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Differential diagnosis of poorly differentiated thyroid cancer: practical case

Relevance. *Diagnostics of undifferentiated thyroid cancer (UTC) is an acute problem since UTC occupies an intermediate position between differentiated and undifferentiated cancers and has a much worse prognosis than differentiated thyroid cancers. UTC is quite a rare form of thyroid cancer (4 to 7% of all thyroid tumours) difficult for diagnostics.*

Materials and methods. *The article describes a case of UTC observed in Kazakh Institute of Oncology and Radiology in 2018 year in a 70 year old female patient K. A histological examination revealed a tumour with a solid, insular and trabecular structure. Differential diagnostics included an immunohistochemical study with antibodies to calcitonin, synaptophysin, chromogranin A, cytokeratin 19, thyroglobulin, TTF-1, P53 with the purpose to exclude other forms of tumours with similar morphological pattern.*

Conclusions. *Proper diagnostics of UTC is extremely important due to its higher aggressiveness and a lower level of recurrence-free survival compared with highly differentiated thyroid tumours.*

Keywords: *thyroid gland, undifferentiated cancer.*

Introduction. Poorly differentiated thyroid cancer (PDTC) or undifferentiated thyroid cancer (UTC) is a rare tumour difficult for morphological diagnostics. UTC is a malignant neoplasm of a follicular-cell origin which is intermediate from the morphological and clinical points of view between the differentiated (papillary and follicular) and undifferentiated (anaplastic) cancer [1,2]. UTC incidence does not exceed 4-7% of all thyroid gland malignant tumours [1-3].

Materials and Methods. The article describes the UTC case observed in KazIOR in 2018 in a 70-years old female patient K. In a clinical examination, the patient complained on the growth of neck formation within 6 months, feeling of compression and discomfort in the neck area. The results of laboratory diagnostics: level of hormones TSH, T3 and T4 - within the limits of normal indicators. The ultrasound examination revealed the nodular formation in the left lobe of thyroid gland, 3 cm in diameter, hypo-echogenic structure, poorly demarcated, led to suspect of the tumour nature of the process. The thyroidectomy was performed. In histological examination of the surgical material, the tumour of a solid, insular and trabecular structure was found. For differential diagnostics, the authors carried out the immunohistochemical (IHC) test by application of an automated staining instrument BenchMark Ultra (manufacturer: Ventana) with antibodies to thyrocalcitonin, synaptophysin, chromogranin A, cytokeratin 19, thyroglobulin, TTF-1, P53.

Results. During histological examination of the thyroid tissue, a non-encapsulated tumour with invasive type of growth and invasion into the underlying tissue of the thyroid gland was identified. The tumour structure was mixed: areas of solid structure alternated with areas of the insular and trabecular structure (Figure 1). Among the fields and nests of tumour cells, the signs of pre-existing follicular cancer were defined: small abortive follicles containing a colloid. The tumour cells were distinct by an extensive cellular and nuclear polymorphism, cells of medium and large sizes with amphophilic cytoplasm, some of the nuclei were small rounded or angular shape with coarsely dispersed chromatin structure; some of the nuclei were large with a vesicular structure of chromatin. The figures of pathological mitosis were detected.

Immunohistochemical test showed a negative reaction for calcitonin, synaptophysin and chromogranin A antibodies, and a diffuse-positive reaction for cytokeratin 19 antibody (Figure 2). Staining with thyroglobulin antibodies was focal-positive (Figure 3), with thyroid transcription factor 1 (TTF-1) antibodies – positive on the abortive follicles. P53 antibodies reaction showed a focal pattern of tumour cell expression (Figure 4).

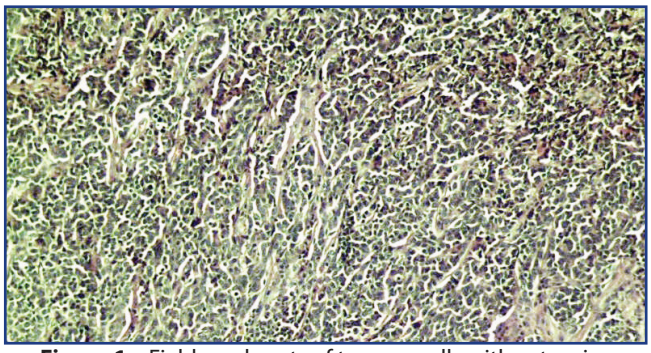

Figure 1 – Fields and nests of tumour cells with extensive polymorphism, separated by fibrotic septa. Haematoxylin-eosin staining, magnification x200

The conducted IHC test enabled to exclude the neuroendocrine nature of the tumour and confirm its epithelial nature. The focal expression of thyroglobulin and TTF-1 indicates the loss of the tumour differentiation, confirmed by P53 expression. Thus, a poorly differentiated thyroid carcinoma was diagnosed based on histological and immunohistochemical tests.

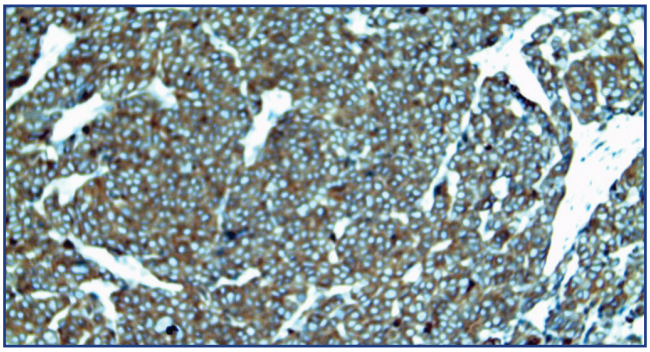

Figure 2 – Diffuse pronounced membrane and cytoplasmic staining of tumour cell fields by CK19 antibodies. x100

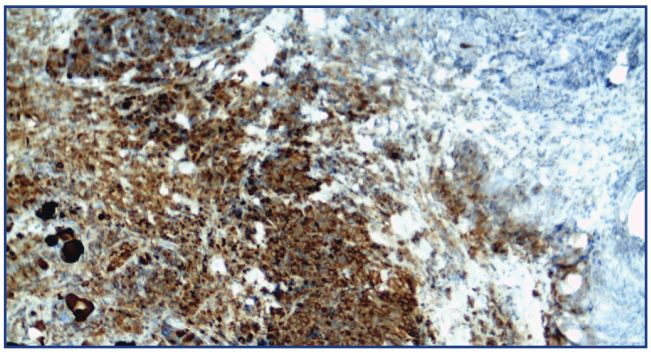

Figure 3 – Focal cytoplasmic staining of tumour cell fields by thyroglobulin antibodies. x100

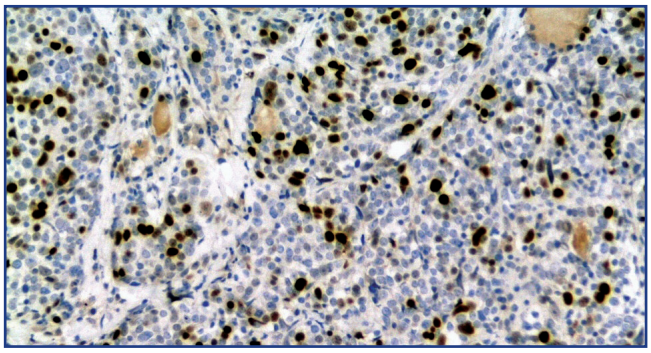

Figure 4 – Focal nuclear staining of tumour cells by P53 antibodies. x200

Discussion. Clinical examination using modern methods of visualization of thyroid formations enables suspecting the presence of malignant process. However, it does not allow identifying the type and degree of differentiation of the tumour. In this regard, morphological verification is a fundamental and extremely important method of UTC diagnostics due to its higher aggressiveness and lower disease-free survival vs. highly differentiated thyroid tumours.

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