中山醫學大學附設醫院

甲狀腺癌診療指引

本臨床指引參考國家衛生研究院、美國ATA、與美國NCCN版本

甲狀腺癌多專科醫療團隊編修

甲狀腺癌治療指引制訂日期

2025/11/17	Version 9.0
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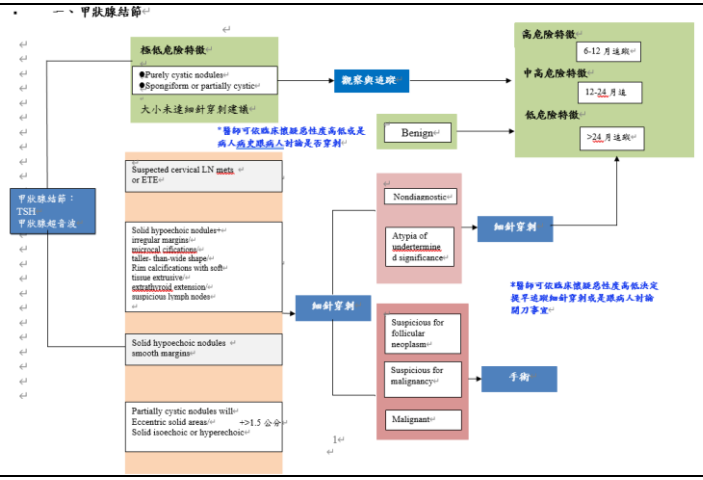
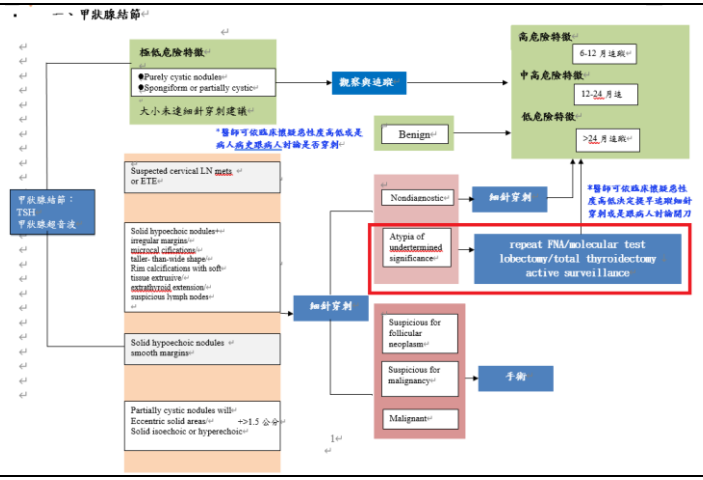
2022/11/14	Version 6.0
2021/12/27	Version 5.0
2020/12/28	Version 4.0
2019/12/09	Version 3.0
2018/11/20	Version 2.0
2018/01/19	Version 1.0

癌症委員會主任委員	癌症委員會執行長	癌症中心主任	抗癌藥物安全小組	團隊負責人

修訂內容

頁數	原文	修訂/增修
1		
2	• *選擇性: • -頸部 CT 或 MRI • -B、C 型肝炎檢查 • -會診 ENT 看聲帶功能(如：頸部手術過)	• *選擇性檢查 • 頸部 CT 或 MRI（建議使用在聲帶麻痺、出血壓迫、有基因風險、淋巴結轉移、遠端轉移） • B、C 型肝炎檢查 • 會診 ENT 做 Laryngoscopy for vocal cord mobility(如：頸部手術過)
4	All of the following: • Negative resection margins • No contralateral lesion • Tumor<1 cm in diameter • No suspicious lymph node	All of the following: • Negative resection margins • No contralateral lesion • Tumor<1 cm in diameter • No suspicious lymph node • NIFTP(Non-invasive follicular thyroid neoplasm with papillarylike nuclear features)

<table>
<tr>
<td>5</td>
<td>invasive cancer

Minimally invasive cancer

Benign</td>
<td>invasive cancer (widely invasive or encapsulated angioinvasive with ≥4 vessels)

Minimally invasive cancer(Encapsulated angioinvasive with <4 vessels or minimally invasive follicular cancer)

Benign / NIFTP</td>
</tr>
<tr>
<td>7</td>
<td>
五、2015 ATA risk stratification system with Proposed Modifications
<table>
<tr><td>Low risk</td><td>Papillary thyroid cancer(with all of the following):
·No local or distant metastases;
·All macroscopic tumor has been resected
·No tumor invasion of loco-regional tissues or structures
·The tumor does not have aggressive histology(e.g., tall cell,hobnail variant,columnar cell carcinoma)
·If ^{131}I is given, there are no RAI-avid metastatic foci outside the thyroid bed on the first posttreatment whole-body RAI scan
·No vascular invasion
·Clinical N0 or ≦5 pathologic N1 micrometastases(<0.2cm in largest dimension)[a]
·Intrathyroidal, encapsulated follicular variant of papillary thyroid cancer[b]
·Intrathyroidal well differentiated follicular thyroid cancer with capsular invasion and no or minimal (<4 foci)vascular invasion[b]
·Intrathyroidal papillary microcarcinoma,unifocal or multifocal, including BRAF^{V600E}mutated(if known)[a]

BRAF (院內代碼 2502011 , 自費 3600 元) ,可由 Cytology 或 Pathology 檢體檢驗</td></tr>
<tr><td>Intermediate risk</td><td>·Microscopic invasion of tumor into the perithyroidal soft tissues
·RAI-avid metastatic foci in the neck on the first posttreatment whole-body RAI scan
·Aggressive histology(e.g.,tall cell,hobnail variant,columnar cell carcinoma)
·Papillary thyroid cancer with vascular invasion
·Clinical N1 or >5 pathologic N1 with all involved lymph nodes <3cm in largest dimension[a]
·Multifocal papillary microcarcinoma with ETE and BRAF^{V600E}mutated(if known)[a]</td></tr>
<tr><td>High risk</td><td>·Macroscopic invasion of tumor into the perithyroidal soft tissues(gross ETE)
·Incomplete tumor resection
·Distant metastases
·Postoperative serum thyroglobulin suggestive of distant metastases
·Pathologic N1 with any metastatic lymph node 3cm in largest dimension[a]
·Follicular thyroid cancer with extensive vascular invasion(>4 foci of vascular invasion)[a]

[a]proposed modifications, not present in the original 2009 initial risk stratification system</td></tr>
</table>
</td>
<td>
五、2025 ATA Risk of Recurrence Categories for Differentiated Thyroid Cancer
<table>
<tr><th>癌症類型</th><th>Low risk (<10%)</th><th>Low-intermediate risk (10–15%)</th><th>Intermediate-high risk (16–30%)</th><th>High risk (>30%)</th></tr>
<tr><td>Papillary Thyroid Carcinoma (PTC)</td><td>•單發、局限於甲狀腺內之T1a腫瘤(≤1 cm)
•無血管侵犯、無顯微鏡外侵犯
•無淋巴結轉移(N0)</td><td>•多發性T1a(≤1cm)伴顯微鏡外侵犯
•限於頸部的少數微小淋巴轉移(<5 個、<2 mm)</td><td>•顯著外侵犯(gross ETE)
•≥5個淋巴轉移或直徑>2 mm但<3 cm
•Tall cell, Columnar cell 或 Diffuse sclerosing variant</td><td>•巨大或多部位轉移性淋巴結(>3 cm)
•遠端轉移(M1)
•腫瘤邊緣陽性(R1/R2)
•BRAF V600E+TERT promoter mutation</td></tr>
<tr><td>Follicular Thyroid Carcinoma (FTC) / Invasive Encapsulated Follicular Variant of PTC (IEFVPTC)</td><td>•僅限於被膜侵犯或輕微血管侵犯(<4 個血管)
•無遠端轉移</td><td>•血管侵犯中度（4–5 個血管）但無遠端轉移</td><td>•廣泛血管侵犯(>5 個血管)或顯著被膜穿透
•腫瘤>4cm或局部侵犯鄰近組織</td><td>•廣泛侵犯或有遠端轉移(骨、肺等)
•TP53 或 TERT promoter mutation陽性</td></tr>
<tr><td>Oncocytic Thyroid Carcinoma (OTC)</td><td>•局限性、被膜完整、無血管侵犯</td><td>•輕度血管侵犯、腫瘤≤4 cm</td><td>•廣泛血管侵犯或顯著局部侵犯</td><td>•遠端轉移
•非放射性碘親和(RAI-refractory)
•TP53 或 DAXX/ATRX mutation 相關高危型</td></tr>
</table>
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</tr>
<tr>
<td>8</td>
<td>
六、術後碘-131治療原則
*需確定為分化良好甲狀腺癌 + 甲狀腺全切除
<table>
<tr><th></th><th colspan="2">定義</th><th>*原子碘</th></tr>
<tr><td rowspan="5">低復發</td><td rowspan="4">病理報告</td><td rowspan="4">**以下需全部符合
All macroscopic tumor has been resected
No tumor invasion of loco-regional tissues or structures
No aggressive histology(e.g., tall cell,hobnail variant, columnar cell)
No vascular invasion
Papillary microcarcinoma, unifocal or multifocal, BRAFV6001E mutated
Follicular cancer
Intra-thyroidal, encapsulated follicular variant or capsular invasion but no/minimal (≤4 foci)vascular invasion</td><td rowspan="4">小劑量</td></tr>
<tr><td>N 淋巴結</td><td>Clinical N0 or <5 N1 micro-metastases(<0.2 cm)</td></tr>
<tr><td>M 轉移</td><td>No local or distant metastases</td></tr>
<tr><td>治療後碘掃描</td><td>No RAI-avid metastatic foci outside the thyroid bed</td></tr>
<tr><td rowspan="3">中復發</td><td rowspan="2">病理報告</td><td>Microscopic invasion of tumor into the peri-thyroidal soft tissues
Aggressive histology
Papillary thyroid cancer with vascular invasion
Multifocal papillary microcarcinoma with ETE and BRAFV600E mutated</td><td rowspan="2">大劑量
轉介碘-131 病房</td></tr>
<tr><td>N 淋巴結</td><td>Clinical N1 or >5 pathologic N1 with all involved lymph nodes <3cm</td></tr>
<tr><td>治療後碘掃描</td><td>RAI-avid metastatic foci in the neck</td><td>大劑量
轉介碘-131 病房</td></tr>
<tr><td rowspan="3">高復發</td><td rowspan="2">病理報告</td><td rowspan="2">**以下任一符合
Macroscopic invasion of tumor into the perithyroidal soft tissues(gross ETE)
Incomplete tumor resection
Follicular cancer with >4 foci of vascular invasion</td><td rowspan="2">大劑量
轉介碘-131 病房</td></tr>
<tr><td>N 淋巴結</td><td>Pathologic N1 with metastatic lymph node >3cm in largest dimension</td></tr>
<tr><td>M 轉移</td><td>Distant metastases
Postoperative serum thyroglobulin suggestive of distant metastases</td><td></td></tr>
</table>
</td>
<td>
六、術後碘-131治療原則
2025 ATA — Postoperative Radioiodine (^{131}I) Therapy by Risk Category
<table>
<tr><th>Risk Category</th><th>Typical RAI Recommendation</th><th>Typical ^{131}I Activity (GBq / mCi)</th><th>Primary Goal of Therapy</th><th>Clinical Context / Comments</th></tr>
<tr><td>Low risk (<10%)</td><td>Usually not recommended</td><td>1.1–1.85 GBq (30–50 mCi) if used</td><td>None or remnant ablation only</td><td>• No gross ETE, no LN metastases, no vascular invasion
• RAI can be omitted if stimulated Tg <1 ng/mL and negative ultrasound
• If used, low-dose ablation may be considered for remnant visualization only.</td></tr>
<tr><td>Low-intermediate risk (10–15%)</td><td>Consider RAI based on postoperative Tg, histology, and age</td><td>1.1–3.7 GBq (30–100 mCi)</td><td>Remnant ablation ± adjuvant therapy</td><td>• For limited nodal disease (≤5 LN, all <2 mm)
• RAI may be beneficial in older patients or those with adverse histology (tall cell, diffuse sclerosing)
• Post-therapy scan usually negative or mild uptake in remnant only.</td></tr>
<tr><td>Intermediate-high risk (16–30%)</td><td>Advised to receive RAI</td><td>3.7 GBq (100 mCi) typical; may range 1.1–5.55 GBq (30–150 mCi)</td><td>Adjuvant therapy (eradicate microscopic residual disease)</td><td>• For multiple LN metastases (>5 nodes, any >2 mm), minimal extrathyroidal extension, vascular invasion, or Tg >10 ng/mL
• Post-therapy scan may show nodal uptake
• RAI improves recurrence-free survival per SEER and meta-analyses.</td></tr>
</table>
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</tr>
</table>

- 六、術後碘-131治療原則-續

2025 ATA — Postoperative Radioiodine (^{131}I) Therapy by Risk Category-續

Risk Category	Typical RAI Recommendation	Typical ^{131}I Activity (GBq / mCi)	Primary Goal of Therapy	Clinical Context / Comments
High risk (>30%)	**Strongly recommended**	3.7–5.55 GBq (100–150 mCi)	Adjuvant and therapeutic (treat known disease)	• Gross ETE, LN >3 cm, distant metastases (M1), positive margins • Post-therapy scan often reveals iodine-avid disease • Repeat or dosimetry-guided RAI may be indicated • TSH should be maximally stimulated (>30 mIU/L).
Distant metastases (RAI-avid)	**Yes – Required**	3.7–7.4 GBq (100–200 mCi) or dosimetry-guided	Treatment of known metastatic disease	• Lung, bone, or brain metastases that uptake RAI • May repeat every 6–12 months depending on Tg and imaging response • Monitor cumulative dose <22–26 GBq (600–700 mCi) to avoid marrow toxicity.
RAI-refractory or post-therapy scan negative	**No further RAI**	—	—	• If Tg persistently elevated but post-therapy scan negative → define as RAI-refractory DTC (see Recommendation 59–61) • Proceed to TKI (lenvatinib, sorafenib, selpercatinib, etc.) or targeted therapy per genotype.

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- 七、手術及碘-131治療後追蹤

Dynamic risk stratification

	定義		處置建議
Excellent response	Tg(ng/mL) Suppressed：<0.2 − TSH-stimulated：<1 頸部超音波 −	碘-131 全身掃描 ‧不建議用在 ATA low risk − if Tg- sono	**TSH 目標：** **0.5-2 low-to-intermediate** **0.1-0.5 for high risk**
Biochemical incomplete	Tg(ng/mL) Suppressed：≧1 TSH-stimulated：≧10 + Rising anti-Tg 頸部超音波 −	碘-131 全身掃描 − 正子造影 *TSH stimulated Tg≧10 −	**TSH 目標：** **0.1-0.5** **0.5-2 if atrial fibrillation** I^{131} 100-200mci If stimulated Tg>10,碘掃描、正子造影
Structural incomplete	Tg(ng/mL) Any TG or 頸部超音波 +	碘-131 全身掃描 + or 正子造影 *TSH stimulated Tg≧10 +	**TSH 目標：** <0.1 **0.1-0.5** **如有心房顫動** **復發或轉移**

- 七、手術及碘-131治療後追蹤

Response Category	Definition (ATA 2025)	Typical Tg / Imaging Features	Approx. Recurrence Risk (per 2025 ATA)
Excellent response	No biochemical or structural evidence of persistent thyroid cancer (i.e., remission).	- Suppressed Tg <0.2 ng/mL or stimulated Tg <1 ng/mL- Negative imaging (US/WBS/CT) - Stable or undetectable anti-Tg antibody (TgAb)	**1–4%** overall; <2% in low-risk; up to 15% in initial high-risk group
Indeterminate response	Nonspecific findings on imaging or mildly elevated Tg levels; TgAb stable or declining; may represent minimal residual tissue but not structural disease	- Stimulated Tg 1–10 ng/mL or mild TgAb positivity - Nonspecific imaging findings (no proven disease)	**5–20%** depending on histology and baseline risk
Biochemically incomplete response	Elevated Tg or rising TgAb levels **without** radiological evidence of disease	- Stimulated Tg >10 ng/mL or increasing Tg/TgAb trend - No visible lesions on imaging	**20–53%** recurrence or persistence; combined biochemical + structural up to 85%
Structurally incomplete response	Structural (imaging or biopsy-proven) evidence of disease recurrence, often with elevated Tg and/or TgAb	- Lesion on ultrasound, CT, PET, or WBS - Tg or TgAb usually elevated	**>80%** show persistent disease or progression

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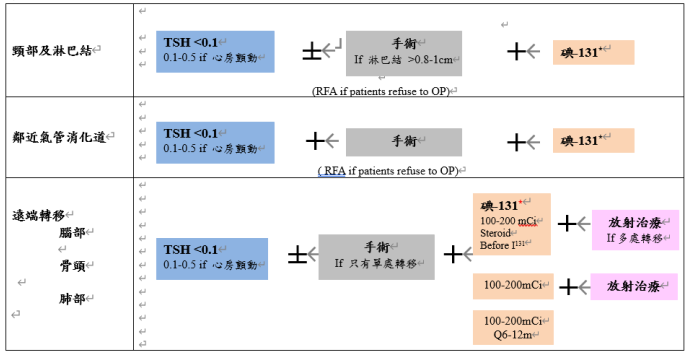
八、復發或轉移治療建議



*碘-131 治療需患處在碘掃描有顯影

八、復發或轉移治療建議

2025 ATA — Management of Recurrent or Metastatic Differentiated Thyroid Cancer

Clinical Setting	Recommended Management	Supporting Notes / Key Evidence
Locoregional residual or recurrent disease (neck or thyroid bed)	Surgery — preferred when feasible (therapeutic central or lateral neck dissection) Percutaneous ethanol injection (PEI) — alternative for high-risk surgical candidates Radiofrequency ablation (RFA) — option for small-volume recurrent lesions, especially when surgery contraindicated	• Decision based on extent, anatomic location, growth rate, patient comorbidities, and prior surgery • Recurrence after "excellent response" usually <15%; rising Tg/TgAb requires PET/CT or cross-sectional imaging to localize lesions
Oligometastatic or solitary distant metastases	Local therapy — surgery, thermal ablation (RFA, microwave), or stereotactic radiation if technically feasible	• May provide long-term control or even cure in selected cases • Considered when disease is slow-growing and iodine-refractory (RAIR)
Iodine-avid distant metastases (lung/bone)	RAI therapy (^{131}I) — dosimetry-guided or empiric 100–200 mCi (3.7–7.4 GBq)	• Repeat every 6–12 months if uptake persists and disease regresses • Favorable genotypes include RAS mutation and RET fusion; BRAF V600E, TERT, TP53 predict resistance
RAI-refractory disease (no uptake or progression despite RAI)	Systemic therapy: • Multikinase inhibitors (lenvatinib, sorafenib) for progressive symptomatic disease • Selective targeted therapy (RET, NTRK, BRAF, ALK inhibitors) per genomic profile • Immunotherapy (PD-1 blockade) in selected clinical trial settings	• Localized oligoprogression may still benefit from local therapy before systemic initiation • Goal is to delay systemic toxicity and preserve quality of life
Symptomatic bone metastases	External beam radiotherapy (EBRT) or RFA/cryotherapy, ± bisphosphonate or denosumab.	• ATA notes bone metastases in ~25% of advanced DTC; often non–RAI-avid
Brain metastases	Surgery or stereotactic radiosurgery (SRS) ± systemic therapy	• RAI only if iodine-avid; otherwise local control prioritized
Follow-up / monitoring after recurrence treatment	• Tg/TgAb every 3–6 months initially • Neck ultrasound and/or diagnostic imaging per risk level • PET/CT if biochemical progression without localization	• Dynamic reassessment of "response to therapy" (Excellent / Biochemical / Structural incomplete) guides TSH suppression and surveillance intensity

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九、碘-131治療無效治療建議

定義	治療建議
1. 病灶不吸收放射性碘 2. 病灶失去原本吸收放射性碘的能力 3. 某些病灶會吸收，某些不會 4. 病灶吸收放射性碘，但疾病仍持續惡化	**甲狀腺素抑制治療** 如病人無症狀，穩定** 病灶在 12 月內長徑增加<20% → **局部控制治療** 手術 或 放射治療 或 RFA → **標靶藥物(ex:Nexava、Lenvima)** 如病人有症狀，快速進展(<6 個月)，病灶危及生命 *多數骨轉移：雙磷酸鹽 或 denasumab

**無症狀，病情穩定無惡化的病人可使用甲狀腺素抑制治療為主

九、碘-131治療無效治療建議

Therapeutic Modality	ATA 2025 Recommendations / Evidence	Key Clinical Context
1. Systemic therapy (Multikinase Inhibitors, MKI)	Lenvatinib 與 Sorafenib 為首選 VEGFR MKI 治療進展性 RAIR DTC；可延長 PFS 與 disease control rate。	適用於症狀性或影像學持續進展病人。
2. Selective targeted therapy (Genotype-directed)	**RET fusion positive → Selpercatinib 或 Pralsetinib （首選一線）。** **NTRK fusion positive → Larotrectinib 或 Entrectinib**（若病灶小且無症狀，可觀察）。	精準治療為 RAIR 管理核心；需 NGS 確認基因型。
3. Re-differentiation therapy	可考慮 MEK 抑制劑 (Selumetinib 等) 或 BRAF/MEK(Dabrafenib/trametinib) 聯合療法 以恢復碘親和性；屬研究性或臨床試驗建議。	適合部分 BRAF 或 RAS 突變病人，可重新嘗試 RAI。
4. Local therapy for oligometastatic lesions	若為少數轉移且緩慢進展，可採手術、RFA、SBRT 等局部治療。	延緩全身治療時機，改善局部控制。

<table>
<tr><td></td><td></td><td>
<table>
<tr><td>• 5. Supportive care / Bone targeted therapy</td><td>骨轉移可使用 EBRT、RFA、Bisphosphonate 或 Denosumab 以緩解症狀。</td><td>約 25 % RAIR DTC 有骨轉移。</td></tr>
<tr><td>• 6. Immunotherapy / Clinical trials</td><td>指南鼓勵參與 PD-1或多靶點免疫治療臨床試驗。</td><td>針對多線治療失效或 genomic wild-type 患者。</td></tr>
</table>
</td></tr>
<tr><td>19</td><td></td><td>標靶治療處方新增：Cabozantinib</td></tr>
<tr><td>23</td><td></td><td>免疫治療處方新增：Nivolumab</td></tr>
<tr><td>24</td><td>
化學治療處方(Chemotherapy Regimen)Systemic Therapy Regimens for Metastatic Disease
<table>
<tr><th>Regimen</th><th>Agents/Dosages</th><th>Frequency</th></tr>
<tr><td>Paclitaxel</td><td>60-80 mg/m² IV</td><td>Weekly</td></tr>
<tr><td>Paclitaxel</td><td>135-150 mg/m² IV</td><td>Every 3-4 weeks</td></tr>
<tr><td>Doxorubicin
or
Epirubicin/Pharmarubicin</td><td>20mg/m² IV

30mg/m² IV</td><td>Weekly

Weekly</td></tr>
<tr><td>Doxorubicin
or
Epirubicin/Pharmarubicin</td><td>60-75 mg/m² IV

90-110 mg/m² IV</td><td>Every 3 weeks

Every 3 weeks</td></tr>
<tr><td>Paclitaxel/carboplatin</td><td>Paclitaxel 60–80 mg/m2 , carboplatin AUC 2 IV
or
Paclitaxel 135–150 mg/m2 , carboplatin AUC 5–6 IV</td><td>Weekly

Every 3–4 Weeks</td></tr>
<tr><td>Docetaxel/doxorubicin</td><td>Docetaxel 60 mg/m² IV, doxorubicin 60mg/m² IV or Epirubicin 90mg/m² (with pegfilgrastim)
or
Docetaxel 20 mg/m² IV, doxorubicin 20mg/m² IV or Epirubicin 30mg/m² IV</td><td>Every 3–4 weeks

Weekly</td></tr>
</table>
Adjuvant/Radiosensitizing Chemotherapy Regimens - Anaplastic Carcinoma
<table>
<tr><th>Regimen</th><th>Agents/Dosages</th><th>Frequency</th></tr>
<tr><td>Paclitaxel/carboplatin</td><td>Paclitaxel 50 mg/m2 , carboplatin AUC 2 IV</td><td>Weekly</td></tr>
<tr><td>Docetaxel/doxorubicin</td><td>Docetaxel 60 mg/m² IV, doxorubicin 60mg/m² IV or Epirubicin 90mg/m²

Docetaxel 20 mg/m² IV, doxorubicin 20mg/m² IV or Epirubicin 30 mg/m² IV</td><td>Every 3–4 weeks

Weekly</td></tr>
<tr><td>Paclitaxel</td><td>30–60 mg/m2 IV</td><td>Weekly</td></tr>
<tr><td>Cisplatin</td><td>30–35mg/m2 IV</td><td>Weekly</td></tr>
<tr><td>Doxorubicin
or
Epirubicin/Pharmarubicin</td><td>20mg/m2 IV
or
30mg/m2 IV</td><td>Weekly

Weekly</td></tr>
<tr><td>Doxorubicin
or
Epirubicin/Pharmarubicin</td><td>60mg/m2 IV
or
90mg/m2 IV</td><td>Every 3 weeks

Every 3 weeks</td></tr>
</table>
</td><td>
3. 化療處方

Regimen Paclitaxel
<table>
<tr><th>Drug Combination(學名藥)</th><th>Dosage</th><th>Route of administration</th><th>Times</th><th>Frequency/Duration</th><th>Notes</th></tr>
<tr><td>Paclitaxel</td><td>60-80 mg/m2</td><td>IV</td><td>drip 3 hrs. on day 1</td><td>weekly</td><td rowspan="4"></td></tr>
<tr><td colspan="5">or</td></tr>
<tr><td>Paclitaxel</td><td>135-150 mg/m2</td><td>IV</td><td>drip 3 hrs. on day 1</td><td>every 3-4 weeks</td></tr>
<tr><td>Ref.</td><td colspan="5">Smallridge RC, Ain KB, Asa SL, et al. American Thyroid Association guidelines for management of patients with anaplastic thyroid cancer. Thyroid 2012;22:1104-1139.</td></tr>
<tr><td>健保給付</td><td colspan="5"></td></tr>
</table>
Regimen Paclitaxel/carboplatin
<table>
<tr><th>Drug Combination(學名藥)</th><th>Dosage</th><th>Route of administration</th><th>Times</th><th>Frequency/Duration</th><th>Notes</th></tr>
<tr><td>Paclitaxel</td><td>60–80 mg/m2</td><td>IV</td><td>drip 3 hrs. on day 1</td><td rowspan="2">weekly</td><td rowspan="5"></td></tr>
<tr><td>carboplatin</td><td>AUC 2</td><td>IV</td><td>on day 1</td></tr>
<tr><td colspan="5">or</td></tr>
<tr><td>Paclitaxel</td><td>135–150 mg/m2</td><td>IV</td><td>drip 3 hrs. on day 1</td><td rowspan="2">every 3–4 Weeks</td></tr>
<tr><td>carboplatin</td><td>AUC 5–6 IV</td><td>IV</td><td>on day 1</td></tr>
<tr><td>Ref.</td><td colspan="5">Smallridge RC, Ain KB, Asa SL, et al. American Thyroid Association guidelines for management of patients with anaplastic thyroid cancer. Thyroid 2012;22:1104-1139.</td></tr>
<tr><td>健保給付</td><td colspan="5"></td></tr>
</table>
Regimen Doxorubicin
<table>
<tr><th>Drug Combination(學名藥)</th><th>Dosage</th><th>Route of administration</th><th>Times</th><th>Frequency/Duration</th><th>Notes</th></tr>
<tr><td>Doxorubicin</td><td>20mg/m2</td><td>IV</td><td>on day 1</td><td>weekly</td><td></td></tr>
<tr><td>Ref.</td><td colspan="5">Bible KC, Kebebew E, Brierley J, et al. 2021 American Thyroid Association guidelines for management of patients with anaplastic thyroid cancer. Thyroid 2021;31:337-386.</td></tr>
<tr><td>健保給付</td><td colspan="5"></td></tr>
</table>
Regimen Docetaxel/doxorubicin
<table>
<tr><th>Drug Combination(學名藥)</th><th>Dosage</th><th>Route of administration</th><th>Times</th><th>Frequency/Duration</th><th>Notes</th></tr>
<tr><td>Docetaxel</td><td>60 mg/m2</td><td>IV</td><td>on day 1</td><td rowspan="2">every 3–4 weeks</td><td rowspan="5"></td></tr>
<tr><td>doxorubicin</td><td>60mg/m2</td><td>IV</td><td>on day 1</td></tr>
<tr><td colspan="5">or</td></tr>
<tr><td>Docetaxel</td><td>20 mg/m2</td><td>IV</td><td>on day 1</td><td rowspan="2">weekly</td></tr>
<tr><td>doxorubicin</td><td>20mg/m2</td><td>IV</td><td>on day 1</td></tr>
<tr><td>Ref.</td><td colspan="5">Smallridge RC, Ain KB, Asa SL, et al. American Thyroid Association guidelines for management of patients with anaplastic thyroid cancer. Thyroid 2012;22:1104-1139.</td></tr>
<tr><td>健保給付</td><td colspan="5"></td></tr>
</table>
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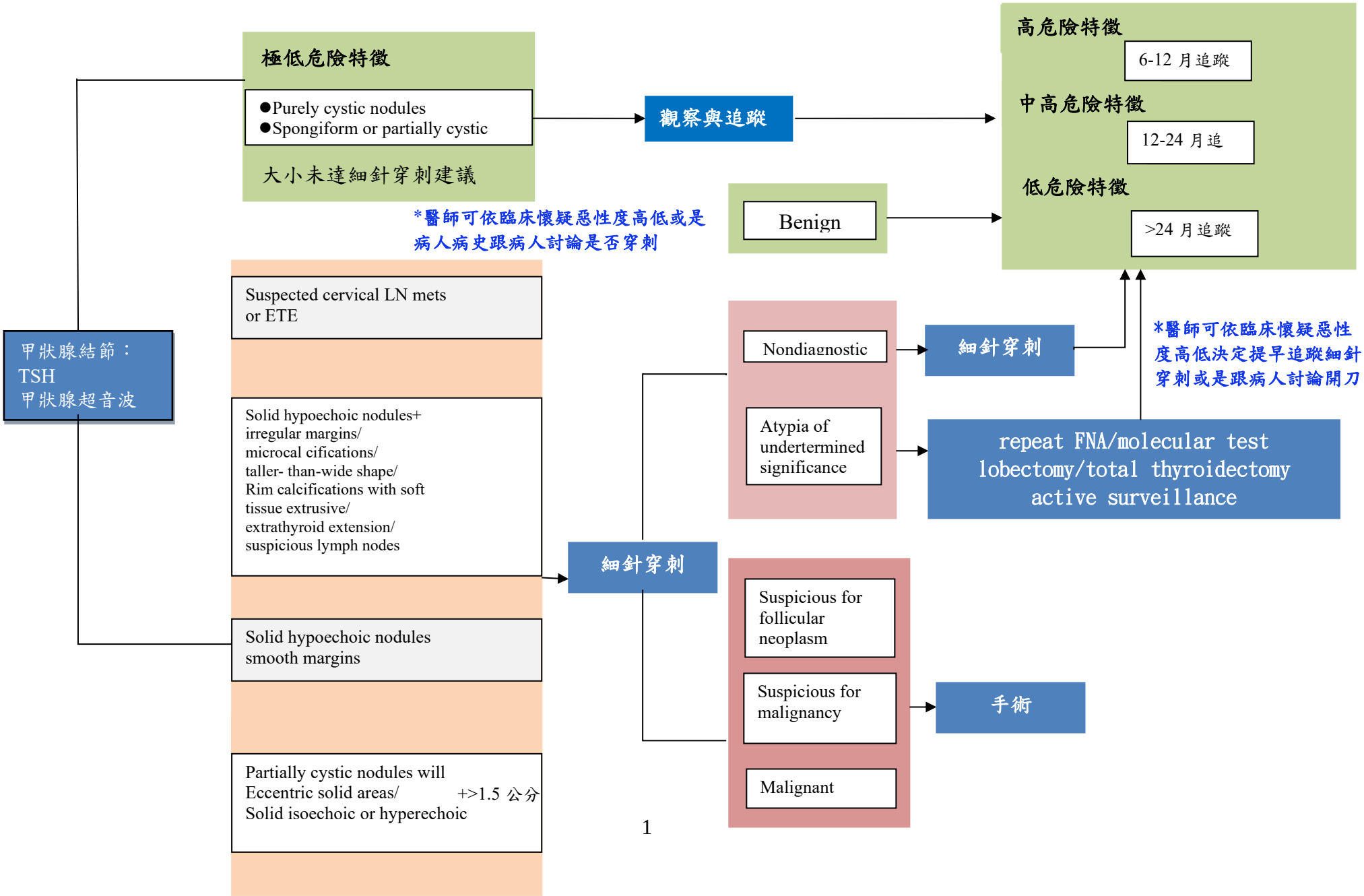
</table>

目　　錄

一、甲狀腺結節


甲狀腺結節：
TSH
甲狀腺超音波
極低危險特徵
●Purely cystic nodules
●Spongiform or partially cystic
大小未達細針穿刺建議
觀察與追蹤
高危險特徵
6-12 月追蹤
中高危險特徵
12-24 月追
低危險特徵
>24 月追蹤
Benign
*醫師可依臨床懷疑惡性度高低或是病人病史跟病人討論是否穿刺
Suspected cervical LN mets or ETE
Solid hypoechoic nodules+ irregular margins/ microcal cifications/ taller- than-wide shape/ Rim calcifications with soft tissue extrusive/ extrathyroid extension/ suspicious lymph nodes
Solid hypoechoic nodules smooth margins
Partially cystic nodules will Eccentric solid areas/ Solid isoechoic or hyperechoic
+>1.5 公分
細針穿刺
Nondiagnostic
細針穿刺
Atypia of undertermined significance
repeat FNA/molecular test lobectomy/total thyroidectomy active surveillance
*醫師可依臨床懷疑惡性度高低決定提早追蹤細針穿刺或是跟病人討論開刀
Suspicious for follicular neoplasm
Suspicious for malignancy
Malignant
手術

二、甲狀腺癌術前評估

一般術前評估：

胸部 X 光

心電圖

一般血液學

肝、腎功能檢查

＋

甲狀腺癌術前評估：

***主要檢查**

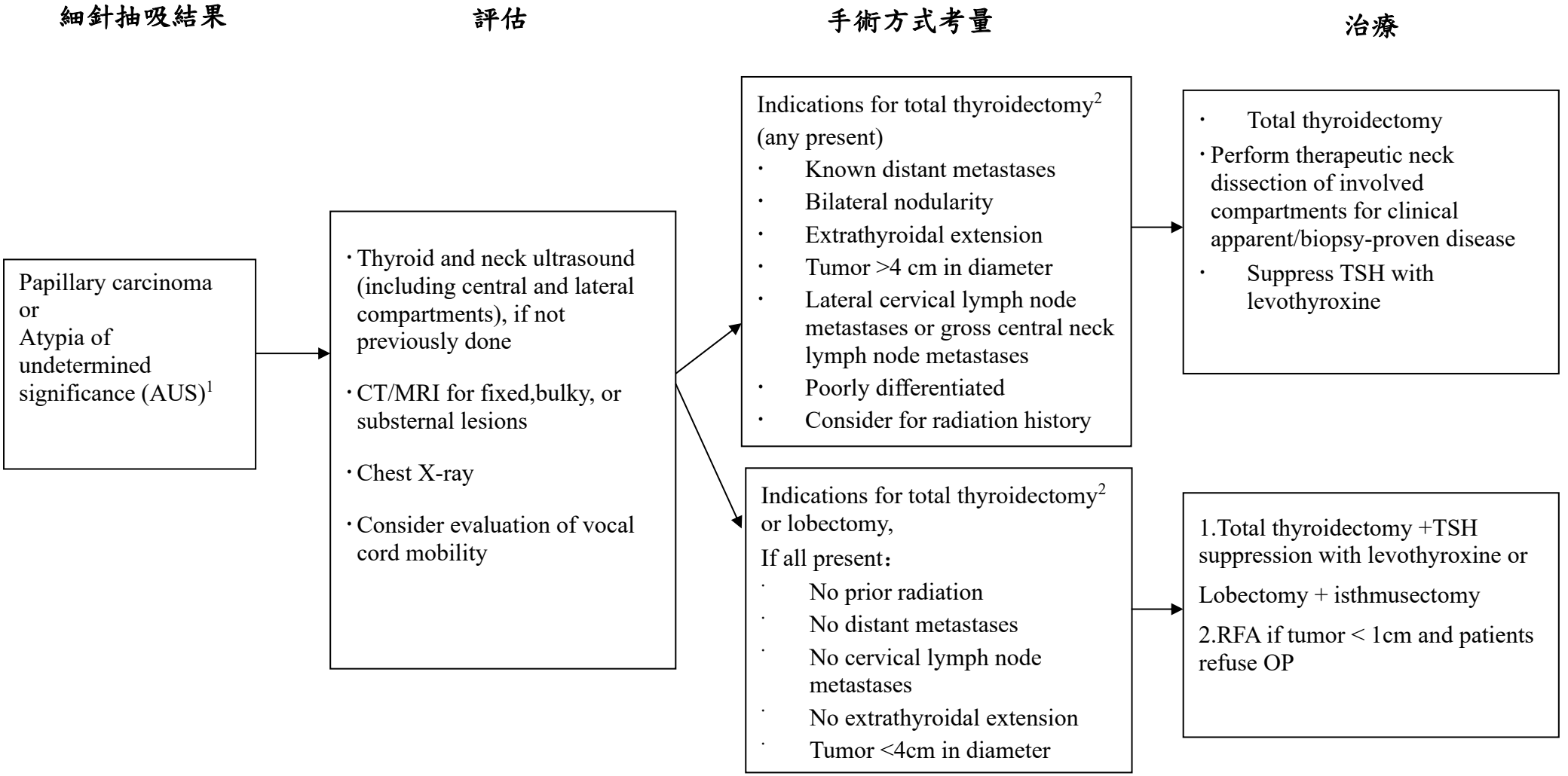
頸部超音波 ＋ 淋巴結評估

***選擇性檢查**

- 頸部 CT 或 MRI (建議使用在聲帶麻痺、出血壓迫、有基因風險、淋巴結轉移、遠端轉移)
- B、C 型肝炎檢查
- 會診 ENT 做 Laryngoscopy for vocal cord mobility(如：頸部手術過)

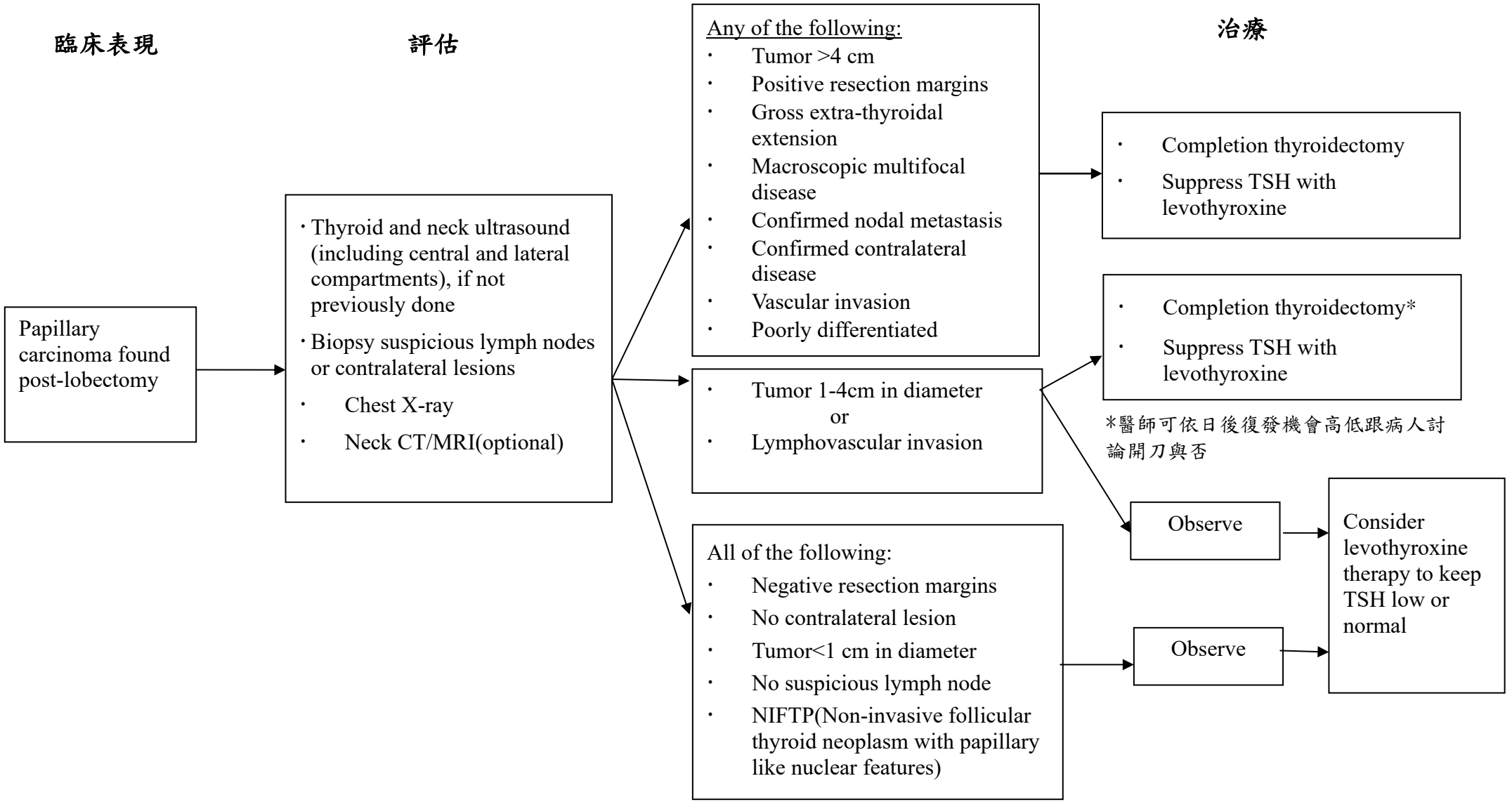
三、手術治療方式

1. 乳突癌（Papillary Carcinoma）

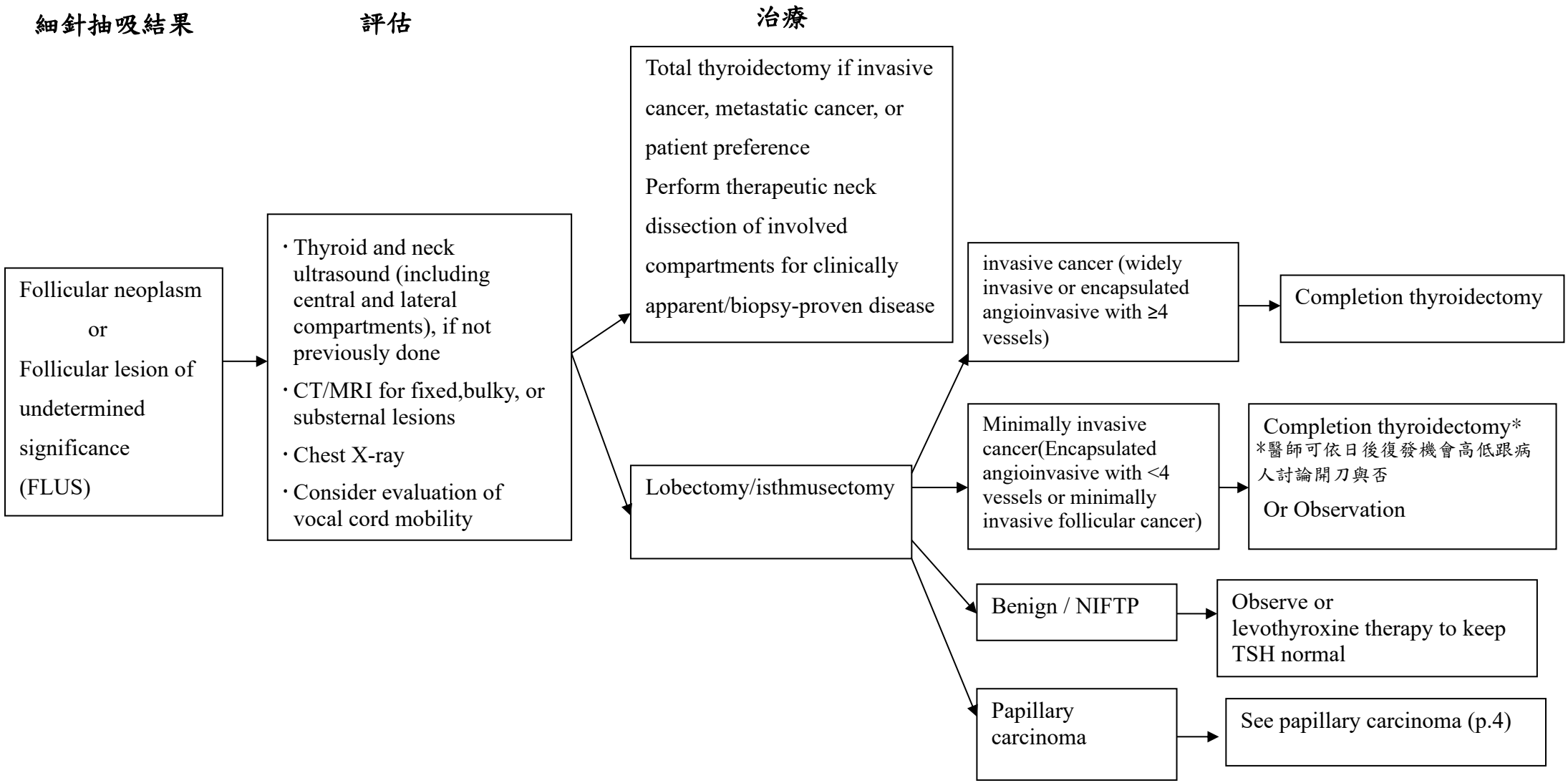


[1]AUS with high clinical suspicion of malignancy may consider lobectomy or total thyroidectomy for definitive diagnosis/treatment
[2]For those who underwent total thyroidectomy, lesion site lobectomy with frozen section might be considered

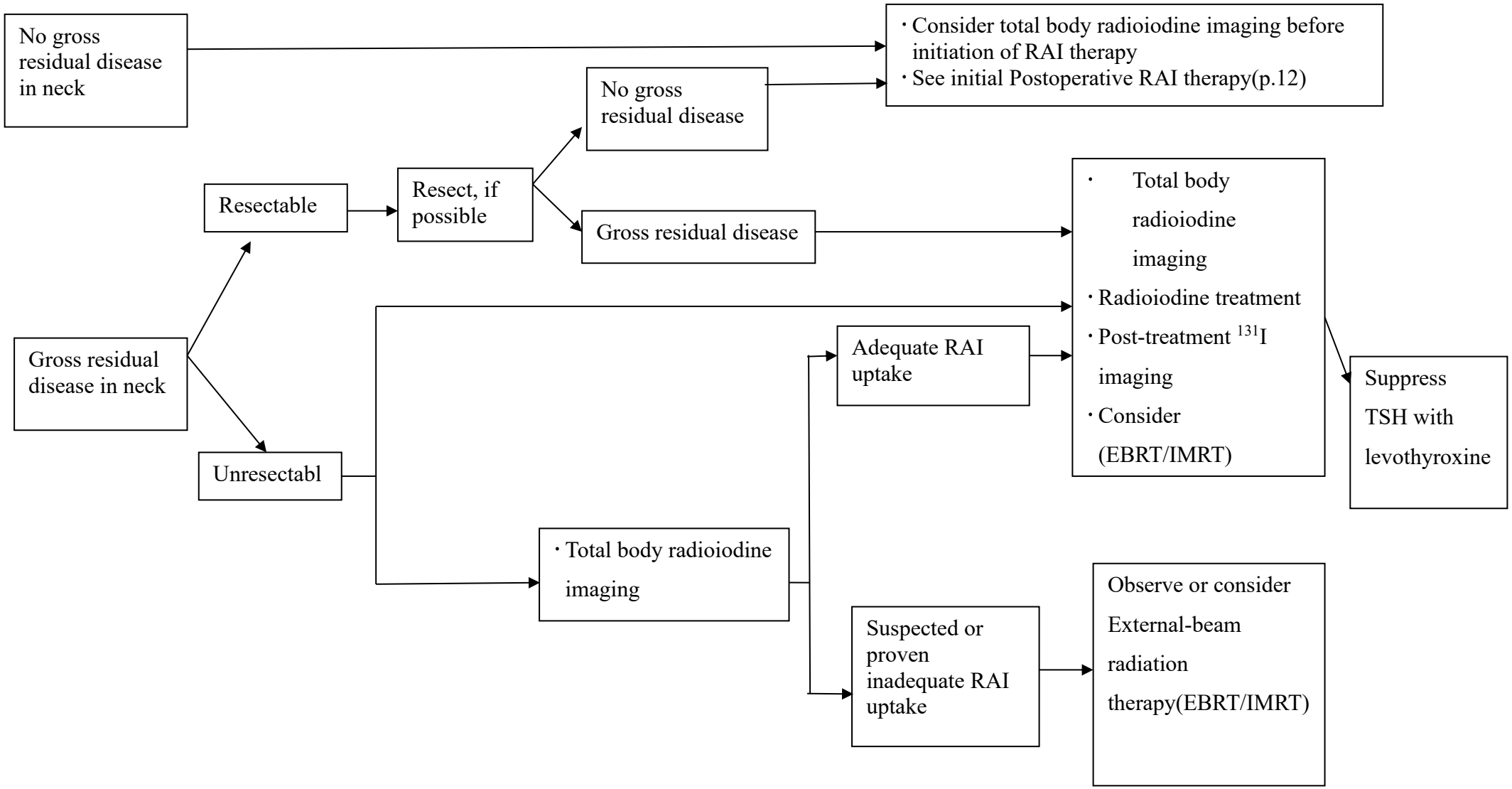
2. 術前認為良性之病灶，作單葉切除術後確認為乳突癌(Papillary carcinoma found post-lobectomy)



3. 濾泡癌（Follicular Carcinoma）



四、術後評估與治療


No gross residual disease in neck
・Consider total body radioiodine imaging before initiation of RAI therapy
・See initial Postoperative RAI therapy(p.12)
No gross residual disease
Resectable
Resect, if possible
Gross residual disease
・ Total body radioiodine imaging
・Radioiodine treatment
・Post-treatment 131I imaging
・Consider (EBRT/IMRT)
Suppress TSH with levothyroxine
Gross residual disease in neck
Adequate RAI uptake
Unresectabl
・Total body radioiodine imaging
Suspected or proven inadequate RAI uptake
Observe or consider External-beam radiation therapy(EBRT/IMRT)

五、2025 ATA Risk of Recurrence Categories for Differentiated Thyroid Cancer

癌症類型	Low risk (<10%)	Low-intermediate risk (10–15%)	Intermediate-high risk (16–30%)	High risk (>30%)
Papillary Thyroid Carcinoma (PTC)	•單發、局限於甲狀腺內之T1a腫瘤(≤1 cm) •無血管侵犯、無顯微鏡外侵犯 •無淋巴結轉移(N0)	•多發性T1a(≤1cm)伴顯微鏡外侵犯 •限於頸部的少數微小淋巴轉移(<5個、<2 mm)	•顯著外侵犯(gross ETE) •≥5個淋巴轉移或直徑>2 mm但<3 cm •Tall cell, Columnar cell 或 Diffuse sclerosing variant	•巨大或多部位轉移性淋巴結(>3 cm) •遠端轉移(M1) •腫瘤邊緣陽性(R1/R2) •BRAF V600E+TERT promoter mutation
Follicular Thyroid Carcinoma (FTC) / Invasive Encapsulated Follicular Variant of PTC (IEFVPTC)	•僅限於被膜侵犯或輕微血管侵犯(<4 個血管) •無遠端轉移	•血管侵犯中度（4–5個血管）但無遠端轉移	•廣泛血管侵犯(>5 個血管)或顯著被膜穿透 •腫瘤>4cm或局部侵犯鄰近組織	•廣泛侵犯或有遠端轉移(骨、肺等) •TP53 或 TERT promoter mutation陽性
Oncocytic Thyroid Carcinoma (OTC)	•局限性、被膜完整、無血管侵犯	•輕度血管侵犯、腫瘤≤4 cm	•廣泛血管侵犯或顯著局部侵犯	•遠端轉移 •非放射性碘親和(RAI-refractory) •TP53 或 DAXX/ATRX mutation 相關高危型

六、術後碘-131治療原則

2025 ATA — Postoperative Radioiodine (^{131}I) Therapy by Risk Category

Risk Category	Typical RAI Recommendation	Typical ^{131}I Activity (GBq / mCi)	Primary Goal of Therapy	Clinical Context / Comments
Low risk (<10%)	Usually **not recommended**	1.1–1.85 GBq (30–50 mCi) *if used*	None or remnant ablation only	• No gross ETE, no LN metastases, no vascular invasion • RAI can be omitted if stimulated Tg <1 ng/mL and negative ultrasound • If used, low-dose ablation may be considered for remnant visualization only.
Low-intermediate risk (10–15%)	**Consider RAI** based on postoperative Tg, histology, and age	1.1–3.7 GBq (30–100 mCi)	Remnant ablation ± adjuvant therapy	• For limited nodal disease (≤5 LN, all <2 mm) • RAI may be beneficial in older patients or those with adverse histology (tall cell, diffuse sclerosing) • Post-therapy scan usually negative or mild uptake in remnant only.
Intermediate-high risk (16–30%)	**Advised to receive RAI**	3.7 GBq (100 mCi) typical; may range 1.1–5.55 GBq (30–150 mCi)	Adjuvant therapy (eradicate microscopic residual disease)	• For multiple LN metastases (>5 nodes, any >2 mm), minimal extrathyroidal extension, vascular invasion, or Tg >10 ng/mL • Post-therapy scan may show nodal uptake • RAI improves recurrence-free survival per SEER and meta-analyses.

六、術後碘-131治療原則-續

2025 ATA — Postoperative Radioiodine (^{131}I) Therapy by Risk Category-續

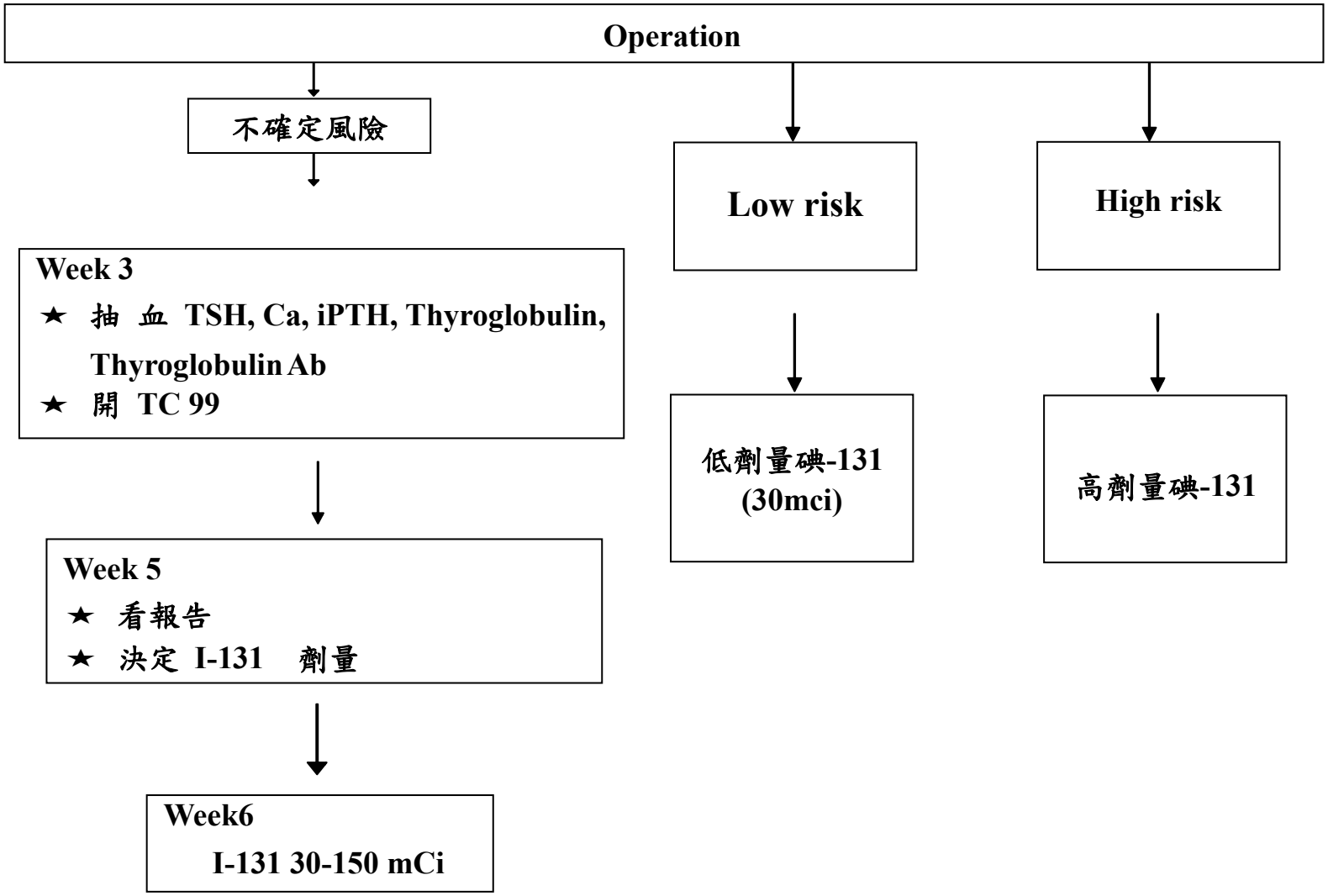
Risk Category	Typical RAI Recommendation	Typical ^{131}I Activity (GBq / mCi)	Primary Goal of Therapy	Clinical Context / Comments
High risk (>30%)	**Strongly recommended**	3.7–5.55 GBq (100–150 mCi)	Adjuvant and therapeutic (treat known disease)	• Gross ETE, LN >3 cm, distant metastases (M1), positive margins • Post-therapy scan often reveals iodine-avid disease • Repeat or dosimetry-guided RAI may be indicated • TSH should be maximally stimulated (>30 mIU/L).
Distant metastases (RAI-avid)	**Yes – Required**	3.7–7.4 GBq (100–200 mCi) or dosimetry-guided	Treatment of known metastatic disease	• Lung, bone, or brain metastases that uptake RAI • May repeat every 6–12 months depending on Tg and imaging response • Monitor cumulative dose <22–26 GBq (600–700 mCi) to avoid marrow toxicity.
RAI-refractory or post-therapy scan negative	**No further RAI**	—	—	• If Tg persistently elevated but post-therapy scan negative → define as RAI-refractory DTC (see Recommendation 59–61) • Proceed to TKI (lenvatinib, sorafenib, selpercatinib, etc.) or targeted therapy per genotype.

六、術後碘-131治療原則-續

***碘-131 劑量**

小劑量	門診：<30mCi for ablation
大劑量	同位素病房：80 mCi,100 mCi,120 mCi,150 mCi,200 mCi *年紀>70 建議 100-150 mCi *腎功能不全 建議劑量少一點 *高復發風險 建議 100-200 mCi

CSMUH Post-operation follow-up protocol



七、手術及碘-131治療後追蹤

Response Category	Definition (ATA 2025)	Typical Tg / Imaging Features	Approx. Recurrence Risk (per 2025 ATA)
Excellent response	No biochemical or structural evidence of persistent thyroid cancer (i.e., remission).	- Suppressed Tg <0.2 ng/mL or stimulated Tg <1 ng/mL- Negative imaging (US/WBS/CT) - Stable or undetectable anti-Tg antibody (TgAb)	**1–4%** overall; <2% in low-risk; up to 15% in initial high-risk group
Indeterminate response	Nonspecific findings on imaging or mildly elevated Tg levels; TgAb stable or declining; may represent minimal residual tissue but not structural disease	- Stimulated Tg 1–10 ng/mL or mild TgAb positivity - Nonspecific imaging findings (no proven disease)	**5–20%** depending on histology and baseline risk

Biochemically incomplete response	Elevated Tg or rising TgAb levels **without** radiological evidence of disease	- Stimulated Tg >10 ng/mL or increasing Tg/TgAb trend - No visible lesions on imaging	**20–53%** recurrence or persistence; combined biochemical + structural up to 85%
Structurally incomplete response	Structural (imaging or biopsy-proven) evidence of disease recurrence, often with elevated Tg and/or TgAb	- Lesion on ultrasound, CT, PET, or WBS - Tg or TgAb usually elevated	**>80%** show persistent disease or progression

八、復發或轉移治療建議

2025 ATA — Management of Recurrent or Metastatic Differentiated Thyroid Cancer

Clinical Setting	Recommended Management	Supporting Notes / Key Evidence
Locoregional residual or recurrent disease (neck or thyroid bed)	Surgery — preferred when feasible (therapeutic central or lateral neck dissection) Percutaneous ethanol injection (PEI) — alternative for high-risk surgical candidates Radiofrequency ablation (RFA) — option for small-volume recurrent lesions, especially when surgery contraindicated	• Decision based on extent, anatomic location, growth rate, patient comorbidities, and prior surgery • Recurrence after "excellent response" usually <15%; rising Tg/TgAb requires PET/CT or cross-sectional imaging to localize lesions
Oligometastatic or solitary distant metastases	Local therapy — surgery, thermal ablation (RFA, microwave), or stereotactic radiation if technically feasible	• May provide long-term control or even cure in selected cases • Considered when disease is slow-growing and iodine-refractory (RAIR)
Iodine-avid distant metastases (lung/bone)	RAI therapy (^{131}I) — dosimetry-guided or empiric 100–200 mCi (3.7–7.4 GBq)	• Repeat every 6–12 months if uptake persists and disease regresses • Favorable genotypes include RAS mutation and RET fusion; BRAF V600E, TERT, TP53 predict resistance

RAI-refractory disease (no uptake or progression despite RAI)	Systemic therapy: • Multikinase inhibitors (lenvatinib, sorafenib) for progressive symptomatic disease • Selective targeted therapy (RET, NTRK, BRAF, ALK inhibitors) per genomic profile • Immunotherapy (PD-1 blockade) in selected clinical trial settings	• Localized oligoprogression may still benefit from local therapy before systemic initiation • Goal is to delay systemic toxicity and preserve quality of life
Symptomatic bone metastases	External beam radiotherapy (EBRT) or RFA/cryotherapy, ± bisphosphonate or denosumab.	• ATA notes bone metastases in ~25% of advanced DTC; often non–RAI-avid
Brain metastases	Surgery or stereotactic radiosurgery (SRS) ± systemic therapy	• RAI only if iodine-avid; otherwise local control prioritized
Follow-up / monitoring after recurrence treatment	• Tg/TgAb every 3–6 months initially • Neck ultrasound and/or diagnostic imaging per risk level • PET/CT if biochemical progression without localization	• Dynamic reassessment of "response to therapy" (Excellent / Biochemical / Structural incomplete) guides TSH suppression and surveillance intensity

九、碘-131治療無效治療建議

Therapeutic Modality	ATA 2025 Recommendations / Evidence	Key Clinical Context
1. Systemic therapy (Multikinase Inhibitors, MKI)	Lenvatinib 與 Sorafenib 為首選 VEGFR MKI 治療進展性 RAIR DTC；可延長 PFS 與 disease control rate。	適用於症狀性或影像學持續進展病人。
2. Selective targeted therapy (Genotype-directed)	**RET fusion positive → Selpercatinib 或 Pralsetinib （首選一線）。** **NTRK fusion positive → Larotrectinib 或 Entrectinib**（若病灶小且無症狀，可觀察）。	精準治療為 RAIR 管理核心；需 NGS 確認基因型。
3. Re-differentiation therapy	可考慮 MEK 抑制劑 (Selumetinib 等）或 BRAF/MEK(Dabrafenib/trametinib) 聯合療法 以恢復碘親和性；屬研究性或臨床試驗建議。	適合部分 BRAF 或 RAS 突變病人，可重新嘗試 RAI。
4. Local therapy for oligometastatic lesions	若為少數轉移且緩慢進展，可採手術、RFA、SBRT 等局部治療。	延緩全身治療時機，改善局部控制。

5. Supportive care / Bone targeted therapy	骨轉移可使用 EBRT、RFA、Bisphosphonate 或 Denosumab 以緩解症狀。	約 25 % RAIR DTC 有骨轉移。
6. Immunotherapy / Clinical trials	指南鼓勵參與 PD-1或多靶點免疫治療臨床試驗。	針對多線治療失效或 genomic wild-type 患者。

十、放射線治療

Differentiated, Medullary, or Poorly Differentiated (non-anaplastic) Thyroid Cancer

- Adjuvant RT for high-risk disease (after R1 resection)
  - Microscopic disease (thyroid bed, involved resected lymph node regions): 60–66 Gy in 1.8–2 Gy per fraction
  - Elective nodal regions: 50–56 Gy in 1.6–2 Gy per fraction
- Salvage RT after R2 resection or inoperable patients
  - Gross disease: 66–70 Gy in 1.8–2 Gy per fraction
  - Microscopic disease (thyroid bed, involved resected lymph node regions): 60–66 Gy in 1.8–2 Gy per fraction
  - Elective nodal regions: 50–56 Gy in 1.6–2 Gy per fraction
- Palliative RT of metastases
  - Bony or soft-tissue metastases[22]
    - For patients with oligometastatic disease and good performance status consider higher doses (45–60 Gy) in 1.8–2 Gy daily fractions, or SBRT following principles for treatment of oligometastases
    - For patients with widely metastatic disease and/or poor performance status limiting life expectancy, consider 8 Gy in 1 fraction; 20 Gy in 5 daily fractions; 30 Gy in 10 daily fractions
  - CNS metastases
    - ≤4 metastases – consider stereotactic radiosurgery (SRS) either following surgical resection or as monotherapy
    - Multiple metastases:
      - Consider enrollment on clinical trial for SRS versus whole brain radiation therapy (WBRT) (with or without hippocampal avoidance)
      - WBRT – 30 Gy in 10 daily fractions; consider 45 Gy in 1.8 Gy daily fractions for good performance status.

Anaplastic Thyroid Cancer

- Adjuvant RT after R0 or R1 resection[14,25-27]
  - Microscopic disease/high-risk regions: 60–66 Gy in 1.2 Gy twice daily fractions or 1.8–2 Gy daily fractions
  - Elective nodal regions can be treated with SIB: 45–54 Gy in 0.8–1.0 Gy twice-daily fractions or 1.6–1.8 Gy once-daily fraction
  - Chemoradiation may be considered on an individual basis.
- Salvage RT after R2 resection or inoperable patients
  - Gross disease: 66–70 Gy in 1.2 Gy twice-daily fractions or 1.8–2 Gy daily fractions
  - Microscopic disease/high-risk regions: 60–66 Gy in 1.2 Gy twice daily fractions or 1.8–2 Gy daily fractions
  - Elective nodal regions can be treated with SIB: 45–54 Gy in 0.8–1.0 Gy twice-daily fractions or 1.6–1.8 Gy once-daily fraction
  - Chemoradiation may be considered on an individual basis.[13]
- Palliative neck RT： 20 Gy in 5 daily fractions, 30 Gy in 10 daily fractions, 45 Gy in 15 daily fractions
- Palliative RT of metastases
  - Bony or soft tissue metastases：8 Gy in 1 fraction; 20 Gy in 5 daily fractions; 30 Gy in 10 daily fractions
  - CNS metastases：Whole brain radiation – 30 Gy in 10 daily fractions

十一、標靶治療處方及免疫治療處方與化療處方

1. 標靶治療處方(Kinase Inhibitor Therapy)

藥名(學名)	**Lenvatinib 24mg Oral Daily**
健保給付	用於放射性碘治療無效之局部晚期或轉移性的進行性(progressive)分化型甲狀腺癌(RAI-RDTC)： (1)需經事前審查核准後使用，每次申請之療程以 3 個月為限，送審時需檢送影像資料，每 3 個月評估一次。 (2)Lenvatinib 與 sorafenib 不得合併使用。(109/8/1)
Ref.	*Schlumberger M, Tahara M, Wirth LJ, Robinson B, Brose MS, Elisei R, Habra MA, Newbold K, Shah MH, Hoff AO, Gianoukakis AG, Kiyota N, Taylor MH, Kim SB, Krzyzanowska MK, Dutcus CE, de las Heras B, Zhu J, Sherman SI. Lenvatinib versus placebo in radioiodine-refractory thyroid cancer. N Engl J Med. 2015 Feb 12;372(7):621-30. doi: 10.1056/NEJMoa1406470. PMID: 25671254.*

藥名(學名)	**Sorafenib 400mg Oral Twice daily**
健保給付	用於放射性碘治療無效之局部晚期或轉移性的進行性(progressive)分化型甲狀腺癌(RAI-RDTC)：(106/1/1) (1)放射性碘治療無效之局部晚期或轉移性的進行性(progressive)分化型甲狀腺癌。 (2)需經事前審查核准後使用，每次申請之療程以 3 個月為限，送審時需檢送影像資料，每 3 個月評估一次。 (3)Sorafenib 與 lenvatinib 不得合併使用。(107/7/1)
Ref.	*Brose MS, Nutting CM, Jarzab B, Elisei R, Siena S, Bastholt L, de la Fouchardiere C, Pacini F, Paschke R, Shong YK, Sherman SI, Smit JW, Chung J, Kappeler C, Peña C, Molnár I, Schlumberger MJ; DECISION investigators. Sorafenib in radioactive iodine-refractory, locally advanced or metastatic differentiated thyroid cancer: a randomised, double-blind, phase 3 trial. Lancet. 2014 Jul 26;384(9940):319-28. doi: 10.1016/S0140-6736(14)60421-9. Epub 2014 Apr 24. PMID: 24768112; PMCID: PMC4366116.*

藥名(學名)	**Cabozantinib 60mg Daily**
健保給付	(1)適用於治療成人及 12 歲以上兒童曾接受 VEGFR 標靶治療後惡化、放射碘治療無效或不適用放射碘治療的局部晚期或轉移性分化型甲狀腺癌病人。 (2)須經事前審查核准後使用，每次申請療程以 3 個月為限，送審時需檢送影像資料，每 3 個月評估一次，無疾病惡化方可繼續使用。 (3)每日限用 1 粒。
Ref.	*Elghawy, O., Barsouk, A., Xu, J., Chen, S., Cohen, R. B., & Sun, L. (2024). Real word outcomes of cabozantinib therapy in poorly differentiated thyroid carcinoma. European Thyroid Journal, 13(6).*

For BRAF V600E mutation that has progressed following prior treatment with no satisfactory alternative treatment options

藥名(學名)	**Dabrafenib/trametinib** **Dabrafenib 150 mg PO Twice daily** **Trametinib 2mg PO Once daily**
健保給付	無
Ref.	*Subbiah V, Kreitman RJ, Wainberg ZA, Cho JY, Schellens JHM, Soria JC, Wen PY, Zielinski C, Cabanillas ME, Urbanowitz G, Mookerjee B, Wang D, Rangwala F, Keam B. Dabrafenib and Trametinib Treatment in Patients With Locally Advanced or Metastatic BRAF V600-Mutant Anaplastic Thyroid Cancer. J Clin Oncol. 2018 Jan 1;36(1):7-13. doi: 10.1200/JCO.2017.73.6785. Epub 2017 Oct 26. PMID: 29072975; PMCID: PMC5791845.* *Subbiah, V., Kreitman, R. J., Wainberg, Z. A., Cho, J. Y., Schellens, J. H. M., Soria, J. C., ... & Keam, B. (2022). Dabrafenib plus trametinib in patients with BRAF V600E-mutant anaplastic thyroid cancer: updated analysis from the phase II ROAR basket study. Annals of oncology, 33(4), 406-415.*

For NTRK gene fusion positive

藥名(學名)	**Larotrectinib 100 mg PO Twice daily**
健保給付	用於放射性碘治療無效之局部晚期或轉移性的進行性 (progressive)甲狀腺癌。
Ref.	*Drilon A, Laetsch TW, Kummar S, DuBois SG, Lassen UN, Demetri GD, Nathenson M, Doebele RC, Farago AF, Pappo AS, Turpin B, Dowlati A, Brose MS, Mascarenhas L, Federman N, Berlin J, El-Deiry WS, Baik C, Deeken J, Boni V, Nagasubramanian R, Taylor M, Rudzinski ER, Meric-Bernstam F, Sohal DPS, Ma PC, Raez LE, Hechtman JF, Benayed R, Ladanyi M, Tuch BB, Ebata K, Cruickshank S, Ku NC, Cox MC, Hawkins DS, Hong DS, Hyman DM. Efficacy of Larotrectinib in TRK Fusion-Positive Cancers in Adults and Children. N Engl J Med. 2018 Feb 22;378(8):731-739. doi: 10.1056/NEJMoa1714448. PMID: 29466156; PMCID: PMC5857389.* *Waguespack, S. G., Drilon, A., Lin, J. J., Brose, M. S., McDermott, R., Almubarak, M., ... & Cabanillas, M. E. (2022). Efficacy and safety of larotrectinib in patients with TRK fusion-positive thyroid carcinoma. European journal of endocrinology, 186(6), 631-643..*

藥名(學名)	**Entrectinib 600mg PO Once daily**
健保給付	無
Ref.	*Bazhenova, L., Hescot, S., Folprecht, G., Daga, H., Massarelli, E., Lamartina, L., ... & Carrizosa, D. (2022, September). Entrectinib in patients with ntrk fusion-positive (ntrk-fp) thyroid cancer: updated data from startrk-2. In Endocrine Abstracts (Vol. 84). Bioscientifica.* *Doebele RC, Drilon A, Paz-Ares L, Siena S, Shaw AT, Farago AF, Blakely CM, Seto T, Cho BC, Tosi D, Besse B, Chawla SP, Bazhenova L, Krauss JC, Chae YK, Barve M, Garrido-Laguna I, Liu SV, Conkling P, John T, Fakih M, Sigal D, Loong HH, Buchschacher GL Jr, Garrido P, Nieva J, Steuer C, Overbeck TR, Bowles DW, Fox E, Riehl T, Chow-Maneval E, Simmons B, Cui N, Johnson A, Eng S, Wilson TR, Demetri GD; trial investigators. Entrectinib in patients with advanced or metastatic NTRK fusion-positive solid tumours: integrated analysis of three phase 1-2 trials. Lancet Oncol. 2020 Feb;21(2):271-282. doi: 10.1016/S1470-2045(19)30691-6. Epub 2019 Dec 11. Erratum in: Lancet Oncol. 2020 Feb;21(2):e70. doi: 10.1016/S1470-2045(20)30029-2. Erratum in: Lancet Oncol. 2020 Jul;21(7):e341. doi: 10.1016/S1470-2045(20)30345-4. Erratum in: Lancet Oncol. 2020 Aug;21(8):e372. doi: 10.1016/S1470-2045(20)30382-X. Erratum in: Lancet Oncol. 2021 Oct;22(10):e428. doi: 10.1016/S1470-2045(21)00538-6. PMID: 31838007; PMCID: PMC7461630.*

For RET fusion positive

藥名(學名)	**Selpercatinib 120 mg PO (< 50 kg) or 160 mg PO (≥ 50 kg) Twice daily**
健保給付	無
Ref.	*Bradford, D., Larkins, E., Mushti, S. L., Rodriguez, L., Skinner, A. M., Helms, W. S., ... & Singh, H. (2021). FDA approval summary: selpercatinib for the treatment of lung and thyroid cancers with RET gene mutations or fusions. Clinical Cancer Research, 27(8), 2130-2135.* *Wirth LJ, Sherman E, Robinson B, Solomon B, Kang H, Lorch J, Worden F, Brose M, Patel J, Leboulleux S, Godbert Y, Barlesi F, Morris JC, Owonikoko TK, Tan DSW, Gautschi O, Weiss J, de la Fouchardière C, Burkard ME, Laskin J, Taylor MH, Kroiss M, Medioni J, Goldman JW, Bauer TM, Levy B, Zhu VW, Lakhani N, Moreno V, Ebata K, Nguyen M, Heirich D, Zhu EY, Huang X, Yang L, Kherani J, Rothenberg SM, Drilon A, Subbiah V, Shah MH, Cabanillas ME. Efficacy of Selpercatinib in RET-Altered Thyroid Cancers. N Engl J Med. 2020 Aug 27;383(9):825-835. doi: 10.1056/NEJMoa2005651. PMID: 32846061; PMCID: PMC10777663.*

藥名(學名)	**Pralsetinib 400mg PO Once daily**
健保給付	無
Ref.	*Kim, J., Bradford, D., Larkins, E., Pai-Scherf, L. H., Chatterjee, S., Mishra-Kalyani, P. S., ... & Singh, H. (2021). FDA approval summary: pralsetinib for the treatment of lung and thyroid cancers with RET gene mutations or fusions. Clinical Cancer Research, 27(20), 5452-5456.* *Subbiah V, Hu MI, Wirth LJ, Schuler M, Mansfield AS, Curigliano G, Brose MS, Zhu VW, Leboulleux S, Bowles DW, Baik CS, Adkins D, Keam B, Matos I, Garralda E, Gainor JF, Lopes G, Lin CC, Godbert Y, Sarker D, Miller SG, Clifford C, Zhang H, Turner CD, Taylor MH. Pralsetinib for patients with advanced or metastatic RET-altered thyroid cancer (ARROW): a multi-cohort, open-label, registrational, phase 1/2 study. Lancet Diabetes Endocrinol. 2021 Aug;9(8):491-501. doi: 10.1016/S2213-8587(21)00120-0. Epub 2021 Jun 9. Erratum in: Lancet Diabetes Endocrinol. 2021 Oct;9(10):e4. doi: 10.1016/S2213-8587(21)00247-3. PMID: 34118198.*

Consider if clinical trials or other systemic therapies are not available or appropriatef

藥名(學名)	**Vandetanib Max 300mg Oral Daily**
健保給付	適用於無法進行手術切除的局部侵犯或轉移性甲狀腺髓質癌，並且為症狀性及疾病侵襲性的患者。 1.需經事前審查核准後使用，每次申請之療程以 6 個月為限，送審時需檢送影像資料，每 6 個月評估一次。 2.出現疾病惡化或無法忍受之藥物不良反應，應立即停用。 3.每日最大劑量為 300 毫克。
Ref.	*Wells SA Jr, Robinson BG, Gagel RF, Dralle H, Fagin JA, Santoro M, Baudin E, Elisei R, Jarzab B, Vasselli JR, Read J, Langmuir P, Ryan AJ, Schlumberger MJ. Vandetanib in patients with locally advanced or metastatic medullary thyroid cancer: a randomized, double-blind phase III trial. J Clin Oncol. 2012 Jan 10;30(2):134-41. doi: 10.1200/JCO.2011.35.5040. Epub 2011 Oct 24. Erratum in: J Clin Oncol. 2013 Aug 20;31(24):3049. PMID: 22025146; PMCID: PMC3675689.*

2. 免疫治療處方

Regimen	Pembrolizumab				
Drug Combination(學名藥)	Dosage	Route of administration	Times	Frequency/Duration	Notes
pembrolizumab	200 mg	IV	drip 30 mins, on day 1	every 3 weeks	
or					
pembrolizumab	400mg	IV	drip 30 mins, on day 1	every 6 weeks	
Ref.	*Oh, D. Y., Algazi, A., Capdevila, J., Longo, F., Miller Jr, W., Chun Bing, J. T., ... & Lebellec, L. (2023). Efficacy and safety of pembrolizumab monotherapy in patients with advanced thyroid cancer in the phase 2 KEYNOTE-158 study. Cancer, 129(8), 1195-1204.*				
健保給付					

Regimen	Nivolumab				
Drug Combination(學名藥)	Dosage	Route of administration	Times	Frequency/Duration	Notes
Nivolumab	240 mg	IV	drip 30-60 mins, on day 1	every 2 weeks	
or					
Nivolumab	480 mg	IV	drip 30-60 mins, on day 1	every 4 weeks	
Ref.	*Kollipara R, Schneider B, Radovich M, et al. Exceptional response with immunotherapy in a patient with anaplastic thyroid cancer. Oncologist 2017;22:1149-1151.* *12 Ma D, Ding XP, Zhang C, Shi P. Combined targeted therapy and immunotherapy in anaplastic thyroid carcinoma with distant metastasis: A case report. World J Clin Cases 2022;10:3849-3855.*				
健保給付					

3. 化療處方

Regimen	**Paclitaxel**				
Drug Combination(學名藥)	Dosage	Route of administration	Times	Frequency/Duration	Notes
Paclitaxel	60-80 mg/m2	IV	drip 3 hrs, on day 1	weekly	
or					
Paclitaxel	135-150 mg/m2	IV	drip 3 hrs, on day 1	every 3-4 weeks	
Ref.	*Smallridge RC, Ain KB, Asa SL, et al. American Thyroid Association guidelines for management of patients with anaplastic thyroid cancer. Thyroid 2012;22:1104-1139.*				
健保給付					

Regimen	**Paclitaxel/carboplatin**				
Drug Combination(學名藥)	Dosage	Route of administration	Times	Frequency/Duration	Notes
Paclitaxel	60–80 mg/m2	IV	drip 3 hrs, on day 1	weekly	
carboplatin	AUC 2	IV	on day 1		
or					
Paclitaxel	135–150 mg/m2	IV	drip 3 hrs, on day 1	every 3–4 Weeks	
carboplatin	AUC 5–6 IV	IV	on day 1		
Ref.	*Smallridge RC, Ain KB, Asa SL, et al. American Thyroid Association guidelines for management of patients with anaplastic thyroid cancer. Thyroid 2012;22:1104-1139.*				
健保給付					

Regimen	**Doxorubicin**				
Drug Combination(學名藥)	Dosage	Route of administration	Times	Frequency/Duration	Notes
Doxorubicin	20mg/m2	IV	on day 1	weekly	
Ref.	*Bible KC, Kebebew E, Brierley J, et al. 2021 American Thyroid Association guidelines for management of patients with anaplastic thyroid cancer. Thyroid 2021;31:337-386.*				
健保給付					

Regimen	**Docetaxel/doxorubicin**				
Drug Combination(學名藥)	Dosage	Route of administration	Times	Frequency/Duration	Notes
Docetaxel	60 mg/m2	IV	on day 1	every 3–4 weeks	
doxorubicin	60mg/m2	IV	on day 1		
or					
Docetaxel	20 mg/m2	IV	on day 1	weekly	
doxorubicin	20mg/m2	IV	on day 1		
Ref.	*Smallridge RC, Ain KB, Asa SL, et al. American Thyroid Association guidelines for management of patients with anaplastic thyroid cancer. Thyroid 2012;22:1104-1139.*				
健保給付					

十二、AJCC 8 edition

Differentiated and anaplastic thyroid carcinoma TNM staging AJCC UICC 2017

Primary tumor (T)

Papillary, follicular, poorly differentiated, Hurthle cell and anaplastic thyroid carcinoma	
T category	**T criteria**
TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
T1	Tumor ≤2 cm in greatest dimension limited to the thyroid
T1a	Tumor ≤1 cm in greatest dimension limited to the thyroid
T1b	Tumor >1 cm but ≤2 cm in greatest dimension limited to the thyroid
T2	Tumor >2 cm but ≤4 cm in greatest dimension limited to the thyroid
T3	Tumor >4 cm limited to the thyroid, or gross extrathyroidal extension invading only strap muscles
T3a	Tumor >4 cm limited to the thyroid
T3b	Gross extrathyroidal extension invading only strap muscles (sternohyoid, sternothyroid, thyrohyoid, or omohyoid muscles) from a tumor of any size
T4	Includes gross extrathyroidal extension
T4a	Gross extrathyroidal extension invading subcutaneous soft tissues, larynx, trachea, esophagus, or recurrent laryngeal nerve from a tumor of any size
T4b	Gross extrathyroidal extension invading prevertebral fascia or encasing the carotid artery or mediastinal vessels from a tumor of any size
NOTE: All categories may be subdivided: (s) solitary tumor and (m) multifocal tumor (the largest tumor determines the classification).	

Regional lymph nodes (N)

N category	N criteria
NX	Regional lymph nodes cannot be assessed
N0	No evidence of locoregional lymph node metastasis
N0a	One or more cytologically or histologically confirmed benign lymph nodes
N0b	No radiologic or clinical evidence of locoregional lymph node metastasis
N1	Metastasis to regional nodes
N1a	Metastasis to level VI or VII (pretracheal, paratracheal, or prelaryngeal/Delphian, or upper mediastinal) lymph nodes. This can be unilateral or bilateral disease.
N1b	Metastasis to unilateral, bilateral, or contralateral lateral neck lymph nodes (levels I, II, III, IV, or V) or retropharyngeal lymph node

Distant metastasis (M)

M category	M criteria
M0	No distant metastasis
M1	Distant metastasis

AJCC8 *Age at diagnosis for staging increased from 45 to 55

Differentiated thyroid cancer

When age at diagnosis…	*And T is….*	*And N is….*	*And M is….*	*Then the stage group is…*
<55 yrs	Any T	Any N	M0	I
	Any T	Any N	M1	II
≧55yrs	T1	N0/NX	M0	I
	T1	N1	M0	II
	T2	N0/NX	M0	I
	T2	N1	M0	II
	T3a/T3b	Any N	M0	II
	T4a	Any N	M0	III
	T4b	Any N	M0	IVA
	Any T	Any N	M1	IVB

十四、甲狀腺癌完治定義

癌別	期別		治療方式	完治定義
甲狀腺癌	治療期	1 期 2 期 3 期	OP	手術(單邊)→完治 手術(兩側全切)，I-131+抽血(Thyroglobulin+Thyroglobulin-Antibody)，若無復發的證據→完治。
		4 期	OP OP→I-131 標靶 C/T	1.如有手術，手術後接受輔助性治療算完治 2.未手術，口服標靶藥物 or 化學治療三個月即算完治 3.治療中轉安寧療護算完治

十五、參考文獻(Reference)

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