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Effect of novel mixed anaesthesia on platelet aggregation in mice

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Anaesthesia for animal experiments is recently up-dating from an ethical point of view. Pentobarbital, the formerly used one, has been replacing by the combination of three kinds of agents; medetomidine (adrenalin α_2 agonist, 0.3 or 0.75 mg/kg), midazolam (benzodiazepine, 4 mg/kg) and butorphanol (opioid κ-agonist, 5 mg/kg). The effect of this novel mixed anaesthesia (0.3MMB or 0.75MMB) on basic animal condition is, however, yet to be clarified. In the present study, we evaluate the effect of MMB on the circulatory system, especially on platelet aggregation.

Blood samples were collected 10 min after each anaesthesia injection to ICR-male mice (6-month-old). Pentobarbital 80 mg/kg was used as a control (PENT), and combinations with medetomidine (PENT+MDT) or with butorphanol (PENT+BTP) were also tried beside 0.3MMB and 0.75MMB. Platelet aggregation was measured by the light-transmission method using platelet-rich plasma (MCM HEMA TRACER 712).

The maximal platelet aggregation induced with collagen 0.8 μg/mL were 37.2 ± 7.7, 59.2 ± 5.0 and 86.6 ± 2.9% in PENT, 0.3MMB and 0.75MMB groups (n=5, 4, 5, $p<0.01$), respectively. Similarly, ADP 5 μM-induced platelet aggregation was also significantly enhanced by MMBs. In addition, butorphanol supplement (PENT+BTP) did not affect the aggregation, while medetomidine supplement (PENT+MDT) did enhance it. There was no difference in Prothrombin Time (PT) or in Activated Partial Thromboplastin Time (APTT) between anaesthesia groups.

Platelet is reported to express α_2 receptors and to conduct weak stimulatory signals which enhance platelet activation (secondary aggregator). We need to consider that the platelet aggregation would be higher when treated with MMB anaesthesia than with conventional pentobarbital.