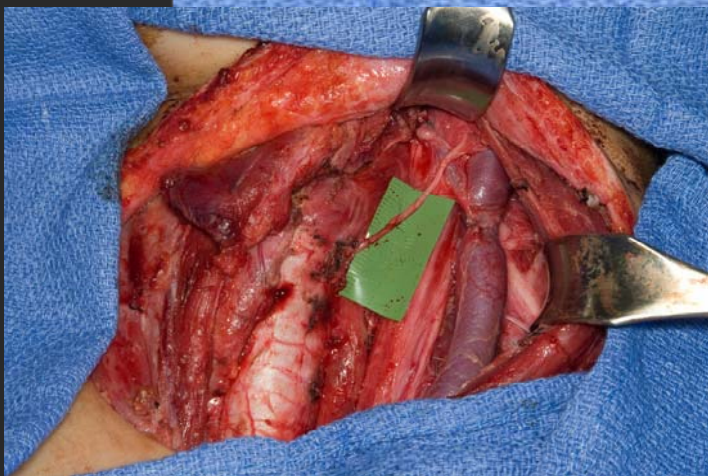
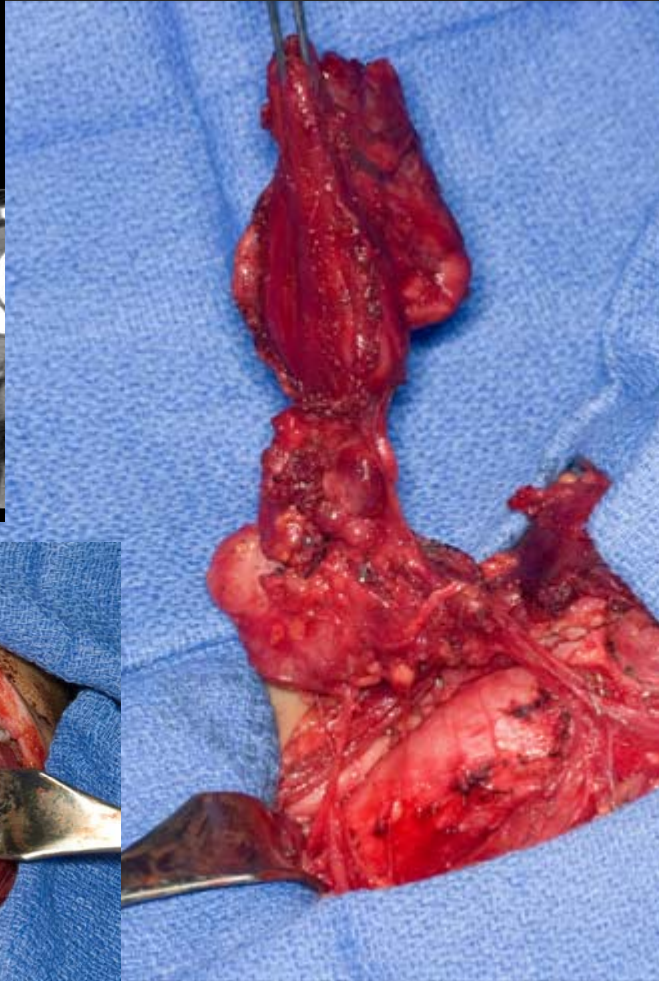
- 683 patients with DTC followed at 14 institutions up to 10 years
- Majority (90%) were PTC

A: Stage I & II

B: Stage III & IV



Childhood PTC



Long-Term Outcome in 215 Children and Adolescents with Papillary Thyroid Cancer Treated During 1940 Through 2008

Ian D. Hay · Tomas Gonzalez-Losada ·
Megan S. Reinalda · Jennifer A. Honetschlager ·
Melanie L. Richards · Geoffrey B. Thompson

© Société Internationale de Chirurgie 2010

Abstract

Background Controversy exists regarding the aggressiveness of initial therapy in childhood papillary thyroid cancer (PTC). Few studies with long-term outcome exist and second primary malignancies have rarely been analyzed.

Methods We studied 215 PTC patients younger than 21 years old managed during 1940 through 2008. The patients were aged 3–20 year old (median age = 16 years); the median follow-up was 29 years. Recurrence and mortality details were taken from a computerized database.

(UL) were significantly ($P < 0.001$) higher than after bilateral lobar resection (BLR). During 1950–2008 radioiodine remnant ablation (RRA) was administered within 18 months to 32%; it did not diminish the 25-year regional recurrence rate of 16% seen after BLR alone ($P = 0.86$). Only two fatal events from PTC occurred at 28 and 30 years, for a cause-specific mortality at 40 years of only 2%. All-causes mortality rates did not exceed expectation through 20 years, but from 30 through 50 years, the number of deaths was significantly ($P < 0.001$) higher than predicted. Fifteen of 22

Childhood and Adolescent PTC Managed During 1940-2008 - Patients Studied -

- **215 consecutive PTC patients aged <21 years**
- **January 1, 1940 - December 31, 2008**
- **Followed to June 2009**

Childhood and Adolescent PTC Treated at Mayo Clinic during 1940-2005

Conclusion

- Patients with PTC before age 21 typically were **node-positive** and **1/3 recurred** in 30 yr
- **Extent of initial surgery**, but not **radioiodine** remnant ablation, influenced recurrence rates
- PTC patients <21 yr at diagnosis enjoyed a **98% cause-specific survival** at 60 postop yr
- However, such patients experienced **excessive** all-causes **mortality** after 30 years

Mortality Rates from All Causes in Childhood and Adolescent PTC 1940-2008 Cohort

- Rates as predicted through 20 yr
- Significantly ($p < 0.001$) higher than expected during years 30 through 50
- 22 deaths observed vs 11 expected
- 17/22 (77%) died from malignancy; 2 from PTC, 15 from other primaries
- 73% received some form of ionizing therapeutic radiation

Childhood and Adolescent PTC Treated at Mayo Clinic during 1940-2008

- Childhood and adolescent PTC **is not** a lethal diagnosis
- Overzealous Treatment vs Predisposition?
- **Overaggressive postoperative treatment** could have long-term, possibly **fatal**, consequences

PAPILLARY THYROID MICROCARCINOMA

**An innocuous occurrence in our
opinion**

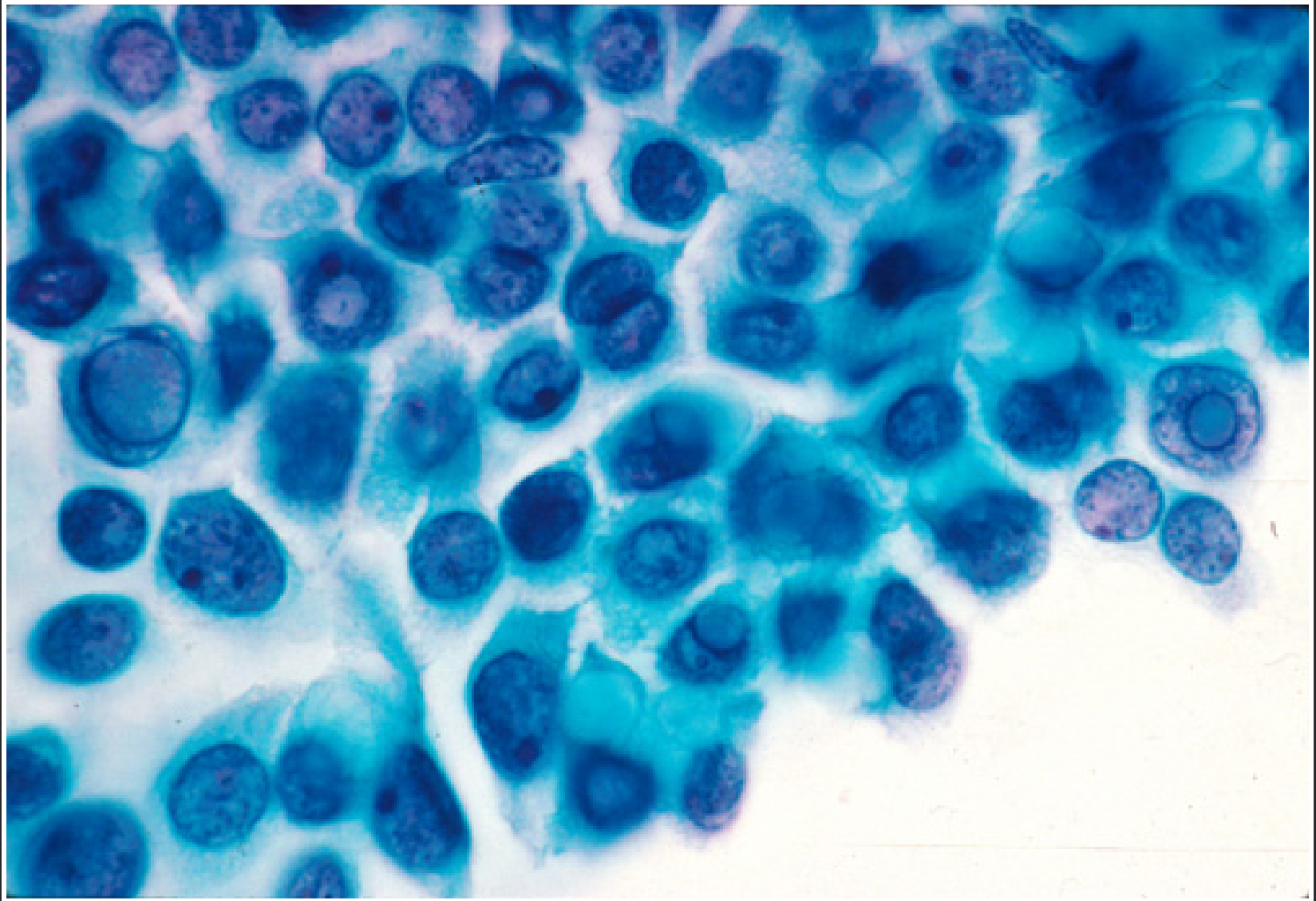
**Unless higher risk features are
present at the time of diagnosis**

Manage accordingly

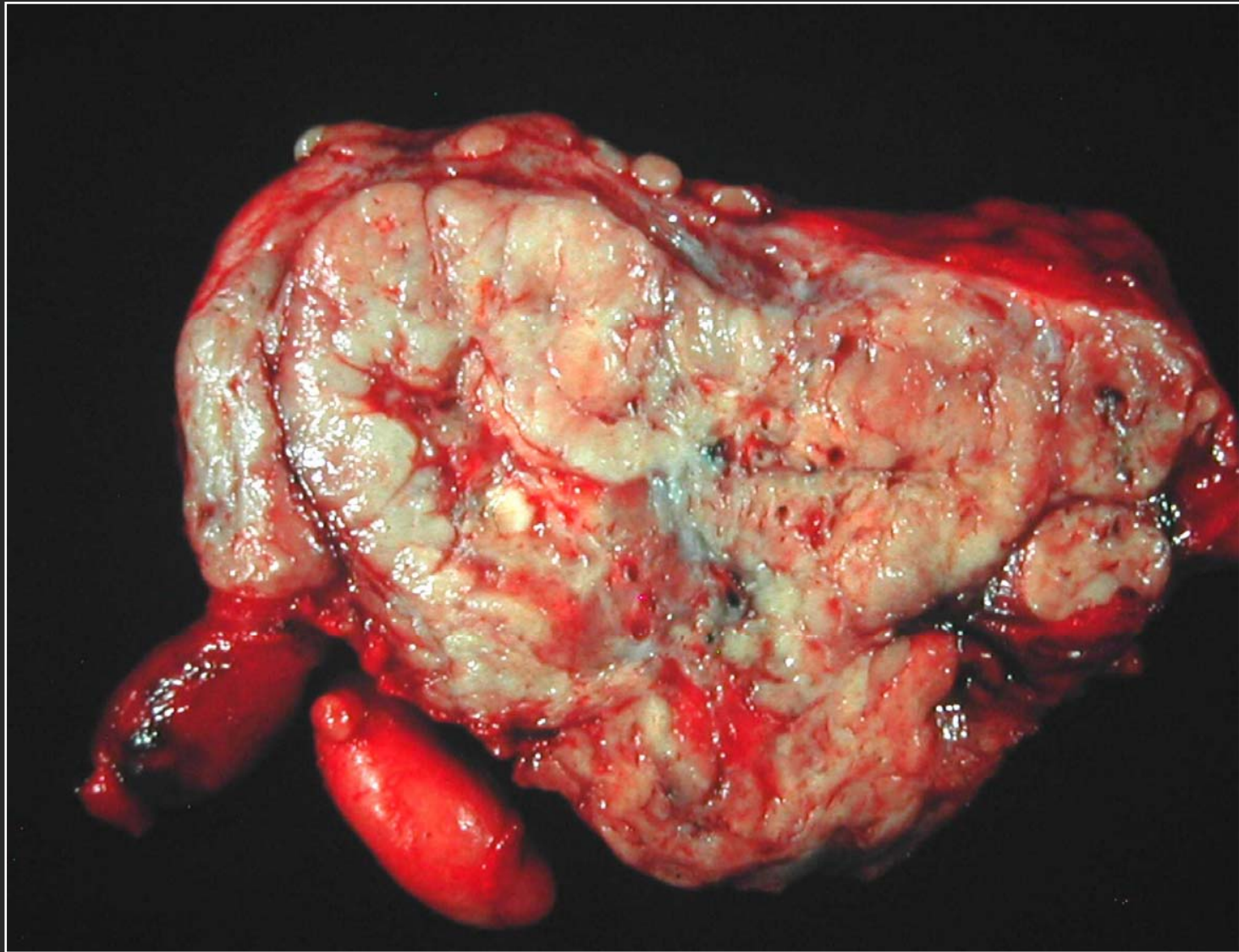
Follicular Thyroid Cancer (FTC)

- **10-15% of thyroid malignancies**
- **Cytology insufficient**
- **Capsular / vascular invasion**
- **90% unifocal**
- **Hematogenous spread**
- **Lung and bone metastases: 15%**
- **Nodal metastases: FCC 5%**

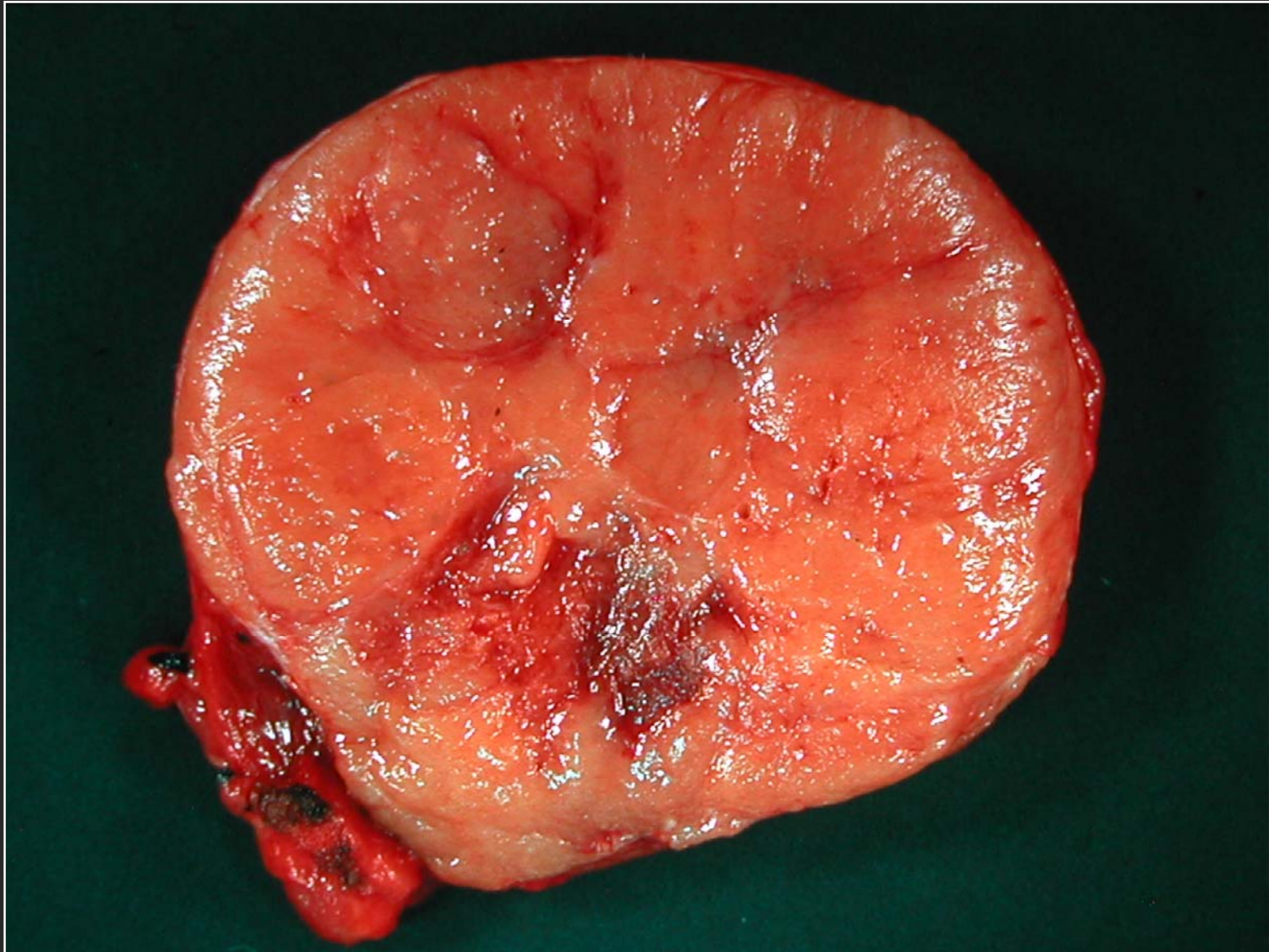
Papillary Thyroid Carcinoma-FNAB



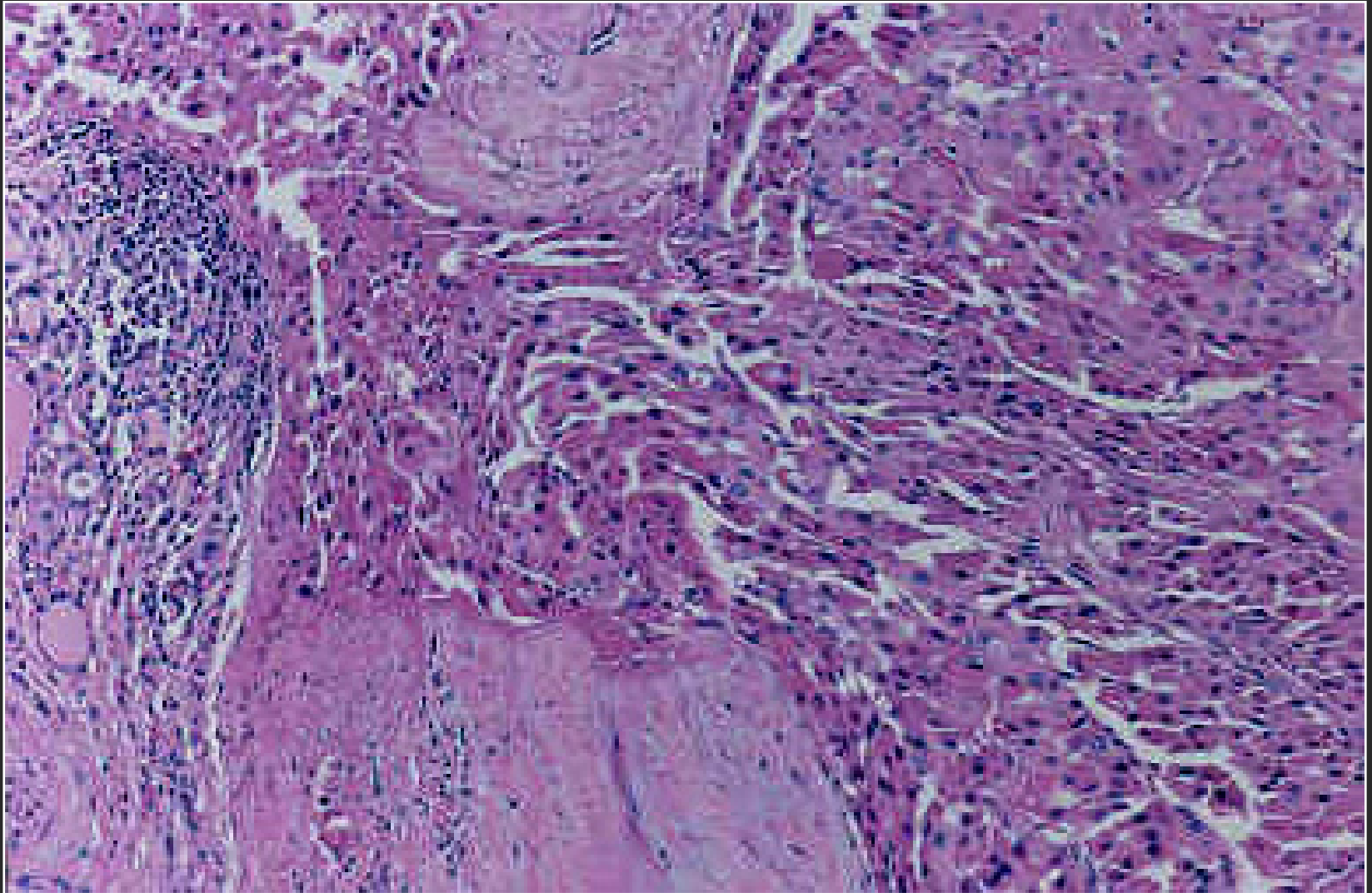
Widely Invasive Follicular Carcinoma



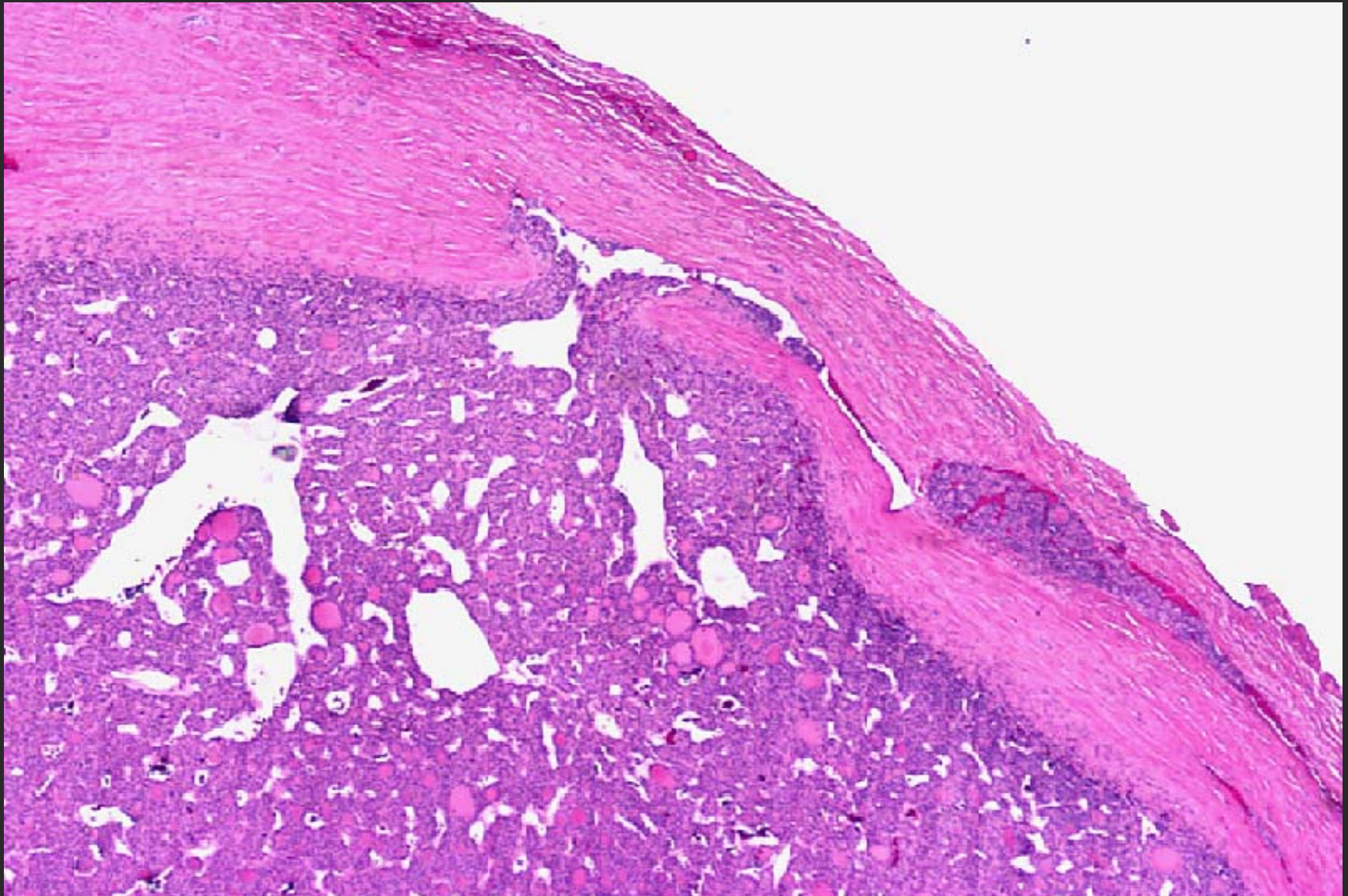
Hurthle Cell Adenoma or Carcinoma ?



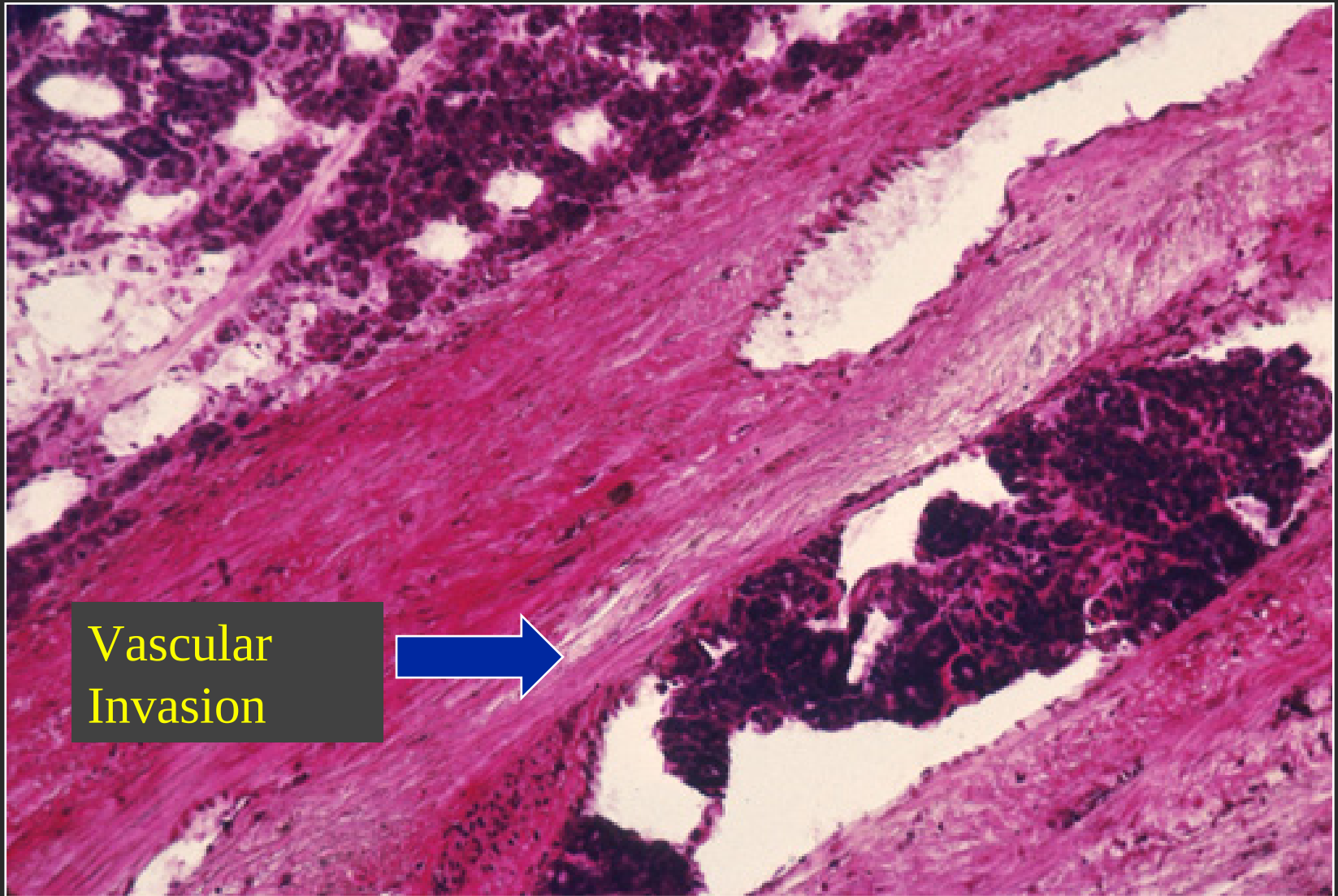
Follicular Carcinoma-Capsular Invasion



Follicular Carcinoma – Minimally Invasive Into Capsular Vessel



Frozen Section-Modified Toluidine Blue Stain



Follicular Neoplasms: **Frozen Section Dependent Upon:**

- **Good pathologists**
- **Significant exposure to frozen section, especially thyroid**
- **Superb support system**



Follicular Neoplasms: Frozen Section

Results: **1023** Patients

286 (28%)



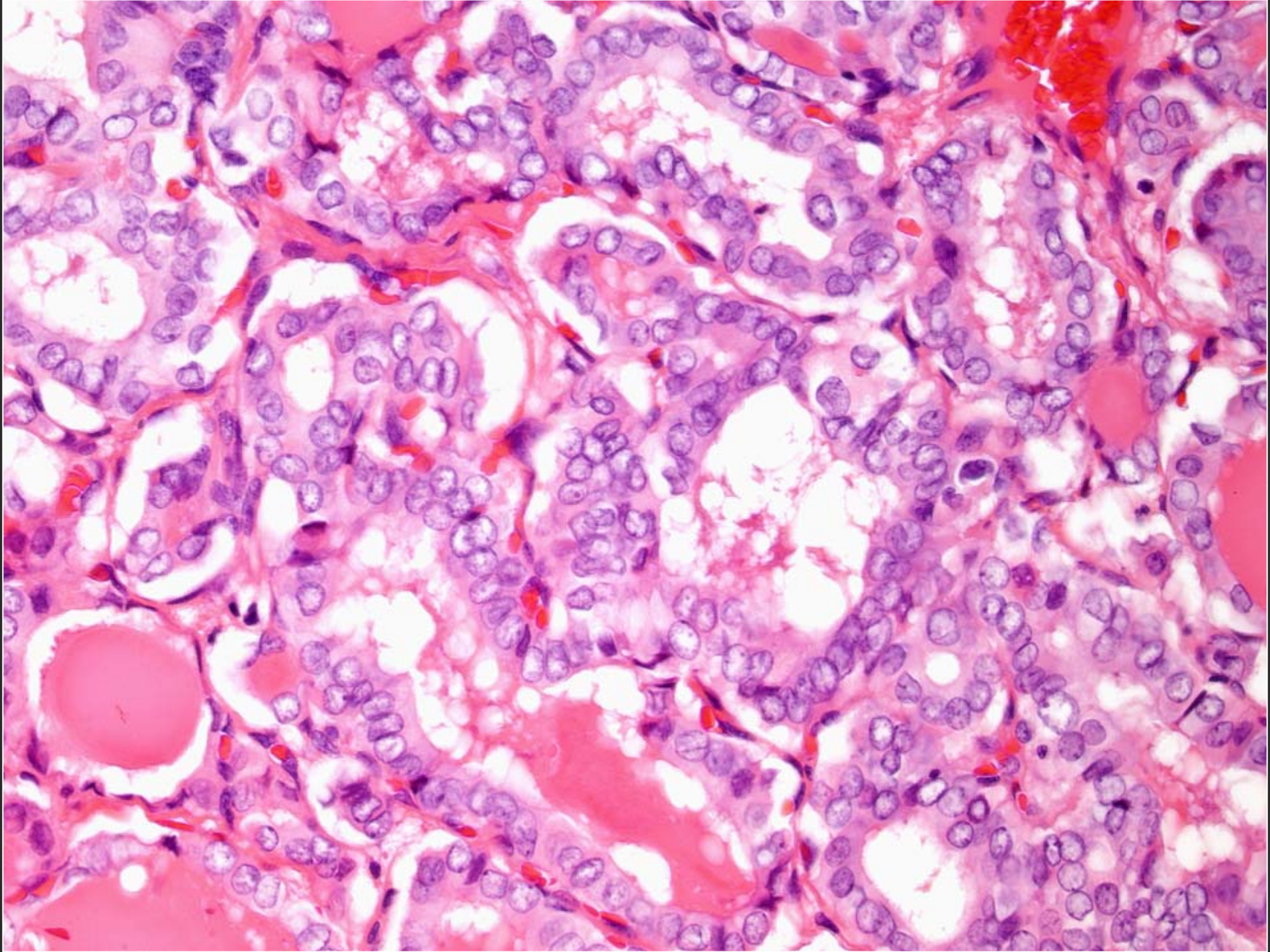
737 (72%)

Mean age: 52.1 years

Follicular Neoplasms: Pathology

		Frozen Section		
		Ca	Non-Ca	Total
Perm Section	Ca	65 TP	18 FN	83
	Non-Ca	7 FP	933 TN	940

65/83 (78%) Ca Dx by FS

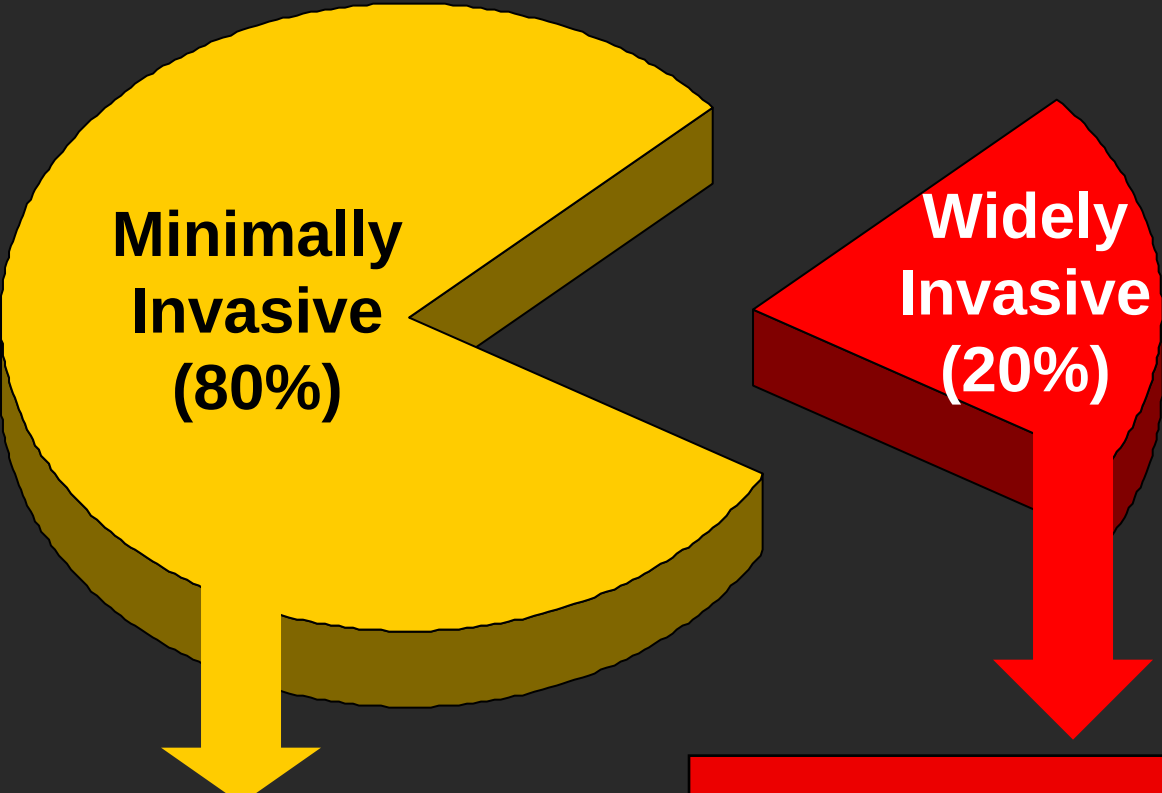


Follicular Thyroid Cancer

- Lymph node metastases (< 5%)
 - Usually associated with locally advanced tumor
 - Worse prognosis

FTC

**Minimally
Invasive
(80%)**



**Widely
Invasive
(20%)**

**Microscopic vascular
and capsular invasion**

**Gross involvement
of vessels and
contiguous structures**

FTC

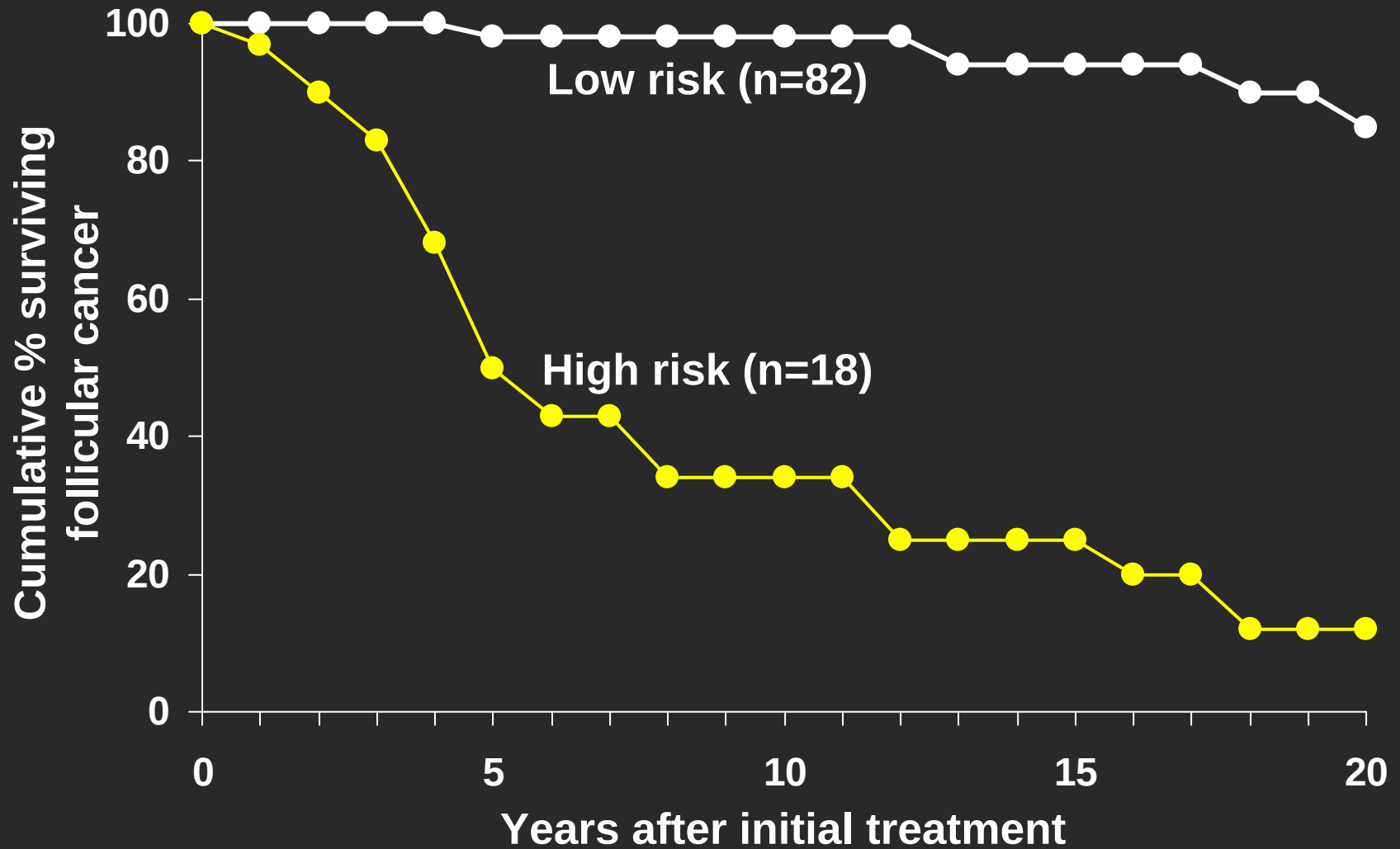
- **Prognostic indicators**
 - **Age > 50**
 - **Marked vascular invasion**
 - **Metastatic disease**

Brennan et al, 1991

FTC

- **High risk** (2/3 risk factors)
 - Survival: 47% and 8% @ 5 and 20 years
- **Low risk** (0-1/3 risk factors)
 - Survival: 99% and 86% @ 5 and 20 years

FTC



FTC

- Tumors < 2 cm with
 - minimal capsular invasion alone
 - ✓ No metastases or deaths
 - ✓ Recent 10-year follow-up
 - Lobectomy Alone

van Heerden et al, 1992

Hurthle Cell Cancer

- **<5% of all thyroid cancers**
- **More locally aggressive**
- **Less avidity for RAI**
- **Nodal metastases in 1/3**

Follicular and Hurthle Cell Carcinoma

- Lymph node mets from FTC rare (<5%); if present consider FVPTC
- Routine CCND and LND for FTC not necessary unless positive nodes are present grossly or by US
- HCC has positive nodes in up to 30%; manage nodes like PTC

FTC/HCC

Treatment:

- Total / NT Thyroidectomy
- Sample central nodes*
- Formal node dissection when nodes $\oplus$
- CCND for HCC
- RRA, THST except in small tumors with minimal capsular invasion

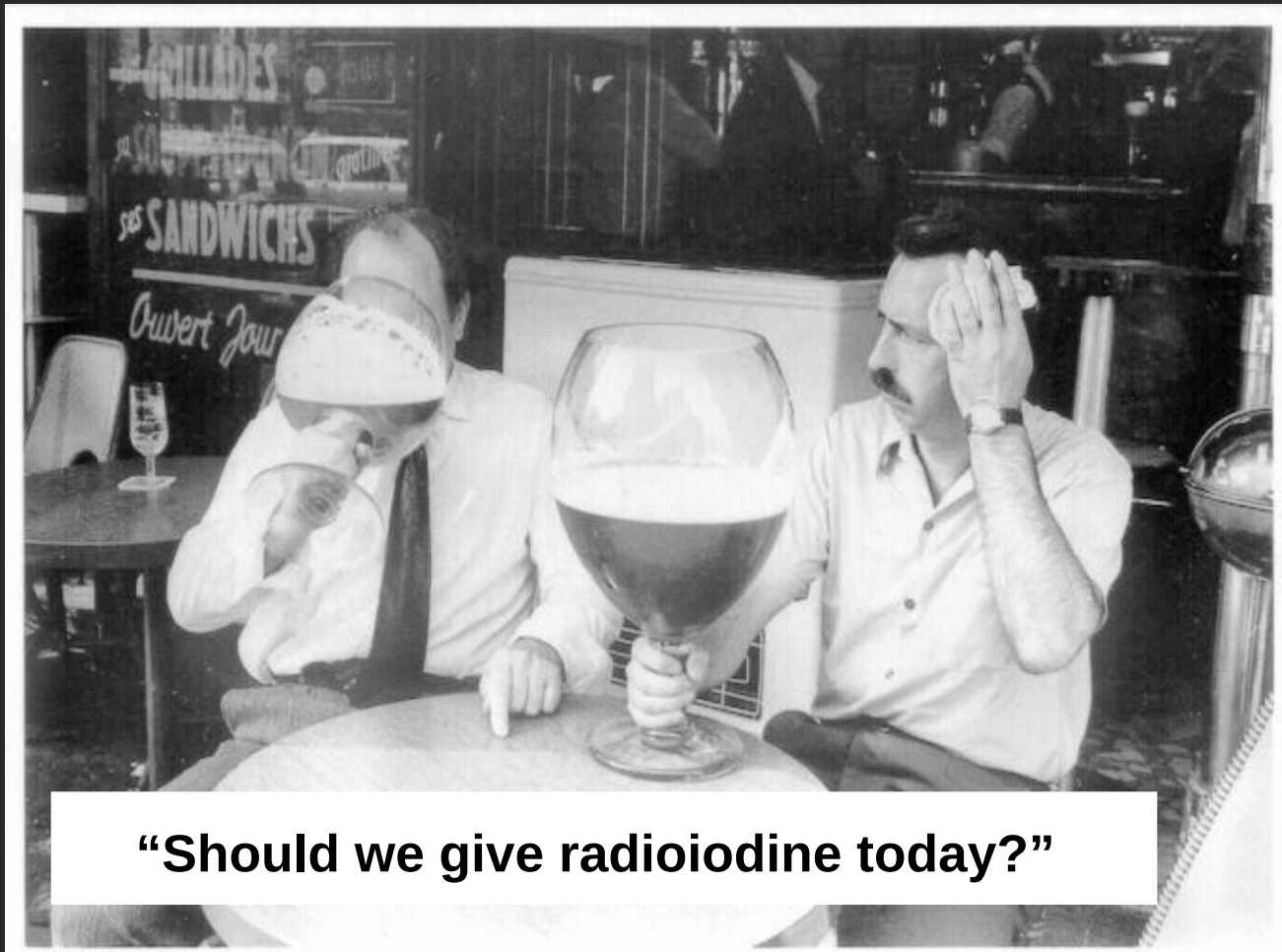
*may be only indication of FVPTC

Summary

- **Total or Near-Total Thyroidectomy**
- **Central Compartment Lymphadenectomy (PTC, HCC)**
- **Lateral lymphadenectomy based on pre-op Ultrasound**
- **RRA based on Risk Assessment**
- **TSH Suppression based on Risk Assessment**

If all else fails.....

Thyroid Cancer Strategy Meeting?



“Should we give radioiodine today?”

THANK YOU

