Abstract

Pathological and immunological consequences of different blood samplings procedures in mice

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Millions of mice are used annually world wide for experimental purposes. Often, these mice will be exposed to different basic procedures including blood sampling. The best method for blood sampling in a given study may depend on the purpose of study performed and consideration must be paid to pathology, immunology and animal welfare.

Compared to earlier studies, the present study has been broadened in three directions, namely by including 6 blood sampling methods, observing the animals for 12 days and assessing both post-bleeding histopathological changes (including healing) of the local sample site and in selected internal organs (liver, kidneys, spleen and lungs), systemic inflammation (measured by the acute phase protein haptoglobin in blood) , gene expression of major mediators of locally acute inflammatory events (S100A8, S100A9 and Cxcx2, IL-6, IL-1□, IL-33 and Nlrp3) as well as animal welfare. Lateral tail incision (Tail), amputation of the tail tip (TTip), retrobulbar puncture in isofluran anesthesia (Eye), sublingual puncture (Tongue), submandibular puncture (Cheek) and saphenous vein puncture (VSaph) were done in a total of 228 mice and evaluated at nine different time points (6 hours, 12 hours or days 1, 2, 4, 6, 8, 10, 12 post bleeding). Control groups were isofluran alone and no treatment.

The blood sampling procedures lead to pathological and/or immunological changes but to a varying degree. Sampling by a lateral tail incision resulted in overall highest expression of inflammatory genes locally and a systemic increase in haptoglobin. Animal welfare tended to be reduced most in procedures affecting the head region of the animals. Blood sampling methods should be carefully considered prior to a study based on the purpose of the study.