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Is arterial stiffness an overlooked parameter in cardio-oncology?

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Short summary

During drug development, safety pharmacology and toxicology studies are performed to identify and evaluate the risk of adverse (cardiovascular) events of new drug candidates. However, for oncology drugs the screening is less stringent and there is a higher acceptance of possible adverse events /risks. As such cancer treatments may have long-term effects on the cardiovascular system of cancer survivors. The discipline of cardio-oncology aims to investigate (long-term) drug-induced cardiovascular toxicities and to identify patients at risk. In this perspective, the presentation will show data of both functional and molecular markers of doxorubicin-induced vascular toxicity, and how these contribute to cardiovascular ageing and disease. Doxorubicin is an anthracycline, an highly effective chemotherapeutic and is widely used in modern cancer treatment despite the advent of targeted therapies. However, dose-dependent cardiotoxicity limits the clinical use of doxorubicin. It is well documented that doxorubicin may provoke cardiotoxicity leading to left ventricular dysfunction and eventually congestive heart failure. Recent studies have reported that anthracyclines also interfere with arterial stiffness, an overall measure of vascular health. In the present study, we investigated vascular toxicity induced by doxorubicin and whether it contributes to cardiovascular pathology such as cardiotoxicity or atherosclerosis.

Publications:

- Doxorubicin Impairs Smooth Muscle Cell Contraction: Novel Insights in Vascular Toxicity.

Bosman M, Krüger DN, Favere K, Wesley CD, Neutel CHG, Van Asbroeck B, Diebels OR, Faes B, Schenk TJ, Martinet W, De Meyer GRY, Van Craenenbroeck EM, Guns PDF.Int J Mol Sci. 2021 Nov 26;22(23):12812. doi: 10.3390/ijms222312812.PMID: 34884612 **Free PMC article.**

- Doxorubicin induces arterial stiffness: A comprehensive in vivo and ex vivo evaluation of vascular toxicity in mice.

Bosman M, Favere K, Neutel CHG, Jacobs G, De Meyer GRY, Martinet W, Van Craenenbroeck EM, Guns PDF.Toxicol Lett. 2021 Aug 1;346:23-33. doi: 10.1016/j.toxlet.2021.04.015. Epub 2021 Apr 22.PMID: 33895255

- INSPIRE: A European training network to foster research and training in cardiovascular safety pharmacology.

Guns PD, Guth BD, Braam S, Kosmidis G, Matsa E, Delaunois A, Gryshkova V, Bernasconi S, Knot HJ, Shemesh Y, Chen A, Markert M, Fernández MA, Lombardi D, Grandmont C, Cillero-Pastor B, Heeren RMA, Martinet W, Woolard J, Skinner M, Segers VFM, Franssen C, Van Craenenbroeck EM, Volders PGA, Pauwelyn T, Braeken D, Yanez P, Correll K, Yang X, Prior H, Kismihók G, De Meyer GRY, Valentin JP.J Pharmacol Toxicol Methods. 2020 Sep;105:106889. doi: 10.1016/j.vascn.2020.106889. Epub 2020 Jun 18.