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Original article

Subcellular localisation of anillin is associated with different survival outcomes in upper urinary tract urothelial carcinoma

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Abstract

Background The protein anillin (ANLN) has important roles in cell cytokinesis. Until now, no studies have evaluated the role of ANLN expression in a large cohort of patients with urothelial carcinoma of the upper urinary tract (UCUT).

Methods This study analysed 156 cases of primary localised UCUT. Pathological slides were reviewed and clinical findings were collected. An immunohistochemical study was performed and the cytoplasmic and nuclear staining results of UCUT were recorded. Expressions of ANLN were analysed to identify correlations with various clinicopathological parameters, disease-specific survival (DSS) and metastasis-free survival (MeFS).

Results Overexpression of ANLN in the nucleus had significant positive associations with tumour stage (p=0.017), histological grade (p=0.040), mitotic count (p=0.023), tumour necrosis (p=0.009), invasion patterns (p<0.001) and simultaneous involvement of the renal pelvis and ureter (p=0.032). Overexpression of ANLN in the cytoplasm had a significant negative correlation with patient age (p=0.004), tumour grade (p=0.021) and vascular invasion (p=0.013). Notably, univariable analysis showed that overexpression of ANLN in the nucleus was significantly associated with a poor DSS (p=0.006) and MeFS (p=0.010), and multivariable analysis showed that it was an independent predictor of adverse DSS outcome (p=0.031, relative risk 1.535). Low expression of ANLN in the cytoplasm was strongly associated with a poor DSS (p=0.045) and MeFS (p=0.041) in univariable analysis but not in Cox regression analysis.

Conclusions Subcellular localisation of ANLN is correlated with different tumour phenotypes and probably confers different tumorigenicity. Since high nuclear expression of ANLN is also an independent predictor of poor DSS, it is a useful prognostic