Parathyroid Carcinoma & Atypical Parathyroid Neoplasm Histopathology Reporting Proforma
Includes the International Collaboration on Cancer reporting dataset denoted by *

Mandatory questions (i.e. protocol standards) are in bold (e.g. **S1.03**).

### Clinical information

**S1.02/S2.02**

* A diagnosis of parathyroid carcinoma or atypical parathyroid neoplasm requires information regarding intra-operative findings, serum PTH and calcium levels, comorbidities such as renal failure etc. Thus, this option should only be used after all efforts to obtain information, including MDT discussion, has been exhausted.

- Hyperparathyroidism
  - Primary
  - Secondary
  - Tertiary
  - Non-functional

- Previous parathyroid surgery, specify

- Relevant familial history, specify

- Presence of a clinical syndrome, specify

- Other, specify

### Macroscopic findings

**S2.01 SPECIMEN LABELLED AS**

**S3.03 **

*PRE-OPERATIVE BIOCHEMICAL INFORMATION* (select all that apply)

- Calcium, specify level with units and specimen type (serum, other)

- Parathyroid hormone (PTH), specify level with units

- Other, specify
S2.04 *OPERATIVE PROCEDURE (select all that apply)

- [ ] Not specified

**Side**
- [ ] Right
- [ ] Left
- [ ] Not specified

**Location**
- [ ] Superior
- [ ] Inferior
- [ ] Not specified

**Tissue nature**
- [ ] Parathyroidectomy, single gland
- [ ] Parathyroidectomy, en bloc with thyroid lobe
- [ ] Other parathyroid gland sampling
  - [ ] Unilateral
  - [ ] Bilateral
- [ ] Lymph node sampling, specify
- [ ] Soft tissue of neck, specify
- [ ] Other, specify
- [ ] Not specified

S2.05 *SPECIMEN(S) SUBMITTED (select all that apply)

- [ ] Not specified

**Parathyroid**
- [ ] Left
  - [ ] Superior
  - [ ] Inferior
  - [ ] Not specified
- [ ] Right
  - [ ] Superior
  - [ ] Inferior
  - [ ] Not specified
- [ ] Mediastinal
- [ ] Intrathyroidal, specify lobe

**Soft tissue or muscle, specify site(s) and laterality**

**Lymph nodes, specify site(s) and laterality**

**Other, specify site(s) and laterality**

S2.06 *TUMOUR SITES (select all that apply)

- [ ] Not specified

**Parathyroid**
- [ ] Left
  - [ ] Superior
  - [ ] Inferior
  - [ ] Not specified
- [ ] Right
  - [ ] Superior
  - [ ] Inferior
  - [ ] Not specified
- [ ] Mediastinal
- [ ] Intrathyroidal, specify lobe

**Soft tissue or muscle, specify site(s) and laterality**

**Lymph nodes, specify site(s) and laterality**

**Other, specify site(s) and laterality**

S2.07 *SPECIMEN WEIGHT

- [ ] Parathyroid alone
  - [ ] mg

**Parathyroid with other structure(s), specify structure(s)**
  - [ ] mg

**Cannot be assessed, specify**

S2.08 *TUMOUR DIMENSIONS

**Maximum tumour dimension (largest tumour)**
  - [ ] mm

**Additional dimensions (largest tumour)**
  - [ ] mm x [ ] mm

**Cannot be assessed, specify**

S2.09 BLOCK IDENTIFICATION KEY

G2.01 OTHER MACROSCOPIC COMMENTS

- [ ] Not specified

**Non-adherent to surrounding structures**

**Adherent to structure(s)**
- [ ] Thyroid
- [ ] Recurrent laryngeal nerve
- [ ] Oesophagus
- [ ] Skeletal muscle
- [ ] Other, specify

**Other, specify**

S2.02 OTHER MACROSCOPIC COMMENTS
Microscopic findings

S3.01 *HISTOLOGICAL TUMOUR TYPE
- Atypical parathyroid neoplasm (atypical parathyroid adenoma)/neoplasm of uncertain malignant potential (UMP)
- Parathyroid carcinoma

* Defined as tumours that are histologically or clinically worrisome but do not fulfill the more robust criteria (i.e., invasion, metastasis) for carcinoma. They generally include tumours that have two or more concerning features, such as fibrous bands, mitotic figures, necrosis, trabecular growth, or adherence to surrounding tissues intraoperatively. Atypical parathyroid neoplasms usually have a smaller dimension, weight, and volume than carcinomas and are less likely to have coagulative tumour necrosis.

S3.02 *HISTOLOGICAL TUMOUR GRADE
- Low grade
- High grade
- Not determined
- Not applicable (i.e., atypical neoplasm/adenoma, UMP)

S3.03 *EXTENT OF INVASION (select all that apply)
- Cannot be assessed
- Confined to parathyroid without invasion through tumour capsule
- Invasion through tumour capsule
- Invasion into extra-parathyroidal soft tissue
- Invasion into adjacent structures, specify
  - Recurrent laryngeal nerve
  - Thyroid gland
  - Oesophagus
  - Skeletal muscle
  - Other, specify

S3.04 *LYMPHOVASCULAR INVASION
- Not identified
- Present
  - Vascular invasion
  - Lymphatic invasion

S3.05 *PERINEURAL INVASION
- Not identified
- Present

S3.06 *NECROSIS
- Not identified
- Present

S3.07 *MITOTIC COUNT
- per 2 mm²
  - Cannot be assessed

b 2 mm² approximates 10 HPFs on some microscopes.

S3.08 *MARGIN STATUS
- Not involved (R0)
- Involved
  - Abutting tissue edge (R1 resection)
  - Transected, fragmented or ruptured (possible R2 resection)
    Specify if named structure/location is involved at margin(s)
  - Cannot be assessed, specify

S3.09 *LYMPH NODE STATUS
- No nodes submitted or found
- Number of lymph nodes examined
  - Not involved
  - Involved
    - Number of positive lymph nodes
    - Number cannot be determined
    - Tissue from another submitted parathyroid gland, specify
      - Normal
      - Hypercellular, specify
      - Other, specify

G3.01 *COEXISTENT FINDINGS (select all that apply)
- None identified
- Present
  - Other finding(s) in same parathyroid gland as neoplasm
    - Other, specify

S3.10 *DISTANT METASTASES
- Not identified
- Information not available
- Present, specify site(s)

G3.02 ADDITIONAL MICROSCOPIC COMMENT
**Ancillary findings**

**ANCILLARY STUDIES**

- Not performed
- Immunohistochemistry performed
  - Ki-67, specify results and method
  - Parafibromin (CDC73), specify results
  - PGP9.5, specify results
  - Other immunohistochemistry, specify
- Molecular performed
  - CDC73 (parafibromin gene)
    - Germline testing, specify results
  - Tumour (somatic) testing, specify results
  - Other molecular test(s), specify
- Other, specify

**Synthesis and overview**

**PATHOLOGICAL STAGING (AJCC TNM 8th edition)**

**TNM Descriptors** (only if applicable) (select all that apply)
- m - multiple primary tumours
- r - recurrent
- y - post-therapy

**Primary tumour (pT)**

- TX Primary tumour cannot be assessed
- T0 No evidence of primary tumour
- Tis Atypical parathyroid neoplasm (neoplasm of uncertain malignant potential)*
- T1 Localised to the parathyroid gland with extension limited to soft tissue
- T2 Direct invasion into the thyroid gland
- T3 Direct invasion into recurrent laryngeal nerve, oesophagus, trachea, skeletal muscle, adjacent lymph nodes, or thymus
- T4 Direct invasion into major blood vessel or spine

*Defined as tumours that are histologically or clinically worrisome but do not fulfill the robust criteria (i.e. invasion, metastasis) for carcinoma. They generally include tumours that have two or more concerning features, such as fibrous bands, mitotic figures, necrosis, trabecular growth, or adherence to surrounding tissues interopertatively. Atypical parathyroid neoplasms usually have a smaller dimension, weight, and volume than carcinomas and are less likely to have coagulative tumour necrosis.

**Regional lymph nodes (N)**

- NX Regional lymph nodes cannot be assessed
- N0 No regional lymph node metastasis
- N1 Regional lymph node metastasis
- N1a Metastasis to level VI (pretracheal, paratracheal, and prelaryngeal/Delphian lymph nodes) or superior mediastinal lymph nodes (level VII)
- N1b Metastasis to unilateral, bilateral, contralateral cervical (Level I, II, III, IV, or V) or retropharyngeal nodes

**Not performed**

**Immunohistochemistry performed**

- Ki-67, specify results and method
- Parafibromin (CDC73), specify results
- PGP9.5, specify results
- Other immunohistochemistry, specify

**Molecular performed**

- CDC73 (parafibromin gene)
  - Germline testing, specify results
- Tumour (somatic) testing, specify results
- Other molecular test(s), specify
- Other, specify

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**Year and edition of staging system**

**DIAGNOSTIC SUMMARY**

Include: Specimen submitted, Specimen weight, Tumour type, Tumour dimensions, Extent of invasion, Tumour stage.

**OVERARCHING COMMENT**

**Edition/version number of the Cancer Structured Reporting Protocol.**