High micro-vessel density correlates with higher peri-tumoural immune response in colorectal cancer

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Background & objectives

Microvessels, a significant component of the tumour microenvironment in colorectal cancer (CRC), have traditionally been assessed in full-face sections. This study aimed to assess the microvessel density (MVD) in CRC tissue microarrays (TMAs) and determined correlations with clinicopathological variables.

Methods

TMAs from 1000 consecutive cases (2008-2014) of CRC from a tertiary centre were immunostained with clinical grade CD34 antibody (1:500 dilution). Stained microvessels and core areas were annotated on digital images (Nanozoomer) and assessed (3D Histech). The MVD was adjudged in luminal, central and peripheral tumour cores as well as adjacent normal, and results correlated to clinicopathological variables (SPSS).

Results

Of 985 assessable cases, 490 had a high overall tumour MVD. The mean tumour MVD was lower than the mean MVD in the adjacent normal area ($p<0.001$). A higher overall and peripheral tumoural MVD was associated with lower T stage ($p=0.04$) and lower overall stage ($p=0.02$). Average tumour MVD (as well as peripheral and luminal specific MVD) correlated with a conspicuous peri-tumoural lymphocyte density ($p<0.0001$). Higher tumour MVD also correlated with mismatch repair (MMR) proficient state ($p<0.001$). The MVD in the adjacent normal neither correlated with the immune response nor with the MMR status. Higher overall tumoural MVD was associated with alive survival status at 5 years ($p=0.045$).

Conclusion

MVD in the CRC microenvironment is correlated with lower stage, a conspicuous peri-tumoural lymphocyte response and is higher in MMR proficient tumours. Digital annotations of core stromal areas may further refine clinical correlations of MVD in CRC.