Quantification of Angiogenesis in Renal Cell Carcinoma

Introduction and Objective: Angiogenesis is the formation of new capillaries from the existing vascular network and is necessary for the progression of tumor growth and metastasis. Assessment of angiogenesis has been reported to predict progression and survival in several carcinomas. However, in renal cell carcinoma, the quantification of angiogenesis is various. In this study, by discriminating between mature vessels (normal vessels) and immature vessels (tumor vessels) in tumor lesions, we evaluated microvessel area (MVA) and microvessel density (MVD) and examined the correlation between the prognosis of RCC.

Materials and Methods: In 50 cases of RCC treated with radical nephrectomy, MVA and MVD were evaluated by double staining with anti-CD34 and α-SMA antibodies. Immature vessels were defined as vessels which were stained only with CD34 and mature vessels were defined as vessels which stained with both CD34 and α-SMA.

Results: MVA and MVD of tumor vessels are higher than normal vessels in these 50cases. MVA and MVD of tumor vessels was significantly higher in high grade tumors than in low grade tumors ($p < 0.05$) and MVA and MVD of tumor vessels in metastatic disease was significantly higher than in clinically localized disease ($p < 0.05$). Additionally, patients with higher MVA and MVD had poor prognosis in OS and PFS ($p < 0.05$). And MVA of tumor vessels was significantly associated with PFS of RCC patients in multivariate analysis.

Conclusion: This is the first study which evaluated tumor vessels in detail by discriminating tumor vessels and normal vessels by double staining, and it is suggested that MVA of tumor vessels might correlate with aggressiveness of RCC.