Società Medico Chirurgica di Ferrara

La terapia Radiante esterna

nel

Carcinoma DIFFERENZIATO della TIROIDE

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Role of EBRT

Unresectable

Sympomatic

Resistant to I-131

EBRT for DTC is limited to near death

Role of EBRT

Role of EBRT

There are **no randomized trials** that address specific indications for EBRT in patients with **differentiated thyroid cancer**

Role of EBRT

There are not
Randomized trials

Role of EBRT

Published studies of EBRT for DTC

EBRT is Beneficial

Tubiana (France) Cancer 1985

Simpson (PMH) Cancer 1988

Esik (Hungary) Oncology 1994

O'Connell (UK) EJC 1994

Tsang (PMH) Cancer 1998

Chow (China) IJROBP 2002

Ford (UK) Clin Oncol 2003

Kim (Korea) IJROBP 2003

Rosenbluth (MSK) IJROBP 2005

Meadows (UF) Am J Otol 2006

Keum (Korea) IJROBP 2006

Terezakis (MSK) IJROBP 2009

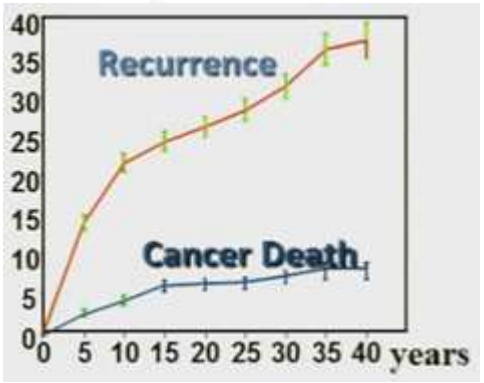
Schwartz (MDAH) IJROBP 2009

Romesser-Lee (MSK) abst IJROBP 2014

EBRT is Useless

Benker (Germany) Cancer 1990

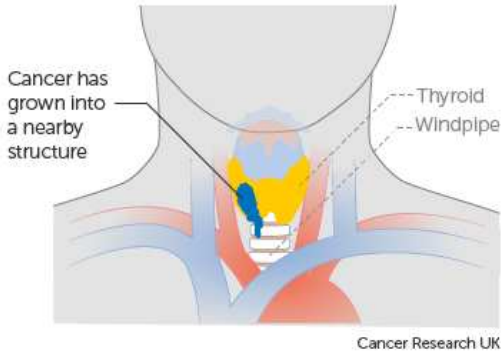
Samaan (MDAH) JCEM 1992

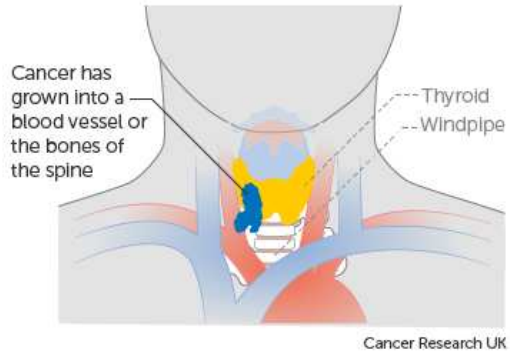


Role of EBRT: Background info

- Age is a powerful predictor of survival to the point that DTC is one of the few cancer where age is a majorfactor in AJCC staging

-T4 means cancer has grown outside the covering of the thyroid gland into nearby soft tissue





Stage grouping:

Differentiated
Under 55 Years

Stage I	Any T	Any N	M0
Stage II	Any T	Any N	M1

Differentiated
55 Years and Older

Stage I	T1	N0/NX	M0
	T2	N0	M0
Stage II	T1	N1	M0
	T2	N1	M0
	T3a/T3b	Any N	MO
Stage III	T4a	Any N	M0
Stage IVA	T4b	Any N	M0
Stage IVB	Any T	Any N	M1

Anaplastic

Stage IVA	T1-T3a	N0/NX	M0
Stage IVB	T1-T3a	N1	M0
	T3b	N0	M0
	T4	N0	M0
Stage IVC	Any T	Any N	M1

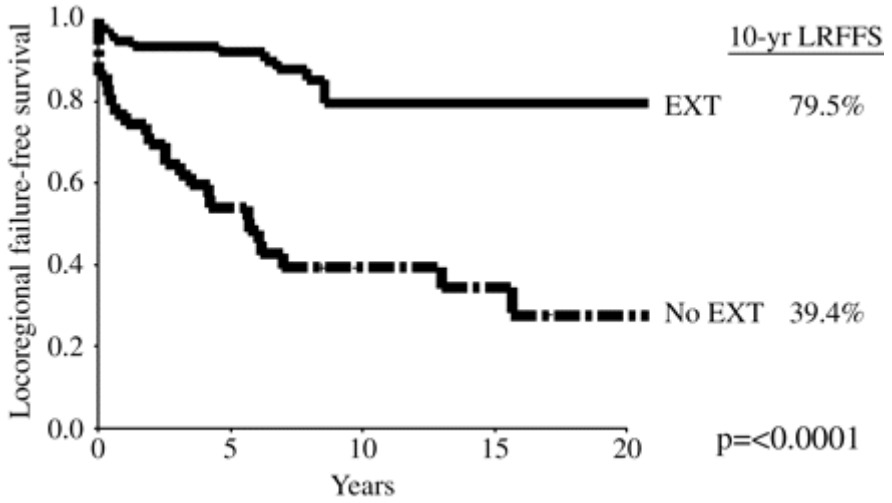
Usual indications for EBRT for most cancers (micro positive margin, node ECE, pos node) are not indipendent indications for EBRT for DTC

Gross residual or unresectable disease

Gross residual or unresectable disease

EBRT is recommended for patients with gross residual or unresectable locoregional disease, except for patients <45 years old with limited gross disease that is RAI-avid.

The use of intensity-modulated radiotherapy (IMRT) with doses >60 Gy results in higher likelihood of long-term control



Chow et al., 2006

70 Gy

Gross disease

	Indications for EBRT to the Neck for Differentiated Thyroid Cancer (Gross disease means visible on CT, MR, or US (not nuc med alone)
ATA	Papillary and Follicular Ca: Give EBRT when dz: Gross, Unresectable AND Symptomatic (no mention I-131 uptake) Consider EBRT in absence of gross, unresectable dz if: T4, > 45 years AND "high likelyhood of micro residual disease" (no mention I-131)
NCCN	Papillary and Follicular Ca: Consider EBRT only when dz: Gross, Unresectable, AND negative Iodine scan DELETED provision in v 2013: Consider EBRT in absence of gross , unresectable dz if: T4 and > 45 years" (I-131 resistance not required)
Amdur U. Florida 2014	Age < 18 yrs: Symptomatic, Gross, Unresectable AND no other palliative option Age 19-45 yrs: ~~Symptomatic~~, Gross, Unresectable AND I-131 resistant I-131 resistant means recurrent after at least one ≥ 150 mCi treatment under optimal conditions (No recent CT contrast, Low Iodine diet, TSH elevation) Age > 45 yrs: Gross, Unresectable disease OR, when No Gross disease: Initial adjuvant: T4, *extensive* (not just focal) pos margin or *extensive* ECE After gross total resection of recurrence: High risk micro residual AND I-131 resistant Visible recurrence not suitable for resection (nuc med or anatomic imaging study) Note: Biochemical (serum Tg) recurrence alone is never an indication for EBRT

Adjuvant external-beam radiotherapy after complete resection of invasive DTC

Adjuvant external-beam radiotherapy after complete resection of invasive differentiated thyroid cancer

After complete resection, EBRT may be considered in select patients older than 45 years old with high likelihood of microscopic residual disease and low likelihood of responding to RAI.

This scenario may occur in the setting of **gross extrathyroidal extension** or with revision surgery for persistent or recurrent disease.

54 Gy	Areas with low risk of microscopic disease (including uninvolved level II–V and VII nodes)

Adjuvant external-beam radiotherapy after complete resection of invasive differentiated thyroid cancer: extrathyroid extension

MINOR

↓

Strap muscles
Soft tissue
Recurrent laryngeal nerve

↓

RT role limited

MAJOR

↓

Trachea
Larynx
Esophagus

↓

RT role very likely

Microscopic residual disease after complete resection

Microscopic residual disease after complete resection

EBRT should not be routinely used as adjuvant therapy after complete resection of gross disease.

Recommend multidisciplinary discussion of each of these cases.

It is important for the radiation oncologist to communicate directly with the surgeon to correlate pathologic findings with operative findings.

66 Gy	Areas of positive surgical margin or shave excision
60 Gy	Areas with high risk of microscopic disease (including thyroid bed, tracheoesophageal groove, and level VI cervical nodes)

Cervical lymph node involvement alone should not be an indication for adjuvant external-beam radiotherapy.

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After complete resection of DTC, patients with cervical nodal metastases have a risk of microscopic residual nodal disease.

Adjuvant RAI is usually quite effective at clearing microscopic residual disease in the nodes.

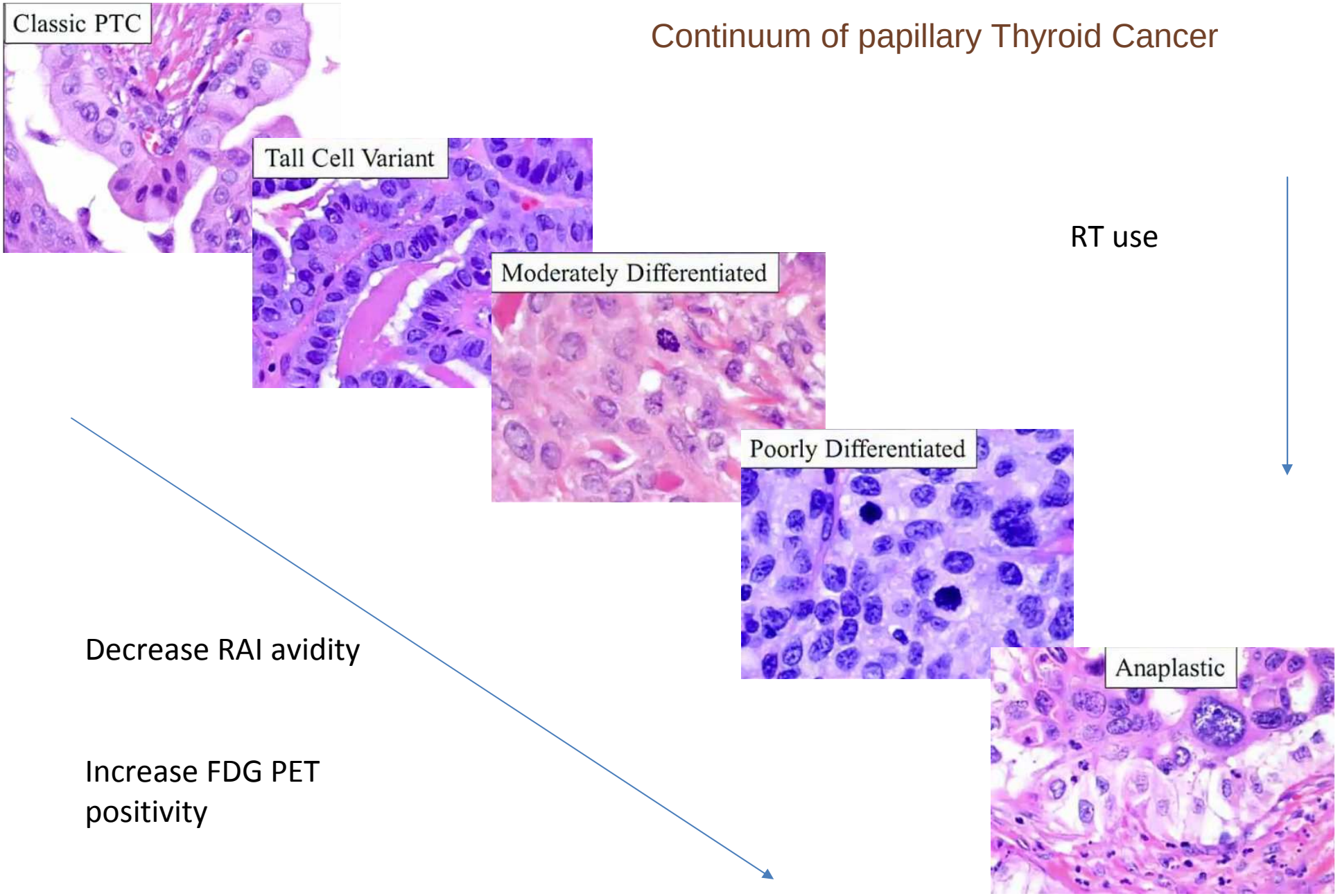
Further recurrences of DTC in the nodes are more easily salvaged (with neck dissection) than recurrences in the thyroid bed.

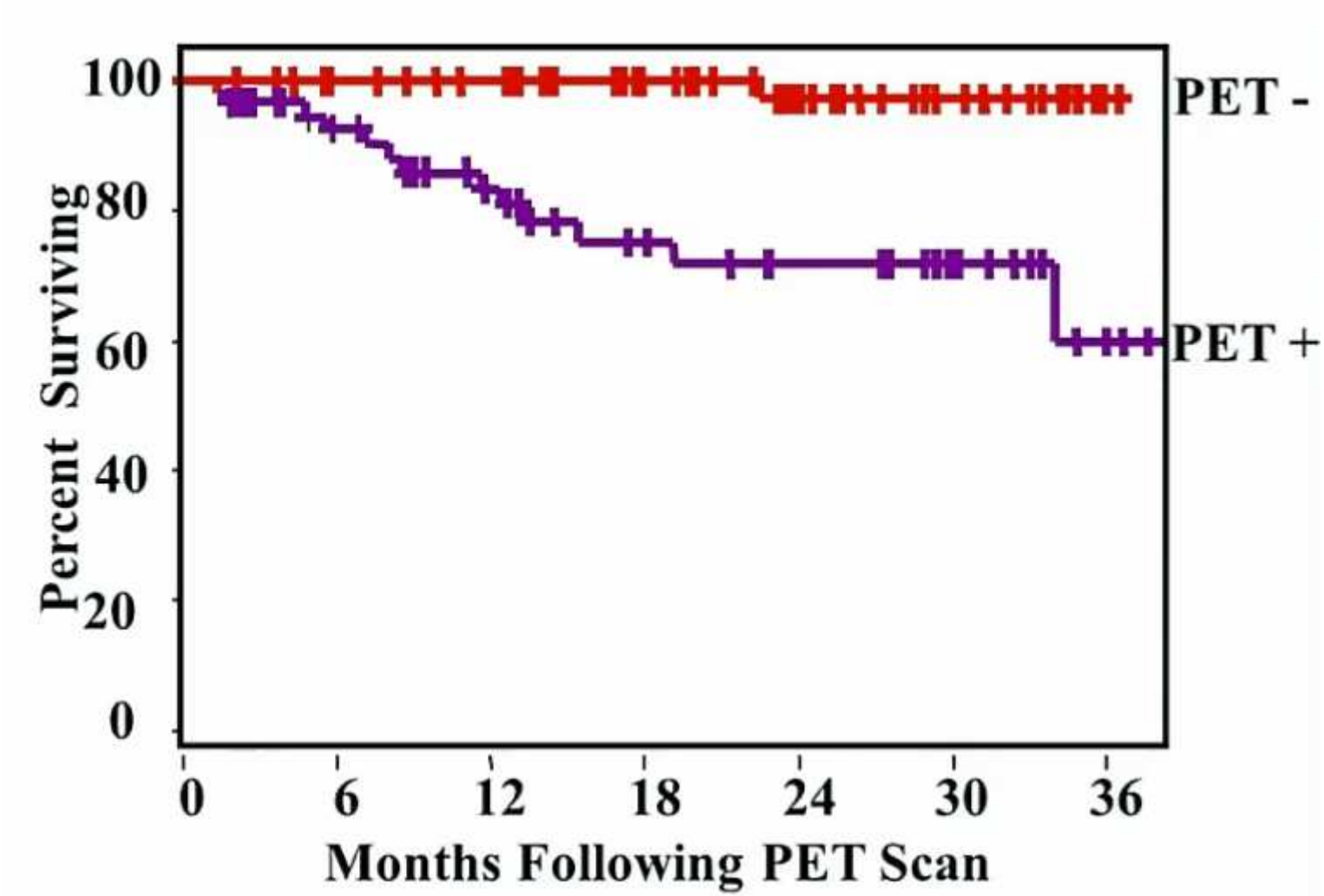
After complete resection, cervical lymph node involvement alone **should not be** an **indication for EBRT**

EBRT may be considered if there is **extensive extracapsular spread** with **high risk of microscopic residual disease.**

Continuum of DTC and radiotherapy

Continuum of papillary Thyroid Cancer




100
80
60
40
20
0
Percent Surviving
0
6
12
18
24
30
36
Months Following PET Scan
PET -
PET +

Radiotherapy toxicities

Radiotherapy toxicities

Toxicities of neck EBRT include common acute toxicities and uncommon chronic/late toxicities.

Acute toxicities: mucositis (G3 in about 20%), dermatitis (G3 in 12%), dysphagia (G3 in 17%), and hoarseness. Some patients will require short-term enteral feeding support via percutaneous gastrostomy or nasogastric tube.

Chronic toxicities may include neck fibrosis, chronic laryngeal edema (in about 3%), and esophageal or tracheal stenosis (in about 2%).

Take home message

- EBRT has a role in DTC management
- Indications for postoperative EBRT for DTC are different from other cancers
- It is necessary a careful selection of patients
- It is necessary discuss with surgeon
- It is necessary a MULTIDISCPLINARY APPROASCH to PERSONALIZE CTC TREATMENT

50 yo Papillary Thyroid Ca: T4 N1b M0

Focal invasion of tracheal wall requiring tracheal wall resected but not laryngectomy

Micro postive tracheal margin

N1b: 5/20 pos level 3-4, yes ECE

No gross residual, not I-131 resistant

My gut feeling is needs EBRT but I followed NCCN and said no EBRT and treated with I-131 alone, 200 mCi

60 yo Papillary Thyroid Ca: neck recurrence

T3 N1b, negative margin, no ECE
150 mCi I-131 (good prep),
1 year later neck recurrence

Neck dissection: soft tissue deposit, 2 nodes with ECE, pos margin

No gross but high density micro residual

I did NOT follow NCCN

I didn't do diagnostic Iodine scan

I think additional I-131 will not be curative (it didnt work the first time)

I treated with EBRT 70 Gy/56 Gy