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Abstract: Cysteine and aspartic proteases possess high elastolytic activity and might contribute to the degradation of the abdominal aortic aneurysm (AAA) wall. The aim of this study was to analyze, in detail, the proteases (cathepsins B, D, K, L and S, and inhibitor cystatin C) found in human AAA and healthy aortic tissue samples. The vessel walls from AAA patients (n=36) and nonaneurysmal aortae (n=10) were retrieved using conventional surgical repair and autopsy methods. Serum samples from the same AAA patients and 10 healthy volunteers were also collected. Quantitative expression analyses were performed at the mRNA level using real-time reverse transcriptase-PCR (RT-PCR). Furthermore, analyses at the protein level included western blot and immunoprecipitation analyses. Cellular sources of cysteine/aspartic proteases and cystatin C were identified by immunohistochemistry (IHC). All cysteine/aspartic proteases and cystatin C were detected in the AAA and control samples. Using quantitative RT-PCR, a significant increase in expression was observed for cathepsins B (P=0.021) and L (P=0.018), compared with the controls. Cathepsin B and cystatin C were also detected in the serum of AAA patients. Using IHC, smooth muscle cells (SMCs) and
macrophages were positive for all of the tested cathepsins, as well as cystatin C; in addition, the lymphocytes were mainly positive for cathepsin B, followed by cathepsins D and S. All cysteine/aspartic proteases analyzed in our study were detected in the AAA and healthy aorta. The highest expression was found in macrophages and SMCs. Consequently, cysteine/aspartic proteases might play a substantial role in AAA.