Analysis of a mathematical model describing necrotic tumor growth

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We study a model describing the growth of necrotic tumors in different regimes of vascularisation. The tumor consists of a necrotic core of death cells and a surrounding shell which contains life-proliferating cells. The blood supply provides the nonnecrotic region with nutrients and no inhibitor chemical species are present. The corresponding mathematical formulation is a moving boundary problem since both boundaries delimiting the nonnecrotic shell are allowed to evolve in time. We determine all radially symmetric stationary solutions and reduce the moving boundary problem into a nonlinear evolution equation for the functions parameterizing the boundaries of the shell. Parabolic theory provides a suitable context for proving local well-posedness of the problem for small initial data.