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Echocardiography: A non invasive method for investigating preclinical drug toxicity and safety

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Echocardiography (EC) is a method used for investigating cardiac morphology and function. Two-dimensional EC gives a visualization of the morphology of the heart. M-mode EC allows heart function to be monitored. Pulsed Doppler EC is the method of choice for measuring blood flows through valves and large vessels. EC is used in routine in clinic and veterinary practice but is infrequently applied to preclinical evaluation of drug toxicity and safety pharmacology despite a number of advantages. Since similar investigations can be done in laboratory animals and humans, preclinical and clinical findings can easily be transposed to each other. EC is totally non invasive, it does not induce any suffering to the animals and has no impact on health and physiology. It allows repeated measurements and consequently monitoring of development and evolution of adverse effects. In this way, EC evaluates the functional adverse effects of drugs on the cardiovascular system and the consequences of induced lesions. Moreover, using the different modes of EC it is possible to determine the changes in heart contractility and hemodynamics that are involved in the development of cardiovascular lesions. This is illustrated by an experiment in dogs treated with minoxidil. The development of lesions in the right atrium and left ventricle were considered to be related to changes in the function of these cardiac structures as demonstrated by EC recordings. These findings confirm the usefulness of EC in assessing the pathogenesis of drug-related cardiac toxicity.

Biography

Gilles Hanton graduated as Doctor in Veterinary Medicine in 1976 and as Diplomate of the American Board of Toxicology in 1991. He has worked for more than 26 years in the Departments of Toxicology of Searle, Pfizer and Tibotec/Johnson & Johnson. He has a large practice of conducting regulatory and mechanistic toxicity studies and he has acquired a broad experience in the development of new molecules and in safety assessment of pharmaceutical compounds. He has developed an expertise in cardiovascular toxicology and pharmacology and in inhalation toxicology. He is currently working as a Consultant for the Pharmaceutical and Biotechnology Industry.

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