Microvessel density in Renal Cell Carcinoma

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Summary:

Background: Prognostic histological evaluation of many cancers have recently concentrated on angiogenesis.

Materials & Methods: A total of twenty formalin-fixed, paraffin embedded blocks of renal cell carcinoma were included in this study. Sections were subjected for immunohistochemical staining of CD34. The median of the MVD of all cases of RCC were obtained to divide the cases into high- and low-MVD score groups and were correlated with the tumor stage and grade.

Results: there was a significant correlation of the high MVD score with tumor stage (P=0.02).

Conclusion: MVD may be considered as a potential prognostic marker for RCC.

Keywords: CD34, MVD (Microvessel density), RCC (Renal Cell Carcinoma).

Introduction:
Renal cell carcinoma (RCC) has a relatively low incidence of 3% among other human tumors, nevertheless; it is the most frequent renal neoplasm (90-95%) in adults. The etiology and pathogenesis of RCC has not been completely elucidated. It is more common in men than women with a male-to-female ratio of about 1.6:1. (1) Angiogenesis refers to the generation of new blood vessels from preexisting microvasculature. This process is not only essential to tumor growth but has a relevance to other biological properties of the tumor including its metastatic potential. (2). Microvascular density (MVD) is an often quantified variable of tumor angiogenesis. Recent reports suggest that increased MVD is associated with poor outcome in several malignancies, including breast, prostate, lung, and nasopharyngeal cancers (3–5). Our aim in this study was to assess the importance of MVD in renal cell carcinoma through estimating its median level & determining what this has to do with some of the prognostically recognized clinicopathological variables.

Materials and Methods:
From March 2009 through January 2010, a total of twenty patients with RCC were enrolled in this study. Their relevant formalin-fixed, paraffin embedded tumor tissue blocks were retrieved from histopathological laboratories of Baghdad teaching hospitals and The Hospital of Specialized surgeries. Two sections were prepared from each block; one for hematoxyline-eosine staining; these were examined to review the original diagnosis. The other was utilized for immunohistochemical staining of CD34 according to the manufacturer instructions (Dako Cytomation LSAB+System-HRP immunostaining kit) that utilizes a refined avidin biotin technique.Regarding CD34 scoring, the most vascularized areas (hotspots) within each section were selected at X100 for quantification of blood vessels at a magnification of ×400. A total of five fields were analyzed. Any brown-staining of endothelial cells cluster that was considered as a single, countable microvessel. MVD in the non tumor areas of the section was evaluated as well, and was taken as an internal control. The mean value of the vessel counts in the selected spots was considered as the final MVD value. The median of the MVD of all cases of RCC were stratified to divide the cases into high- and low-MVD score groups (6).

Results:
A total of twenty cases of RCC were included in this study. Nine (45 %) were males and 11 (55%) were females. Their ages ranged between 30 and 76 years. The values of MVD varied between 19.0 and 36.4 with a median of 27.7 in RCC tumor areas which was significantly higher than the control (P<0.5) . As shown in table (1), there was a significant correlation of the high MVD score with tumor stage (P=0.02).

Table (1): MVD score in relation to different criteria in RCC.

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<tr>
<th>criteria</th>
<th>MVD score</th>
<th>P value</th>
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<tbody>
<tr>
<td>Low</td>
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<tr>
<td>Age More50</td>
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<td>Less 50</td>
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<td>III</td>
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<td>Total</td>
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Table (1): MVD score in relation to different criteria in RCC.

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Pearson Chi-Square

However, no statistically significant association was observed between MVD score and other variables such as the grade of the tumor, age or sex of the patients (p= 0.087, P= 0.406 & P= 1.00 respectively).

Figure (1): A- H & E staining of RCC. B- Immunostaining of endothelial cells with CD34 marker in RCC (X400).

Discussion: Angiogenesis, the growth of new blood vessels, has a critical role in tumor growth and metastasis. The purpose of this study was to investigate the involvement of angiogenesis in the pathogenesis of renal cell carcinoma (RCC) through quantitative evaluation of CD34 immunohistochemical expression. The value of MVD as a predictor of prognosis in RCC is controversial. Several reports have shown a positive correlation between MVD and survival or prognosis (7–9). These observations support our findings that high MVD score is significantly correlated with the tumor stage; as all cases of RCC stage T1 revealed low MVD score while all cases of stage T3 showed high MVD score. However, some researchers have reported an inverse relationship (10, 11), and still others were unable to find a significant correlation between MVD and survival (12, 13). These contradictory results from different researches probably require the immunohistochemical application of a combination of other vascular markers like CD31, VEGF, CD105 as well as the application of molecular techniques. In conclusion, our findings indicated that MVD can be considered as a potential prognostic marker for RCC.

References: