Immunohistochemical detection and age determination of early myocardial infarctions

Susan Sprogøe-Jakobsen

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Official opponents: Mogens Vyberg and Sidsel Rogde, Norway.

Tutor: Jørgen L. Thomsen.

Correspondence: Susan Sprogøe-Jakobsen, Rättsmedisinska Avdelningen Umeå, Box 7616, 907 12 Umeå, Sweden.
E-mail: susan.sprogoe-jakobsen@formed.umu.se

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ABSTRACT

The work for this PhD dissertation was carried out at the Institute of Forensic Medicine, University of Southern Denmark. The aim was to select a panel of antibodies for age determination of early myocardial infarctions, to apply the panel of antibodies to a material of experimental myocardial infarctions, to apply the results from this study to human autopsy hearts with signs of coronary artery disease, to compare the panel of antibodies with a histochemical staining, PTAH, and to perform a quality assessment by inter- and intra-observer analyses.

The rat as an experimental animal for induction of myocardial infarction is inexpensive and fairly easy to work with. A short-term death rate of 37% with a 100% success rate of producing myocardial infarctions is acceptable compared to previous results in the literature. In the experimental study all the tested antibodies, myoglobin, desmin, troponin T, tropomyosin, fibronectin, dystrophin and complement C9, could be used for detecting early myocardial infarction. The highest kappa values were obtained for myoglobin (0.64) and fibronectin (0.55) in the inter-observer analysis and for myoglobin (0.83) and PTAH (0.83) in the inter-observer analysis. Myoglobin seemed to be the best choice for detecting 1h old infarctions and, according to the results of the experienced observer, fibronectin and PTAH could be used for detecting infarctions of 6h or more. The results from the human myocardial infarction material indicated that immunohistochemical stainings provide useful additional information when applied to sections from hearts with severe coronary atherosclerosis but without signs of infarction with routine microscopy. The highest kappa values were obtained for C9 (0.94), fibronectin (0.88) and PTAH (0.88). It is advisable always to perform inter- and/or intra-observer analyses before using immunohistochemical stainings, to use at least two to three different antibodies, where a kappa value of at least 0.61 has been obtained, and to use a supplementary histochemical staining, e.g. PTAH.