Anaplastic thyroid carcinoma and poorly differentiated thyroid carcinoma: A single-centre study on treatment outcomes

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Background

Anaplastic thyroid carcinoma (ATC) and poorly differentiated thyroid carcinoma (PDTC) are known to be rare and aggressive subtypes of thyroid neoplasm. ATC is the most undifferentiated form of thyroid cancer with a dismal prognosis, with disease-specific mortality approaching 100%.[1] PDTC is another subtype of high-grade follicular cell-derived carcinoma that is histologically poorly differentiated because of its solid, trabecular or insular growth patterns (or combination of these).[2,3] These patients had poorer survival than the differentiated carcinoma patients, with a reported five-year disease-specific survival of around 60%. The optimal treatments for these disease entities remain the focus of active research. Given the low incidence of these diseases and the paucity of local data, the treatment patterns and outcomes in our locality warrant investigation.

Methods

Patients who had a pathological diagnosis of ATC or PDTC between 1996 and 2024, and had follow-up at the Department of Clinical Oncology at the Prince of Wales Hospital, Hong Kong, were identified. Survival data cut-off was performed on 30th June 2025. Patients with no retrievable follow-up medical records were excluded. Eligible patients' medical records were retrospectively reviewed through the Clinical Management System. Log-rank test, chi-square test and Cox regression model were used for comparison when appropriate. Separate analyses were conducted for the two cohorts: patients with ATC and PDTC.

Patients

A total of thirty-one patients were identified. Five patients who had no retrievable follow-up records were excluded. Sixteen had anaplastic thyroid cancer, and ten had poorly differentiated thyroid cancer. ATC group's median age at diagnosis was 76, while that for the PDTC group was 61.

Table 1. Characteristics and treatments received in the ATC cohort

	n	Percentage
Sex		
Female	8	50%
Male	8	50%
T stage		
T1	0	0%
T2	0	0%
T3	7	43.8%
T4	9	56.2%
N stage		
N0	10	62.5%
N+	6	37.5%
M stage		
M0	10	62.5%
M1	6	37.5%
Molecular testing	6	37.5%
BRAF V600E mutant	2	12.5%
Treatment modalities		
Total thyroidectomy	7	43.8%
Near-total thyroidectomy	1	6.3%
Subtotal thyroidectomy	1	6.3%
Hemithyroidectomy	2	12.5%
Targeted therapy	1	6.3%
Palliative chemotherapy	2	12.5%
Adjuvant radiotherapy (with or without chemotherapy)	3	18.8%
Palliative radiotherapy	3	18.8%
Radioactive iodine	1	6.3%
Tracheostomy	2	12.5%
Tracheal stenting	1	6.3%
Intubation	1	6.3%

Table 2. Characteristics and treatments received in the PDTC cohort

	n	Percentage
Sex		
Female	4	40%
Male	6	60%
T stage		
T1	0	0%
T2	1	10%
T3	4	40%
T4	5	50%
N stage		
N0	4	40%
N+	6	60%
M stage		
M0	5	50%
M1	5	50%
Molecular testing	1	10%
BRAF V600E mutant	0	0%
Treatment modalities		
Total thyroidectomy	5	50%
Near-total thyroidectomy	0	0%
Subtotal thyroidectomy	1	10%
Hemithyroidectomy	2	20%
Targeted therapy	2	20%
Palliative chemotherapy	1	10%
Adjuvant radiotherapy (with or without chemotherapy)	5	50%
Palliative radiotherapy	6	60%
Radioactive iodine	4	40%
Tracheostomy	2	20%
Tracheal stenting	1	10%
Intubation	0	0%

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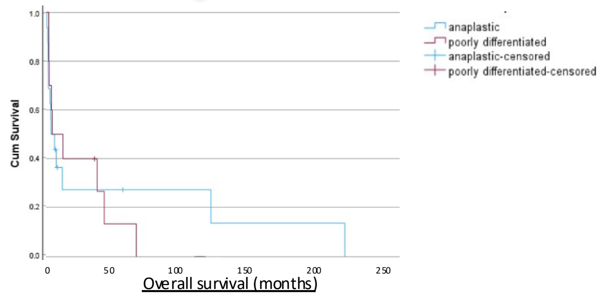
Oncological outcomes

The median survival for the ATC group was 3.2 months, while that for the PDTC group was slightly longer at 4 months (p=0.006).



For the ATC cohort, 62.5% died from the disease. At the end of the study, three patients were alive. The 6-month survival rate was 43.8% and the 1-year survival rate was 25%. 56.3% developed airway obstruction, resulting in mortality in 31.2% of the cohort. Metastatic disease and infection complications are other causes of death. Long-term survivors were identified in this cohort. The three longest observed survival times were 4.6, 9.9, and 18 years, respectively. These three patients all had no nodal or distant metastasis at diagnosis. They all received radical surgery. One had adjuvant radiotherapy. One had early local recurrence with definitive chemoradiation done, resulting in complete disease remission for up to 4.3 years at the end of the study.

For the PDTC cohort, 90% of the patients died. One patient remained alive at the end of the study. The 6-month survival rate was 40% and the 1-year survival rate was 30%. Only one patient died from airway compromise from a local tumour. Two patients died from lung metastases. One patient died from bleeding from nasal metastases. Three patients died from chest infection complications. One died from myocardial infarction, and one died from congestive heart failure. One had an uncertain cause of death. The longest survivor had an overall survival of 5.4 years. This patient had no distant metastasis and received radical surgery followed by adjuvant radical radiotherapy.

In the PDTC cohort, significant predictors of longer survival were the use of surgery (either complete or partial thyroidectomy) (HR 0.081, 95%CI: 0.007-0.914,p=0.01) and adjuvant radical radiotherapy (HR 0.175, 95%CI: 0.32-0.95,p=0.026) in univariate survival analysis. However, they did not retain prognostic significance in multivariate analysis after adjustment for confounding factors. No statistically significant predictors of survival were observed in the ATC group.

Percentage of remaining life spent receiving radiation therapy (PRLSRT)

PRLSRT was calculated as the time between start and finish of palliative radiotherapy divided by overall survival in days from start of radiotherapy. A cut-off of less than 10% was proposed to be incorporated as a potential quality indicator, reflecting treatment burden.[5]
For the ATC group, 3 patients received palliative neck radiotherapy. The median treatment days were 15 days, and the median PRLSRT was 16.4%.
For the PDTC group, palliative RT was given to 6 patients. Irradiation sites include metastasis to the neck, bone, chest wall, breast and nasal cavity. The median treatment days were 26. Two patients had more than one course of radiotherapy. The median PRLSRT was 22.7%. The highest one was 54.5%. One patient passed away after 2 days of palliative radiotherapy to the neck.

Conclusions

Long-term survival is achievable in a subset of patients. Durable disease control or even complete responses were observed after radical multi-modality treatments. Hypo-fractionated radiotherapy regime should be utilised to improve PRLSRT, and proper palliative strategy selection is needed to enhance patients' quality of life.